

**Parking In and Around Mixed-Use Buildings  
in Designated Growth Areas with Frequent and Reliable  
Transit Service: A Puget Sound Region Study**

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## SUMMARY

**Purpose** – This report explores the parking situations both off-street in mixed-use developments, and on-street, in designated growth areas with frequent and reliable transit in the Puget Sound Region. The primary question answered here was whether the off-street parking provided by these mixed-use developments was reasonable and responsible. The paper also compared these supplies to Seattle Municipal Code to deduce whether they were comparable. Finally, the paper sought to evaluate the on-street parking situations around these mixed-use developments. It compared cost of on-street parking to cost of off-street parking, and explored potential spillover of mixed-use development residents onto on-street parking. The culmination of this study seeks to inform parking policies and regulations in designated growth areas with frequent and reliable transit into the future.

**Methodology** – There were several components necessary to answer the questions posed above. First, study areas were identified and off-street parking requirements were defined. Then, a database of new, large, TOD-style mixed-use developments was created in each study area. These buildings were contacted for short surveys of occupancy and parking cost. Each site was visited overnight, on-street license plates were collected, and on-street parking use and regulations were noted. The plates were sent to the Washington State DOL and returned with street addresses for each vehicle, revealing where on-street parkers resided. This data was all analyzed to address the questions above.

**Findings** – In both study areas, mixed-use developments were providing parking supplies characteristic of an older, more auto-centric mentality despite several parking reduction opportunities. It was, however, generally found that this parking was being appropriately utilized. In each study area, the on-street parking was generally found to be free, under regulated, and readily available. Finally, it was discovered that some spillover was occurring from mixed-use developments into the adjacent neighborhood's on-street parking, but not nearly to the extent that single- and multi-family uses were spilling over.

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## Chapter 1

### INTRODUCTION

Providing off-street parking spaces is costly. As of 2013, average capital cost of parking was roughly \$25,000 (urban) to \$75,000 (downtown) per space in King County, WA. As of 2012, average capital cost to construct a parking space in Seattle was roughly \$25,000 for above ground spaces and \$35,000 for below ground spaces.<sup>1</sup> The Victoria Transportation Policy Institute has a robust Parking Cost Calculator that, as of 2013, produced the parking cost statistics outline in Figure 1.1.<sup>2</sup>

Type of Facility	Land Cost Per Acre	Annualized Land Cost Per Space	Annualized Construction Costs	Annual O & M Costs	Total Annual Cost	Total Monthly Cost
Suburban, On-Street	\$250,000	\$94	\$326	\$345	\$765	\$64
Suburban, Surface, Free Land	\$0	\$0	\$326	\$345	\$671	\$56
Suburban, Surface	\$250,000	\$215	\$326	\$345	\$885	\$74
Urban, On-Street	\$1,200,000	\$453	\$543	\$345	\$1,341	\$112
Urban, Surface	\$1,200,000	\$944	\$543	\$575	\$2,062	\$172
Urban, 3-Level Structure	\$1,200,000	\$315	\$1,954	\$575	\$2,844	\$237
Urban, Underground	\$1,200,000	\$0	\$2,714	\$575	\$3,289	\$274
CBD, On-Street	\$6,000,000	\$2,265	\$543	\$460	\$3,268	\$272
CBD, 4-Level Structure	\$6,000,000	\$1,089	\$2,171	\$575	\$3,835	\$320
CBD, Underground	\$6,000,000	\$0	\$3,776	\$575	\$4,007	\$334

Figure 1.1: Parking Costs by Facility Type

If building occupants do not use their allotted off-street parking spaces, the expense of building and maintaining parking stalls is foregone, and the costs are passed on to the unit owners and/or tenants. On the other hand, not having sufficient parking to meet the demand

<sup>1</sup>Shoup, DC. (1997). The High Cost of Free Parking. *Journal of Planning Education and Research*, 17(1), 3-20.

<sup>2</sup>Litman, Todd. (2012, January 16). Victoria Transport Institute - Online TDM Encyclopedia. Retrieved May 17, 2015, from <http://www.vtppi.org/tdm/>

of occupants can make a property less desirable for users compared to properties with ample parking spaces. Under supply of parking may also be unpalatable to neighbors who have grown accustomed to having the on-street parking in front of their homes available. This is due to the risk that these users may spill over into those on-street spaces when space in the building is not available. What is the right amount of off-street parking spaces?

Most cities in the US have historically judiciously followed the Institute of Transportation Engineers' (ITE) Parking Generation manual. This document summarizes a collection of parking demand data observations made all over the world by land use type. However, the merits of ITE's Parking Generation have come under significant scrutiny.<sup>3</sup> First, these parking demand data sets are based on peak time parking counts. This means that parking requirements generated from this document likely equate to the provision of parking for every car during some of the highest volume events annually. Parking policy for the last half century has focused almost exclusively on preventing the under supply of parking. The intent has been to proactively remedy all risk of some land owners foregoing this expensive provision and then encroaching on other land owners' parking supply. It is the classic case of the prisoner's dilemma. Thus, the oversupply of parking has been the pervasive answer.<sup>4</sup>

Second, much of the data found in ITE's Parking Generation Manual was measured several decades ago and was almost exclusively collected in suburban settings. The observations therein had no consideration for recent changes in transportation trends, locational characteristics, including the proximity of public transit, facilities for bicycling/walking, and future behavioral, demographic, and life styles changes. For example, the U.S. reached its peak vehicle miles traveled per capita in 2004 and was in decline until early 2014 (see figure 2.6). While it is likely that some of this decline was influenced by economic depression and high gasoline prices, there are some trends emerging in certain age cohorts. Between 2001 and 2009, there was a 23% drop in driving by people aged 16 to 34, including those who

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<sup>3</sup>Shoup, DC. (1999). The Trouble with Minimum Parking Requirements. Transportation Research Part A: Policy and Practice, 33(7-8), 549-574.

<sup>4</sup>Rowe, D., Mccourt, R., Morse, S., & Haas, P. (2013). Do Land Use, Transit and Walk Access Affect Residential Parking Demand? Institute of Transportation Engineering, from <http://metro.kingcounty.gov>



are employed and financially stable.<sup>5</sup> The younger demographic group's reduction in driving may be attributed to an increase in their use of public transportation and bicycling, as has been widely reported in popular press.<sup>6</sup> Figure 1.2 shows transportation mode choice trends by generation.<sup>7</sup>

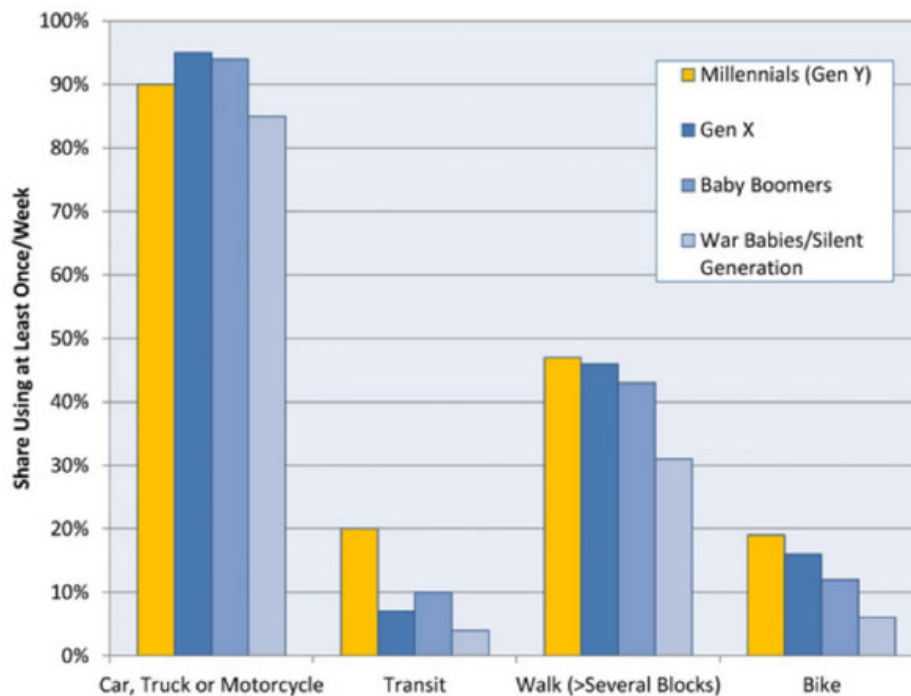


Figure 1.2: Transportation Choice Trends by Generation

This suggests that current transportation policy, which is largely focused on road building and parking space provision, is fundamentally out of touch with the prevailing transportation patterns and expressed preferences of growing numbers of Americans. There is a need to re-examine parking requirements for locations that are representative of some of these new

<sup>5</sup>Frontier Group. (2012). Transportation And The New Generation: Why Young People Are Driving Less And What It Means For Transportation Policy. Retrieved May 17, 2015, from <http://www.uspirg.org>

<sup>6</sup>Badger, E. (2014, October 15). The Many Reasons Millennials Are Shunning Cars. The Washington Post. Retrieved May 17, 2015, from <http://www.washingtonpost.com>

<sup>7</sup>Urban Land Institute. (2013). America In 2013: A ULI Survey Of Views On Housing, Transportation, And Community. Retrieved May 17, 2015, from <http://www.uli.org>

trends described. What is an appropriate parking requirement for residential and commercial properties near public and other transportation facilities?

Today, in many large US cities, specifically in neighborhoods with high accessibility to public transportation, planners and policy makers focus on creating a robust mix on land uses. In early American urbanism, the city relied on a rich mix of uses. As cities grew they became dirty, overcrowded, and in places, dangerous.<sup>8</sup> Thus, those in society with the means began trying to separate themselves from these blighted areas.<sup>9</sup> In time, this separation became institutionalized with the materialization of modern euclidean zoning.<sup>10</sup> While zoning strived to, and was quite successful at, segregating non-agreeable land uses for much of the early to mid nineteenth century, many municipalities have since recognized the benefits of mixing uses whose daily activities are not detrimental to one another. Throughout the late 20th century, it became apparent to many urban planners and policy makers that integrating uses had many benefits and should be promoted again. Seattle, for example, has developed three levels of neighborhood commercial zoning as well as a designation called Seattle Mixed, each of which discusses the importance of pedestrian friendliness and having a mix of uses.<sup>11</sup>

Within these areas it is common to find developments specifically known as mixed-use developments. Over the years “Mixed-use” has inherited a plethora of idyllic definitions, most with subtle difference, but there are several criteria that all good mixed-use developments meet:<sup>12</sup>

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<sup>8</sup>Chudacoff, H. (1975). *The evolution of American urban society* (Seventh Edition ed.). Englewood Cliffs, N.J.: Prentice-Hall.

<sup>9</sup>Warner, S. (1962). *Streetcar suburbs: The process of growth in Boston, 1870-1900*. (Second Edition ed.). Cambridge: Harvard University Press.

<sup>10</sup>Babcock, R. (1966). *The zoning game; municipal practices and policies*. Madison: University of Wisconsin Press.

<sup>11</sup>Seattle Zoning Designations. (2011, April 14). City of Seattle Department of Planning and Development. Retrieved May 17, 2015, from <https://seattleslandusecode.wordpress.com>

<sup>12</sup>Atlanta Regional Commission. (2002). *Mixed-Use Development: Community Choices: Quality Growth Toolkit*.

- “They include a combination of related uses in one place - residential, office, retail, entertainment, civic space, and even government uses.”
- “They provide a significant proportion of each use within the ‘mix.’”
- “They provide convenient and safe pedestrian and bicycle connections both within the development and to places outside the development.”

Mixed-use development poses several unique parking complexities, such as differing peak parking periods between adjacent uses, which offer opportunities for parking sharing. Many isolated land uses’ parking provisions have been explored in great depth, specifically in Seattle, which will be explored in later chapters of this report. This report will focus on mixed-use parking and not at the needs of individual, isolated uses. What do mixed-use developments currently require as far as parking regulations? Is it too much? Is it too little? What happens when there is an oversupply? What happens when there is an under supply? How does it influence on-street parking nearby?

This report documents a parking study conducted in the Puget Sound Region. The intent of this study is to inform both builders and regulators about appropriate parking supplies, regulations, and requirements. More specifically, this study focuses on the kind of development that this region is likely to see in the future: mixed-use transit-oriented style development that is consolidated near frequent and reliable transit. Identified within this report are two study areas that most closely represent this kind of development and an evaluation of several key components of their parking.

This report will start, in chapter two, with historical and background information. It will explore several supporting facets of parking as well as previous studies and methodologies that have been used in attempts to answer the questions posed above. Chapter three will describe the methods used in this study to analyze the parking situations in two study areas. Chapter four analyzes King County Metro’s 2013 Transportation and Parking Trends Survey in an effort to identify parking mentalities in the context of the Puget Sound Region. Chapter five will include an explanation of the process used for selecting the study areas,

a definition of the study areas selected, and descriptions of the current parking climates in each study area. Chapter six explores the results of this study including both the on-street and off-street parking situations in the two study areas. Chapter seven will conclude with some implications of findings, recommendations, limitations to this research, and areas for further study.

## Chapter 2

# BACKGROUND

*“This looks like it could be the Decade of the City.”*<sup>1</sup>

*“Our country has entered upon a stage of progress in which its welfare is to depend on the convenience, safety, order and economy of life in its great cities. It cannot gain in virtue, wisdom, comfort, except as they also advance.”*<sup>2</sup>

Cities and other urbanized areas are growing in global prominence. A United Nations report released in July of 2014 stated that, currently, 54% of the global population lives in cities; more than any other time in recorded history.<sup>3</sup> That number is expected to increase to as high as 66% by 2050.<sup>4</sup> In the United States, 2013 census data shows total population growth around .7% since 2010. During that same time 64 of the largest 100 metropolitan areas grew by over 1%, 16 grew by over 2%, and 4 grew by over 3% per year.<sup>5</sup> Figure 2.1 shows the US population growth from the end of the 18th century to present, broken down by urban vs. rural populations.<sup>6</sup> This shows a similar trend to global trends that urban areas are growing, and far more rapidly than other places in society.

The same can be found locally. Between June of 2012 and June of 2013 Seattle was the

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<sup>1</sup>Toppo, G., & Overberg, P. (2014, October 7). In latest U.S. Census figures, cities continue growing. USA Today. Retrieved May 17, 2015, from <http://www.usatoday.com>

<sup>2</sup>Frederick Law Olmsted quote: Bender, T. (1975). *Toward an urban vision: Ideas and institutions in nineteenth-century America*. Lexington: University Press of Kentucky.

<sup>3</sup>Worlds population increasingly urban with more than half living in urban areas. (2014, July 10). United Nations Department of Economic and Social Affairs. Retrieved May 17, 2015. From <http://www.un.org>

<sup>4</sup>iBid.

<sup>5</sup>Toppo, G., & Overberg, P. (2014, October 7). In latest U.S. Census figures, cities continue growing. USA Today. Retrieved May 17, 2015, from <http://www.usatoday.com>

<sup>6</sup>U. S. Census Bureau. (1790 - 2010). American FactFinder fact sheets: Population data, Allegany County, N.Y. Retrieved January 17, 2015

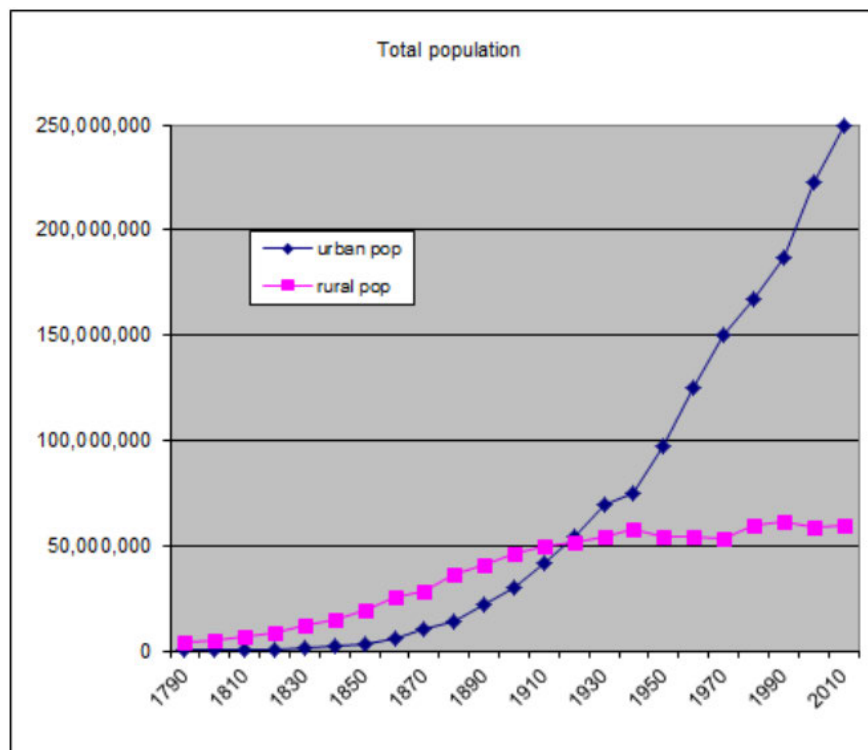


Figure 2.1: Rural vs. Urban Population Growth in US: 1790 - Present

fastest growing of the largest 50 Cities in America at 2.8 percent population growth.<sup>7</sup> Forbes magazine, which measures metropolitan growth based in six metrics (estimated population growth, year-over-year job growth, gross metropolitan product growth, unemployment rates, and median annual pay for college-educated workers), rank Seattle as the 10th fastest growing city in America in 2014.<sup>8</sup> Further, as shown in Figure 2.2, Seattle’s Department of Planning and Development suggests, Seattle is expected to continue to grow steadily over the next several decades.<sup>9</sup>

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<sup>7</sup>Balk, G. (2014, May 22). Census: Seattle is the fastest-growing big city in the U.S. The Seattle Times. Retrieved May 17, 2015, from <http://blogs.seattletimes.com>

<sup>8</sup>Carlyle, E. (2015, January 27). America’s Fastest-Growing Cities 2015. Forbes. Retrieved May 17, 2015, from <http://www.forbes.com>

<sup>9</sup>Population and Demographics. (n.d.). City of Seattle Department of Planning and Development. Retrieved May 17, 2015, from <http://www.seattle.gov>

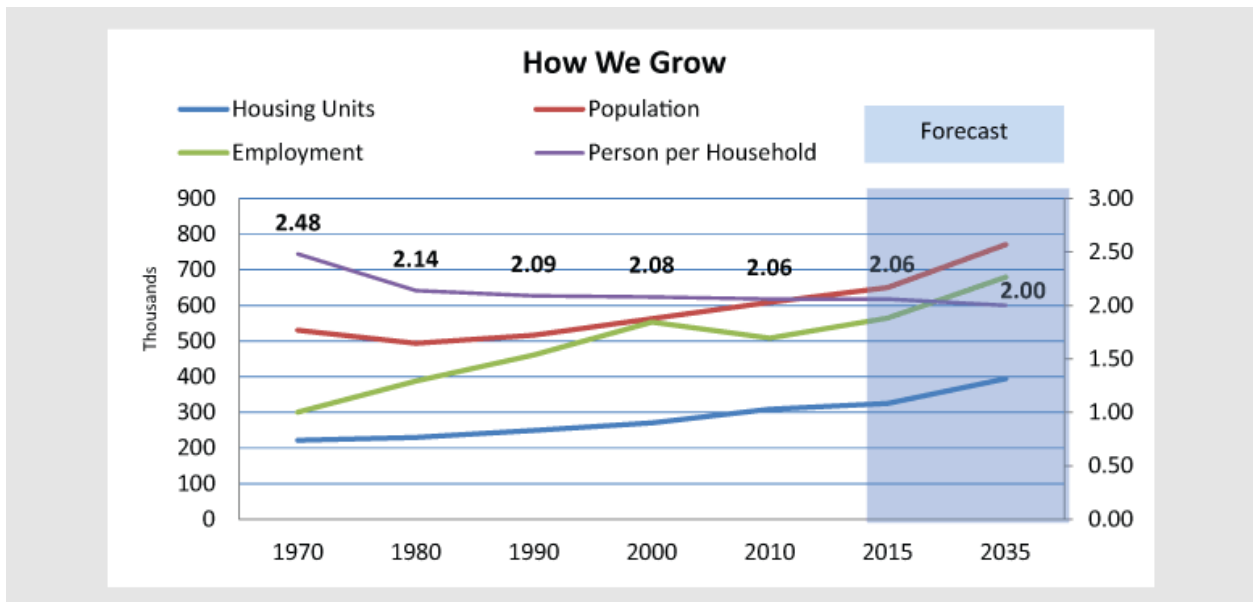


Figure 2.2: Seattle Growth Trends and Forecasts

This growth, coupled with an all star cast of major regional employers such as Amazon, Boeing, Costco, Microsoft, the Port of Seattle, and Starbucks, places Seattle, like many cities across the country, with an ever growing need to house, employ and move increasing numbers of people in a finite amount of space. In a growing city with confined physical space, land will continue to come at a premium, and so using the land for its highest and best use will become more and more necessary.

This section will explore several facets of the built environment which set the stage for the subsequent study. It will touch on ways people move, ways land is organized, and issues that arise due to these considerations. This chapter will culminate with an in depth look at parking, specifically, studies that have been done in the past and findings of those studies.

## 2.1 Single Occupancy Vehicles

*“Unable to foresee a future of sprawl, oil dependence, congestion, and smog, many contemporary observers, undoubtedly including many [First National] conference [of City Planning]*

participants, considered the private auto the savior of urban transportation.”<sup>10</sup>

Groundwork for America’s love affair with the automobile began in 1885 when German inventor Karl Benz completed the world’s first automobile powered by a gasoline-powered internal combustion engine. By 1903, American Industrialist Henry Ford began mass production of the first internal combustion automobile in the United States with the Ford Motor Company. Figure 2.3 depicts the production and sales price of the Ford Model T, which is generally recognized as the first affordable automobile.<sup>11</sup> The graphic displays two larger automobile trends through the first two decades of the twentieth century: the invention of the assembly line significantly reduced the price of the automobile and increased the volume of production.

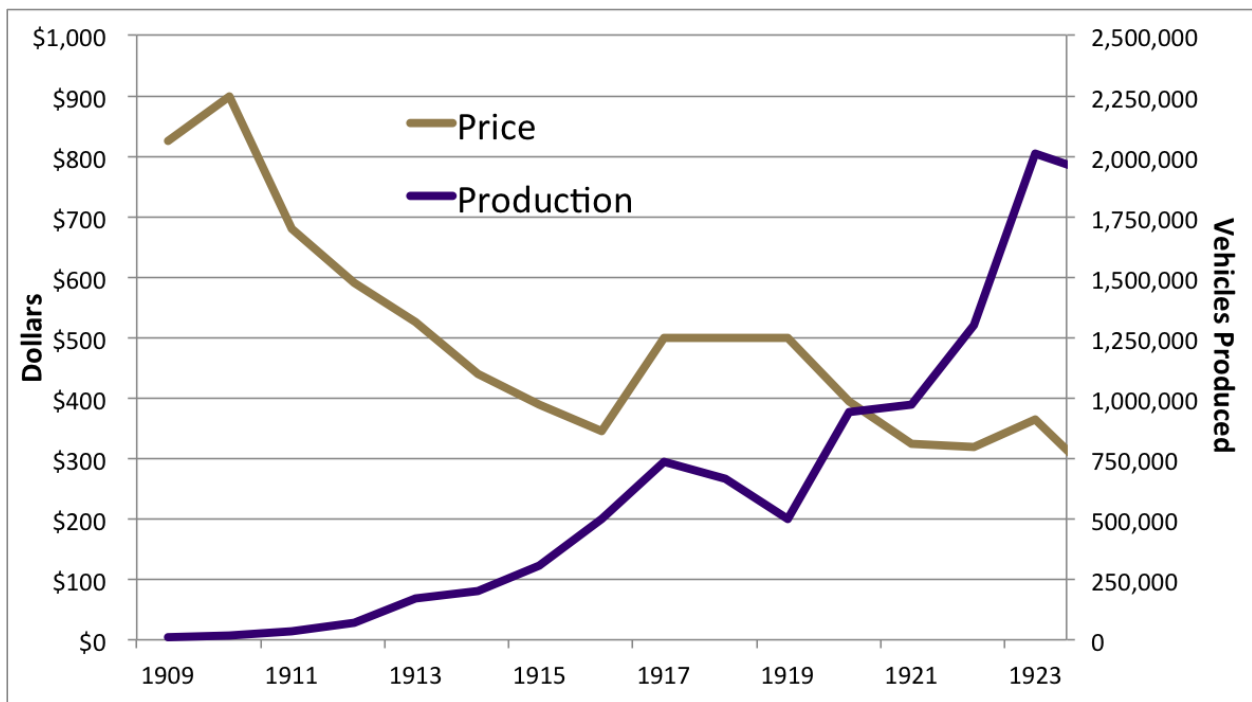


Figure 2.3: Ford Model T Price per Unit vs. Production Over Time

<sup>10</sup>Brown, J., Morris, E., & Taylor, B. (2009). Planning for Cars in Cities: Planners, Engineers, and Freeways in the 20th Century. *Journal of the American Planning Association*, 75(2), 161-177, from <http://diginole.lib.fsu.edu>

<sup>11</sup>Ford Model T. (2015, May 16). Wikipedia. Retrieved May 17, 2015, from <http://en.wikipedia.org>



By 1930, there were 26 million vehicles on American roads.<sup>12</sup> Initially the automobile was used more for recreation rather than commuting. Poor road quality, lack of gas stations, and lack of parking initially limited peoples' ability to commute by car. Further, both the Great depression and World War II stalled rapid growth of the automobile.<sup>13</sup> In the decade following the end of World War II, automobile ownership in the United States doubled.<sup>14</sup> Then, in 1956, President Dwight D. Eisenhower signed the Federal Aid Highway Act into law. The Act authorized \$25 billion for the construction of 41,000 miles of the Interstate Highway System over a 10-year period<sup>15</sup> At this point, Americans were provided abundant infrastructure and unobstructed access to affordable vehicles, and they did not look back. Commuting via automobile became commonplace. Figure 2.4 shows American commuter trends from the 1960s to present.<sup>16</sup> Further historic trends show that not only is private vehicle use becoming more prominent, but single-occupancy of those vehicles is as well; as shown in Figure 2.5.<sup>17</sup>

With this increase in automobile ownership and usage came an increase in vehicle miles travel. Since the 1960s, US annual vehicle miles traveled per person has increased from 4,000 to more than 10,000.<sup>18</sup> Within the last decade, as can be seen in Figure 2.6, both total US annual vehicle miles traveled and annual per capita vehicle miles traveled changed in

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<sup>12</sup>The Auto Industry, 1930 - 1939. (n.d.). The History of American Technology – Fall 1998. Retrieved May 17, 2015, from <http://web.bryant.edu>

<sup>13</sup> Jackson, K. (1985). Crabgrass frontier: The suburbanization of the United States. New York: Oxford University Press.

<sup>14</sup>iBid.

<sup>15</sup>Federal-Aid Highway Act of 1956: Creating the Interstate System. (2015, February 20). U.S. Department of Transportation Federal Highway Administration: Public Roads. Retrieved May 17, 2015, from <http://www.fhwa.dot.gov>

<sup>16</sup>American Association of State Highway and Transportation Officials. (2013). Commuting In America 2013: The National Report On Commuting Patterns And Trends. Retrieved May 17, 2015, from <http://traveltrends.transportation.org>

<sup>17</sup>iBid.

<sup>18</sup>Traffic Volume Trends. (n.d.). U.S. Department of Transportation Federal Highway Administration: Office of Highway Policy Information Travel Monitoring. Retrieved May 17, 2015, from <http://www.fhwa.dot.gov>

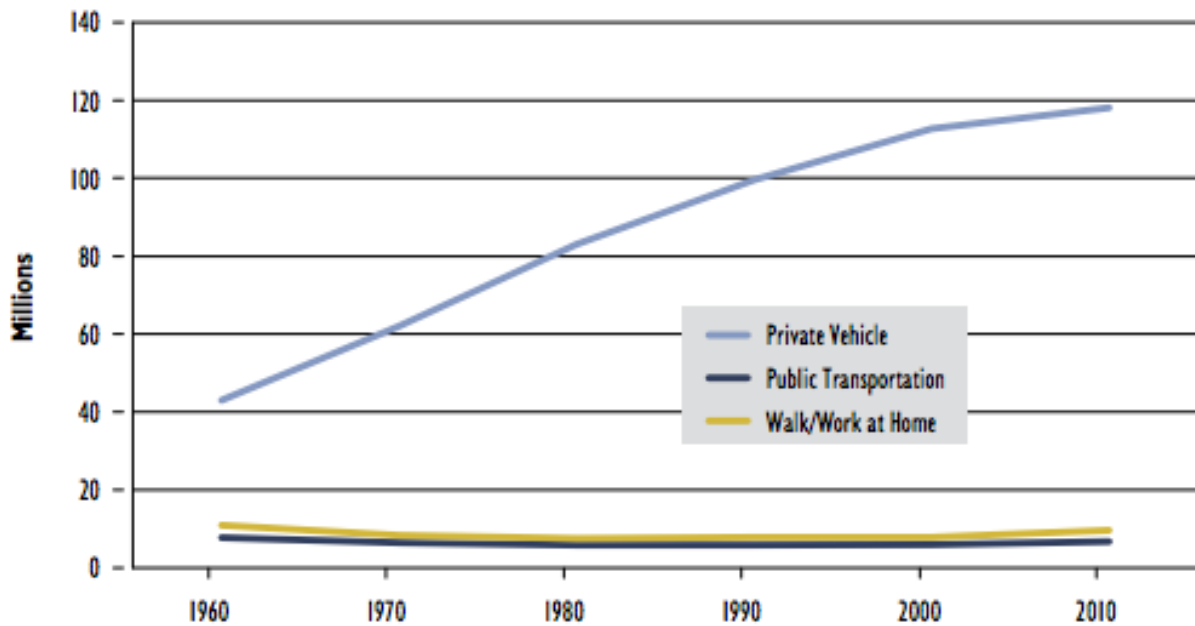


Figure 2.4: US Commute Mode Choice Trends: 1960 - 2010

trajectory.<sup>19</sup> The graphic shows that both total annual vehicle miles traveled and per capita vehicle miles traveled have historically increased over time. Then, around 2005 that changed. The US annual per capita vehicle miles traveled crested and began to decrease. As the total number of drivers continue to rise, the total annual vehicle miles traveled increased for a few more years until the per capita vehicle miles traveled fell so sharply that the overall annual vehicle miles traveled in the US also began to decline. There are several likely contributing factors to this change.

First and foremost, as gas prices escalated and the Great Recession set in it became much more expensive to drive. Many studies have found a correlation between gas prices and travel behavior.<sup>20</sup> More specifically, as gas prices increase, vehicle use decreases and transit use

<sup>19</sup>iBid.

<sup>20</sup>Lee, B., & Lee, Y. (2013). Complementary Pricing and Land Use Policies: Does It Lead to Higher Transit Use? *Journal of the American Planning Association*, 79(4), 314-328. AND Kaza, N., Knaap, G., Knaap, I., & Lewis, R. (2011). Peak Oil, Urban Form, and Public Health: Exploring the Connections. *Am J Public Health American Journal of Public Health*, 101(9), 1598-1606.

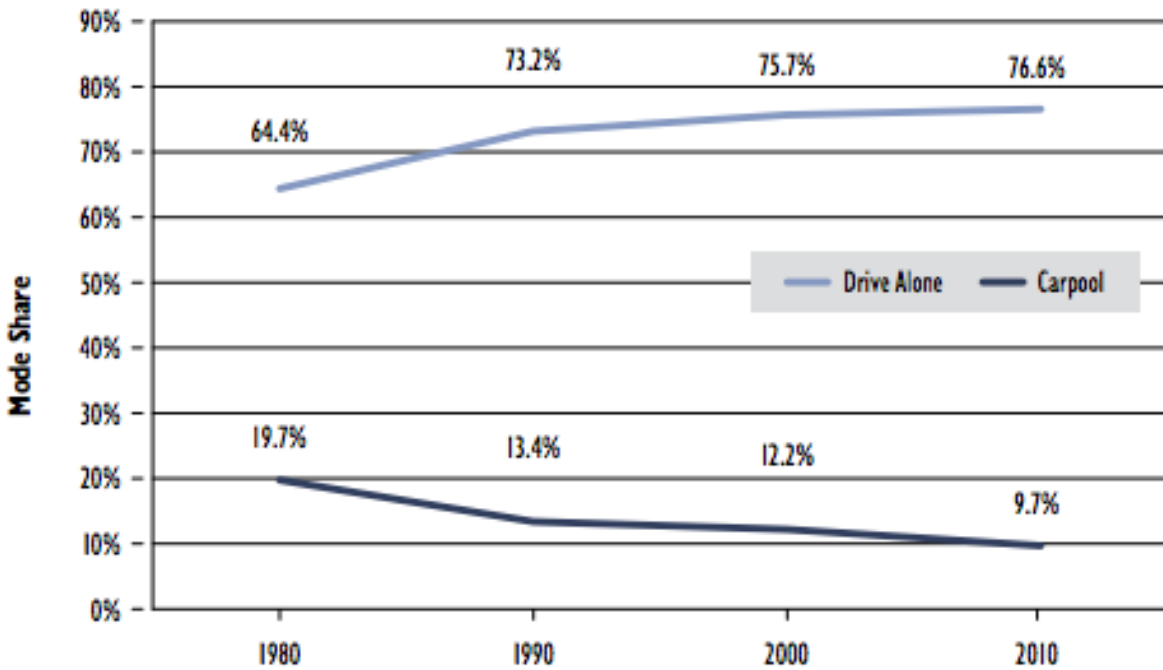


Figure 2.5: US Commute Mode Choice Trends: 1980 - 2010

increases. Figure 2.7 shows monthly US gasoline price averages from 1994 to present.<sup>21</sup>

Interestingly, comparing total and per capita vehicle miles traveled to this figure suggests that this isn't necessarily true, or at least that it may not be the more influential factor. While gasoline prices generally increased from 1994 to 2008, vehicle miles traveled increases as well. Then, in late 2008 there is a sudden downward spike in gas prices which coincides with a sudden decrease in per capita vehicle miles traveled and the first point at which total vehicle miles traveled decreased. This is all contrary to academic assertions.

A common way to analyze the impacts of economic recession has been to look at unemployment trends. When the economy enters a recession unemployment rises, and it is theorized that vehicle miles traveled will subsequently fall. Figure 2.8 depicts percent un-

<sup>21</sup>U.S. All Grades All Formulations Retail Gasoline Prices. (n.d.). U.S Energy Information Administration: Petroleum & Other Liquids. Retrieved May 17, 2015, from <http://www.eia.gov>

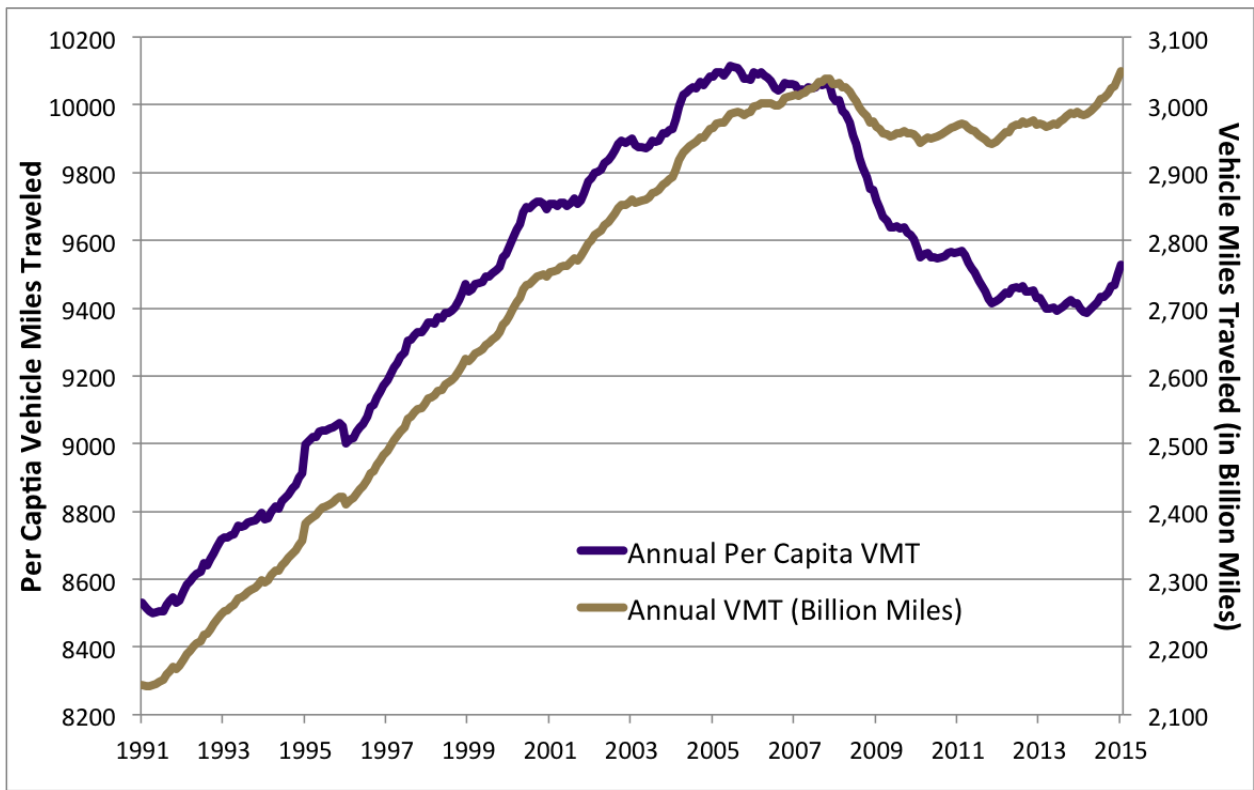


Figure 2.6: US Annual Total and Per Capita Vehicle Miles Traveled: 1991 - Present

**U.S. All Grades All Formulations Retail Gasoline Prices**



Figure 2.7: US Retail Gasoline Prices: 1994 - Present

employment nation wide from a period of 1994 to present.<sup>22</sup>

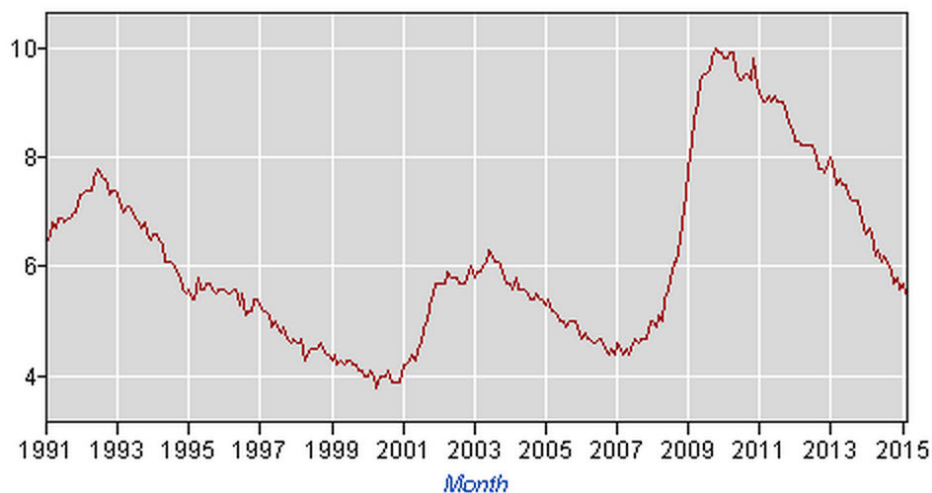


Figure 2.8: US Percent Unemployment: 1991 - Present

Based on a comparison of Figure 2.6 on vehicle miles traveled and this unemployment figure, the recession of the early 2000s seemed to have no effect on vehicle miles traveled. The most recent and more significant recession, the Great Recession of 2008 and 2009, coincided with both the fall of gasoline prices and the change from growing to shrinking vehicle miles traveled. This suggests that the economic climate is a more influential factor on peoples' decisions to, or not to, drive. It is impossible, however, to attribute any specific amount of influence to one factor over another. There are likely several other factors that contributed to this change in vehicle miles traveled trend.

Another likely reason was the evolution of our understanding of Global Climate Change and the human impacts thereon. With increases in total annual vehicle miles traveled, there has been a corresponding rise in greenhouse gas emissions and energy use within the transportation sector. More specifically it now accounts for 28% of total U.S. energy use and

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<sup>22</sup>Labor Force Statistics from the Current Population Survey. (n.d.). Bureau of Labor Statistics. Retrieved May 17, 2015, from <http://data.bls.gov>

30% of CO<sub>2</sub> emissions.<sup>23</sup> As environmental consciousness becomes more mainstream, it has become trendier to both own hybrid vehicles and drive less; whether through lifestyle change or using alternative transportation options.

Finally, over reliance on the single occupancy vehicle has congested road infrastructure and costs users in both time and money. The Texas Transportation Institute estimates that Americans in 2011 lost: 5.5 billion hours of time, 2.9 billion gallons of wasted fuel, \$121 billion of delay and fuel cost, and added 56 billion pounds of additional carbon dioxide (CO<sub>2</sub>) greenhouse gas into the atmosphere during urban congested conditions.<sup>24</sup>

Locally, Seattle ranked 9th worst in the nation with an average peak hour traveler losing 48 hours per year due to sitting in traffic.<sup>25</sup> The Bureau of Transportation Statistics and the US Department of Transportation published data showing, in Seattle in 2011, the average cost per single occupancy vehicle user was just over \$1,000 per year due to time and gasoline loss from sitting in traffic.<sup>26</sup> In 2014, TomTom International's North American Congestion Index Report ranked Seattle 5th worst in congestion and had the largest single quarter increase in the entire country at 5% in the first quarter of 2012. The report estimated that: the average Seattle-area driver wastes 35 minutes in slowdowns for every hour on the road during commute times, morning commute times are 48 percent longer than in free-flowing traffic, and that afternoon commutes take 70 percent longer.<sup>27</sup> INRIX, a traffic information company based out of Kirkland, WA, collects trillions of bytes of information about roadway speeds from over 185 million real-time anonymous mobile phones, cars, trucks, delivery vans,

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<sup>23</sup>Greenhouse Gas Emissions: Transportation Sector Emissions. (2015, May 7). U.S. Environmental Protection Agency. Retrieved May 17, 2015, from <http://www.epa.gov>

<sup>24</sup>Texas A&M Transportation Institute. (2012). TTI'S 2012 Urban Mobility Report. Retrieved May 17, 2015, from <http://d2dtl5nnlpfr0r.cloudfront.net>

<sup>25</sup>iBid.

<sup>26</sup>Annual Highway Congestion Cost. (2013, February 7). U.S. Department of Transportation Office of the Assistant Secretary for Research and Technology: Bureau of Transportation Statistics. Retrieved May 17, 2015, from <http://www.rita.dot.gov>

<sup>27</sup>TomTom News. (2013, November 6). TomTom International. Retrieved May 17, 2015, from <http://www.tomtom.com>

and other fleet vehicles equipped with GPS locator devices. They estimated that in 2012 city living Americans lost 42 hours to sitting in congestion and that Seattle ranked 8th in worst congestion.<sup>28</sup> As Seattle continues to show strong growth in both population and jobs, the issue of congestion is likely to worsen.

## **2.2 Public Transportation**

*“Investing in mass transit and high speed rail, for example, doesn’t just make our downtowns livable, it helps our regional economies grow.”<sup>29</sup>*

In an effort to reduce public dependence on the single-occupancy vehicle the greater Puget Sound Region has recognized the need for major investment in public transportation. The Puget Sound Region consists of four counties in western Washington: King, Kitsap, Pierce, and Snohomish. Each county has its own transit authority, with the caveat that Snohomish County has both a county transit authority and the city of Everett has its own transit authority. There is also a regional transit authority, Sound Transit, which operates in King, Pierce, and Snohomish County. Figure 2.9 shows ridership for the previously named transit authorities for the past 6 years.<sup>30</sup>

Further there are two different ferry systems operating in the Puget Sound Region, King County Ferries and Washington State Ferries, a street car network in Seattle, and even a monorail. This section will give a brief overview of the extent of transit options that are provided in the Puget Sound Region.

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<sup>28</sup>Hess, A., & Weigley, S. (2013, May 4). Ten cities with the worst traffic. USA Today. Retrieved May 17, 2015, from <http://www.usatoday.com>

<sup>29</sup>Obama, Pres. Barrack. (2009, July 13). Remarks at Urban and Metropolitan Policy Roundtable. Office of the White House. Retrieved May 17, 2015, from <https://www.whitehouse.gov>

<sup>30</sup>Regional Transit Ridership. (2014, May 6). Puget Sound Regional Council. Retrieved May 17, 2015, from <http://www.psrc.org>

Year	Metro King County	Sound Transit Bus	Sound Transit Commuter Rail	Sound Transit Tacoma Link	Sound Transit Central Link	Pierce Transit	Community Transit	Kitsap Transit	Everett Transit	Regional Total
2008	118,824,795	12,528,824	2,668,623	930,605	N/A	15,449,274	10,406,957	3,993,884	2,628,874	167,431,836
2009	111,717,148	12,896,713	2,492,362	889,320	2,501,211	14,714,359	9,913,120	3,320,735	2,599,363	161,044,331
2010	109,583,654	12,494,547	2,364,292	871,793	6,989,504	14,492,192	8,854,844	2,725,306	2,392,160	160,768,292
2011	112,766,326	13,637,221	2,543,954	972,368	7,812,433	12,149,043	8,793,651	2,741,981	2,443,001	163,859,978
2012	115,357,787	15,430,663	2,808,891	1,024,053	8,699,821	10,585,629	8,173,046	2,692,302	2,384,054	167,156,246
2013	118,629,373	16,600,400	3,035,736	1,004,742	9,721,432	10,344,991	8,168,770	2,665,317	2,104,980	172,275,741

Figure 2.9: Puget Sound Public Transportation Ridership Numbers: 2008 - 2013

### 2.2.1 King County Metro

King County Metro currently operates 214 individual fixed bus route on 112 corridors, owns a fleet of vans for a vanpooling program that offers 4 to 14 people the opportunity to create their own route, and has a program called Access which offers disabled riders a subsidized, personalized transit service. In 2014, each of their total riderships were as follows: fixed-route was 118.6 million, vanpool was 3.5 million, and access was 1.2 million.<sup>31</sup> In October of 2010, King County metro, above and beyond regular service, began operation of its first of now six-line bus rapid transit service known as RapidRides. These lines traverse major arteries around the city and currently provide about 15 percent of Metros total daily ridership.<sup>32</sup>

### 2.2.2 Kitsap Transit

Kitsap Transit currently operates 47 individual fixed bus routes, foot ferry service between Bremerton to Port Orchard, an Access program similar to that of King County Metro for disabled and elderly riders, 21 commuter routes operating to and from Puget Sound Naval Shipyard/Naval Base Kitsap-Bremerton where the drivers are full-time shipyard employees

<sup>31</sup>King County Metro Transit. (2014). 2014 Service Guideline Report. Retrieved May 17, 2015, from <http://metro.kingcounty.gov>

<sup>32</sup>Ridership for Metro's RapidRide surges again, up nearly 40 percent. (2014, July 30). King County. Retrieved May 17, 2015, from <http://kingcounty.gov>



who are also part-time Kitsap Transit operators, and a vanpooling program similar to King County Metro. The fixed bus routes ridership has been shrinking over the last 5 years and as of 2013 was at 2.66 million, while the entire system serviced 4 million.<sup>33</sup>

### 2.2.3 Pierce Transit

Pierce Transit currently operates 38 individual fixed bus routes, has a vanpooling program, and a access program that it calls Paratransit. Pierce Transit's most recent ridership figures date back 2011, where they present Figure 2.10.<sup>34</sup>

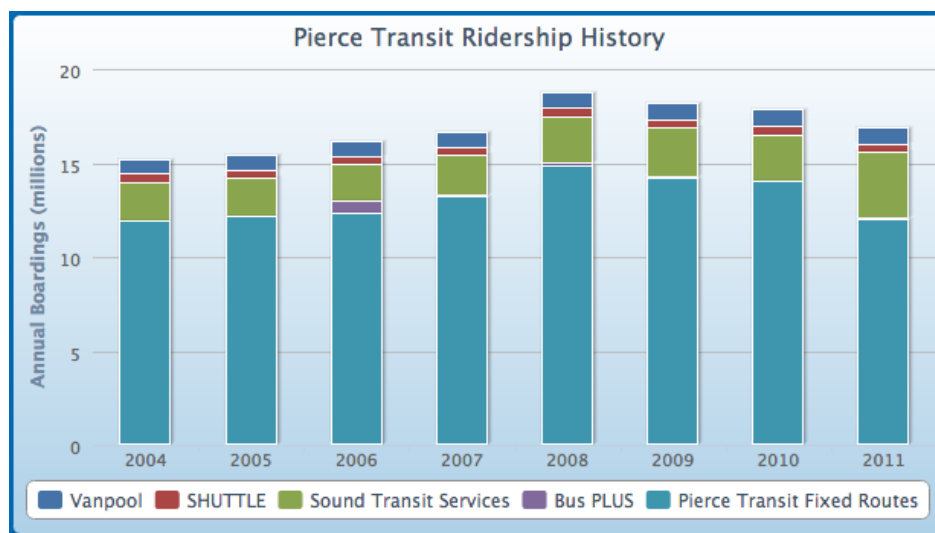


Figure 2.10: Pierce Transit Ridership History: 2004 - 2011

The graphic shows fixed routes serving 12 million, Paratransit shuttles serving 440,000, and vanpools serving 860,000.

<sup>33</sup>Regional Transit Ridership. (2014, May 6). Puget Sound Regional Council. Retrieved May 17, 2015, from <http://www.psrc.org> AND About Us. (2014). Retrieved May 17, 2015, from <http://www.kitsaptransit.com>

<sup>34</sup>Pierce Transit Ridership History. (n.d.). Pierce Transit. Retrieved May 17, 2015, from <http://www.piercetransit.org>

#### 2.2.4 *Community Transit*

Snohomish County's transit agency is called Community Transit. Community Transit operates 46 fixed bus routes, two commuter routes to downtown Seattle and the University of Washington campus, has a vanpooling program, a ridesharing website, its own version of paratransit called Dart, and a reward program called Choice Connections that provides tools and resources to encourage users to choose smart commute options that: “reduce stress, save money and time, and help the environment.”<sup>35</sup> Community Transit also created the Puget Sound Region's first bus rapid transit line called Swift in 2009. This line runs along a 16.7-mile route on State Route SR-99, traversing the cities of Everett, Lynnwood, Edmonds, Shoreline, and unincorporated Snohomish County to the southern county line.<sup>36</sup> As of 2013 Community Transit's total annual ridership was just over 9 million.<sup>37</sup>

#### 2.2.5 *Everett Transit*

Everett Transit operates 13 routes in the city of Everett.

#### 2.2.6 *Sound Transit*

Originally created in 1996 the Central Puget Sound Regional Transit Authority was renamed Sound Transit in 1999.<sup>38</sup> Sound Transit operates express bus, commuter rail, and light rail service. The express buses serve cities in all three counties and are actually maintained and operated under contracts with Community Transit, King County Metro, and Pierce Transit.<sup>39</sup> The commuter rail, named the Sounder, provides service between Everett and Seattle, and

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<sup>35</sup>Bus Plus. (2015). Community Transit. Retrieved May 17, 2015, From <http://www.commtrans.org>

<sup>36</sup>Swift Bus Rapid Transit (Community Transit and Everett Transit). (2012). Texas A&M Transportation Institute. Retrieved May 17, 2015, from <http://tti.tamu.edu>

<sup>37</sup>2014 Budget. (2013). Community Transit. Retrieved May 17, 2015, from <http://www.commtrans.org>

<sup>38</sup>History And Chronology. (2007). Sound Transit.

<sup>39</sup>About Sound Transit. (n.d.). Sound Transit. Retrieved May 17, 2015, from <http://www.soundtransit.org>



### 2.2.7 Seattle Streetcar Network

The City of Seattle is in the process of building its first streetcar network since the streetcars of the early twentieth century ceased operations in 1941. The first piece, the South Lake Union Streetcar, started operating in 2007 and runs a 1.3-mile route serving the South Lake Union neighborhood of Seattle.<sup>43</sup> It goes from the Westlake hub to the Fred Hutchinson Cancer Research Center. It is owned by the City of Seattle, was funded through a “Local Improvement District” tax, and is operated by King County Metro. As of 2013 it carried 760,000 annual passengers.<sup>44</sup>

They are currently preparing to begin service on the second piece of the network, the First Hill Streetcar. This piece is a 2.5-mile line with 10 stops serving the Capitol Hill, First Hill, Yesler Terrace, Central Area, Chinatown ID and Pioneer Square neighborhoods of Seattle.<sup>45</sup> Construction began in April 2012, was completed in June 2014, and the line is projected to open in 2015 pending completion, delivery, and testing of the streetcars. This portion was funded by Sound Transit’s ST2 mass transit expansion plan, and will also likely be operated by King County Metro.

Finally, there are currently plans to connect the two existing streetcar lines, the South Lake Union Streetcar and the First Hill Streetcar, with a Center City Connector that will connect the Pioneer Square end of the First Hill Line to the Westlake end of the South Lake Union Line. This is expected to begin construction in mid 2016 and begin operation in early 2018.<sup>46</sup>

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<sup>43</sup>Seattle Streetcar. (n.d.). Seattle Streetcar. Retrieved May 17, 2015, from <http://www.seattlestreetcar.org>

<sup>44</sup>Ridership Report Archives. (n.d.). American Public Transportation Association. Retrieved May 17, 2015, from <http://www.apta.com>

<sup>45</sup>Seattle Streetcar. (n.d.). Seattle Streetcar. Retrieved May 17, 2015, from <http://www.seattlestreetcar.org>

<sup>46</sup>Seattle Streetcar: Center City Connector. (n.d.). Seattle Streetcar. Retrieved May 17, 2015, from <http://www.seattlestreetcar.org>

### *2.2.8 King County Ferries*

King County owns and operates two passenger-only water taxi routes.<sup>47</sup> Both originate in Downtown Seattle. One route serves the north end of Vashon Island and the other serves the Alki neighborhood of West Seattle. The district is funded through a property tax levied on all property in the county.

### *2.2.9 Washington State Ferries*

Washington State Ferries operates automobile and passenger ferry service in Washington State as part of the Washington State Department of Transportation.<sup>48</sup> It operates 10 routes serving 20 terminals located on the Puget Sound and in the San Juan Islands. As of 2014 the agency carried 22 million passengers annually.<sup>49</sup>

### *2.2.10 Seattle Monorail*

The Seattle Center Monorail is an elevated monorail line that was built in the early 1960s as part of the Century 21 World's Fair Exposition. It operates along Fifth Avenue between Seattle Center in Lower Queen Anne and Westlake Center in Downtown.<sup>50</sup> Owned by the City of Seattle, the line has been operated by private contractor Seattle Monorail Services since 1994.<sup>51</sup> It was given historical landmark status by the Seattle Landmarks Preservation Board in 2003.<sup>52</sup> Eight million people rode the monorail during the half year the fair was

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<sup>47</sup>King County Ferry District. (n.d.). Wikipedia. Retrieved May 17, 2015, from <http://en.wikipedia.org>

<sup>48</sup>Washington State Ferries. (n.d.). Washington State Department of Transportation. Retrieved May 17, 2015, from <http://www.wsdot.wa.gov>

<sup>49</sup>WSF Traffic Statistics. (n.d.). Washington State Department of Transportation. Retrieved May 17, 2015, from <http://www.wsdot.wa.gov>

<sup>50</sup>About the Monorail. (2013). Seattle Center Monorail. Retrieved May 17, 2015, from <http://www.seattlemonorail.com>

<sup>51</sup>Yardley, W. (2006, September 25). In Seattle, a Dream From the Past Has a Hazy Future. New York Times. Retrieved May 17, 2015, from <http://www.nytimes.com>

<sup>52</sup>Space Needle officially becomes a City of Seattle historic landmark on April 19, 1999. (2003, April 17). HistoryLink. Retrieved May 17, 2015, from <http://www.historylink.org>

open. Today, annual ridership is around 2 million.<sup>53</sup>

As this review has shown, the Puget Sound has invested in many different forms of public transit over the last half century. While it is a chaotic, seemingly uncoordinated, farrago, it does provide a robust mix of options for people to travel between home, work, and other needs. As road congestion continues to become more prevalent, investment in, and expansion of, these systems is likely to occur. This has many implications outside of the realm of transportation, including the way we use our land.

### **2.3 Development Strategies**

*“The more successfully a city mingles everyday diversity of uses and users in its everyday streets, the more successfully, casually (and economically) its people thereby enliven and support well-located parks that can thus give back grace and delight to their neighborhoods instead of vacuity.”<sup>54</sup>*

The Puget Sound Region has intended goals of housing and employment density, reduced auto congestion and dependency, and more general sustainable practices. While heavy investment in transit is absolutely necessary, there are other land use and transportation policies and practices that must accompany these measures to realize intended success. In the Puget Sound Region there are a number of efforts occurring at various levels of government to incorporate innovative development pattern strategies such as: smart growth, transit-oriented development, New Urbanism, urban growth center and village strategies, and transit communities. This section will discuss each strategy and their intended goals.

#### *2.3.1 Smart Growth*

Sprawling development that both coincided with and was largely made possible by the advancement of the automobile and corresponding infrastructure, has lead to what James

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<sup>53</sup>Seattle Center Monorail. (n.d.). Wikipedia. Retrieved May 17, 2015, from <http://en.wikipedia.org>

<sup>54</sup>Jacobs, J. (1961). *The Death and Life of Great American Cities*. New York: Random House.

Howard Kunstler calls, “the National Automobile Slum.”<sup>55</sup> Not alone in his discontent for the development trends and patterns of the second half of the nineteenth century, Kunstler goes on to suggest that Americans have relinquished their nation to the automobile. In his book, “Native to Nowhere,” Timothy Beatley writes, “...the proliferation of mind-numbing sameness is an alarming trend. As the march of globalization continues, it manifests across the continent in places that look and feel alike. In shopping malls that carry the same stores, and in commercial strips that have the same fast-food franchises, there is a stifling sense of sameness to the new suburban and exurban landscapes we inhabit...”<sup>56</sup> Even President Obama, in a speech in July of 2009 at an Urban and Metropolitan Policy Roundtable remarked, “...we need to fundamentally change the way we look at metropolitan development. For too long federal policy has actually encouraged sprawl and congestion and pollution rather than quality public transportation and smart and sustainable development.”<sup>57</sup>

He wasn’t the first person to come to this realization. As early as the 1970s, some transportation and community planners, who recognized the detriment of the development of the times, were beginning to promote the idea of compact cities and communities, and urging them to adopt many of the regulatory approaches associated with something called Smart Growth. The formalized concept of smart growth did not truly materialize until the 1990s. It began as a bottom-up measure based on market incentives (partnerships, education, priority funding) and ultimately became a nation-wide movement.<sup>58</sup> The Smart Growth Network defined smart growth like this, “Growth is ‘smart’ when it gives us great communities, with more choices and personal freedom, good return on public investment, greater opportunity across the community, a thriving natural environment, and a legacy we

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<sup>55</sup>Kunstler, J. (February 2004). James Howard Kustler: The ghastly tragedy of the suburbs. From <http://www.ted.com>

<sup>56</sup>Beatley, T. (2004). *Native to nowhere: Sustaining home and community in a global age*. Washington, DC: Island Press.

<sup>57</sup>Obama, Pres. Barrack. (2009, July 13). Remarks at Urban and Metropolitan Policy Roundtable. Retrieved May 17, 2015, from <https://www.whitehouse.gov>

<sup>58</sup>What is Smart Growth?. (2015, March 16). Smart Growth Network. Retrieved May 17, 2015, from <http://smartgrowth.org>

can be proud to leave our children and grandchildren.”<sup>59</sup>

The Smart Growth Network identifies ten principles that are at the core of their efforts to recognize smarter growth:

1. mixed land uses;
2. take advantage of compact building design;
3. create housing opportunities and choices;
4. create walkable communities;
5. foster distinctive, attractive communities with a strong sense of place;
6. preserve open space, farmland, natural beauty and critical environmental areas;
7. strengthen and direct development towards existing communities
8. provide a variety of transportation choices
9. make development decisions predictable, fair and cost-effective
10. encourage community and stakeholder collaboration in development decisions

These broad principles introduce smart growth as a foundational, overarching mentality toward growth that sets the stage for the succeeding strategies. Smart Growth’s values manifest themselves throughout the remainder of the more practical strategies that are defined in this section.

### *2.3.2 Transit-Oriented Development*

Many attribute the origins of a development pattern known as Transit Oriented Development (TOD) to Peter Calthorpe, a San Francisco-based architect, urban designer and urban planner. In his 1995 book, *The Next American Metropolis: Ecology, Community, and the American Dream*, Calthorpe introduces the concept: “The alternative to sprawl is simple and timely: neighborhoods of housing, parks, and schools placed within walking distance of shops, civic services, jobs, and transit - a modern version of the traditional city. The convenience of the car and the opportunity to walk or use transit can be blended in an environment with local access for all the daily needs of a diverse community.”<sup>60</sup> He goes on to

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<sup>59</sup>iBid.

<sup>60</sup>Calthorpe, P. (1993). *The next American metropolis: Ecology, community, and the American dream*. New York: Princeton Architectural Press. Retrieved May 17, 2015, from <http://www.botsfor.no>



assert that this development pattern has the potential to support transit investment, reduce auto congestion, create affordable neighborhoods (through transportation cost reductions), and preserve open space.<sup>61</sup> Figure 2.14 depicts the spatial differences between traditional development patterns of the times and transit oriented development.<sup>62</sup>

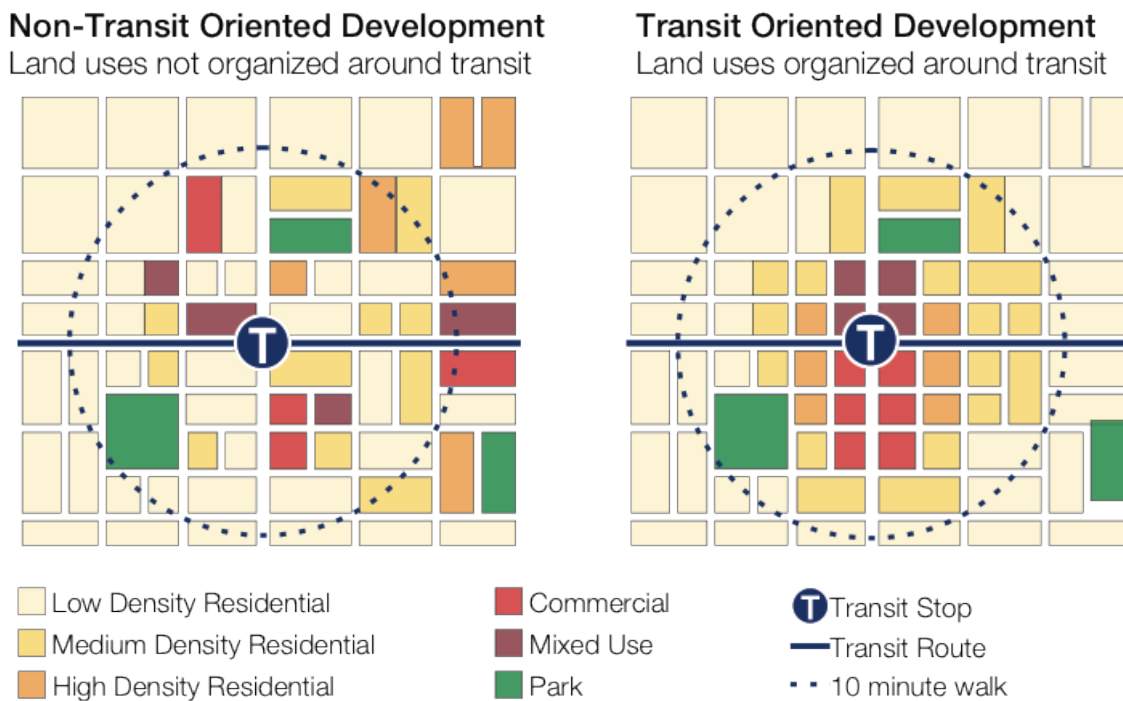


Figure 2.14: Spatial Diagram of Transit Oriented Development

Transit-oriented development advocates seek to increase density of new land development and infill redevelopment. This is partly in order to reduce auto use by reducing the distances between trip origins and destinations. These changes in development patterns result in more enjoyable walking environments, slowing down road travel, and increasing the market for transit. Todd Litman of the Victoria Transportation Policy Institute defines it this way:

<sup>61</sup>iBid.

<sup>62</sup>Seattle Transit Communities: Integrating Neighborhoods with Transit. (November 2010). Seattle Planning Commission. From <http://www.seattle.gov>

“Transit oriented development (TOD) refers to residential and commercial areas designed to support transit and walking. It creates transit villages around transit stations, where a significant portion of local errands (travel to school, shops and other errands) can be performed by walking. It usually involves parking management to allow higher densities around transit stations and encourage use of alternative modes.”<sup>63</sup>

The fundamentals of Transit Oriented Development begin to identify more tangible ways that this paradigm shift can be achieved. It identifies specific ways, generally within urban settings, that the lofty goals of smart growth can be realized.

### *2.3.3 New Urbanism*

New Urbanism is a form of urban design that originated in the 1990s which recognized the strengths of pre-World War II development, thus departing from recent development trends. It seeks to incorporate many of the principles discussed in the smart growth and transit oriented development sections and adds regionalism and environmentalism.<sup>64</sup>

The Congress of New Urbanism, founded in 1993, is a group of industry leaders seeking to advance understanding, methods, and outcomes of the use of New Urbanism. Their charter states: “We advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.”<sup>65</sup>

These beliefs and principles manifest themselves in neighborhoods that resemble neigh-

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<sup>63</sup>Litman, T. (5 November 2013). Parking Management: Strategies, Evaluation, and Planning. Victoria Transport Policy Institute. Retrieved May 17, 2015, from <http://www.vtpi.org>

<sup>64</sup>Kelbaugh, Douglas S. (2002). Repairing the American Metropolis: Common Place Revisited. Seattle: University of Washington Press. 161

<sup>65</sup>Charter of the New Urbanism. (2007). Congress for the New Urbanism. Retrieved May 17, 2015, from <http://www.cnu.org>

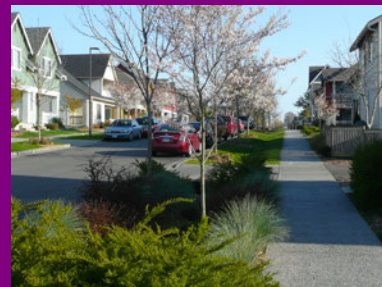
borhoods built in the 1920s and 1930s: small lots, front porches, garages in the back off the alley, considerable public green space, and growing density closer to the center where some retail amenities are encouraged.

Many principles identified by the builders of the New Urbanism framework are identical to those of smart growth and transit-oriented development. Where transit oriented development is generally found in urban settings, New Urbanism is found in suburban settings. New Urbanism, like transit-oriented development, shows functional signs of ways these principles may be implemented. As explored in the High Point example below, while New Urbanism achieves some of its goals, it falls fundamentally short on others. Now, this exploration will move to policy techniques used in the Puget Sound Region.

## Local New Urbanism Example: High Point

High Point, located in West Seattle, was originally developed during World War II to provide government housing, and remained low-income through the 1990s. In 2003, the Seattle Housing Authority a six-year project to redevelop High Point into a mixed-income community.<sup>a</sup> The redevelopment removed all existing housing, roads, and utilities and replaced them with new roads, underground infrastructure, about 1,600 new housing units, and a community facilities. The new development utilized New Urbanist design patterns.

High Point was praised for its mixing of income, its environmental consciousness, and its aesthetic appeal. The development has been criticized for many of the issues that most New Urbanist developments are; namely that it is not “new” nor is it “urban.” High Point is not well connected to transit, doesn’t have many of the amenities that might make it more self-sustaining (restaurants, coffee shops, grocery stores, etc.), and hasn’t created a strong sense of place. Many assert that this dense development without amenities to support such density is far more damaging than sprawl.



<sup>a</sup>Welcome to Highpoint and West Seattle. (n.d.). Highpoint Neighborhood. Retrieved May 17, 2015.

### 2.3.4 *Urban Villages Strategy*

In 1990, Washington State passed a piece of legislation known as the the Growth Management Act (GMA) into law. The Washington State GMA requires state and local governments to manage growth by preparing comprehensive plans, designating urban growth areas within those plans, and implementing them through their public investments, zoning, and municipal codes.<sup>66</sup> At the regional level, the Puget Sound Regional Council (PSRC) does this with a strategy that includes designating certain places as Regional Urban Growth or Manufacturing Centers as well as urban growth boundaries, beyond which development is discouraged.<sup>67</sup> In Seattle this is done through the City’s Comprehensive Plan in what they call their “Urban Villages Element.” The City defined a hierarchy of designated growth areas which are defined as follows:<sup>68</sup>

1. “Urban centers are the densest neighborhoods in the city and are both regional centers and neighborhoods that provide a diverse mix of uses, housing, and employment opportunities. Larger urban centers are divided into urban center villages to recognize the distinct character of different neighborhoods within them.
2. Manufacturing/Industrial Centers are home to the city’s thriving industrial businesses. As with urban centers, Manufacturing/Industrial Centers are regional designations and are an important regional resource.
3. Hub urban villages are communities that provide a balance of housing and employment, generally at densities lower than those found in urban centers. These areas provide a focus of goods, services, and employment to communities that are not close to urban centers.

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<sup>66</sup>Chapter 36.70A RCW: Growth Management. (n.d.). Washington State Legislature. Retrieved May 17, 2015, from <http://apps.leg.wa.gov>

<sup>67</sup>Vision 2040. (December 2009). Puget Sound Regional Council. Retrieved May 17, 2015, from <http://www.psrc.org>

<sup>68</sup>City of Seattle Comprehensive Plan: Toward a Sustainable Seattle. (January 2005). City of Seattle. Retrieved May 17, 2015, from <http://www.seattle.gov>

4. Residential urban villages provide a focus of goods and services for residents and surrounding communities but may not provide a concentration of employment.”

Figures 2.15 and 2.16 show the hierarchy and locational designations for both regional and city levels of villages and centers.<sup>69</sup>

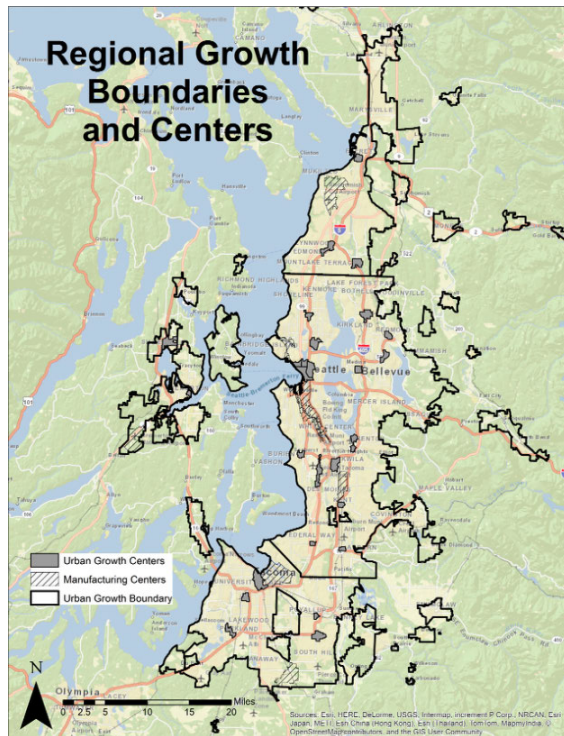


Figure 2.15: Regional Growth Boundary and Centers

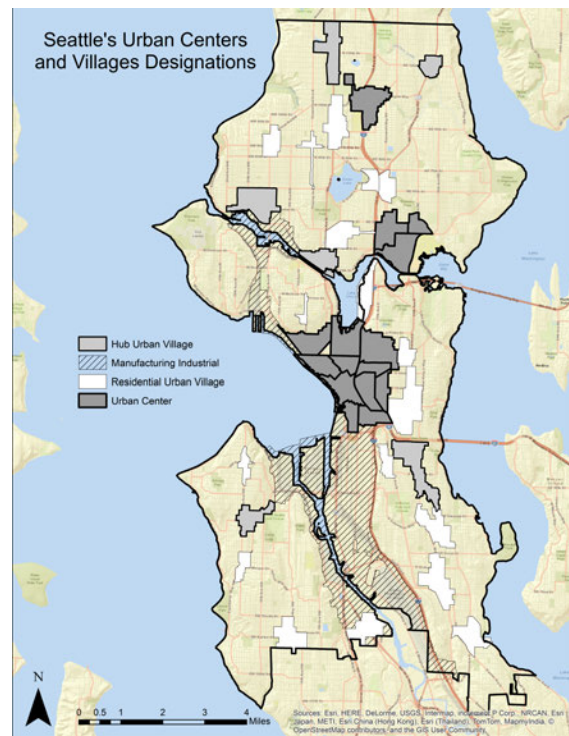


Figure 2.16: City of Seattle Urban Centers and Villages

The practical applications of these strategies will be explored in more depth in further chapters, suffice it to say that its working. A recent report released by the research firm Steinbrueck Urban Strategies identified that in the past 20 years, close to 75 percent of Seattle’s new housing developed in urban centers and villages which researchers said constitutes an overall success.<sup>70</sup>

<sup>69</sup>iBid.

<sup>70</sup>Winter, M., Williamson, S., Patterson, M., Barb, D., & Greaney, Y. Seattle Sustainable Neighborhoods Assessment Project Report 2014. (January 2015). Steinbrueck Urban Strategies. Retrieved May 17, 2015,

### 2.3.5 *Transit Communities*

Since 2010, both the City and the Region have been developing strategies called “Transit Communities.” Since the region began promoting development in regional and urban growth centers and villages, more housing and employment has correspondingly located in these designated areas. The region has since recognized that this land use initiative is dangerous without subsequent frequent and reliable transit to serve these densely growing places. Thus each has begun identifying more localized areas to receive higher amounts of investment in an effort to provide the necessary transit option to make these land use developments viable. The Puget Sound Regional Council identifies three main goals for its strategy as follows:<sup>71</sup>

1. Attract more of the region's residential and employment growth near high-capacity transit,
2. Provide housing choices affordable to a full range of incomes near high-capacity transit, and
3. Increase access to opportunity for existing and future community members in transit communities

In Seattle the “Transit Communities” strategy works in parallel to the Urban Villages Strategy. The main difference is that these areas are defined by 10-minute walk sheds which are generally significantly smaller than many of the urban centers and villages around Seattle. Practically, this equates to more transit communities than centers and villages, most of which fall within those centers and villages but some of which do not. Seattle defines transit communities in the this way:<sup>72</sup> “[Transit Communities are places where] people can walk, bike, or take transit from their homes to accomplish many of their daily activities including getting to work or school, picking up groceries, or going out to a restaurant or a special event.

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from <http://www.seattle.gov>

<sup>71</sup>Growing Transit Communities Strategy. (n.d.). Puget Sound Regional Council. Retrieved May 17, 2015, from <http://www.psrc.org>

<sup>72</sup>Seattle Transit Communities: Integrating Neighborhoods with Transit. (November 2010). Seattle Planning Commission. Retrieved May 17, 2015, from <http://www.seattle.gov>

Transit communities require well coordinated public investment centered on transit service to create these lively, diverse communities. People need to be able to obtain the goods and services they require and have rich options for enhanced livability, including access to open space and neighborhood schools.”

Figures 2.17 and 2.18 show the locational designations for both levels of Transit Communities.<sup>73</sup>



Figure 2.17: Transit Communities of the Puget Sound Region

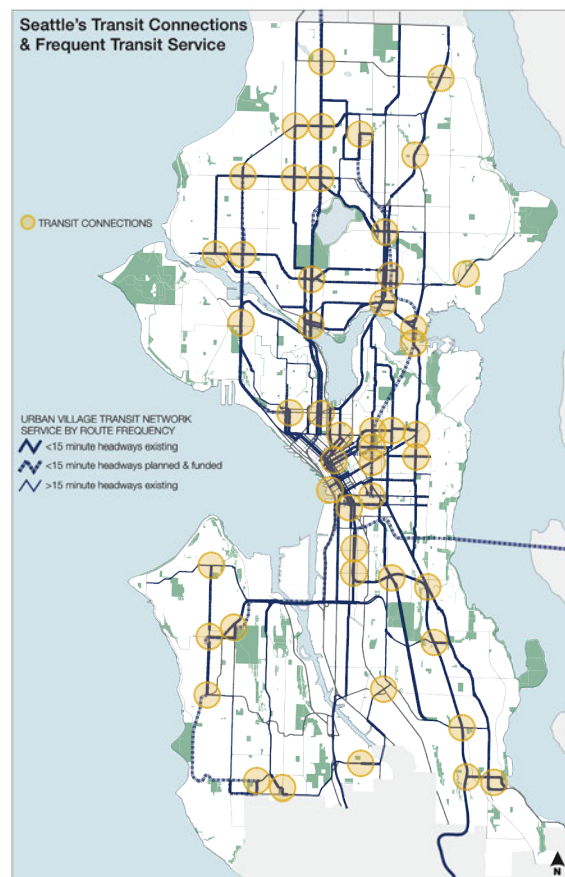


Figure 2.18: Transit Communities of the City of Seattle

These transit community initiatives are still in their infancies, the verdict is not yet out on their potential utilities. Further, because their intents are to build on the centers and

<sup>73</sup>iBid.



villages strategies it will be difficult moving forward to separate the results of one strategy from the other.

The breadth of strategies explored above paints a clear picture of the direction the Puget Sound Region is moving in with regard to development. To recap, the Region is using policies, planning tools, and investment to accomplish consolidated, dense development in close proximity to frequent and reliable transit.

### *2.3.6 Studies on Development Strategies*

As early as 1996, studies were suggesting that mixed-use developments and travel-oriented developments (TODs) require less parking than their stand-alone, suburban counterparts.<sup>74</sup> In 2010, the San Diego Regional Planning Agency (SANDAG) released a study on trip generation in smart growth areas. They found that reductions in vehicle trips were observed for smart growth development relative to the number of trips that would be expected to occur in typical suburban developments.<sup>75</sup> This suggested there are potentially less automobiles and thus less need for parking. In 2008, the Transportation Research Board's Transit Cooperative Research Program (TCRP) released report 128 which urged that appropriate parking supply was paramount to the success of TOD and like development initiatives.<sup>76</sup> Many of the locations suitable for this type of development coincide with the new and future light rail stops and the major bus rapid transit stops.

## **2.4 Parking**

*"We've become a United Parking Lot of America."<sup>77</sup>*

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<sup>74</sup>Cervero, R. (1996). California's Transit Village Movement. *Journal of Public Transportation*, 1(1).

<sup>75</sup>Trip Generation for Smart Growth: Planning Tools for the San Diego Region. (June 2010). San Diego's Regional Planning Agency. Retrieved May 17, 2015, from <http://www.sandag.org>

<sup>76</sup>Arrington, G. & Cervero, R. TCRP Report 128: Effects of TOD on Housing, Parking, and Travel. (2008). Transit Cooperative Research Program. Retrieved May 17, 2015, from <http://onlinepubs.trb.org>

<sup>77</sup>Kunstler, J. *Sleepwalking into the Future*. (1999). Long Island Newsday. Retrieved May 17, 2015, from <http://www.kunstler.com/>

Discussions of land use and transportation have often historically neglected considerations of parking. Parking influences not only how people travel, but also how a city uses its land. Accordingly, the impacts of parking on urban form and travel behavior are compounded. When there is an oversupply of cheap parking, residents and employees are effectively incentivized to use single occupancy vehicle. This in turn, along with population and employment growth, suggests a need for more parking, which consumes more finite lands and the cycle continues. Richard Willson describes this cycle in Figure 2.19.<sup>78</sup> Todd Litman of the Victoria Transport Policy Institute depicts a similar situation in Figure 2.20.<sup>79</sup>

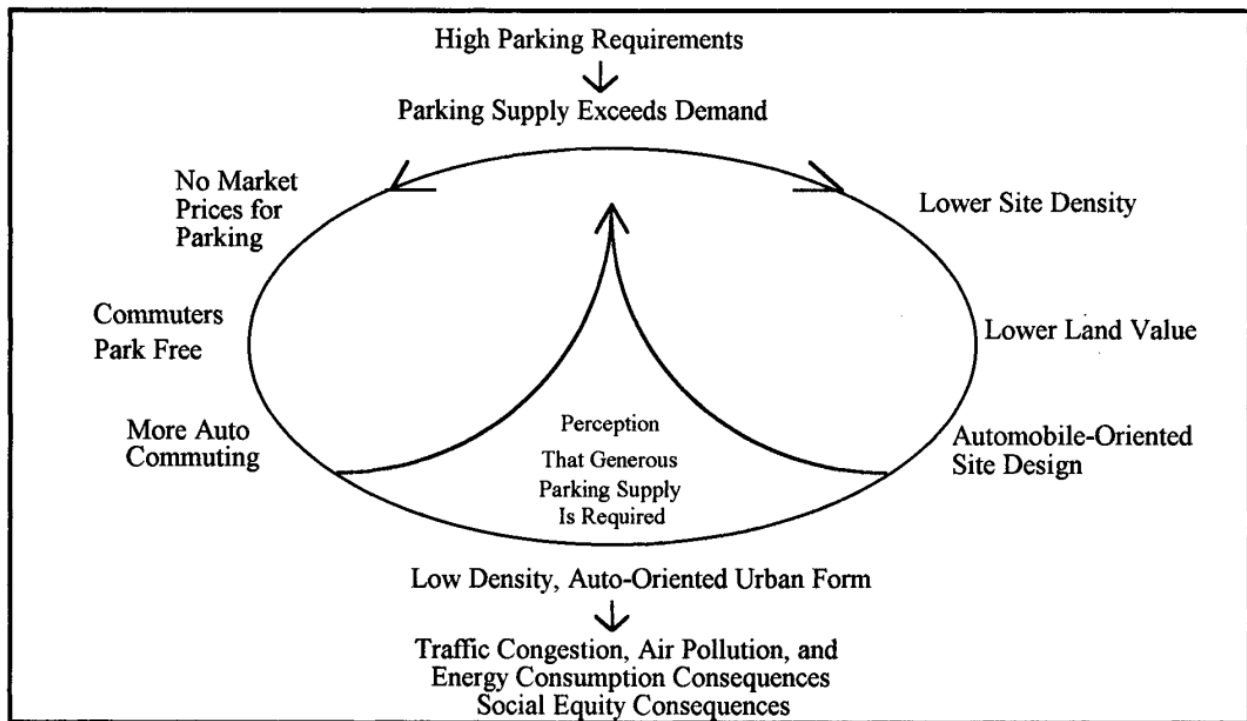


Figure 2.19: Willson’s Depiction of Reinforcing Auto Dependency

In 2005, Donald Shoup calculated that, including on-street parking, US cities have an

<sup>78</sup>Willson, R. (1995). Suburban Parking Requirements: A Tacit Policy for Automobile Use and Sprawl. *Journal of the American Planning Association*, 61(1), 29-42.

<sup>79</sup>Litman, T. (5 November 2013). *Parking Management: Strategies, Evaluation, and Planning*. Victoria Transport Policy Institute. Retrieved May 17, 2015, from <http://www.vtppi.org>

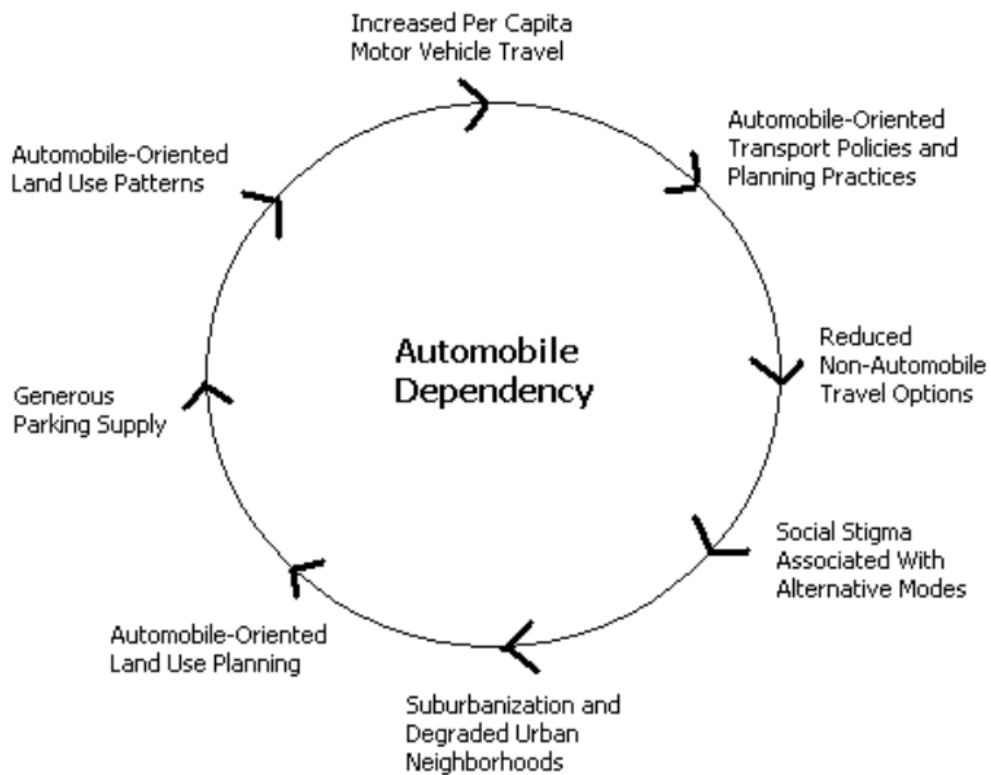


Figure 2.20: Litman Depiction of Reinforcing Auto Dependency

average of about of eight parking spaces for each car.<sup>80</sup> How did we get to eight parking spaces for each car?

#### 2.4.1 *Types of Parking Regulation*

There are three basic types of parking regulation: parking minimums, parking maximum, and a market-based approach. This section will define each regulation type. Further, it will focus exploration on the most prevalent form of regulation which also happens to be the culprit of the previously stated oversupply: minimum parking requirements. This, coincidentally, is the form of parking regulation used in municipalities in the Puget Sound Region.

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<sup>80</sup>Shoup, DC. (1997). The High Cost of Free Parking. *Journal of Planning Education and Research*, 17(1), 3-20.

### *Minimum Parking Requirements*

Since the 1950s, due to fears of escalating congestion and lack of parking, many cities around the world began establishing minimum parking requirements as part of city zoning. It was an effort to keep them economically competitive and attractive. Traditional parking regulations and codes require a set amount of parking for a given unit of something relating to the land use for which the parking will be used. Specifically, a building's required parking provision is calculated per cubicle in office space, square foot of retail or office space, dwelling unit, seat in a theater, etc. The Victoria Transportation Policy Institute published typical parking standards shown here in Figure 2.21.<sup>81</sup>

<b>Land Use Category</b>	<b>Unit</b>	<b>Index (85<sup>th</sup> Percentile)</b>	<b>Peak Parking Period</b>
Single Family Housing	Dwelling Unit	2.0	Evening
Multi-Family Housing	Dwelling Unit	1.5	Evening
Elderly Housing	Dwelling Unit	0.5	Weekday
Hotel	Guest Room	1.0	Weekday-evening
Hospital	100 sq. m./Bed	5/2.6	Weekday-day
Health Spa	100 sq. m. GLA	6.8	Weekday
Retail – Shopping Center	100 sq. m. GLA	5.0	Saturday-day
Office Building	100 sq. m. GFA/Employee	3.3/0.9	Weekday-day
Light Industry	100 sq. m. GFA/Employee	2.2/1.0	Weekday-day
Heavy Industry	100 sq. m. GFA/Employee	1.7/0.6	Weekday-day
Fast-Food Restaurant	Seat	0.85	Weekday
Church/Synagogue/Mosque	Seat	0.2	Sunday/Saturday/Friday
Movie Theater	Seat	0.25	Saturday-Evening

GLA = Gross Leasable Area

GFA = Gross Floor Area

Figure 2.21: Typical Example of Parking Standards

These requirements have historically assumed that trips will be realized by private automobile and ignore a neighborhoods particular mix of uses, access to transit and walking, and context within the metropolitan region.<sup>82</sup> Resulting development has encouraged automobile

<sup>81</sup>Litman, T. (5 November 2013). Parking Management: Strategies, Evaluation, and Planning. Victoria Transport Policy Institute. Retrieved May 17, 2015, from <http://www.vtpi.org>

<sup>82</sup>Parking Spaces/Community Places: Finding the Balance through Smart Growth Solutions. (January 2006). U.S. Environmental Protection Agency: Development, Community, and Environment Division.

use, reduced housing affordability, increased development costs, consumed land and natural resources, and increased associated air and water pollution.<sup>83</sup>

In ignoring the neighboring land uses and local density, parking needs are generally misunderstood. For example, at night and on the weekend an office building parking lot will be empty while the restaurant next door is packed, and vice versa. So, requiring both uses to provide for 100 percent of their parking needs simultaneously leaves the one or the other uses parking vacant most of the time. Static parking requirements force businesses to provide sometimes excess parking that can waste space and money. On the cost of space: a Transportation and Land Use Coalition report found that each on-site parking space can reduce the number of new housing units or other users by 25 percent or more.<sup>84</sup> On the cost of money: land costs vary widely across urban and suburban areas, and by specific location within a particular city. Land costs in urban centers are generally significantly higher than in suburban areas. For example, an Urban Land Institute study showed cost per square foot of land in downtown Charlotte, North Carolina, was \$121, while suburban land cost \$21.<sup>85</sup> Higher land costs make efficient use of space critical in urban areas, whereas efficiency is arguably less of a financial issue in suburban settings. These parking requirements can therefore represent a significant barrier to better development.<sup>86</sup>

Although cities frequently use minimum parking requirements to manage traffic, parking

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Retrieved May 17, 2015, from <http://www2.epa.gov> AND Hamre, A., & Buehler, R. (2014). Commuter Mode Choice and Free Car Parking, Public Transportation Benefits, Showers/Lockers, and Bike Parking at Work: Evidence from the Washington, DC Region. *Journal of Public Transportation JPT*, 17(2), 67-91.

<sup>83</sup>Rowe, D., Bae, C., & Shen, Q. (2011). Evaluating the Impact of Transit Service on Parking Demand and Requirements. *Transportation Research Record: Journal of the Transportation Research Board*, (2245), 56-62.

<sup>84</sup>Housing Shortage/Parking Supply: Silicon Valley's Opportunity to Address Housing Needs and Transportation Problems with Innovative Parking Policies. (July 2002). Transportation and Land Use Coalition. Retrieved May 17, 2015, from <http://www.transformca.org>

<sup>85</sup>Urban Land Institute. (1997). *Market Profiles 1997: North America*. Washington D.C.: the Urban Land Institute.

<sup>86</sup>Housing Shortage/Parking Surplus: Silicon Valley's Opportunity to Address Housing Needs and Transportation Problems with Innovative Parking Policies. (2002). Transportation and Land Use Coalition. Retrieved May 17, 2015, from <http://www.transformca.org>

requirements inherently accommodate private automobile use, suggesting they should lead to more driving, resulting in more congestion instead of less.<sup>87</sup> Challengers of minimum parking requirements argue that these conditions cause a surplus of parking spaces in most urban areas.<sup>88</sup> Shoup, in 1999, argued based on the logic of supply and demand that this increased supply reduces the price, but not the cost of this parking, and thus encourages greater use of the private automobile.<sup>89</sup> In addition, critics claim that minimum parking requirements force developers to use a larger area of land, and makes development projects in expensive areas more costly and less profitable. Brian Bertha studied the cost of 64 apartment projects in Oakland, California between 1957 and 1963. He studied 45 from before 1961, when the city began mandating one parking space per residential unit, and 19 buildings after 1961. The cost of constructing a project post 1961 was 18% higher than pre parking requirements. Further, density decreased by 30% and land values fell by 33%.<sup>90</sup> More recently, in 1995 Richard Willson of UC Cal Poly, studying parking impacts on travel behavior, development density, development costs, and urban design, developed a generic project based on the average characteristics of his typical case study site. Figure 2.22 shows how parking affects the size of a building and the use of land.<sup>91</sup>

Scenario A shows the project as built, while Scenario B shows how much smaller the site could be while achieving the same building size if parking were reduced by a third. Scenario C shows how much larger the building could be on the same size site if parking were reduced by a third. This was then used as part of a larger exercise to produce Figure 2.23 which

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<sup>87</sup>Turning Housing into Driving: Parking Requirements and Population Density in Los Angeles and New York. (2013). Transportation Research Board. Retrieved May 17, 2015, from <http://docs.trb.org>

<sup>88</sup>Shoup, DC. (1997). The High Cost of Free Parking. *Journal of Planning Education and Research*, 17(1), 3-20. AND Willson, R. (1995). Suburban Parking Requirements: A Tacit Policy for Automobile Use and Sprawl. *Journal of the American Planning Association*, 61(1), 29-42.

<sup>89</sup>Shoup, DC. (1999). The Trouble with Minimum Parking Requirements. *Transportation Research Part A: Policy and Practice*, 33(7-8), 549-574.

<sup>90</sup>Bertha, B. (1964). Appendix A. The Low-Rise Speculative Apartment by Wallace Smith, Research Report 25. Berkeley, California: Center for Real Estate and Urban Economics, University of California

<sup>91</sup>Willson, R. (1995). Suburban Parking Requirements: A Tacit Policy for Automobile Use and Sprawl. *Journal of the American Planning Association*, 61(1), 29-42.

Characteristic	Scenario A: As Built	Scenario B: Reduce Site Size	Scenario C: More Building Area
Parking Supply (spaces/1,000 gross square feet)	3.8	2.5	2.5
Site Size (square feet)	190,000	135,000	190,000
Number of Stories	4	4	4
Building Size (gross square feet)	95,000	95,000	135,000
Number of Parking Spaces	361	238	338
Area of Parcel Devoted to Parking	70%	65%	66%
Floor Area Ratio	0.50	0.70	0.71

Figure 2.22: Parking effects on Development Size

shows the relationship between required parking and floor area ratio (FAR) on a given site.

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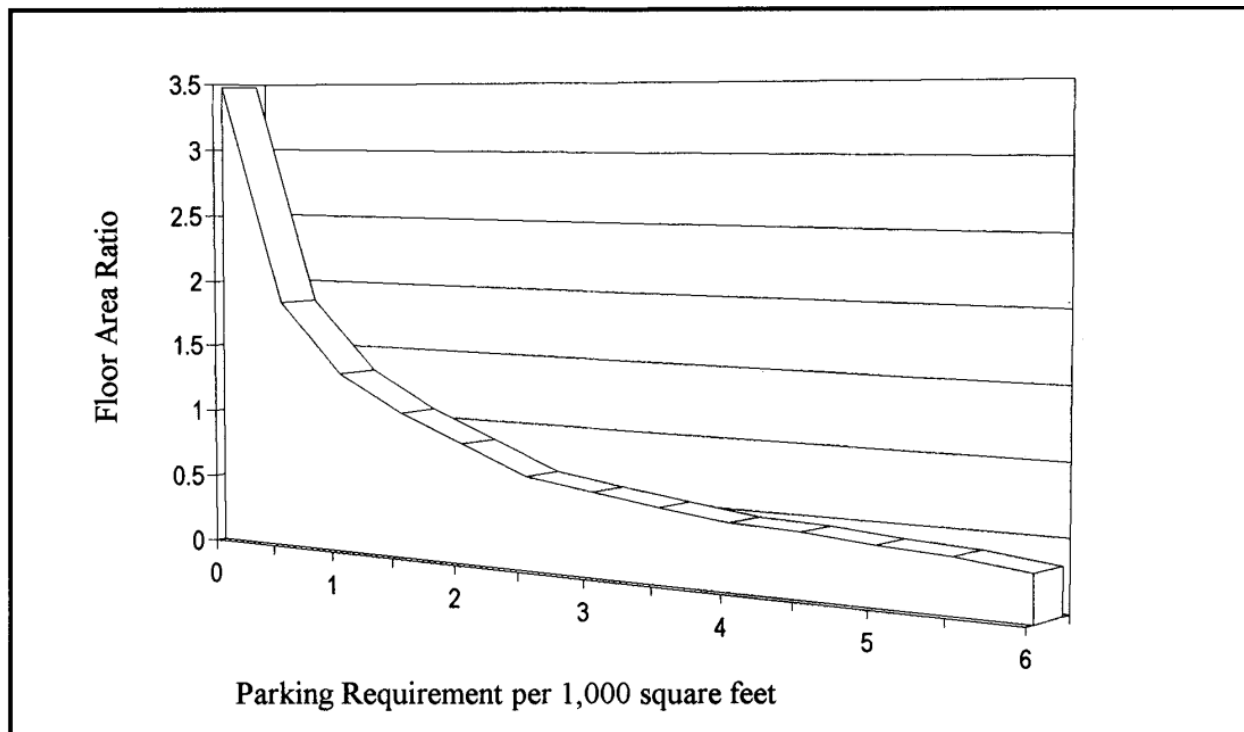


Figure 2.23: Parking Requirements Effects of Floor Area Ratio

The figure shows that parking requirements have an exponentially negative relationship with FAR. Finally, Willson took this exercise a step further and built a pro forma summary for each of the scenarios as shown in Figure 2.24. The author assumes the developer's goal is a 15% return on investment and that the market would support a monthly rent of \$1.60 per square foot under each scenario.<sup>93</sup>

Characteristic	Scenario A: As Built	Scenario B: Reduce Site Size	Scenario C: More Building Area
Maximum Building Size (gross square feet)	95,000	95,000	135,000
Supportable Land Value	\$11.00	\$16.50	\$16.25
Project Cost	\$10,592,000	\$10,594,000	\$14,496,000
Equity Required (@ 70% loan to value ratio)	\$2,399,000	\$2,404,000	\$3,293,000
Annual Net Operating Income	\$1,042,000	\$1,053,000	\$1,440,000
Project Value (@ 9% capitalization rate)	\$11,703,000	\$11,701,000	\$16,005,000

Figure 2.24: Building Size Effects on Development Revenue and Project Value

Notice how significantly more valuable Scenario C's project is than Scenario A, which is the same size site with different percentages of land devoted to parking.

### *Maximum Parking Requirements*

During the last ten years, transportation planners have become further aware of the influence of car parking on air quality, car congestion, the pedestrian environment and economic growth. Where historically the problem of car parking was known as a problem of insufficient supply, it is now increasingly considered to be a problem of poor management of the current supply; and even over supply. Thus many have begun experimenting with a different form of parking regulation called maximum parking requirements which works similarly, but opposite, to minimum parking requirements.

With maximum parking requirements, developers are allowed to build up to a certain number of off-street parking spots per square foot of floor area or residential unit. The

<sup>93</sup>iBid.



aim of any maximum parking standard is to reduce the number of trips made by private cars while seeking to maintain and enhance the capability of present economic centers and support sustainable development. The intent, while not always achieved, is a mentality shift from one in which we provide abundant free parking for all to one where limited supply makes parking more expensive, ultimately providing a more accurate reflection of the cost to supply such parking.

In Massachusetts, the Town of Burlington, the City of Somerville, the City of Cambridge, the Town of Belmont, Town of Bedford, and the City of Boston have each experimented with this form of parking regulation.<sup>94</sup> Most of these maximum requirements are additions to the minimum requirements as opposed to stand-alones. Further, it has been quite common that they increase over time due to public influence and fear of under supply, making them effectively ineffective.

The difficulty inherent in removing these decision from the private sector is made apparent by the fact that while some planners recommend minimums which force the supply of parking above the quantity that would be provided by the private market, others recommend an upper limit on the number of parking space to reduce the quantity below what would be provided by the private market.

### *Market-Based Approach*

The third approach, the market-based approach, to parking is one that eliminates all parking requirements and allows the market to dictate the need. Advocates of this approach believe that developers are intelligent enough, and incentivized by profits, and so they will provide the optimal number of parking spaces to realize maximum returns. While this approach has not found common use, in cities where it has been implemented, it has struggled due to the scale at which it is used. For example, cities that use this method will create a policy such as: no parking requirements within a quarter mile of a light rail station. But because the

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<sup>94</sup>Maximum Parking Allowances. (2010, March 8). Massachusetts Metropolitan Planning Council. Retrieved May 17, 2015, from <http://www.mapc.org>

buildings just outside this quarter mile walk shed are required to provide parking minimum style quantities, developers of projects within the quarter mile walk shed find they need to provide the same amount to stay competitive. In Seattle, for example, a recent change to municipal code has lifted all parking requirements in urban centers and in urban villages where parcels are within 1,320 feet of frequent and reliable transit. This opportunity is still very new, thus there are very few examples for study. Later in this report, micro housing, which gets away with no parking requirements, will be used in an attempt to analyze local parking trends based on these developments.

There have been studies done on eliminating parking requirements in other places in the country. One study found that either reducing the quantity of parking required or entirely eliminating minimum parking requirements would have mixed results dependent on individual land use types.<sup>95</sup> More specifically, it found that these changes would significantly reduce parking supply in general office, medical office, general retail, and large retail. It would not, however, reduce parking in banks and large grocery stores. In another study, contrary conclusions were found. Comparisons of development activity indicated that there was no difference in parking supplied among buildings constructed inside a no-parking-requirements area and outside, where rigid parking minimums were required.<sup>96</sup> It was surmised that although certain advantages of accessibility and building size are present on sites within areas with no parking requirements, competitive market conditions combined with financier considerations lead to parking supplies inside the no-parking-requirement areas being the same as those outside.

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<sup>95</sup>EngelYan, J., Hollingworth, B., & Anderson, S. (2007). Will Reducing Parking Standards Lead to Reductions in Parking Supply?: Results of Extensive Commercial Parking Survey in Toronto, Canada. *Transportation Research Record*, (2010), 102-110.

<sup>96</sup>Nelson, A., Meyer, M., & Ross, C. (1997). Parking Supply Policy and Transit Use: Case Study of Atlanta, Georgia. *Transportation Research Record*, 60-66.

### *Implications*

While parking requirements should have a logical relationship to observed levels of parking use, this can be misleading because free parking has caused artificial demand without regard to either the cost of providing parking spaces or what motorists are willing to pay for them.<sup>97</sup>

Further, parking requirements should also take into account goals related to transportation, land use, and housing. These requirements are important elements of transportation policy because they influence vehicle ownership rates, travel choices, and mobility options.<sup>98</sup> They also shape land use outcomes, such as density, and social outcomes, such as housing affordability. Within New York City, a ten percent increase in minimum parking requirements was found to be associated with a six percent increase in vehicles per square mile, a four percent increase in vehicles per person, and an eight percent reduction in both population and housing density.<sup>99</sup>

As described above, in Seattle new development and redevelopment projects are being focused in urban cores and villages. Jobs and housing are being directed toward transit communities where there is easy access to frequent and reliable transit services. Thus, there are strong arguments to be made for more thoughtful, dynamic, and context specific parking regulations for the future.

#### *2.4.2 Where do Municipalities get their Parking Minimums?*

In 1999 UCLA professor Dr. Donald Shoup published an article titled, “The Trouble with Minimum Parking Requirements.”<sup>100</sup> In the introduction to that article, Shoup satirically described the arcane methods most municipalities have historically used to derived their min-

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<sup>97</sup>Shoup, D. (1995). An Opportunity to Reduce Minimum Parking Requirements. *Journal of the American Planning Association*, 61(1), 14-28.

<sup>98</sup>Manville, M., Beata, A., & Shoup, D. (2013). Turning Housing Into Driving: Parking Requirements and Density in Los Angeles and New York. *Housing Policy Debate*, 23(2), 350-375.

<sup>99</sup>iBid.

<sup>100</sup>Shoup, DC. (1999). The Trouble with Minimum Parking Requirements. *Transportation Research Part A: Policy and Practice*, 33(7-8), 549-574.

imum parking requirements. He began by observing that urban planning text books by and large do not provide any substantial foundation from which to formulate such requirements. He then went on to suggest that upon anecdotal inquiry, most municipalities form their minimum parking requirements by researching and modestly adjusting the parking requirements set by other municipalities of similar size and structure. The few places that formed their own requirements, as opposed to relying on others', derived them from a publication put out by the Institute of Transportation Engineers called "Parking Generation."

"Parking Generation", currently in its 4th edition, compiles data from external, voluntarily submitted, parking studies in an effort to offer one single study that comprehensively evaluates parking needs and use of over 150 individual land uses.<sup>101</sup> But the limitations of this publication, which are expressly described in the text of the document, are abundant. First, the majority of data are from the 1980s and 1990s and have only been updated as relevant new data is presented. Second, numerous land uses have small data sets that provide only an initial indication of parking demand. In only a few cases, good correlation between an independent variable and parking demand appears to exist. ITE suggests that information from these data sets should be viewed as speculative in terms of parking demand estimation due to limited quantity, and that users of this report should exercise caution when utilizing data that is based on small numbers of data points. Finally, the majority of the sites explored for this publication are isolated land uses, in suburban settings, with ample free parking and lack of access to transit. "Parking Generation" clearly states that it is only the beginning point of information to be used in estimating parking demand, and that local conditions and area type influence parking demand as well.

Despite these flaws, planners and policy makers continue to use the information provided in this publication without justification or context. So, theoretically, parking needs in locations in densely developed areas with a strong mix of uses, near frequent and reliable transit services, are being set by potentially outdated and statistically poor data derived from lo-

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<sup>101</sup>Parking Generation (4th ed.). (1987). Washington, D.C., USA: Institute of Transportation Engineers.

cations very different in size and shape. What is worse is that others are looking at these parking requirements and mimicking them, perpetuating an excess in parking provision.

### *2.4.3 The Relationship Between Parking Supply, Parking Costs, and Mode Choice*

It has been asserted previously in this report that free, underpriced, and under regulated parking has cyclical effects on reinforcing single occupant vehicle use. First, it is important to understand specifically how much parking is free in the US. A 1990 Nationwide Personal Transportation Survey asked 48,400 people if they paid for parking during any part of any trip made the previous day.<sup>102</sup> The national response was that 99% of all trips were completely free of paying for parking. When these same respondents were asked if they pay for parking at work, 95% said it was free. A 1993 survey put out by the Commuter Transportation Services asked 2,500 respondents in Southern California if they paid for parking at work; 93% said it was free.<sup>103</sup> In 1989, the Center for Urban Transportation Research surveyed 4,000 people and found that in 17 large metropolitan areas, 89% of parking was free for commuters.<sup>104</sup> In 1991 Jon Williams found that 82% of commuters in Washington DC did not pay for parking.<sup>105</sup>

An over abundance of free, under priced, or under regulated off-street parking has been shown to have a positive correlation with use of the single occupancy private automobile. When employers provide parking, either by straight provision of free parking or when they pay for employee parking, parking needs jump from 2.4 to 3.1 spaces per 1,000 square feet.<sup>106</sup>

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<sup>102</sup>Shoup, D. (1995). An Opportunity to Reduce Minimum Parking Requirements. *Journal of the American Planning Association*, 61(1), 14-28.

<sup>103</sup>Commuter Transportation Services. (1992). 1993 State of the Commute Report.

<sup>104</sup>Center for Urban Transportation Research. (1989). *Factors Related to Transit Use*. Tampa: University of South Florida

<sup>105</sup>Williams, Jon. (1991). Estimating the Travel and Parking Demand Effects of Employer-Paid Parking. *Regional Science and Urban Economics* 22, 133-45.

<sup>106</sup>Shoup, D. (1995). An Opportunity to Reduce Minimum Parking Requirements. *Journal of the American Planning Association*, 61(1), 14-28.

A similar study found the same correlation between parking supply, cost, and mode choice.<sup>107</sup> In this study a multinomial logit model was developed to estimate the probability that commuters will choose to drive alone, ride in a carpool, or use transit for the trip to work in Portland's (Oregon) Central Business District (CBD) based on whether or not they are charged for parking. The model predicted that with free parking: 62% of commuters would drive alone, 16% would commute in carpools, and 22% would ride transit. The model further predicted that with a daily parking charge of \$6: 46% would drive alone, 4% would ride in carpools, and 50% would ride transit. Thus, the model predicted that a daily parking charge of \$6 in the Portland CBD would result in 21 fewer cars driven for every 100 commuters, which translates to a daily reduction of 147 VMT per 100 commuters and an annual reduction of 39,000 VMT per 100 commuters.<sup>108</sup> This report found that the policy variables that seemed to most effect mode choice for commuters were parking cost and travel time by transit.

#### *2.4.4 On-Street Parking, Existing Parking Management, and Spillover*

There are two general forms of parking: on-street and off-street. Thus far, this report has discussed parking and parking regulations for off-street parking, but on-street parking plays a significant roll in the needs and organization of off-street parking. On-street parking refers to parking along the sides of streets in the public right-of-way. While it costs taxpayers \$765 per year per parking space for suburban settings, \$1,341 per year per parking space for urban settings, and \$3,268 per year per parking space for CBD settings (Figure 1.1); much on-street parking is provided free of charge. In other cases, usually in more densely populated areas, there are three other general forms of managing on-street parking:

- zone permit parking - where the user purchases a monthly parking permit which allows them to park in a specific zone or neighborhood

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<sup>107</sup>Hess, D. (2001). Effect of Free Parking on Commuter Mode Choice: Evidence from Travel Diary Data. Transportation Research Record, (1753), 35-42.

<sup>108</sup>iBid.

- time restricted parking - where users can either use on-street space for a limited amount of time or only at certain times of day
- metered parking (can be done in tandem with time restricted parking) - users pay by cash, card, or phone for their parking spot for the amount of time they intend to use it

In many of these cases, even when parking is charged for, the full cost of land, construction, and ongoing operations are not fully recovered, essentially subsidizing parking. In Shoup's, *The High Cost of Free Parking*, he assumes a lifespan of parking is about 50 years, and after amortizing the total costs of the space, determines conservatively that it would require an average of \$124 per month to fully recover those costs.<sup>109</sup> He goes on to observe that in downtown Los Angeles, for example, only roughly 75% of parking that is not free realizes at least \$124 per month in returns. This leaves 25% of all on-street parking in Los Angeles in the red, effectively subsidizing it with public funds.

Several studies have found that for places where parking is an issue, it's not the amount of parking but how it is being used and managed that is the issue.<sup>110</sup> On-street parking needs to be appropriately restricted and enforced which then can alleviate the need for excess off-street parking.<sup>111</sup>

Many advocates of a market-based approach to parking provision believe that solving the on-street parking commons problem would empower a more free enterprise approach to off-street parking.<sup>112</sup> Under-priced, on-street parking hinders private investment in off-street

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<sup>109</sup>Shoup, DC. (1997). *The High Cost of Free Parking*. *Journal of Planning Education and Research*, 17(1), 3-20.

<sup>110</sup>Deakin, E. et al. (2004). *Parking Management and Downtown Land Development in Berkeley, California*. *Transportation Research Record*, (1898), 124-129. AND Litman, T. (2015, April 17). *Victoria Transportation Policy Institute: Regulate Parking Use*. Retrieved May 17, 2015, from <http://www.vtpi.org>

<sup>111</sup>Montgomery County Parking Policy Study. (2011). *Montgomery County Department of Transportation*. Retrieved May 17, 2015, from <http://www6.montgomerycountymd.gov> AND *Mount Rainier Mixed-Use Town Center Parking Study Technical Report*. (January 2013). *City of Mount Rainier, Maryland*. Retrieved May 17, 2015, from <http://www.princegeorgescountymd.gov>

<sup>112</sup>Rowe, D. (November 2013). *Minimum Efforts*. *International Parking Institute*. Retrieved May 17, 2015, from <http://metro.kingcounty.gov>

parking by undercutting the market and depriving it of appropriate representation of price.<sup>113</sup> With no respite from parking saturation and its associated congestion, municipalities are then pressured to supply, and even require, off-street parking. Then, fear of the return of such consequences as parking supply shortages makes reversing existing off-street parking requirements politically difficult in the absence of appropriate on-street pricing.

Another issue with free, under priced, and under regulated on-street parking is the potential for spillover.<sup>114</sup> Spillover can occur in two ways. If off-street parking is charged for and on-street parking is not, or if there is a large enough disparity between the cost to park off street and the cost to park on street, some users will forgo the convenience of off-street parking and choose the less expensive option by using the adjacent neighborhood's more cost effective parking. If insufficient parking is provided off street, regardless of cost disparity, users will have no choice but to spillover to on-street parking in the surrounding neighborhood. This generally results in traffic and parking congestion in those nearby areas as motorists spend time searching for less expensive/available parking. In growing cities, spillover is one of the leading causes of the not-in-my-back-yard (or NIMBYism) mentality toward new development, as is discussed in the following example of microhousing. Spillover parking problems can be addressed by pricing, regulation and enforcement of on-street parking in areas that experience such problems.

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<sup>113</sup>iBid.

<sup>114</sup>Litman, T. (2015, April 17). Victoria Transportation Policy Institute TDM Encyclopedia: Parking Evaluation. Retrieved May 17, 2015, from <http://www.vtpi.org>



## Local Example: Micro Housing

Six years ago, Seattle Developer Jim Potter discovered a loophole in Seattle's Municipal Code, that would allow him to build eight small units around a common kitchen and call it a single apartment.<sup>a</sup> This is possible because the city code counts kitchens, not sleeping units, for the purpose of regulating development. Thus the owner of a parcel zoned single family, or 1 dwelling unit per parcel size of land, could build eight small rooms with a common kitchen and living space. Over the last 2 years micro apartments or have become exceedingly prevalent. At last count, 780 micro-housing units were cleared for occupancy in Seattle, with another 1,598 units in the pipeline.<sup>b</sup> Besides neighbors concerns that this development skirts the design review process, they are also concerned about parking. These developments require no parking but have strong potential higher vehicle ownership than was intended. Neighbors are concerned for the spillover this could cause to the on-street parking in from of their homes.

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<sup>a</sup>Solovitch, S. (2014, October 14). Scrunched in Seattle. Politico Magazine. Retrieved May 17, 2015.

<sup>b</sup>Keheller, S. (2014, March 7). Seattles micro-housing boom offers an affordable alternative. Seattle Times. Retrieved May 17, 2015.



#### *2.4.5 Developers' Opinions on Parking Regulation*

As stated previously, the provision of parking, more specifically the over provision of parking, can lead to the reduction of housing affordability, increases in development costs, and unnecessary consumption of land and natural resources. Developers will state that their projects must meet a certain rate of return, based on several things like the amount of risk being taken, or they will scrap a project. So, if they are required to build more parking than they otherwise might, and more than is needed, that added cost will simply get passed along to users of the property so the rate of return is still achieved. This exacerbates issues of housing affordability.

Several studies have sought to explore the general views of developers with regard to minimum parking requirements. One such report found that generally developers find parking requirements to be excessive and overly rigid.<sup>115</sup> Anecdotally, one developer shared that parking requirements prevented him from including three-bedroom units in a project because the units would have required three parking spaces per unit.<sup>116</sup> In this case, parking requirements dictated the kind of housing that was being supplied.

Developers perceived considerable market interest in exploration and experimentation of alternative development typologies but identified government regulation to be the primary obstacle to further exploring such alternative.<sup>117</sup>

#### *2.4.6 Multifamily Parking*

One of the major facets of smart growth, and more specifically dense development, is parking demand for multifamily parking. Dan Rowe with King County Metro has done extensive research on this subject dating back to his master's thesis while studying urban planning at

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<sup>115</sup>Mejias, L., & Deakin, E. (2005). Redevelopment and Revitalization Along Urban Arterials: Case Study of San Pablo Avenue, California, from the Developers' Perspective. *Transportation Research Record*, (1902), 26-34.

<sup>116</sup>iBid.

<sup>117</sup>Levine, J., & Inam, A. (2004). The Market for Transportation-Land Use Integration: Do Developers Want Smarter Growth than Regulations Allow? *Transportation*, 31(4), 409-427.

the University of Washington.<sup>118</sup> His thesis was later published in the Journal of American Planning Association,<sup>119</sup> and in the Institute for Transportation Engineers Journal.<sup>120</sup> This work confirms what has already been discussed about the foundations of most minimum parking requirements. Namely, how they have been a result of old data collected in suburban settings with little transit availability. His report evaluates multifamily parking demand in two densely developed locations in King County, WA. The results from this study suggest that these locations have supplied almost 50% more free off-street parking than demand necessitates, specifically where transit is present.<sup>121</sup>

From this report Rowe has worked with King County Metro to develop a program called “Right Size Parking.”<sup>122</sup> A major result of this program is a tool that Metro calls the “Right Size Parking Calculator,” which is a data-driven tool to estimate parking use based on context-sensitive land use, transit, and building characteristics.<sup>123</sup>

In November 2013, Rowe published an article titled, “Minimum Efforts: How a City Successfully Addressed Minimum Parking Requirements for Multifamily Properties.” In this report he asserted that the best case would be for cities to adopt a market-based approach where parking requirements are removed and the amount of parking supplied in multifamily projects would then be determined by the developer’s determination of customer/tenant needs.<sup>124</sup>

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<sup>118</sup>Rowe, D. (2010). Assessing Multifamily Residential Parking Demand and Transit Service: A Comparison of Two Urban (Master’s Thesis). Retrieved from UW Built Environments Library

<sup>119</sup>Rowe, D., Bae, C., & Shen, Q. (2011). Evaluating the Impact of Transit Service on Parking Demand and Requirements. Transportation Research Record: Journal of the Transportation Research Board, (2245), 56-62.

<sup>120</sup>Rowe, D., Bae, C., & Shen, Q. (2010). Assessing Multifamily Residential Parking Demand and Transit Service. ITE Journal - Institute of Transportation Engineers, 80(12), 20-24.

<sup>121</sup>iBid.

<sup>122</sup>Right Size Parking. (n.d.) King County Metro: Projects & Planning. Retrieved May 17, 2015, from <http://metro.kingcounty.gov>

<sup>123</sup>King County Multi-Family Residential Parking Calculator. (2012). Right Size Parking. Retrieved May 17, 2015, from [www.rightsizeparking.org](http://www.rightsizeparking.org)

<sup>124</sup>Rowe, D. (November 2013). Minimum Efforts. International Parking Institute. Retrieved May 17, 2015, from <http://metro.kingcounty.gov>

## **2.5 Mixed-Use Parking**

### *2.5.1 The Complexities of Mixed Use Parking*

Take, for example, a simple mixed use building with retail on the street level and several floors of apartments above. General practice for current minimum parking requirements would stipulate that the developer provide a certain number of parking stalls per residential unit as well as a certain number of parking stalls per square foot of retail space. If the developer provides each and every one of those spaces, the majority of the residential spaces will sit vacant from 9am to 5pm while those residents are at work, and the retail spaces will sit vacant from about 8pm to 9am; depending on the retail establishments' hours of operation. If residents and retail patrons could find a way to share parking spaces, residents at night and patrons during the day, a significant number of stalls could be eliminated.

The example above is a simple one. Now imagine expanding the scope of development to either one large development or several adjacent developments with dozens more land use types mixed in. Parks, churches, restaurants, schools, theaters and others each have their own isolated minimum parking requirements. But, because certain uses have peak times at one time of the day or week and others at a different time of the same day or week, the parking could be shared subordinate to proximity.

This concept is called “shared parking,” and is written about extensively in Victoria Transport Policy (VTP) Institute’s, “Transportation Demand Management Encyclopedia.”<sup>125</sup> This resource provides substantial background, explanation, alternatives, and additional resources to thinking differently about parking supply for mixed use developments and areas. One thing this resource does not do, is attempt to quantify either new contextual mixed-use parking requirement suggestions, or percent parking reductions based on mix of uses. This will be explored in the remainder of this section.

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<sup>125</sup>Litman, T. (2013, March 12). Victoria Transportation Policy Institute TDM Encyclopedia: Shared Parking. Retrieved May 17, 2015, from <http://www.vtppi.org>

### *2.5.2 Methods of Estimating Mixed-Use Parking Demand*

As early as 1991, it has been acknowledged that mixed-use parking demand has not been well understood. Geok Kuah recognized this need and developed his own approach.<sup>126</sup> The approach consisted of three steps: estimating the basic parking demand for employees and non-employees for each of the proposed uses of a mixed-use development, reducing the basic parking estimates to account for transit use, and finally, reducing parking demand is adjusted to account for shared parking among individual land uses of the development. Since then, there have been two general approaches to estimating parking needs in mixed-use developments: policy determined flat rate reduction factors and ITE's trip generation estimates for Multi-use (or mixed-use) Development.

#### *Reduction Factors*

The reduction factor, essentially takes minimum parking requirements for multiple isolated uses like described above, combines them to get the overall minimum parking requirements for a mixed-use development, and then reduces it by some factor. In terms of trips taken, this reduction accounts for internal trips taken within the development as well as walking and transit trips that would normally have been taken by automobile, while, in terms of parking supply needs, this reduction essentially accounts for the parking sharing that is possible in a mixed-use development. There have been several reports published on different methodologies for accomplishing this reduction. For example, one research finding suggested that reductions could be estimated on a quantified, context-based approach using household travel surveys.<sup>127</sup> Using common metrics of the built environment it is possible to group similar contexts across a region, empowering the approach to be applied to other locations. When this study controlled for socio-demographic variables, the contexts became the most signifi-

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<sup>126</sup>Kuah, G. (February 1991). Estimating Parking Demand for Mixed-Use Developments Subject to TSM Ordinances. ITE Journal - Institute of Transportation Engineers. 61(2). 19-24.

<sup>127</sup>Clifton, K. et al. (2012). Household Travel Surveys in Context-Based Approach for Adjusting ITE Trip Generation Rates in Urban Contexts. Transportation Research Record: Journal of the Transportation Research Board, (2307), 108-119.

cant parameter in predicting reduction opportunities, while variations in socio-demographic parameter combinations contribute little to the predicted reductions.

One group has taken ITE “Parking Generation” base information—the data collected from each single, isolated, suburban land use—and combined it with data collected by the Urban Land Institute in a report named, “Shared Parking.”<sup>128</sup> This utilized both publication and created its own methodology for computing the reduction attributed to shared parking and has attached its work to a scenario planning tool called Envision Tomorrow Plus (ET+).

### *Trip Generation*

The second method to estimating parking needs is to assess trip generation in an effort to find out how many vehicles will be making trips to and from a particular location and at a particular time. Trip generation is already a necessary component to development because developers must ascertain the impacts their development will have on the existing nearby roadways. If this is done well, peak hour trip generation should indicate how many spaces a certain property or location needs.

This method requires a second publication put out by the Institute of Transportation Engineers called, “Trip Generation.”<sup>129</sup> Like “Parking Generation,” “Trip Generation” is a manual of data that have been voluntarily collected and submitted to ITE. More specifically with regard to mixed-use development (MXD), the 2nd edition of the “Trip Generation Handbook,” published in 2004, has an entire chapter called, “Multi-Use Development” where it sets out a methodology for estimating trip counts in multi-use, or mixed-use development. Trip generation, like the reduction factor method, must account for ways in which mixed-use development behaves differently than the suburban isolated land uses that are the primary sources for trip generation’s data. More specifically, based on the size and layout of the

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<sup>128</sup>Mixed Use Parking Demand. (2012). Envision Tomorrow Plus. Retrieved May 17, 2015, from <http://www.arch.utah.edu>

<sup>129</sup>Trip generation: An ITE informational report. (8th ed.). (2008). Washington, DC: Institute of Transportation Engineers.

development, a certain number of trips may be entirely internal. In other words, a person may drive from one part of the development to another to utilize a different use. This person is exchanging one parking space for another and theoretically should not be supplied with two spaces.

This method was validated in a study done for the San Diego Region Planning Agency in 2010.<sup>130</sup> The study compared the trip generation estimates to actual travel data from twenty of the San Diego regions Smart Growth Opportunity Areas and six smaller mixed-use transit-oriented development (TOD) sites. It was further validated with data collected at sixteen smart growth sites nationwide. The report asserted that the ITE method represented a dramatic improvement over current methods of estimating trip generation for mixed-use development. While the method does produce reliable estimates of trip generation that are highly sensitive to the context of any given development, the study did contend that the method is still somewhat conservative.

Like “Parking Generation,” “Trip Generation” has borne its share of criticism. This manual represents weighted averages from studies conducted throughout the United States and Canada since the 1960s. Data were primarily collected at suburban locations having little or no transit service, nearby pedestrian amenities, or travel demand management programs. In the multi-use development chapter, in the procedures for estimating trip generation, it states, “The analyst is encouraged to exercise caution in applying the data presented herein because of the limited sample size and scope.” Further, while the publication uses the word “daily” it only has data available for weekday P.M. hour, for midday, and for the period between noon to 6:30pm. The ITE method has no data for the A.M. peak hour.

Many reports suggest that ITE’s trip generation and parking generation rates underestimate automobile trip reductions in smart growth, or transit-oriented, development.<sup>131</sup> Thus many of the studies cited here have made attempts to manipulate ITE’s trip gener-

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<sup>130</sup>Trip Generation for Smart Growth: Planning Tools for the San Diego Region. (June 2010). San Diego’s Regional Planning Agency. Retrieved May 17, 2015, from <http://www.sandag.org>

<sup>131</sup>Schneider, R. et al. (2013). Methodology to Gather Multimodal Trip Generation Data in Smart-Growth Areas. Transportation Research Record: Journal of the Transportation Research Board, (2354), 68-85.

ation method. One study asserted that older versions of “Trip Generation” only took into consideration the three most frequent components of MXD: office, retail, and residential. This report suggests expanding the considered components to six as it asserts that almost all MXDs contain at least four of the six of these uses: office, retail, restaurant, residential, cinema, and hotels.<sup>132</sup> Beyond adding three land uses, this particular report also created a methodology: included peak AM hours and included the effects of proximity between interacting land uses to represent compactness and design. Ultimately, this methodology was made into an easy-to-use, spreadsheet format.

### *2.5.3 Mixed Use Parking Studies*

In this section, studies conducted on mixed-use parking will be explored. Those studies and explored methodologies presented here have been deemed to be in some way related to the topic at hand; specifically mixed-use, smart growth, or transit-oriented development parking demand.

Many have studied what has already been hypothesized as an oversupply of parking in areas with easy transit access. A study done in small cities in 2006 found that study sites achieve more benefit from a smaller amount of parking.<sup>133</sup> Their method, occupancy count, revealed that every site had been oversupplied with parking even during peak hours. One of the control sites had more than half of its parking spaces vacant on the busiest day of the year.

San Diego County’s Metropolitan Planning Organization, SANDAG, published a parking strategies document on smart growth areas in the region.<sup>134</sup> As part of the formulation of this document, parking studies were conducted. SANDAG found that typical parking

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<sup>132</sup>Boachner, B. et al. (2011). NCHRP Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments. National Cooperative Highway Research Program. Retrieved May 17, 2015, from <http://onlinepubs.trb.org>

<sup>133</sup>Marshall, W., & Garrick, N. (2006). Parking at Mixed-Use Centers in Small Cities. Transportation Research Record: Journal of the Transportation Research Board, 164-171.

<sup>134</sup>Parking Strategies for Smart Growth: Planning Tools for the San Diego Region. (June 2010). San Diego’s Regional Planning Agency. Retrieved May 17, 2015, from <http://www.sandag.org>



requirements in the region may provide an excess supply of parking relative to demand documented in nationwide studies. Further study of parking demand was called for at smart growth sites in the region at the neighborhood level, in order to capture each areas unique characteristics with respect to parking demand. A 1998 study asserted similar findings with regard to context specific requirements.<sup>135</sup> This report suggested that while many patrons in their study sites walk, the trips by modes other than automobile are offset by a higher overall level of activity in the area.

A 2010 study found that current parking requirements in the San Diego region are likely higher than typical parking demand at smart growth developments and that reducing parking supply would be appropriate.<sup>136</sup> In 2013 a similar study found that minimum parking requirements for neighborhood-oriented shopping centers located near light rail stations are commonly too high.<sup>137</sup>

To accompany many of these findings that parking has been over supplied in mixed-use and smart growth areas, several studies included suggestions and exploration of parking strategies that municipalities could utilize moving forward.<sup>138</sup> Some of these strategies include:

- off-street parking agreements
- improvement of select off-street lots

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<sup>135</sup>Steiner, R. (1998). Trip Generation and Parking Requirements in Traditional Shopping Districts. Transportation Research Record, (1617), 28-37.

<sup>136</sup>Lee, R. et al. (December 2010). Smart Growth Parking Requirements Review. ITE Journal - Institute for Transportation Engineers. 80(12) 36-40.

<sup>137</sup>Smith, A. (2013). Parking Utilization in Neighborhood Shopping Centers on Transit Routes in San Jose, California: are Minimum Parking requirements Too High?. Transportation Research Record. (2359) 27-35.

<sup>138</sup>Mount Rainier Mixed-Use Town Center Parking Study Technical Report. (January 2013). City of Mount Rainier, Maryland. Retrieved May 17, 2015, from <http://www.princegeorgescountymd.gov> AND Parking Spaces/Community Places: Finding the Balance through Smart Growth Solutions. (January 2006). U.S. Environmental Protection Agency: Development, Community, and Environment Division. Retrieved May 17, 2015, from <http://www2.epa.gov> AND Zimler, R. (n.d.) Driving Urban Environments: Smart Growth Parking Best Practices. Maryland Governor's Office of Smart Growth. Retrieved May 17, 2015, from <http://www.mass.gov>

- better parking information
- performance parking
- graduated parking
- wayfinding signage
- increasing parking turnover

Now that the breadth of study on this subject has been revealed, the following chapter will describe the questions that this study posed and the methods it took to answer those questions.

## Chapter 3

### METHODOLOGY

Thus far, this report has attempted to paint a broad picture of factors that inform parking habits and trends. The remainder of this report will explore many of these factors within the context of the Puget Sound Region. The primary question that this report strives to answer pertains to the regions emerging trends to encourage TOD-style mixed-use developments in areas that have both been designated for future growth and have frequent and reliable transit. The question is whether or not these developments are providing reasonable and responsible levels of off-street parking. As studies previously discussed have suggested, it was hypothesized that these new developments are generally providing more parking than is warranted considering the wealth of alternative transportation options being facilitated in these areas.

There are a number of secondary questions that succeed the first. Namely:

1. How do actual parking supplies in large, TOD-style mixed-use developments compare to prescribed city municipal code requirements?
2. Is there a difference between the cost to park on street and off street?
3. How are all of these factors effecting both the occupancy of off-street facilities that have already been constructed as well as on-street parking in the neighborhood?

Here it was hypothesized that developers are providing fairly traditional levels of off-street parking despite the presence of frequent and reliable transit and the opportunity for parking space reduction which will be explored in later chapters. Further it was hypothesized that spillover to on-street parking is occurring; not because there is an under supply of off-street parking but because the neighborhoods are not doing enough to regulate, and

more specifically charge for, on-street parking. This cost disparity and abundance of under regulated on-street parking is enabling residents to forgo the cost of off-street parking. This would, in turn, leave off-street parking under utilized.

This report first analyzed King County Metro's 2013 transportation and parking trends survey. This analysis gave local credence to the academic findings presented above as well as some insight into park mentalities in the Puget Sound Region's context. The next step was to identify the areas that make the most sense to study. Here a series of characteristics were employed to narrow the field of potential study areas until finally two remained. Two, instead of one, to make sure that one study area selected was not a complete anomaly and to broaden the contexts in an effort to be able to say something more universally substantial. In order to answer the primary question, a database of all mixed-use developments within the two study areas was gathered, and narrowed to just the large, TOD-style developments. Each buildings leasing office was the contact for the following information:

1. How many residential units are there in your building?
2. What is your current occupancy rate for units?
3. How many square feet of commercial space is there in your building?
4. How many off street parking spaces are there in your building?
5. Are they separated by use?
6. If so, how many for each use?
7. What is your current occupancy rate for parking spaces?
8. How much do you charge monthly for a parking space?

The unit occupancy rates vs. parking occupancy rates gave some indication of whether or not appropriate levels of parking supply have been provided. The amount of parking provided vs. number of units/square feet of commercial space were compared to City municipal codes to see then whether or not developers were providing the proscribed amount of parking. These two results combined gave some insight into whether or not city codes are asking an appropriate amount of parking be provided.

The Runstad Center's unique relationship with the Washington State Department of Licensing (DOL) offered a compelling opportunity to explore the situation further. License

plates were collected for all vehicles parked on street within the study areas in the middle of the night; between 11:00pm and 4:00am on a weeknight. These plate numbers were then sent to the State DOL and were returned with registered addresses for the owners of those vehicles. These addresses were joined with King County assessor data to established what present uses of those addresses were. Ultimately, this revealed what type of use's vehicles were parking on the streets in the study areas. More specifically, this revealed whether or not mixed-use development residents were parking on street. This gave some indication of whether spill over is occurring. If there is no parking vacancy in a mixed-use building and there are residents who were parking on the street, spillover was likely occurring do to under supply of parking. If there was parking vacancy in a mixed-use building and it has residents who were parking on the street, spillover was likely occurring do to a pricing differential. This could be confirmed by finally comparing the price to park off street and the price to park on street. This ultimately gave some indication of whether the neighborhood is appropriately regulating on-street parking.



## Chapter 4

### KING COUNTY METRO SURVEY ANALYSIS

In early 2013, King County Metro disseminated a survey of transportation and parking use at residential developments in King County. The survey consisted of 35 questions and takers were offered a \$10 gift card incentive for taking the survey. In all, 559 people took the survey. This chapter will summarize several of the results in an effort to better understand the public's mentality toward driving and parking in the Puget Sound Region.

The survey asks several demographic questions in an effort to gauge whether or not those who took the survey were characteristic of the general population. Figures 4.1 and 4.2 show the household income and size of households, respectively.

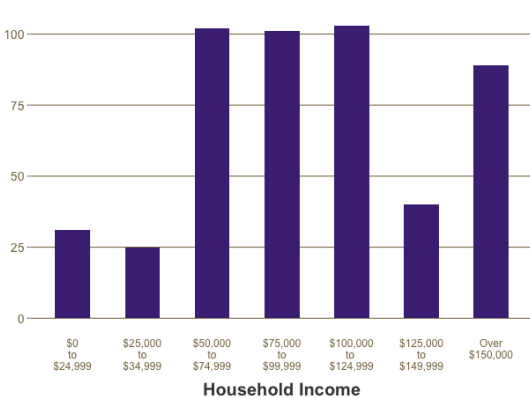


Figure 4.1: Household Income of Surveyees

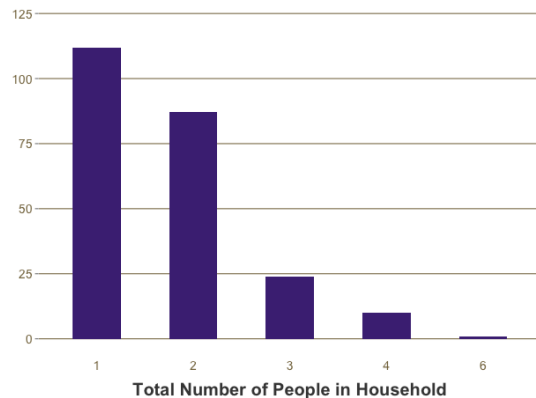


Figure 4.2: Total People per Household of Surveyees

The median income range for this group fell somewhere in the upper part of the \$75,000 to \$99,999 income category. The average household income in King County in 2013 was \$71,811, suggesting that in general, survey takers were slightly more affluent than the general

King County population.<sup>1</sup> The average household size for survey takers is 1.7 people. The average size of households in King County in 2013 was 2.42, suggesting that in general, survey taking households were smaller than the general King County population.<sup>2</sup> Generally, more affluent and yet smaller households suggest that many of the survey takers may have been characteristic of the young, creative class that has recently come to characterize the new Seattle.

Next, the survey attempts to gather some general vehicle use information from the takers. Figures 4.3 and 4.4 show the total number of licensed drivers and owned vehicles per household, respectively.

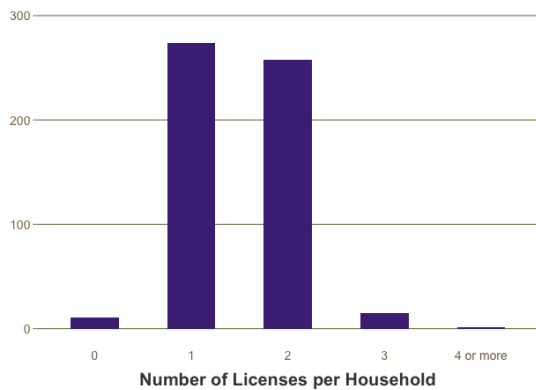


Figure 4.3: Total Licenses per Household of Surveyees

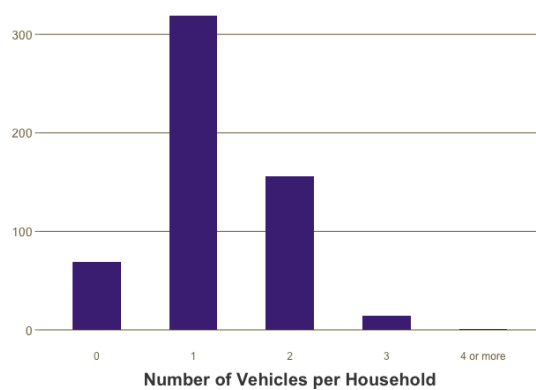


Figure 4.4: Total Vehicles per Household of Surveyees

The average number of licenses per household was 1.5 while the average number of vehicles owned per household was 1.2. Both the graphics and these averages suggest there are about 20% less vehicles than license holders.

The survey then moves to several questions on general household parking tendencies. Figures 4.5 and 4.6 show the number of household vehicles parked on site (off street, in

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<sup>1</sup>King County, Washington. (2015, April 22). U.S. Census: State & County QuickFacts. Retrieved May 17, 2015, from <http://quickfacts.census.gov>

<sup>2</sup>iBid.



their building’s garage or lot) and the number of household vehicles parked off site (anywhere other than their building’s garage or lot), respectively.

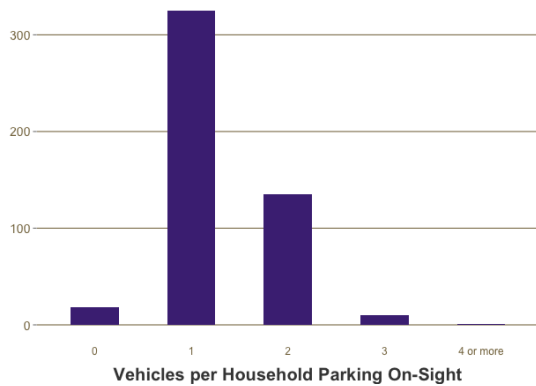


Figure 4.5: Vehicles per Household Parking On-Sight

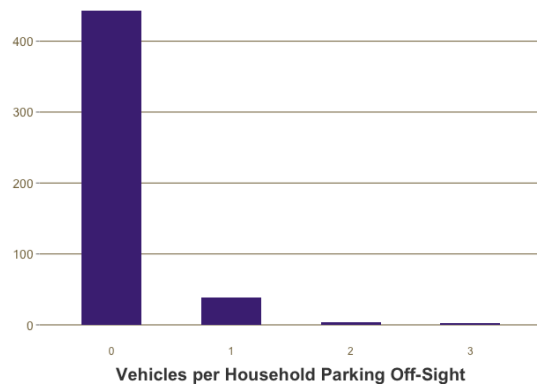


Figure 4.6: Vehicles per Household Parking Off-Sight

Vehicles parked in building’s garage or lot average almost 1.3 per household while vehicles parked anywhere other than building’s garage or lot average .1 per household. In comparing Figure 4.5 to Figure 4.4 above, it can be observed that they are almost identical. This suggests that just about every vehicle owned by survey takers is parked on site (off street) while nearly none are parked off site (on street or otherwise).

The survey then asks this same question again in a different way. It asks, “For parking at home, do you or your other household members’: park in an on-site garage or lot, in an off-site garage or lot, or use on-street parking.” Figure 4.7 shows the results of this question. This confirms the results found in the previous line of questioning.

The next question gets at the cost people were paying for parking spaces at home. Figure 4.8 is a histogram of how many people pay a certain cost in \$10 increments.

For those who pay for parking, costs ranged from \$30 to \$210 per month with the average being right around \$120. Another 31 responders said they paid \$0 per month for parking which would bring the average cost down to about \$90 per month.

The next two questions dealt with the amount of time it generally took responders to

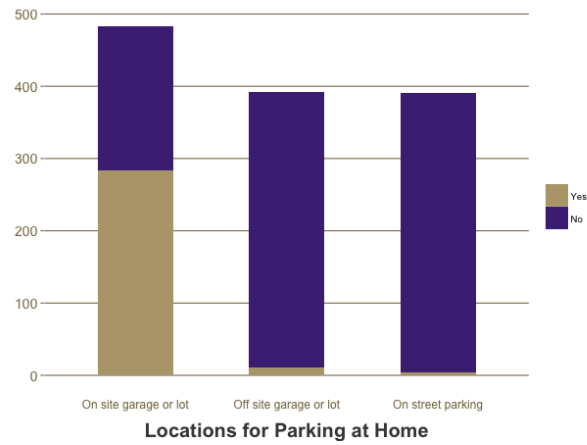


Figure 4.7: Location for Parking at Home

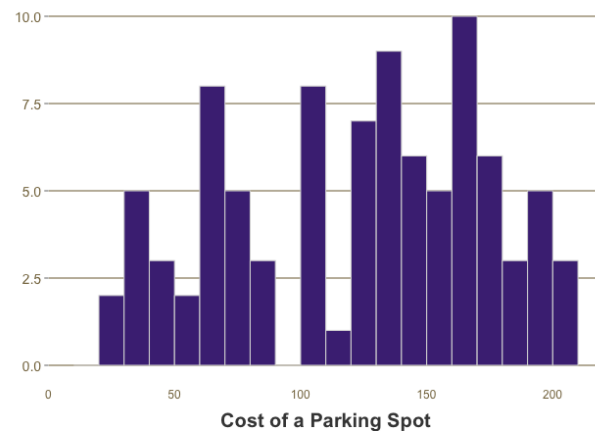


Figure 4.8: Cost of Parking Spaces

find parking and then the amount of time it generally took them to walk from their parking space to their residences. Figures 4.9 and 4.10 show the results.

The median category for time searching for a parking space is none suggesting that people generally spend nearly no time at all having to search for parking. This is likely due to the fact that many people have assigned spaces, or at the very least, an unassigned spot in a lot that is reserved for them. The median category for time walking from parking to home is less than a minute, suggesting that not only do people not spend very much time searching

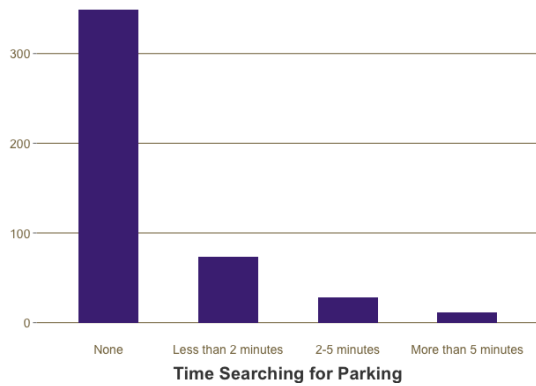


Figure 4.9: Amount of Time Searching for Parking

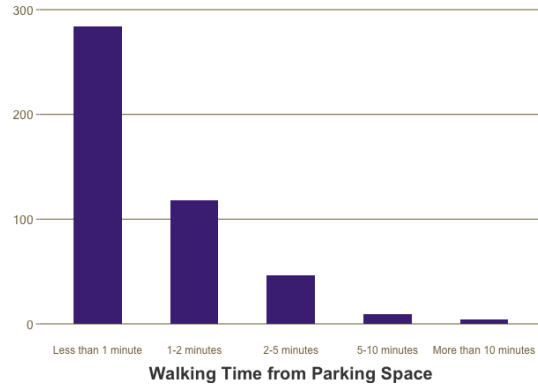


Figure 4.10: Amount of Time Walking Home from Parking

for parking, but, when they find it, it is very close to home. This is likely due to the fact revealed above, most people park on site.

The next line of questioning asks whether people use assigned parking spaces or unassigned. It then asks why people use assigned or unassigned spaces. Figures 4.11, 4.12, and 4.13 summarize the results.

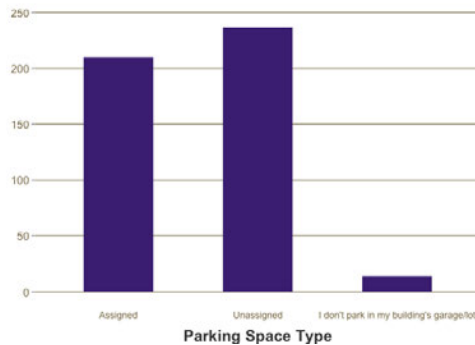


Figure 4.11: Assigned vs. Unassigned Parking Rental

The first graphic shows that people are generally split between paying for assigned spaces and using unassigned spaces, and reinforces the notion that very few survey takers park off site. Nearly 2/3 of survey takers who use assigned parking say they do so because all spaces

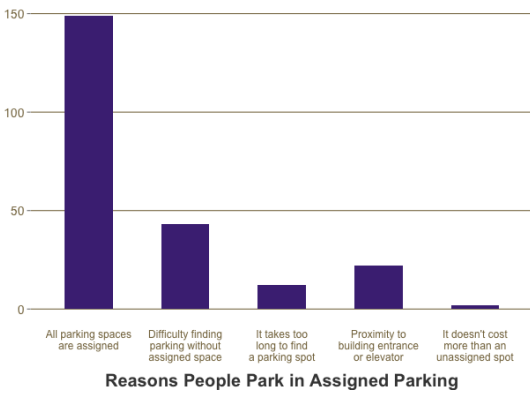


Figure 4.12: Reasons People Park in Assigned Parking

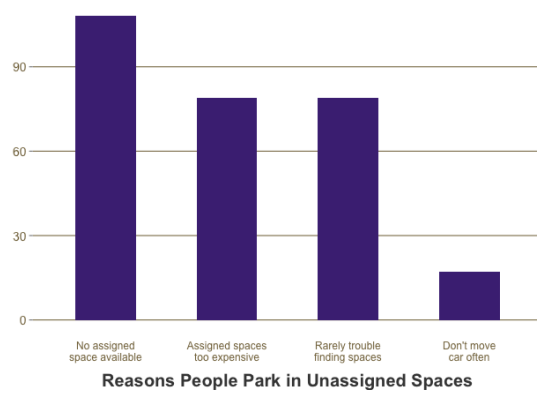


Figure 4.13: Reasons People Park in Unassigned Parking

in their building are assigned. For those survey takers who use unassigned parking, there is much more of an even split between: no assigned parking being available, assigned spaces being too expensive, and users rarely having trouble finding spaces. Put together, these graphics suggest that if more people were given the option not to use assigned parking they would likely do so.

The next question in the survey had to do with exploring when, if ever, people had a hard time finding parking. Figure 4.14 breaks down time by weekday and weekend.

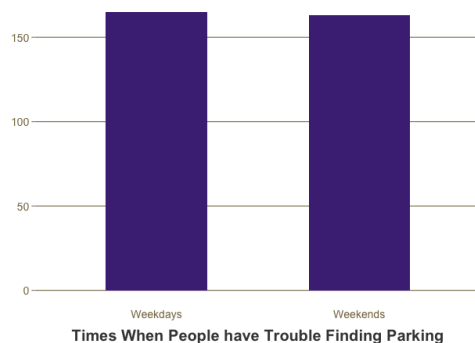


Figure 4.14: Times When Parkers Have Difficulty Finding Parking

The graphic shows that they are essentially the same, with just over 150 of the 559

survey takers having difficulty finding weekday parking and just over 150 of the 559 survey takers having difficulty finding weekend parking. It is surprising that almost all survey takers suggest they park on site and yet well over a quarter of them have difficult finding parking. If the survey taker lives in a single family detached home he/she should have no problem fighting his/herself off for on-site parking on their own property, while if that another survey taker lives in a multifamily situation he/she should likely have some kind of arrangement for his/her on-site space (whether assigned or unassigned). This result makes very little sense unless the managers of the multifamily buildings are over renting their unassigned parking spaces, or are not charging for parking and so it is effectively a free-for-all.

The next question attempted to get at some of the incentives users might find most attractive. The survey gets at this by asking how interested survey takers would be in a parking space in an off-site, safe, secure garage or lot with a guaranteed parking space within walking distance of your residence if: (a) the cost was half as much as the price of parking spaces at your building; (b) the cost was free; (c) the cost was the same, but you were provided a discount for a transit pass; or (d) the cost was the same, but you were provided a discount for car share? Figure 4.15 shows the results.

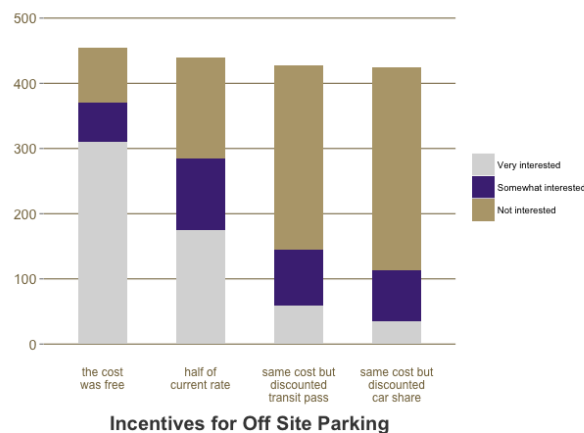


Figure 4.15: Peoples Interest in Incentives

This graphic shows that the cost of parking is the strongest of the factors present. As

the incentive goes from completely free, to half price, to full price plus perks, interest drops by about half each time.

The next question asked what survey takers' biggest concerns were about parking at home. While responses were stated in survey takers' own words, they generally fell into one of eight categories:

- High cost
- Security and safety
- Parking space size
- Convenience
- More guest parking
- Covered spot
- Upkeep
- Someone parking in my spot

Figure 4.16 summarizes the frequency in which each category was suggested.

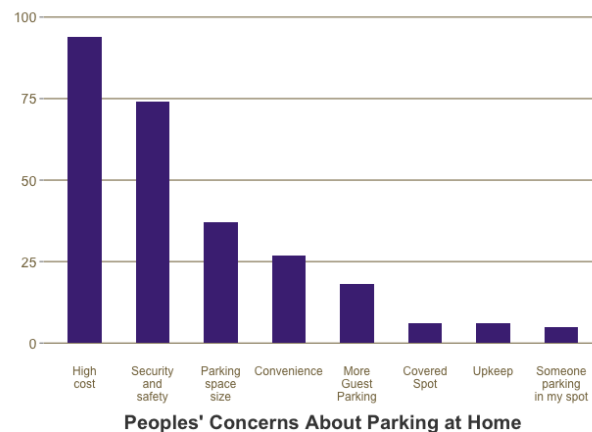


Figure 4.16: Peoples Concerns About Parking at Home

As suggested from the last survey question results, cost is the largest factor influencing peoples' parking habits. Safety and space size were also significant factors.

As was shown in the previous graphic, guest parking is an issue for many users. The next two questions in the survey were intended to analyze visitor use. Figures 4.17 and 4.18 show where visitors park when they visit as well as how frequently they have issues finding parking, respectively.

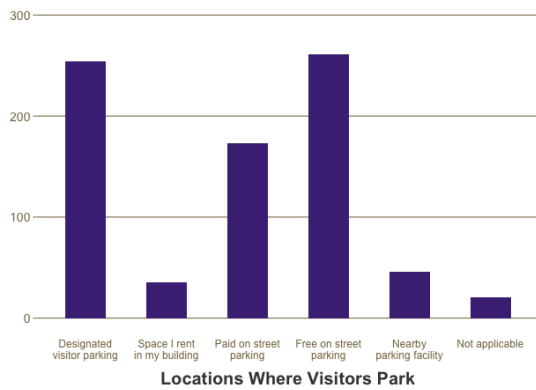


Figure 4.17: Locations Where Visitors Park

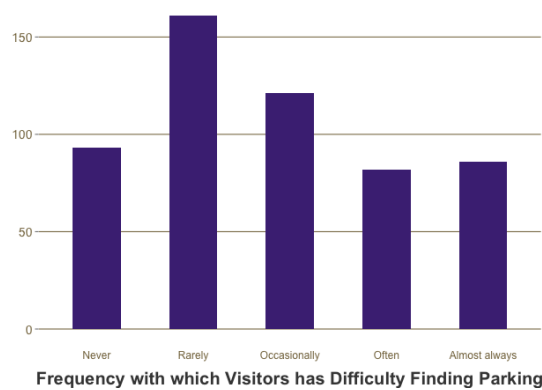


Figure 4.18: Visitors Difficulty Finding Parking

The graphics show that most visitors either park on street or in on-site visitor parking. Further, while visitors are slightly more likely not to have issues finding parking it seems that they will generally be just about as likely to have a hard time finding parking as not.

The next survey question sought to identify how people typically move during non-commute trips. In other words, not including trips to work or school how do people run errands, get to appointments, and get to entertainment? Figure 4.19 summarizes the results.

The graphic shows that driving alone and walking make up almost 75% of the non-commute trips taken, while carpooling and transit make up almost all of the rest, and biking is done very little by the responders to this survey. The large response to walking suggests that many of the survey takers live in places where errands, appointments and entertainment are close and accessible.

The next two survey questions explore survey takers' use of the ORCA card. ORCA

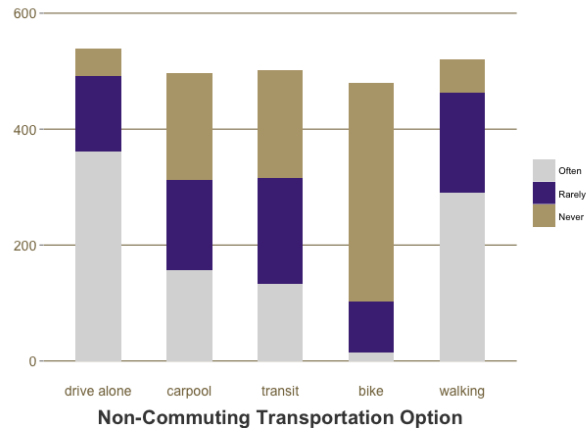


Figure 4.19: Peoples Non Commuting Transportation Choices

stands for “One Regional Card for All.” The ORCA card works like cash or a pass, automatically tracking the value of different fares and transfers. The electronic fare card works for all seven of the major public transportation agencies serving King, Kitsap, Pierce and Snohomish counties: Community Transit, Everett Transit, King County Metro Transit, Kitsap Transit, Pierce Transit, Sound Transit, and the Washington State and King County Ferries. Figures 4.20 and 4.21 summarizes responders’ possession of ORCA cards, and for those who have one, how it is paid for, respectively.

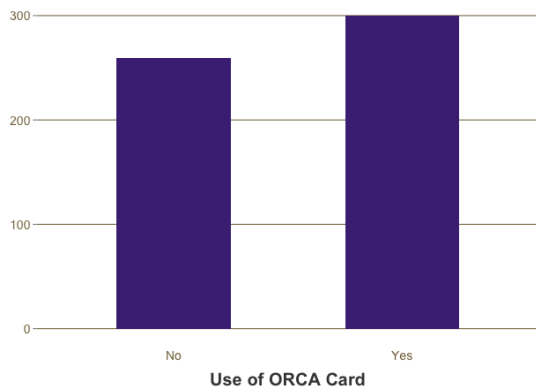


Figure 4.20: Surveyees Use of ORCA Cards

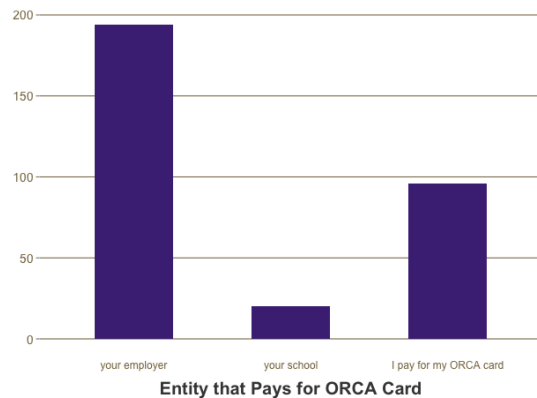


Figure 4.21: Payer of Peoples ORCA Cards



About half of survey takers had ORCA cards and half did not. Of those that did, 2/3 were paid for by employers while most of the rest of the remaining third were paid for by the ORCA card holder themselves.

The next survey question sought to discover the top factors that influenced survey takers' choices on where to live. Figure 4.22 summarizes the results.

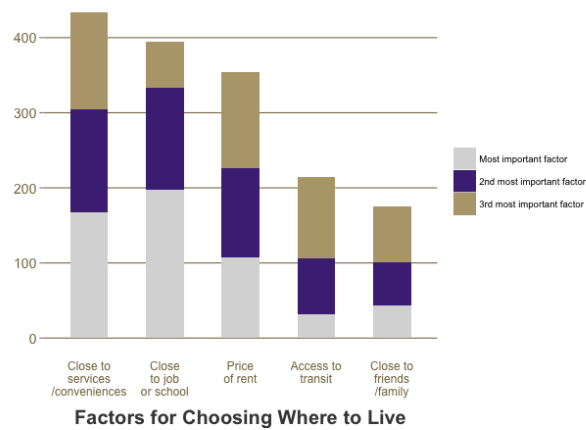


Figure 4.22: Factors that Most Influence Where People Choose to Live

Proximity to services/conveniences and work as well as price of rent were among the leading factors for most people. The two strongest factors continually revealing themselves throughout these questions have been cost and convenience. People desire convenience but are even more heavily influenced by cost. Then, the survey attempted to deduce whether the priorities just reviewed had ever caused survey takers' to have zero cars, or less cars than they would otherwise have. Figure 4.23 shows the results.

Keep in mind here that this response was to whether or not survey takers' most influential factors when choosing where to like have ever influenced them to reduce the number of vehicles they own. The result is a resounding no. The survey ends with the second part to that question. If survey takers' were not willing to reduce vehicle ownership based on any of the factors suggested in Figure 4.22 then what are the most important features that cause them to think about having less vehicles than they would otherwise have? Figure 4.24 shows

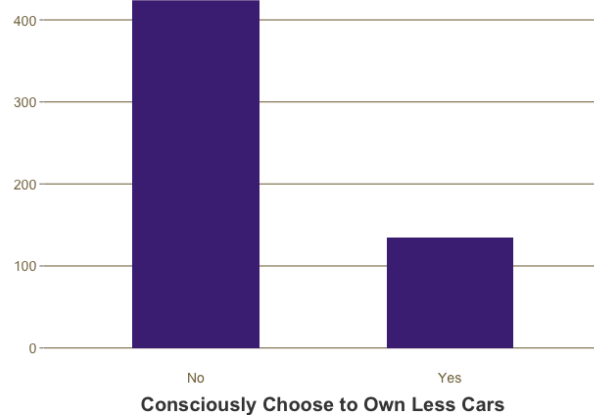


Figure 4.23: Reduction in Vehicle Ownership Do to Factors

the results.

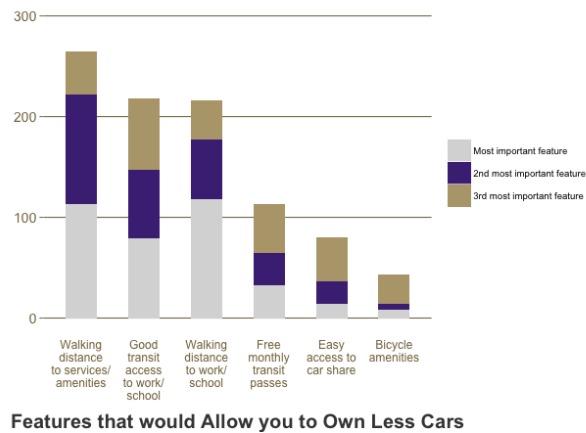


Figure 4.24: Features that Would Allow Surveyees to Own Less Cars

The most important 3 factors all revolved around good access (or convenience): access to services/conveniences, access to transit, and access to work/school. Oddly enough, these are essentially the same factors seen in Figure 4.22. This suggests that either people are not actually able to live in places that satisfy their most important selection criteria, or that even the most important features that could influence them to reduce their vehicle ownership are

not influential enough. This might suggest that survey takers have lofty ideals but quickly excuse them when it is not practically convenient.

This survey suggested several important parking facts which reinforce many of the issues that have already been discussed in this paper. The results of the comparison between Figures 4.4 and 4.5, pair with Figure 4.10 suggests that in King County, just about everyone who owns a car had the ability to park it in a convenient, on-site garage/lot. The results of parking costs revealed that the percentage of respondents who pay for: on-site garage or lot was 58%, off-site garage or lot was 2%, and off site street parking was 1%. This suggests that for those who find parking outside of their buildings' garages or lots, they pay very little if ever. Finally, as stated throughout this chapter, this survey confirms that cost is the most influential factor in parking followed by convenience. When people are given free parking they are inclined to use it more and when not, the survey suggests they think harder about not.



## Chapter 5

### STUDY AREAS

The Puget Sound Region, its counties, and its municipalities have elected to direct future growth to designated areas for denser development, encourage a broad range of amenities, and provide transportation options within those areas. The intent of this report is to analyze the appropriateness and effectiveness of parking requirements for mixed-use buildings in these places. Thus, it is vital to the integrity of this report to choose locations for the study that bear several important characteristics. The most effective places to analyze will be those that look most similar to what the region is encouraging, are currently developing in that direction, and are in designated growth areas in the future. That way, any inappropriate practices in current parking policy, regulations, and provision might inform smarter action in the future. This chapter will briefly explore each of these characteristics and demonstrate why the Seattle neighborhoods of Ballard and West Seattle were selected as study areas for this report. This chapter will further explore the current off-street parking requirements in each of these study area.

#### **5.1 Selection Characteristics**

The three most important characteristics that should be present in the study areas are: fast and reliable transit service, future growth area designation, and presence of transit-oriented development (TOD) style mixed-use developments.

##### *5.1.1 Frequent and Reliable Transit*

As outlined above, the Puget Sound Region, its counties, and its municipalities has primarily invested in frequent and reliable transit in two forms: light rail and bus rapid transit. The

Link Light Rail headways range from 7.5 minutes during weekday morning and evening travel hours to a maximum of 15 minutes during early morning, late night, and weekends.<sup>1</sup> Similarly RapidRide headways range from 10 minutes during the busiest morning and evening travel hours to 15 minute service during off-peak periods.<sup>2</sup> Finally, Swift Bus Rapid Transit runs with 10 to 12 minute headways.<sup>3</sup> The initial field of potential cities and neighborhoods as candidates for the study areas were narrowed to those that are either on bus rapid transit routes or where a Link Light Rail station is present.

As shown in Figures 5.1 and 5.2 below, the Link Light Rail system currently serves a total of 19 station. Figure 5.3 shows King County Rapid Ride lines servicing many other neighborhoods and cities in King County.<sup>4</sup> And finally, Figure 5.4 shows Community Transit’s Swift line servicing a handful of cities north of Seattle in Snohomish County.<sup>5</sup>



Figure 5.1: Central Link Light Rail Configuration

<sup>1</sup>Link Light Rail. (n.d.) Sound Transit. Retrieved May 17, 2015, from <http://www.soundtransit.org>

<sup>2</sup>Always There. (n.d.) King County Metro RapidRide. Retrieved May 17, 2015, from <http://metro.kingcounty.gov>

<sup>3</sup>Swift Bus Rapid Transit (Community Transit and Everett Transit). (2012). Texas A&M Transportation Institute. Retrieved May 17, 2015, from <http://tti.tamu.edu>

<sup>4</sup>Link Light Rail. (n.d.) Sound Transit. Retrieved May 17, 2015, from <http://www.soundtransit.org> AND New Routes Coming Online for RapidRide. (2014, January 7). The Northwest Urbanist. Retrieved May 17, 2015, from <https://northwesturbanist.wordpress.com>

<sup>5</sup>Swift Bus Rapid Transit (Community Transit and Everett Transit). (2012). Texas A&M Transportation Institute. Retrieved May 17, 2015, from <http://tti.tamu.edu>

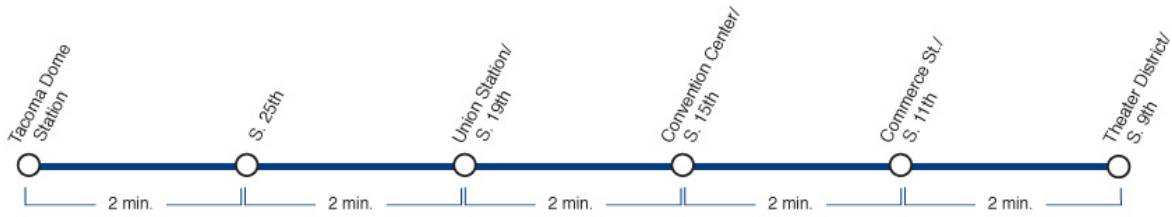


Figure 5.2: Tacoma Link Light Rail Configuration

*Side Note*

The most obvious locations to look for heavy presence of mixed-use development and frequent and reliable transit would be in the largest downtowns located within the Puget Sound Region. Downtown Seattle, Downtown Bellevue, Downtown Tacoma, and even Pioneer Square each have a substantial amount of mixed-use development. Further, each of these neighborhoods either has Rapid Ride service or Link Light Rail Service. However, because cities generally contain only one downtown, or Central Business District, it is impractical to assume that any other smaller cities or neighborhoods surrounding these downtown, either now or in the future, will ever operate in the same way that these downtown neighborhoods do. Thus these places have been eliminated as potential models for the future parking situations of high transit neighborhoods.

*5.1.2 Future Growth Area Designation*

For both the light rail and bus rapid transit there are some municipalities and neighborhoods with access at their peripheries and some with access in more central locations. Because the study areas for this report must not only have frequent and reliable transit present but transit that serves in places that are designated for concentrated growth, the cities and neighborhoods that have frequent and reliable transit, but only at their peripheries, were eliminated. This left the following cities as potential candidates: Burien, Everett, Federal Way, Redmond, Renton, SeaTac, and Tukwila. Further there are a number of neighborhoods



Figure 5.3: Rapid Ride Lines A Through F

in the City of Seattle that were still candidates for the study areas including: Aurora, Ballard, Beacon Hill, Chinatown/International District, Columbia City, Crown Hill, Fauntleroy, and West Seattle.





Figure 5.4: Swift Bus Rapid Transit Line Map

### 5.1.3 Presence of Mixed Use and TOD

To be an effective analysis of the kinds of development that is being encouraged for many of these urban centers, urban villages, and transit communities they must contain transit-oriented development patterns with a significant presence of mixed-use developments. Interestingly, most of the cities and neighborhoods still on the list do not have significant amount of mixed-use development present. Meanwhile, several of the neighborhoods that will be receiving light rail in the next five years as part of ST2 do have a considerable amount of mixed-use development but currently do not have frequent and reliable transit yet. Because the heavy transit in these neighborhoods, such as Capitol Hill and Roosevelt, does not yet exist, it can be expected that residents, employees, and patrons of these neighborhoods do not currently act how they will act with regard to parking once the transit arrives. Thus it is impractical to study their current parking situations.

This eliminated just about all of the rest of the field of candidates except the two chosen as the study areas: West Seattle and Ballard. While both of these neighborhoods are growing, they each have a solid amount of existing TOD-style mixed-use development.

## 5.2 The Study Areas

It should first be acknowledge that this study will use the boundaries for each chosen neighborhood as set by the urban village element of Seattle's comprehensive plan. It was deter-

mined that these would be the boundaries as opposed to using the full neighborhood extents or the transit communities' half-mile walksheds for several reasons.

First, urban planners in the US have conventionally drawn a walkshed line (how far people will walk to reach a transit) at a half-mile radius from high capacity transit stations; which is roughly a 10-minute walkshed. Some guidelines pull it back to a quarter-mile; which is roughly a 5-minute walkshed. This is determined based on the level of service of transit, topography, and several other factors. Regardless, historical consensus held that no one goes farther than half a mile on foot. New research, however, coming from Dr. Arthur Nelson out of the University of Arizona suggests that for some cities this walkshed is too conservative.<sup>6</sup> They found that a quarter of the rent premium, which was their metric of measurement, extended to nearly a mile away from transit. This has the potential implications for Puget Sound and Seattle Transit Communities that their half-mile walksheds are arbitrary and likely do not accurately reflect what is happening on the ground in these neighborhoods.

Second, as has already been discussed, Seattle has chosen to use an urban village strategy for accommodating and directing the growth in both housing and jobs for the coming decades. As this analysis is meant to explore parking in transit-oriented mixed-use neighborhoods with frequent and reliable transit it is most appropriate to study within the boundaries where the future growth is likely to take place; the urban villages.

Both Ballard and West Seattle were originally defined as Hub Urban Villages by the Seattle City Comprehensive Plan in 1994.<sup>7</sup> These areas originally had four goals:

1. Promote employment and commercial services that serve the populations of the village, the city and the region;
2. Support densities that support transit use;

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<sup>6</sup>Jaffe, E. (2015, January 12). What Does Living 'Close' to Transit Really Mean?. City Lab. Retrieved May 17, 2015, from <http://www.citylab.com>

<sup>7</sup>City of Seattle Comprehensive Plan 1994: Toward a Sustainable Seattle. Urban Villages Element. (1994). City of Seattle.

3. Provide locations for employment and commercial services that serve the surrounding city and region, in addition to the village population; and
4. Allow concentrations of employment at locations convenient to the city's residential population to improve transportation by reducing work trip commutes.

One major piece of the urban villages element of the Comprehensive Plan was to allocate neighborhoods with growth targets in jobs and housing for a twenty-year outlook horizon. Figure 5.5 shows the growth distribution for both housing and employment broken down by category.<sup>8</sup>

<b>Category</b>	<b>% of Citywide Residential Growth</b>	<b>% of Citywide Employment Growth</b>
Urban Centers	45% (22,500 - 26,700 hshlds)	65% (85,410 - 95,500 jobs)
Manufacturing/Industrial Centers	No housing target	10% (13,140 - 14,660 jobs)
Urban Villages	30% (15,000 - 18,000 hshlds)	No Target for Residential Urban villages Hub Urban Villages Only: 15% (19,700 - 21,990 jobs)
Remainder of City	25% (12,500 - 15,300 hshlds)	No Specific Target
Totals	50,000 - 60,000 hshlds	131,400 - 146,600 jobs

Figure 5.5: Growth Distribution in Housing and Employment of Centers and Villages, 1994

Based on these figures the City then took into account factors such as current zoning, transit accessibility, and land area and distributed the housing and job goals among each area per category. Thus, the 1994 to 2014 targeted 15,000 to 18,000 households and 19,700 to 22,000 jobs were distributed between Ballard, Bitter Lake Village, Fremont, Lake City, North Rainier, and West Seattle Junction. These targets were meant to provide common

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<sup>8</sup>iBid.

expectations, to be used as tools for neighborhood planning, to guide capital investment, and to influence rezones of property.<sup>9</sup>

When the City did its major Comprehensive Plan update in 2004, it reported progress as shown here in Figure 5.6.

Location	% of Citywide Residential Growth		% of Citywide Employment Growth	
	Planned	Experienced	Planned	Experienced
In Urban Centers	45%	41%	65%	56%
In Manufacturing/Industrial Centers	No Goal	0%	10%	13%
In Hub Urban Villages	15%	15%	15%	11%
In Residential Urban Villages	15%	19%	No Goal	7%
Outside of Centers and Villages	25%	26%	No Goal	13%

Figure 5.6: 2004 Progress Report of Growth in Centers and Villages

The housing growth ended up focused slightly more in the residential areas than in the centers as targeted, while the jobs were locating more heavily in the centers than in the neighborhood villages as targeted. At this point, the City had three options: retain existing 2014 urban village targets, and apply new 2024 targets citywide; update targets to reflect new 2004-2024 citywide targets; or eliminate urban village targets entirely.

Ultimately, the second option was chosen. Thus, new housing and employment targets were distributed to each of the villages and centers as had been done previously, but this time for the period from 2004 to 2024. These targets and more recent neighborhood trends will be discussed in detail in the following sections.

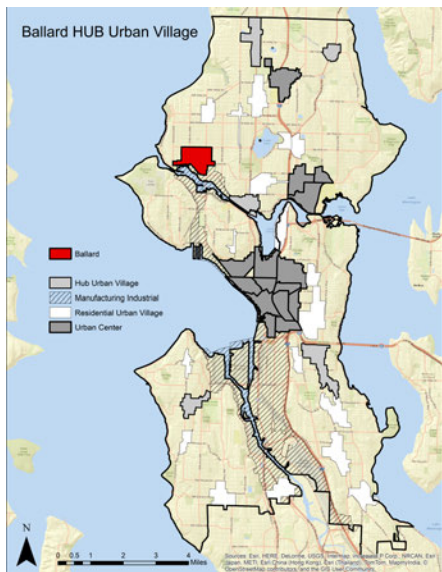


Figure 5.7: Ballard Context Map

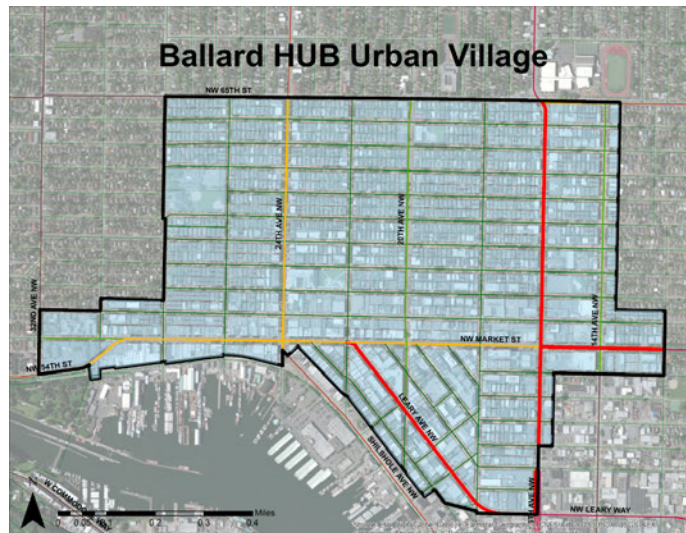


Figure 5.8: Ballard HUB Urban Village

### 5.2.1 Ballard

Ballard, originally its own city, was annexed by Seattle in 1907. The neighborhood is located in northwest Seattle just north of the ship canal along the coast of the Puget Sound. For much of Ballard’s early history it was known as a Norwegian fishing village as 6,000 Scandinavian’s migrated to the area at the end of the nineteenth century due to the excellent salmon fishing as well as the great water access from Salmon Bay.<sup>10</sup>

Initially, Ballard Avenue was the center of all neighborhood commercial activity. During the first several decades of the twentieth century, however, commercial activity shifted north toward Market Street. By the 1970s there were two distinct parts of the Ballard neighborhood. Old town consisting of Ballard Avenue, which was named a National Historic District in 1976, had brick-laid streets, old architecture, and a pedestrian friendly environment. Mar-

<sup>9</sup>Seattle’s Comprehensive Plan Update Issue Paper #1: Options for Updating Urban Village Growth Targets. (2014, October 14). City of Seattle.

<sup>10</sup>Seattle Neighborhoods: Ballard – Thumbnail History. (1999, March 31). HistoryLink. Retrieved May 17, 2015, from <http://www.historylink.org>

ket Street was the more autocentric part of the neighborhood extending six or seven blocks to the east to the main intersection of 15th Avenue. The Hub Urban Village primarily encompasses those two districts but extends a ways north as shown on the map above.

Figure 5.9 shows housing stock by year within the Ballard Urban Village along with the 2014 and 2024 target goals.<sup>11</sup>

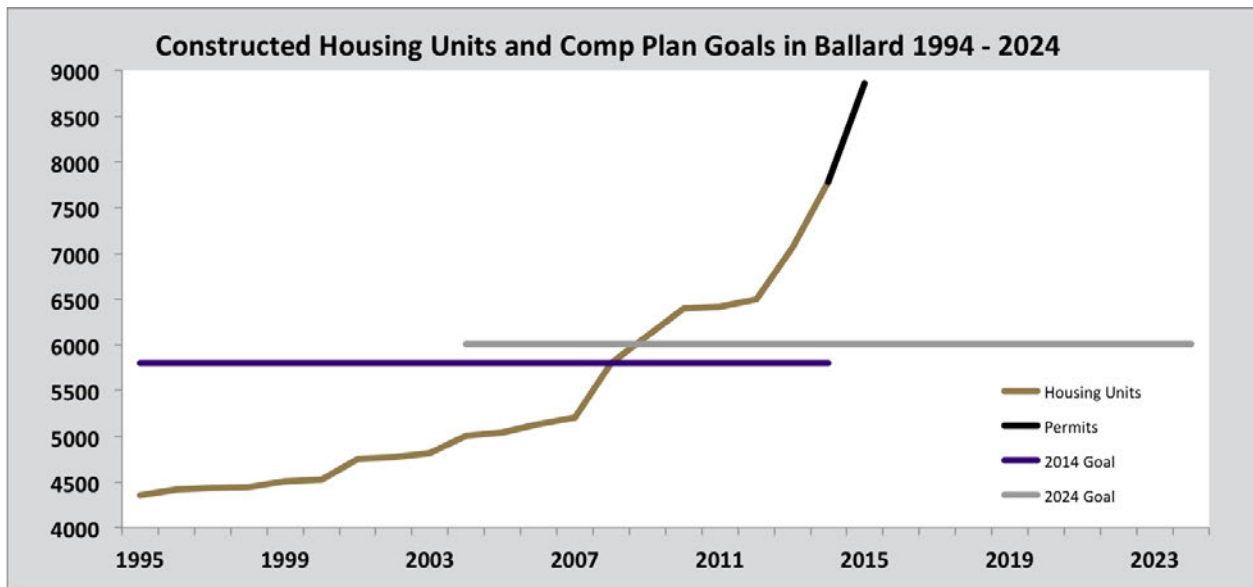


Figure 5.9: Ballard Housing Goals and Growth: 1994 - Present

The figure shows that the 2014 target was reached in 2008. The 2024 goal seems to have been adjusted to fit the fairly consistent trends between 1995 and 2006. Then housing production began to rapidly increase in 2007, and then again even more rapidly in 2012. The 2024 target was reached in 2009 and by 2014 housing stocks were 35% higher than 2014 targets and 29% higher than 2024 targets (53% and 47% respectively if uncompleted, permitted units are accounted for).

Figure 5.10 shows employment statistics by year within the Ballard Urban Village along

<sup>11</sup>Urban Center/Village Residential Growth Report. (2015, April 6). City of Seattle Department of Planning and Development. Retrieved May 17, 2015, from <http://www.seattle.gov>

with the 2014 and 2024 target goals.<sup>12</sup>

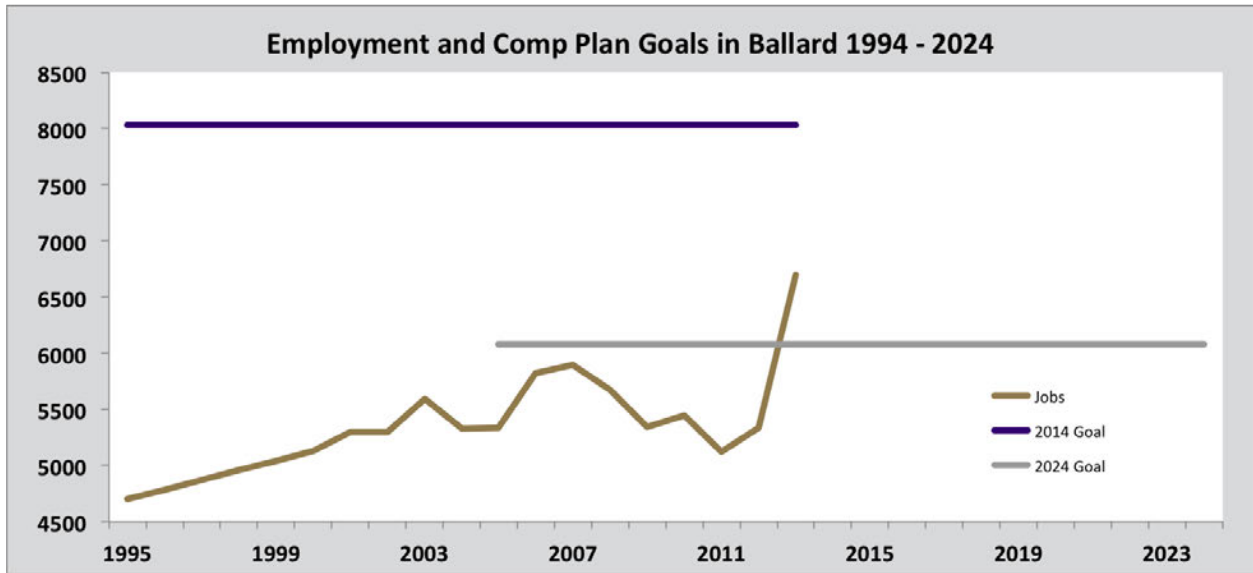


Figure 5.10: Ballard Employment Goals and Growth: 1994 - Present

This figure shows how characteristically ambitious the 2014 jobs targets were for the urban villages. The final 2024 jobs target was actually lessened significantly from the original 2014 target. Employment has shown significant growth in Ballard in the last several years, passing the 2024 goal in 2012, and if this trend of job growth continues, the original 2014 target will be reached sometime in the next few years.

While job growth in Ballard has been sluggish in the recent decades, likely in part to the Great Recession, the last several years have shown promise. Meanwhile housing creation has continued to rise at an exponential rate. Ballard is well surpassing the kind of growth the City has asked of them. The neighborhood is served most frequently by the D-line of the Rapid Ride (BRT) system. It goes North and South down 15th Avenue to downtown with headways every 10 to 15 minutes. This makes Ballard an ideal candidate for study to give insight into the kinds of parking situations other, up-and-coming transit-oriented

<sup>12</sup>Urban Center/Village Employment Growth Report. (2014, August 11). City of Seattle Department of Planning and Development. Retrieved May 17, 2015, from <http://www.seattle.gov>

neighborhoods will likely face in the near future.

### 5.2.2 West Seattle

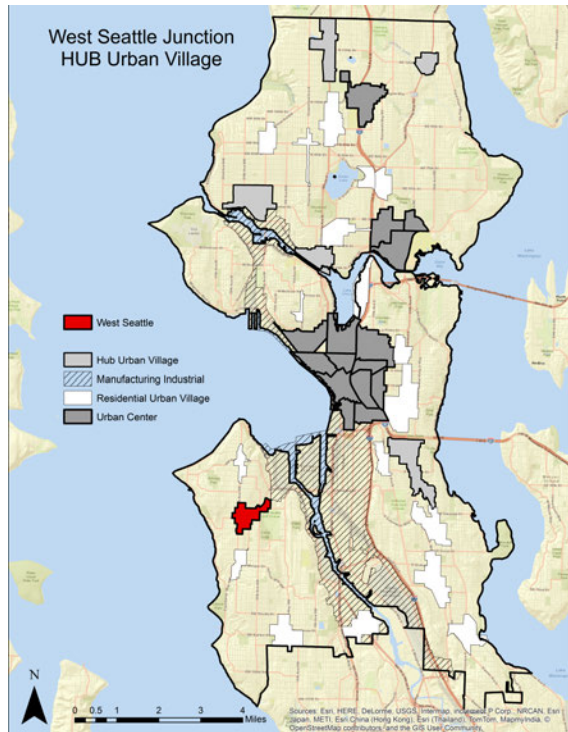


Figure 5.11: West Seattle Context Map

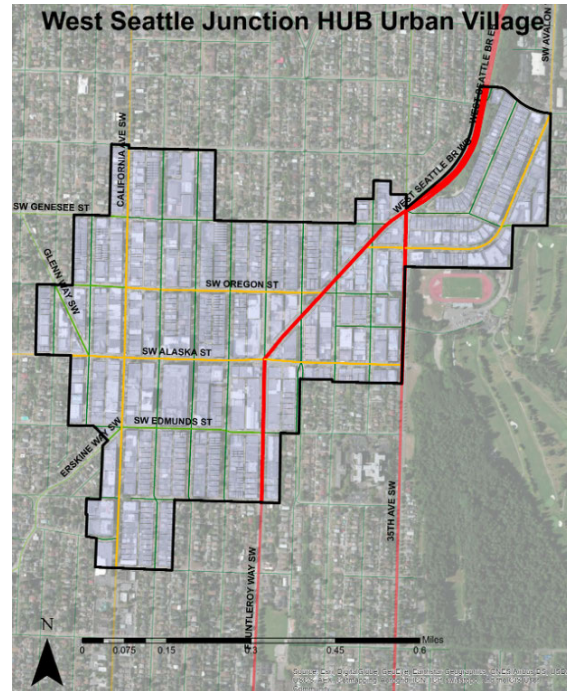


Figure 5.12: West Seattle HUB Urban Village

West Seattle, or more specifically Alki Point, was the location for the first landing of European settlers in 1851.<sup>13</sup> Within a few months, many had moved to a more agreeable location on the other side of Elliott Bay; the site of present-day downtown Seattle. As the name suggests, the neighborhood is west of downtown and sits on a peninsula between the Puget Sound and Elliot Bay.

Early growth was slow, most settlers followed the Denny party over to present day downtown Seattle. Remaining inhabitants finally made their way up the hill to the present day

<sup>13</sup>Seattle Neighborhoods: West Seattle – Thumbnail History. (1999, March 31). HistoryLink. Retrieved May 17, 2015, from <http://www.historylink.org>



Admiral Junction by 1885. The first ever municipal street car network expanded south down present day California Avenue from Admiral and west up present day Fauntleroy, turning into Alaska Way on the top of the hill. When the two lines met in 1907 (also the year West Seattle was annexed by Seattle), The Junction was born. By 1911, The Junction had grown to become a full fledged business district. The Hub Urban Village primarily encompasses the Fauntleroy, Alaska, and California corridors extending several blocks outward in each direction from these streets.

Figure 5.13 shows housing stock by year within the West Seattle Junction Urban Village along with the 2014 and 2024 target goals.<sup>14</sup>

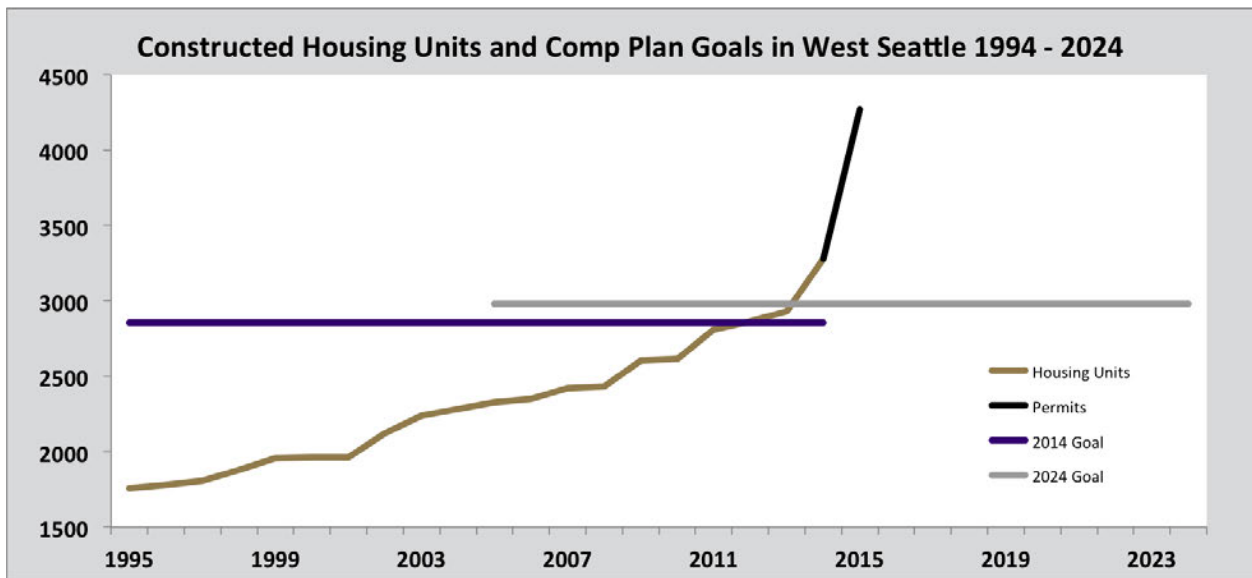


Figure 5.13: West Seattle Housing Goals and Growth: 1994 - Present

While housing growth here was initially slower than seen in Ballard, the West Seattle Junction is showing similar trends to those discussed for Ballard. The figure shows that the 2014 target was reached in 2012. West Seattle's 2024 goal similarly seems to have been adjusted to fit the fairly consistent trends between 1995 and 2006. Housing production here

<sup>14</sup>Urban Center/Village Residential Growth Report. (2015, April 6). City of Seattle Department of Planning and Development. Retrieved May 17, 2015, from <http://www.seattle.gov>

began to rapidly increase in 2013, the same year that the 2024 target was reached. By 2014 housing was 15% higher than 2014 targets and 10% higher than 2024 targets (49% and 43% respectively if uncompleted, permitted units are accounted for).

Figure 5.14 shows employment statistics by year within the West Seattle Junction Urban Village along with the 2014 and 2024 target goals.<sup>15</sup>

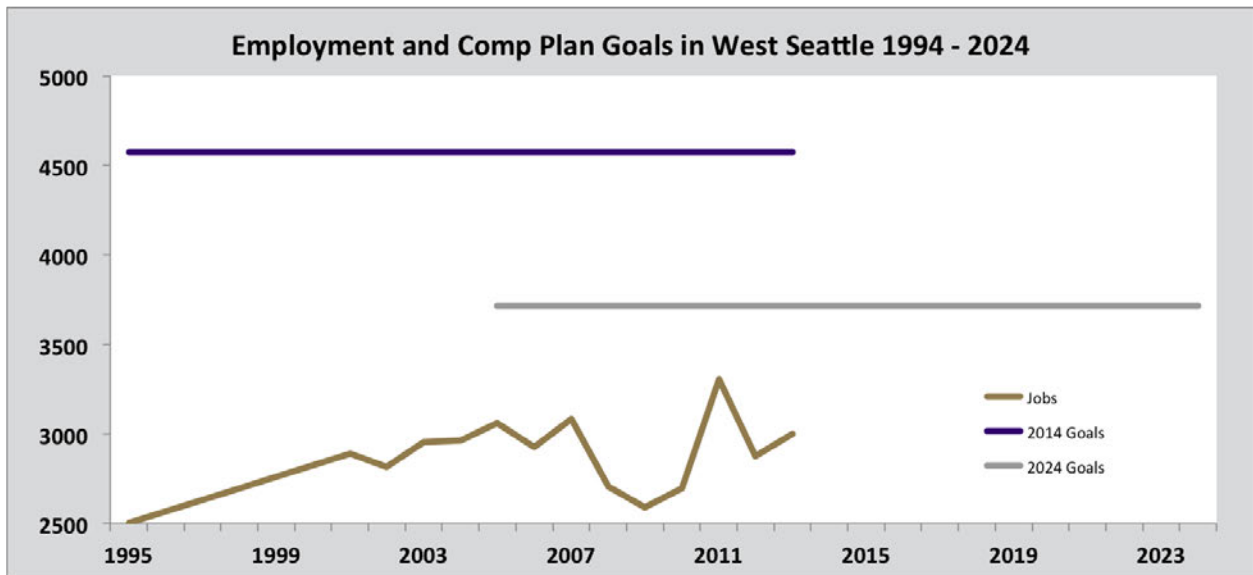


Figure 5.14: West Seattle Employment Goals and Growth: 1994 - Present

Again, this figure shows how high the 2014 jobs targets were for the urban villages. Similarly to Ballard, the final 2024 jobs target was lessened significantly from the original 2014 target. The job market in the West Seattle Junction Urban Village has not shown recent growth in the same way that Ballard has. The strong positive rebound in 2011 was all but undone in 2012. The employment situation in West Seattle currently shows very little in the way of consistent trends.

Despite the lack of employment growth, West Seattle’s housing creation, like Ballard’s, has continued to rise at an exponential rate. In this regard, West Seattle is surpassing the

<sup>15</sup>Urban Center/Village Employment Growth Report. (2014, August 11). City of Seattle Department of Planning and Development. Retrieved May 17, 2015, from <http://www.seattle.gov>

kind of growth the City has asked of them. The neighborhood is served most frequently by the C-line of the Rapid Ride (BRT) system. It runs North and South along California Ave to “The Junction” at Alaska Way and turns east to Fauntleroy and to the West Seattle Bridge which takes it downtown. This line also runs with headways every 10 to 15 minutes. The West Seattle Junction Urban Village is similarly a strong candidate for study to give insight into the kinds of parking situations other, up-and-coming transit-oriented neighborhoods will likely face in the near future.

### *5.2.3 Study Area Parking Situations*

This section will first explore Seattle Municipal code off-street parking requirements, with emphasis on any regulations specific to Hub Urban Village designations.

#### *Seattle Parking Requirements*

As stated previously, parking requirements are usually outlined within a municipalities zoning codes. However, in Seattle, this is not the case. Seattle’s municipal codes outline the various parking requirements based on use.<sup>16</sup> The code generally splits the requirements into non-residential and residential uses. Non-residential uses range from 1 space per 250 square feet for eating and drinking establishments to 1 space to 2000 square feet for uses such as storage and manufacturing. Residential uses range from 1 space per 4 dwelling units for congregate housing to 1 space per unit for standard multifamily developments.

These base parking requirements would suggest then, that for a mixed-use building, the minimum requirements for each use would simply be summed to reach the building’s total parking requirement. So, for example, a large, mixed-use, TOD-style building such as this report is intending to analyze, might have upwards of 350 residential units on top of 20,000 square feet of retail space. For this example the code would require 350 parking spaces for the residential units (1 per dwelling unit) and 40 parking spaces for the retail space (1 space

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<sup>16</sup>Seattle Municipal Code: 23.54.015 Required Parking. (n.d.). City of Seattle. Retrieved May 17, 2015, from <https://www.municode.com>

per 500 square feet), totaling 390 spaces. But Seattle has built into its municipal code, several opportunities to reduce this parking.

### *Seattle Parking Requirement Reduction Opportunities*

There are several opportunities within the code to make reductions in this base parking. First, there are opportunities to reduce parking in the neighborhood commercial zoning and uses. For example, if a building is general sales and service uses; medical service uses; lodging uses; or entertainment uses; in NC1 zones, they can waive parking for the first 4,000 square feet of total commercial space, and for uses in NC2 and NC3 zones they can waive parking for the first 5,000 square feet of total commercial space. There are several other uses that offer this reduction as well. Within the context of the previously used example, this means that if the building were in an NC1 zone, 4,000 of the 20,000 square feet of retail could be subtracted from parking requirement and if it were in an NC2 or NC3 zone, 5,000 square feet could be subtracted. Thus, the example's total commercial space necessitating parking would be 15,000 square feet instead of 20,000 and the requirement would fall to 30 parking spaces for commercial uses, totaling 380 parking spaces for the building.

Figures 5.15 and 5.16 show each study areas zoning code, respectively. Of particular interest, these maps identify areas that are zoned neighborhood commercial.

The second opportunity for reduction comes specifically for mixing of uses. This section is called "shared parking" and offers percent reductions for one use if it is coupled with any number of other uses. For example, if an office use shares parking with: general sales and services, heavy sales and services uses, eating and drinking establishments, lodging uses, entertainment, medical services, animal shelters and kennels, automotive sales and services, or maritime sales and services, the parking requirement for the non-office use may be reduced by 20%, provided that the reduction will not exceed the minimum parking requirement for the office use. More impressive is the example of office space and residential space sharing parking. If an office and a residential use share off-street parking, the parking requirement for the residential use may be reduced by 50%<sup>98</sup> provided that the reduction does not exceed

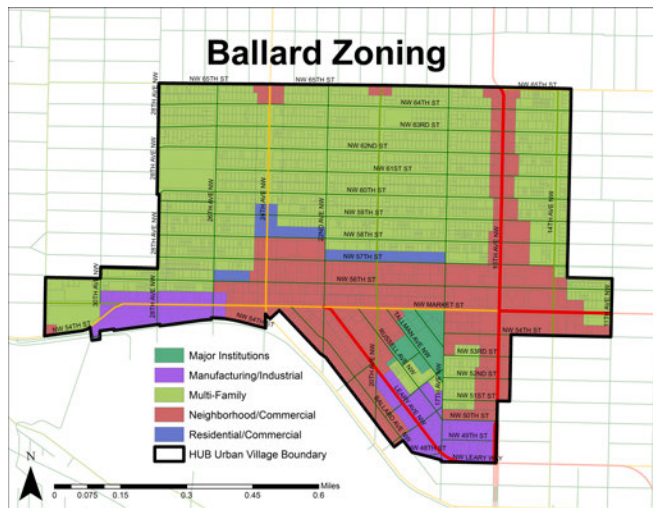


Figure 5.15: Ballard Zoning Map

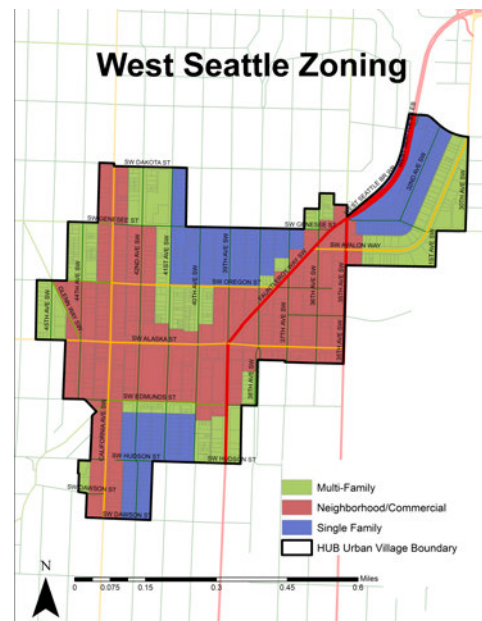


Figure 5.16: West Seattle Zoning Map

the minimum parking requirement for the office use. For the sake of the previous example of residential and retail, the retail can achieve a maximum 30% reduction. This means that the retail portion of the parking requirement could be reduced to 27 spaces for the retail space which would total 377 total spaces for the building. It should be noted that these two reductions cannot be used together.

Figures 5.17 and 5.18 highlight both the apartment mixed-use and condominium mixed-use parcels in the Ballard and West Seattle HUB Urban Villages, respectively.

Finally, the code offers a full pardon from parking requirements for both non-residential and residential uses in urban villages if they are located within 1,320 feet of a street with frequent transit service. So, there is a line at 1,320 feet from streets with frequent transit service where, on one side there are no parking requirements at all, and on the other side, all of the previous rules apply. Figures 5.19 and 5.20 show the rapid ride stops and routes within each neighborhood as well as 1,320 foot buffer drawn around their routes for both Ballard and West Seattle, respectively.

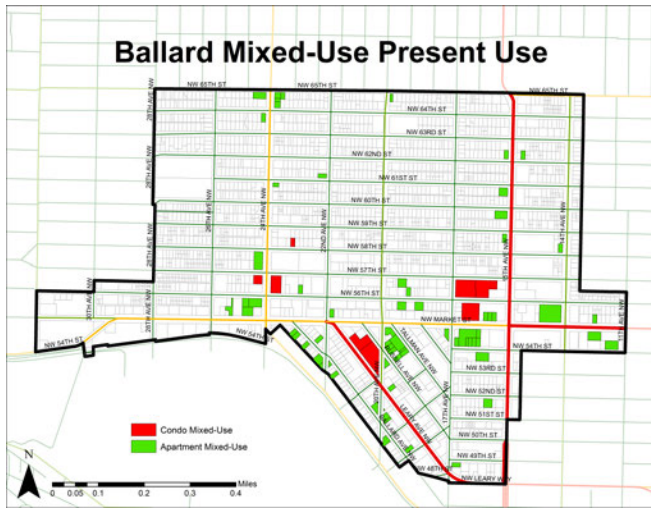


Figure 5.17: Ballard Mixed-Use Parcels

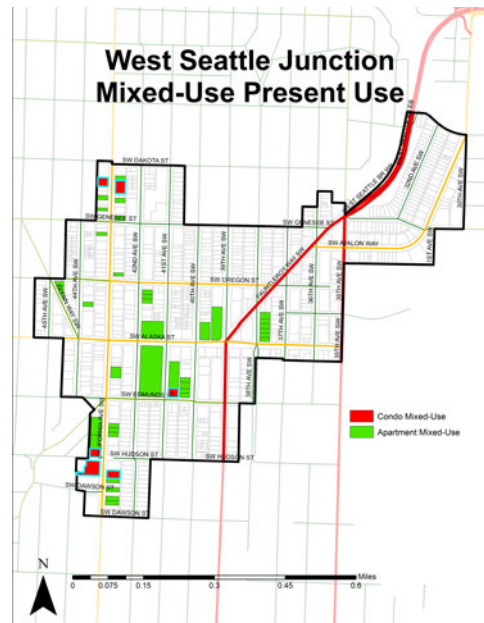


Figure 5.18: West Seattle Mixed-Use Parcels

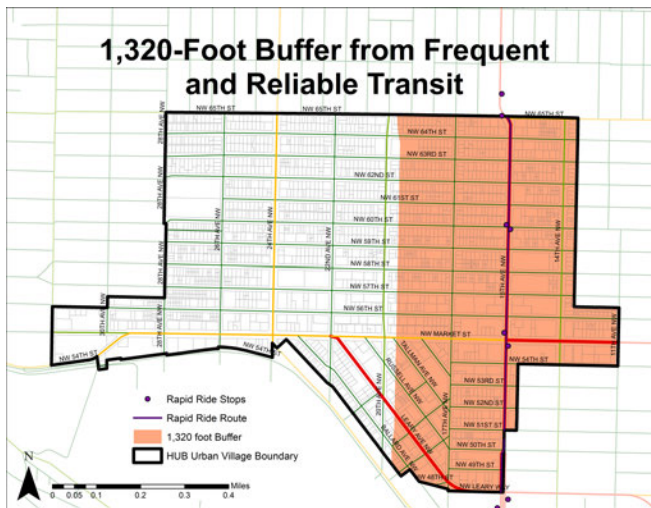


Figure 5.19: Ballard 1,320-Foot Buffer from Frequent Transit

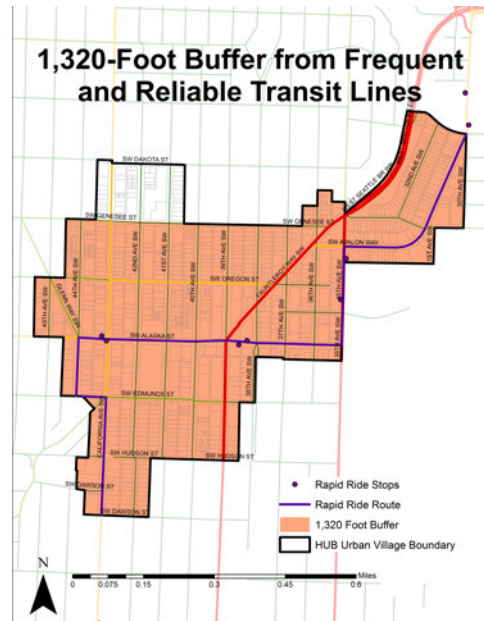


Figure 5.20: West Seattle 1,320-Foot Buffer from Frequent Transit

This last opportunity has only recently been implemented and so many of the constructed and operating buildings studied in this report were developed before this exemption was an option.

Upon review of these municipal parking codes, it seems that base regulation is characteristic of traditional, rigid, minimum parking requirements. However, the opportunities for parking reduction show a modest attempt to provide some flexibility and make parking requirements more context specific to each neighborhoods makeup.





## Chapter 6

### RESULTS

This chapter will explore the results of investigation of both off- and on-street parking in each study area. Off-street parking results will include: a more in-depth description of the types of buildings that this report was interested in, off-street parking provision in comparison with Seattle Municipal Codes, and results of unit occupancy rates vs. parking occupancy rates. On-street parking results will include: current parking regulations within each HUB urban village, general comments about the use and capacity of on-street parking in each study area, and the results of license plate collection.

#### **6.1 Off-Street Parking**

As defined above, off-street parking refers to any lots or garages that are not in the public right-of-way. As the parking survey showed, almost all off-street parkers use the garage or lot provided by their own building (on site). This section will explore off-street parking provision and use in the two study areas.

At this point, it is important to more explicitly describe the types of buildings that this research was interested in. A database was created for each study area based on King County Assessor's present use function. There are two present uses of interest to this study: apartment mixed-use and condominium mixed-use. In Ballard this created a list of 78 parcels and in West Seattle 46 parcels. Figures 5.17 and 5.18 in the previous chapter show these parcels.

Each parcel was then investigated to identify size, use, and age of structure thereon. There were generally three types of structures found:

1. Very small buildings with a single storefront on the ground floor and a unit or two

above. Sometimes there was a parking spot or two and other times there were not;



Figure 6.1: Example of Very Small Mixed-Use Development

2. Old, medium-size buildings with a few storefronts or offices on the ground floor and several units above. Many times these did not have any parking and other times had little;



Figure 6.2: Example of Small-to-Medium Mixed-Use Development

3. Newer, generally large buildings with either a handful of smaller businesses on the ground floor or a few large commercial tenants. These buildings had structured, usually underground parking for both the residential uses and commercial uses.



Figure 6.3: Example of Medium-to-Large Mixed-Use Development

This study was interested in the third type of building; the new, generally large buildings with structured parking. This is in part because these buildings are proving to be the development trend for coming years. Above and beyond the buildings explored in this exercise, each study area has at least a half dozen or more, similar size and style buildings under construction. These buildings will add a few more thousand residential units to the housing stock in Seattle over the coming years. Further, this development style is emerging all over the city, especially in growth areas with frequent and reliable transit. Thus, about 2/3 of the apartment mixed-use and condominium mixed-use parcels, the ones characterized as types 1 and 2 buildings described above, were eliminated. Further, in a number of cases, several adjacent parcels that were mixed present uses were found to have been consolidated to build one larger development. So, several duplicates were also removed from the lists. Finally, several of the new, large TOD-style mixed-use developments were either still under construction or at least had not yet started lease ups. These buildings were similarly eliminated.

This left a final database of 10 apartment mixed-use developments and 5 condominium mixed-use developments in the Ballard neighborhood and 5 apartment mixed-use developments and 3 condominium mixed-use developments in the West Seattle Junction neighborhood. Each remaining building's leasing office was contacted for a short survey as outlined in

the methodology chapter. It was found that the parking in each of the condominium mixed-use developments contacted was owned by the owners of the condos, thus each had 100% parking occupancy, and owners/occupiers had no option not to own a parking space. Thus, the condominium mixed-use developments were eliminated from the study. The results of the remaining short surveys are presented in this section along with a brief comparison of parking supplied as compared to municipal code requirements.

*Ballard Off-Street Parking Situation*

The ten new, generally large, TOD-style mixed-use developments that were surveyed in Ballard are summarized in Figure 6.4.

Building Number	Residential Units	Occupancy Rate	Commercial Space (Sq Ft)	Total Parking Stalls	Parking by Use?	Residential Parking Stalls	Commercial Parking Stalls	Parking Occupancy	Parking Stall Cost
1	15	100%	3,200	22	No	N/A	N/A	100%	\$75
2	111	27%	5,000	85	Yes	77	8	29%	\$125
3	304	62%	12,000	378	Yes	288	90	80%	\$125
4	265	95%	12,000	321	Yes	265	56	70%	\$125
5	287	94%	31,225	393	Yes	290	103	94%	\$145
6	260	91%	6,500	326	Yes	306	20	60%	\$105
7	166	92%	Live Work	155	No	N/A	N/A	80%	\$130
8	64	95%	Live Work	66	No	N/A	N/A	95%	\$95
9	24	80%	1,600	20	Yes	20	2	75%	\$150
10	268	99%	30,000	400	Yes	279	121	98%	\$130

Figure 6.4: Ballard Mixed-Use Development Survey Results Summary

The first item of interest is how much parking is being supplied compared to how much parking municipal codes require/suggest. Recall from the previous chapter the base municipal code parking regulations along with the three opportunities for reductions. Figure 6.5 shows actual parking provision along with each alternative parking regulation based on building size and configuration as well as differences and percent difference between actual and required/suggested.

On average, the buildings explored in Ballard provided 7% more parking than was required based on the Neighborhood Commercial Zoning reduction opportunity, or 6% more parking than was required based on the mix of uses reduction opportunity. Further, even

Building Number	Base Municipal Code	NC Zone Reduction	Mixed Use Reduction	1,320-Foot Buffer Exemption	Actual Supplied Parking	Base		NC Zone Reduction		Mixed Use Reduction	
						Difference	% Difference	Difference	% Difference	Difference	% Difference
1	21	21	19	No	22	1	3%	1	3%	2.5	13%
2	121	113	118	No	85	-36	-30%	-28	-25%	-33.0	-28%
3	328	320	321	No	378	50	15%	58	18%	57.2	18%
4	289	281	282	Yes	321	32	11%	40	14%	39.2	14%
5	349	341	331	Yes	393	44	12%	52	15%	62.3	19%
6	273	265	269	Yes	326	53	19%	61	23%	56.9	21%
7	166	166	166	Yes	155	-11	-7%	-11	-7%	-11.0	-7%
8	64	64	64	Yes	66	2	3%	2	3%	2.0	3%
9	27	19	26	Yes	20	-7	-26%	1	4%	-6.2	-24%
10	328	320	310	No	400	72	22%	80	25%	90.0	29%

Figure 6.5: Ballard Mixed-Use Development Parking Comparisons

if these buildings were permitted and constructed before these reduction opportunities were instated, the buildings provided 2% more parking than base municipal code parking regulations. Figure 6.6 shows this graphically.

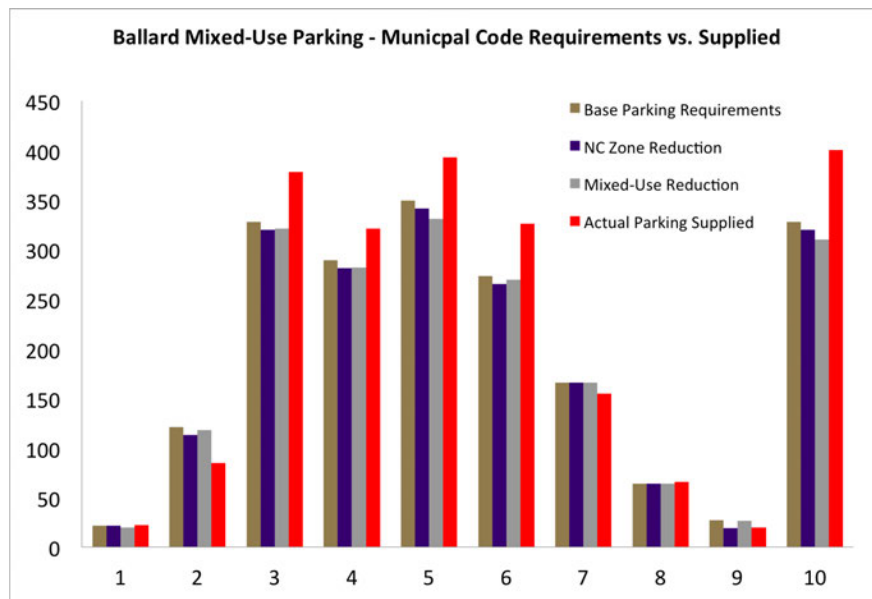


Figure 6.6: Ballard Supply vs. Requirements Comparison

Now that provided parking versus requirements is understood it is important to know how well the parking is being utilized. For this, the previous table Figure 6.4, will provide a ratio of unit occupancy to parking occupancy (UOR:POR). This ratio suggests roughly how

many parking spaces are being rented per rented unit. In Ballard the range of UOR:POR is between 1:.66 to 1:1.29, and the average is 1:.96. This suggests that at a minimum about 2/3 of unit rentals also equate to parking stall rentals, and at most for every 3rd residential unit rented, one extra (a 4th) parking stall is rented. The average suggests that essentially one parking stall is rented for every one residential unit rented. Figure 6.7 shows graphical representation of these observations.

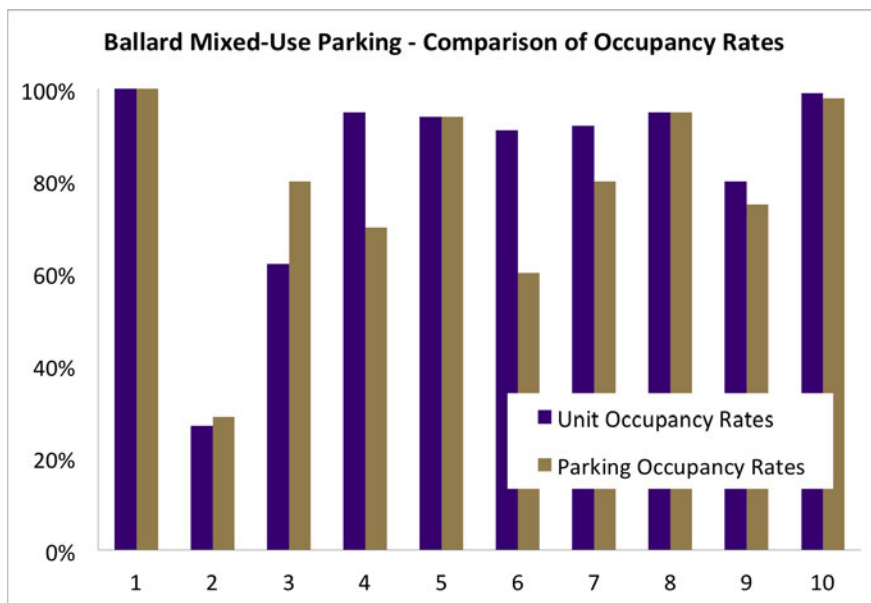


Figure 6.7: Ballard Unit vs. Parking Occupancy

Unfortunately, because the utilization of parking for commercial uses was outside the purview of this study it is impossible to know for sure whether, and to what extent, there was capacity for practical reduction through parking sharing. Because 7 of the 10 buildings secure the residential parking from other use parking they can be thought of as generally separate. While this study is ill-equipped to comment on the commercial parking provision and use, the residential and mixed parking seems to be appropriately supplied assuming providing everyone with off-street parking who wants, and can afford, off-street parking is the goal.

### West Seattle Off-Street Parking Situation

The five new, generally large TOD-style mixed-use developments that were surveyed in the West Seattle Junction are summarized in Figure 6.8.

Building Number	Unit			Total Parking Stalls	Separated Parking by Use?	Residential		Residential Parking Occupancy	Parking Stall Cost
	Residential Units	Occupancy Rate	Commercial Space (Sq Ft)			Residential Parking Stalls	Commercial Parking Stalls		
1	133	97%	13,254	150	Yes	136	14	85%	\$95
2	195	97%	15,650	153	No	N/A	N/A	100%	\$95
3	157	98%	64,803	371	Yes	153	218	unknown	\$75
4	96	99%	30,000	144	Yes	75	69	100%	\$70
5	85	100%	3374	112	No	N/A	N/A	92%	\$70

Figure 6.8: West Seattle Mixed-Use Development Survey Results Summary

Figure 6.9 shows actual parking provision along with each alternative parking regulation based on building size and configuration as well as differences and percent difference between actual and required/suggested.

Building Number	Base		Mixed Use Reduction	1,320-Foot Buffer Exemption	Actual Supplied Parking	Base		NC Zone Reduction		Mixed Use Reduction	
	Municipal Code	NC Zone Reduction				Difference	% Difference	Difference	% Difference	Difference	% Difference
1	160	152	152	Yes	150	-10	-6%	-2	-1%	-2	-1%
2	226	218	217	Yes	153	-73	-32%	-65	-30%	-64	-29%
3	287	279	248	Yes	371	84	29%	92	33%	123	50%
4	156	148	138	Yes	144	-12	-8%	-4	-3%	6	4%
5	92	84	90	Yes	112	20	22%	28	34%	22	25%

Figure 6.9: West Seattle Mixed-Use Development Parking Comparisons

On average, the buildings explored in West Seattle provided 7% more parking than was required based on the Neighborhood Commercial Zoning reduction opportunity, or 10% more parking than was required based on the mix of uses reduction opportunity. Further, even if these buildings were permitted and constructed before these reduction opportunities were instated, the buildings provided 1% more parking than base municipal code parking regulations. Figure 6.10 shows this graphically.

Now that provided parking versus requirements is understood it is again important to know how well the parking is being utilized. For this the previous table, Figure 6.8 will

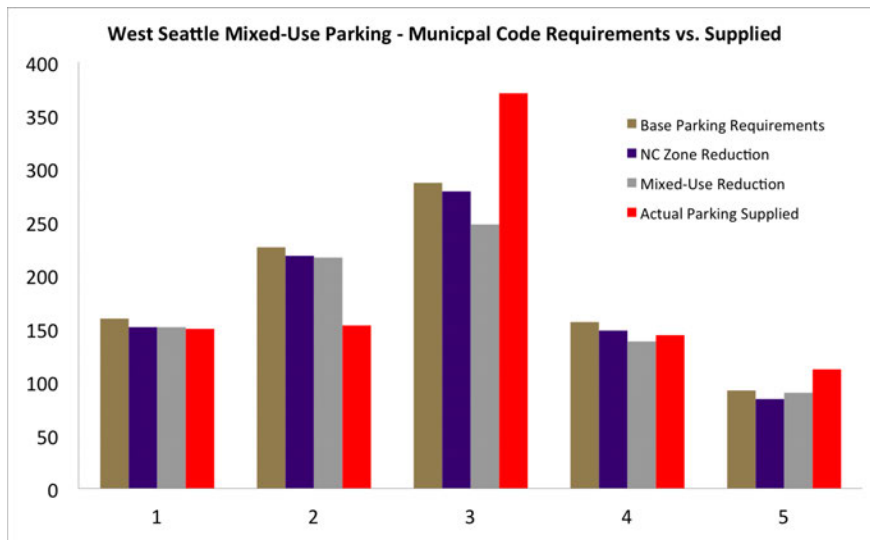


Figure 6.10: West Seattle Supply vs. Requirements Comparison

provide a ratio of unit occupancy to parking occupancy (UOR:POR). This ratio suggests roughly how many parking spaces are being rented per rented unit. In West Seattle the range of UOR:POR is between 1:.88 to 1:1.03, and the average is 1:.96. This small range suggests that in West Seattle there is much more consistency in residential renting vs. parking renting than was seen in Ballard. The average, however, in West Seattle was identical to that in Ballard. More specifically, essentially one parking stall is rented per residential unit rental. It should be noted that this does not imply each residential unit renter is renting parking, but that overall, about as many parking stalls are being rented as residential units. Figure 6.11 shows graphical representation of these observations.

Again, because the utilization of parking for commercial uses was outside the purview of this study it is impossible to know for sure whether, and to what extent, there was capacity for reduction through parking sharing. Because 3 of the 5 buildings studied secure the residential parking from other use parking they can be thought of as generally separate. Again, the residential and mixed parking seems to be appropriately supplied assuming providing everyone with off-street parking who wants, and can afford, off-street parking is the goal.



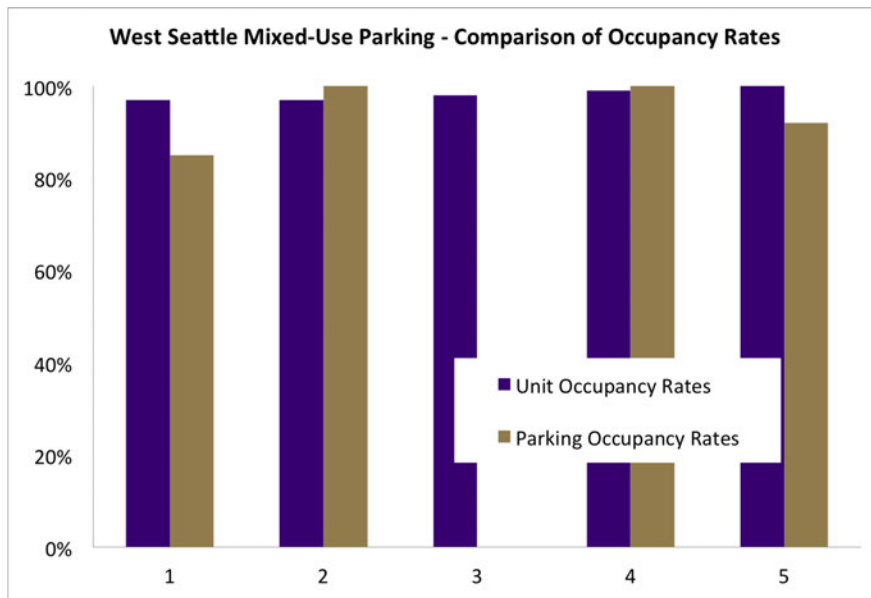


Figure 6.11: West Seattle Unit vs. Parking Occupancy

## 6.2 On-Street Parking

As defined above, on-street parking refers to any parking on the street, in the public right-of-way. The parking survey analyzed in chapter 4 suggested, based on responses, that about 99% of parkers do not use on-street parking. This section will explore on-street parking regulation and use in the two study areas.

As laid out in the methodologies chapter, this was accomplished by canvassing each HUB Urban Village in its entirety on weeknights between 11:00pm and 4:00am. Presence of on-street parking regulation, fullness or vacuity of on-street parking supply, and specific vehicle information were all collected during these site visits. The following subsections will summarize the findings.

### *Ballard On-Street Parking Situation*

The majority of the HUB Urban Village of Ballard on-street parking is regulated by free, 2-hour limits between the hours of 7am and 6pm, excluding Sundays and holidays. This

means that if someone leaves home for work by 9am and returns home no earlier than 4pm Monday through Friday they have a plethora of free on-street parking at their disposal. The exception for this user would be Saturday when they would either need to move their car every 2 hours or risk being cited by parking police. There are a few streets at the North and West ends of the village that have no regulations of any kind. This did not seem to be an issue because these areas were generally comprised of single family detached residential uses; low density. Finally, Market Street and a block in both directions from Market Street had some 2-hour and 4-hour limit metered parking. These meters run from 7am to 6pm. No on-street permit parking was found in Ballard.

In the middle of the night the parking in the heavy retail areas was generally empty. Even though the meters were not to turn on again until 7am, there was plenty of overnight parking in these places. On streets just outside of the retail areas, typically with dense residential development, on-street parking was generally full. There seemed to be an open spot here and there but it was generally at capacity. In those areas described above as regulation free with entirely single family detached houses there was plenty of open on-street parking. On the periphery of the urban village boundaries there were some blocks with only one or two cars parked on the street. While these streets were several blocks away from most of the larger residential and mixed-use developments in the neighborhood, it is difficult to say that the neighborhood has any on-street parking problems.

In Ballard, over two nights of site visits, 2,543 license plates were collected. Ballard had 7.9 vehicles parked on-street per acre of land in the HUB urban village. Those plates were then sent to the Washington State Department of Licensing so that registered addresses for the owners of those vehicles could be returned for this analysis. Several of the plates came back as non-existent, likely do to mistakes made during documentation. These plates were eliminated along with any plates registered to addresses outside of the HUB urban village. Once this list was joined with the King County Assessor data via street address, there were a total of 1,115 plates with corresponding addresses and their present uses remaining. After receiving the corresponding addresses, 97.8%<sub>112</sub> of the vehicles parked on street were regis-

tered to residence. These were summarized into four categories: single family, multifamily (excluding mixed-use), condominium (excluding mixed-use), and mixed-use.

Next, using King County Assessor data, the total number of residential units existing in Ballard was summarized into those same four categories. To estimate how many vehicles were likely registered to all addresses in the Ballard study area, vehicles per household statistics were required from the U.S. Census Bureau. Unfortunately, the Census Bureau does not break this statistic down by housing type but it does break it down by tenure (owner occupied vs. renter occupied). More specifically, in 2013, 2.1 was the median number of vehicles owned per owner occupied household, and 1.3 was the median number of vehicles owned per renter occupied household.<sup>1</sup> Here several assumptions needed to be made. It was assumed that renters who live in single family houses likely have lifestyle and vehicle ownership characteristics similar to the owner occupied single family homeowners. Likewise, owners of condos likely have lifestyles and vehicle ownership characteristics similar to the renter occupied apartments residents. Thus, it became possible to estimate approximately how many vehicles were owned in the HUB urban village by housing type, which was then compared with on-street parking results.

Figure 6.12 summarizes these results. The “count” refers to the actual number of documented on-street parked vehicles. The “Percent of Total Vehicles Parked on Street” shows what proportion of all vehicles parked on the street belonged to that housing type. “Total Units in Study Area,” based on the King County Assessor data, reports how many units in each type of residential housing there were in the whole study area. “Estimated Total Vehicles in Study Area” is the result of multiplying the median vehicle per household (by tenure) statistic to total units. This estimated how many vehicles are owned by the entirety of each housing type. The “Estimate Percent of Vehicles owned in Study Area” shows estimates of the proportion of all vehicle in the study area belonged to that housing

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<sup>1</sup>United States Census Bureau / American FactFinder. (2013) B25044 : TENURE BY VEHICLES AVAILABLE. 2009–2013 American Community Survey. U.S. Census Bureau's American Community Survey Office. Retrieved May 19, 2015, from <http://factfinder2.census.gov>

type. Finally, the last row shows that ratio between vehicles parked on-street to estimated total vehicles in study area.

	<b>Single Family</b>	<b>Multi Family</b>	<b>Condominium</b>	<b>Mixed-Use</b>
<b>Count</b>	<b>483</b>	<b>482</b>	<b>65</b>	<b>60</b>
<b>Percent of Total Vehicles Parked on Street</b>	<b>44%</b>	<b>44%</b>	<b>6%</b>	<b>6%</b>
<b>Total Units in Study Area</b>	<b>1481</b>	<b>4263</b>	<b>537</b>	<b>2516</b>
<b>Estimated Total Vehicles in Study Area</b>	<b>3173</b>	<b>5675</b>	<b>715</b>	<b>3349</b>
<b>Estimate Percent of Vehicles owned in Study Area</b>	<b>25%</b>	<b>44%</b>	<b>6%</b>	<b>26%</b>
<b>Ratio of Estimated Total Vehicles in Study Area to Total Vehicles Parked on Street</b>	<b>6.6 : 1</b>	<b>11.8 : 1</b>	<b>11 : 1</b>	<b>55.8 : 1</b>

Figure 6.12: Results of Ballard License Plate Exercise

There are two important findings in this table. First, as the figure shows, a total of 60 of the 1,115 vehicles belonged to owners who lived in mixed-use developments. This confirms that overflow is occurring. Second, as the ratios on the bottom row show: there were approximately 6.6 vehicles registered to single family residents for every vehicle parked on street by a single family resident, there were approximately 11.8 vehicles registered to multifamily residents for every vehicle parked on street by a multifamily resident, there were approximately 11 vehicles registered to condominium residents for every vehicle parked on street by a condominium resident, and there were approximately 55.8 vehicles registered to mixed-use residents for every vehicle parked on street by a mixed-use resident. This suggests that the rate of on-street parking is nearly ten times higher for single family house residents, and five-and-a-half times higher for multifamily residents and condominium residents than mixed-use residents. Mixed-use residents are using on-street parking much less than other residence types. Figure 6.13 shows this graphically.

Still 60 of the 1,115 vehicles documented belong to residents of mixed-use developments

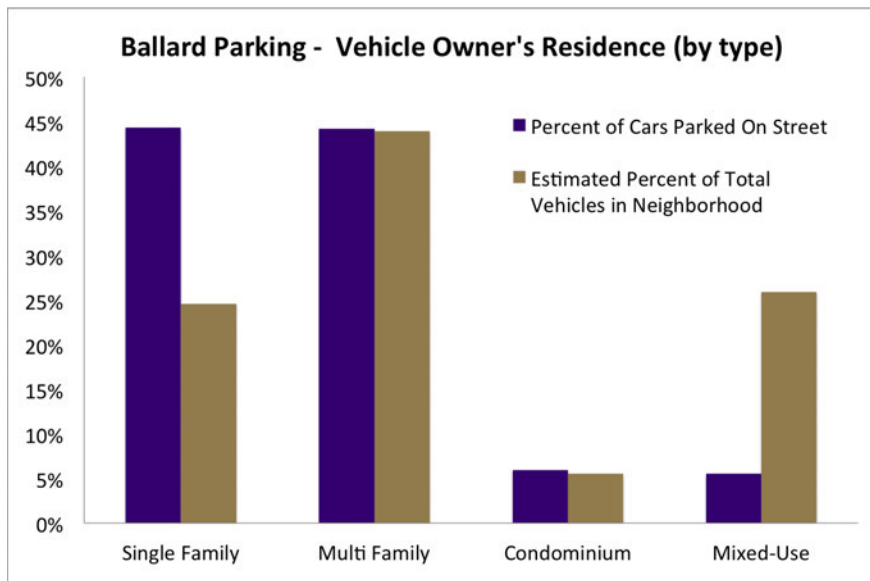


Figure 6.13: Ballard Rates of Mixed-Use to Estimated Proportion of On-Street Parking

while Figure 6.4 above shows that there was still vacancy within the parking structures of the mixed-use buildings. Because there is some spillover to on-street parking from mixed-use residents, while there is available off-street parking in users' complexes, there is likely a parking disparity between the cost of on-street parking and the cost of off-street parking. As described above, this is in fact the case. While on-street parking in Ballard is readily available and generally unregulated overnight, the average cost of an off-street parking space is \$125 per month. This suggests that, for 60 mixed-use residents in Ballard, the cost savings of \$125 per month is worth foregoing the reduced security and convenience of off-street parking.

#### *West Seattle On-Street Parking Situation*

The majority of the HUB Urban Village of West Seattle on-street parking, like Ballard, is regulated by free, 2-hour limits between the hours of 7am and 6pm, excluding Sundays and holidays. This neighborhood also similarly has some streets that have no regulations of any kind. In West Seattle, these streets can be found in the far north between California and Fauntleroy. These areas are generally comprised of single family detached residential; low

density. No metered regulation or on-street permit parking of any kind was found in West Seattle.

Like Ballard, in the middle of the night the parking in the heavy retail areas was generally empty. Streets just outside of the retail areas, typically with dense residential development, on-street parking availability was mixed. To the north of Fauntleroy and Alaska, just a block or so from some of the new large, mixed-use developments there were blocks of empty, free, unregulated parking. South of Alaska, between California and Fauntleroy, there were found to be a good number of operating quasi industrial uses. This meant there was less on-street parking capacity than might otherwise have been. Here the streets directly adjacent to the larger residential developments were full, but just a block further south into the neighborhood there was plenty of open on-street, free, unregulated parking. The regulation free areas with entirely single family detached houses had primarily empty streets. Even the multifamily parking lots that were visible from the streets were generally only 1/2 to 2/3 full. This suggests that either residents of West Seattle have very low vehicle ownership rates or parking has genuinely been oversupplied and under regulated.

In West Seattle, over a one night site visit, 907 license plates were collected. West Seattle had 4.0 vehicles parked on-street per acre of land in the HUB urban village. While it is unfair to make an apples-to-apples comparison without knowing how many linear feet of on-street parking there were in each neighborhood, it is safe to say that on-street parking is much more heavily used in Ballard than in the West Seattle Junction. Again, several of the plates came back as non-existent, likely due to mistakes made during documentation. These plates were similarly eliminated along with any plates registered to addresses outside of the HUB urban village. Once this list was joined with the King County Assessor data via street address, there were a total of 577 plates with corresponding addresses and their present uses remaining. Of the corresponding addresses, 99.8% of the vehicles parked on street were registered to residence. These were summarized into four categories: single family, multifamily (excluding mixed-use), condominium (excluding mixed-use), and mixed-use.

Figure 6.12 summarizes these results. The “count” refers to the actual number of

documented on-street parked vehicles. The “Percent of Total Vehicles Parked on Street” shows what proportion of all vehicle parked on the street belonged to that housing type. “Total Units in Study Area” reports, based on the King County Assessor data, how many units in each type of residential housing there were in the whole study area. “Estimated Total Vehicles in Study Area” is the result of multiplying the median vehicle per household (by tenure) statistic to total units. This estimated how many vehicles are owned by the entirety of each housing type. The “Estimate Percent of Vehicles owned in Study Area” shows estimates of the proportion of all vehicles in the study area belonging to that housing type. Finally, the last row shows the ratio between vehicles parked on-street to estimated total vehicles in the study area.

	<b>Single Family</b>	<b>Multi Family</b>	<b>Condominium</b>	<b>Mixed-Use</b>
<b>Count</b>	<b>386</b>	<b>140</b>	<b>14</b>	<b>37</b>
<b>Percent of Total Vehicles Parked on Street</b>	<b>67%</b>	<b>24%</b>	<b>2%</b>	<b>6%</b>
<b>Total Units in Study Area</b>	<b>463</b>	<b>1226</b>	<b>532</b>	<b>1132</b>
<b>Estimated Total Vehicles in Study Area</b>	<b>992</b>	<b>1632</b>	<b>708</b>	<b>1507</b>
<b>Estimate Percent of Vehicles owned in Study Area</b>	<b>21%</b>	<b>34%</b>	<b>15%</b>	<b>31%</b>
<b>Ratio of Estimated Total Vehicles in Study Area to Total Vehicles Parked on Street</b>	<b>2.6 : 1</b>	<b>11.7 : 1</b>	<b>50.5 : 1</b>	<b>40.7 : 1</b>

Figure 6.14: Results of West Seattle License Plate Exercise

This figure shows that, in West Seattle, a total of 37 of the 577 vehicles belonged to owners who lived in mixed-use developments. Again some overflow is occurring. Here, as the ratios on the bottom row show: there were approximately 2.6 vehicles registered to single family residents for every vehicle parked on street by a single family resident, there were approximately 11.7 vehicles registered to multifamily residents for every vehicle parked on street by a multifamily resident, there were approximately 50.5 vehicles registered to con-

minimum residents for every vehicle parked on street by a condominium resident, and there were approximately 40.7 vehicles registered to mixed-use residents for every vehicle parked on street by a mixed-use resident. This suggests that the rate of on-street parking is nearly sixteen times higher for single family house residents, and four times higher for multifamily residents than mixed-use residents. On-street parking use by condominium residents in West Seattle is actually a lower rate than mixed-use developments. There is an even higher rate of single family residential use of on-street parking than in Ballard and mixed-use residents are generally using on-street parking much less than other residence types (with the exception of condominium users). Figure 6.15 shows this graphically.

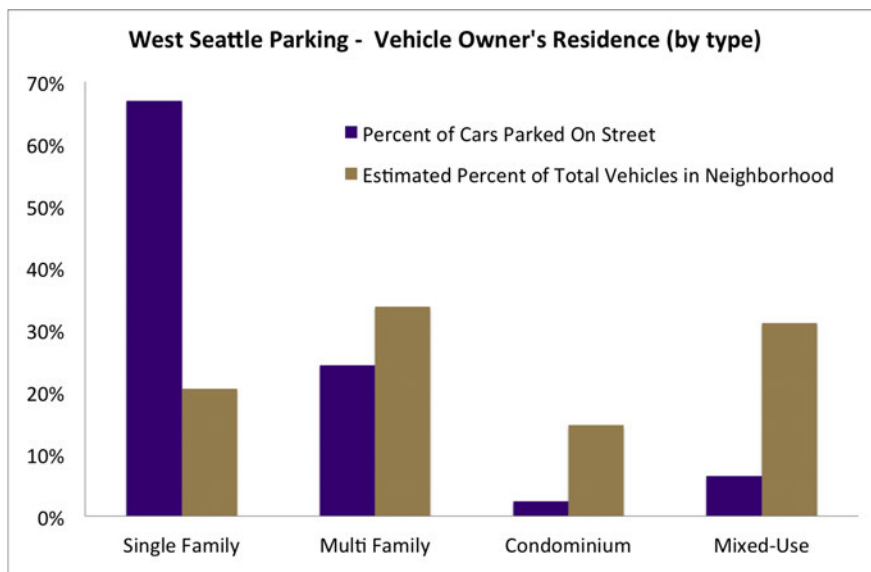


Figure 6.15: West Seattle Rates of Mixed-Use to Estimated Proportion of On-Street Parking

Still, 37 of the 577 vehicles documented belong to residents of mixed-use developments. As Figure 6.8 above shows, West Seattle generally had far less vacancy of off-street parking for the mixed-use developments. Regardless, spillover was found to be present.

Thus, the story in West Seattle is likely a bit different than Ballard. Nearly identical UOR:POR ratios in Ballard and West Seattle suggest that each has about the same rate of residential unit rental to parking stall rental. At the same time, both the residential



and parking units in West Seattle had higher occupancy rates than Ballard. There are two potential explanations for this, either: (1) the buildings studied in West Seattle are coincidentally older than those in Ballard, having had more time to lease up; or (2) mixed-use development living in West Seattle is in higher demand than in Ballard. Another factor is the average parking stall rental rate is \$125 in Ballard while only \$80 in West Seattle.

Regardless, because the off-street parking in West Seattle is generally full, the 37 vehicle spillover into on-street parking is more likely do to lack of parking availability in the off-street structures. It should however be acknowledge that, like Ballard, there is significant disparity between the cost of on-street and off-street parking in West Seattle. While on-street parking in West Seattle is readily available and generally unregulated overnight, the average cost of an off-street parking space is \$80 per month. It is more difficult here to determine whether residents of mixed-use developments are parking on street because of lack of off-street options or due to the price disparity.

### *Micro Housing*

It has now been discussed in several chapters of this report, that new Seattle Municipal Codes offer a bounty of parking reduction opportunities. Most significantly, there is a full exemption for many parcels along corridors of frequent and reliable transit. Unfortunately, as has also been revealed, many developers continue to provide traditional parking supplies despite these opportunities. Consequently, there are very few opportunities to investigate on-street parking trends of residents in buildings that significantly under-provide parking. Fortunately, this can be achieved by analysis of the micro housing developments that were defined in the color box in chapter 2. Because these buildings have no parking requirements and do not provide off-street parking, they make a strong case for revealing these trends.

As of last year there were two operating micro housing developments in Ballard.<sup>2</sup> In these developments there were 12 “dwelling units” which equated to 98 separate sleeping rooms.

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<sup>2</sup>Micro-Housing Tracking List. (June 2014). Seattle Department of Planning and Development. Retrieved on May 19, 2015, from <http://www.seattle.gov>

In West Seattle there were similarly two micro housing developments.<sup>3</sup> Here 12 “dwelling units” equated to 91 separate sleeping rooms. Upon cross referencing the street addresses of these buildings with the on-street license plate data provided by the Washington State DOL, the following was found: 3 total vehicles of residents of these buildings were parking on street in Ballard and none were found on street in West Seattle.

It must be acknowledged that in both neighborhoods these were very small sample sets. Still, despite the lack of provided off-street parking supply, there was very little to no spillover to on-street parking. This finding suggests interesting implications for the reduction opportunities in other new developments moving forward.

### ***6.3 Acknowledgment of Sample Gap***

There is one final note that must be acknowledged about the license plate exercise before transitioning to implications of findings. In Ballard, 2,543 plates were documented within the HUB urban village. This did not include the 2 or 3 % of vehicles that had out-of-state plates. Then 60 plates came back as non existent and 1,368 plates came back as having registered addresses that were outside of the HUB urban village. This left 1,115 plates for the exercise. Similarly in West Seattle, 907 plates were documented within the HUB urban village. This did not include the 2 or 3% of vehicles that had out-of-state plates. Then 23 plates came back as non existent and 307 plates came back as having registered addresses that were outside of the HUB urban village. This left 577 plates for the exercise.

In considering the 1,368 plates in Ballard and the 307 plates in West Seattle that were registered to addresses outside the HUB urban village there are three possibilities:

1. Some of those vehicles likely belong to people who live just outside of the HUB urban village and just happened to park within the village on the particular night that places were being documented;

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<sup>3</sup>iBid.

2. Some of those vehicles likely belong to people who have recently moved from other parts of Washington and have not yet updated their registered addresses; and
3. Some of those vehicles likely belong to people who were either lending it to a friend or were visiting.

Regardless, the 2 or 3% undocumented out-of-state plates, the 60 non-existent plates, and the 1,368 out-of-HUB-urban-village plates make up a significant percent of vehicles that were parked on street in Ballard. Likewise, the 2 or 3% undocumented out-of-state plates, the 23 non-existent plates, and the 307 out-of-HUB-urban-village plates make up a significant percent of vehicles that were parked on street in West Seattle. Thus, the 1,115 plates used for the exercise in Ballard and the 577 plates used for the exercise in West Seattle must be thought of as a sample set of the whole. It must however be recognized that this is not a random sampling as each plate in the sample had certain criteria in common while each plate out of the sample had the opposite in common.

So, for example, one could speculate that occupants of single family homes are more likely to be established and have their vehicle registration addresses accurately reflect where they live. At the same time occupants of multi-family units, and specifically occupants in new mixed-use developments, are likely to be more transient and newer to their current residence. This means their vehicles could be more likely to reflect incorrect registered addresses. So, of the undocumented out-of-state plates and potential vehicles belonging to those who have recently moved to the HUB urban village from other parts of Washington State, but have not yet updated their registered addresses, it could be suggested that it is likely that a larger proportion of those vehicles belong to occupants of mixed-use and multi-family units as opposed to single family homes.

The implications for this are that the results of the plate exercise presented above could be skewed. Unfortunately, without the ability to find the actual current addresses of the residents who own these vehicles, as opposed to there registered addresses, it is impossible

to know for sure whether the plates used in the exercise are in any way representative of the entire group of vehicles that were parked on street.

## Chapter 7

# CONCLUSIONS

This chapter will wrap up the report by exploring the implication of the study as well as some recommendations that can be inferred from the results. Further, it will explore the limitations in this research, and areas for further study.

### ***7.1 Implications of Findings***

There is a question inherent in this study that up until this point has remained unstated. Should public policy and regulations attempt to provide at least as much parking as users demand, or should policy and regulations attempt to further an agenda; such as reducing single occupant auto use? As part of this study has shown, many developers continue to provide parking at levels characteristic of an older, more auto-centric mentality. Further, most of this parking supply is being utilized, suggesting that developers are accurately supplying parking despite their forgone opportunities for reduction. Results of the license plate exercise suggest that there is some spillover from the mixed-use developments into on-street parking, but it is happening at much lower rates than with single- and multi-family residents. As described above, both neighborhoods, specifically West Seattle, still have an abundance of unused, on-street inventory. This all suggests that at present there are no pressing issues with mixed-use development parking provision or the on-street parking situations in either neighborhood.

As the city continues to grow, however, and congestion continues to build, there is certainly an argument to be made for furthering a reduction-of-single-occupant-automobile-use agenda.<sup>1</sup> As more large, TOD-style mixed-use developments come online, it can be expected

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<sup>1</sup>Adolph, C. (2015, May 12). Seattle Congestion 'Is Going To Get Way Worse'. KUOW. Retrieved May 12, 2015.

that some portion of their residents will elect to similarly forego the cost of off-street parking and begin to crowd on-street parking. Eventually, the remaining available inventory will disappear. This will not only cause parking issues but will also exacerbate road congestion issues. Large public investment in transit options may necessitate policies that reward those who utilize these new systems and make those who don't pay for their added convenience.

## **7.2 Recommendations**

These findings suggest several practical recommendations for parking policies and regulations in designated growth areas around the Puget Sound Region moving forward.

First, recall the early provided statistic that there are 8 parking spaces per vehicle in the US. Specifically in these neighborhoods, the mixed-use developments and multifamily buildings provide a parking space for every unit, single family residential parcels provide garages and driveways, and on-street, the municipality provides a wealth of unregulated free parking. While on-street parking remains unregulated and free, residents have no incentive to use the parking provided on their land or in their building and so the infrastructure and cost to provide those driveways, garages, and structures go underutilized. On the public side, if on-street parking were to be regulated more heavily, say with a minimal zone permit requirement, those who are only parking on street because it is free would likely change habits and move their vehicles onto the parking that is provided on their property or in their building. This would likely create more availability for on-street parking moving forward. As congestion grows this extra inventory will be highly desirable. Those who choose to remain parking on-street would be providing the municipality revenue for maintaining those spaces. Based on the Metro survey results highlighted in chapter 4, cost is a significant factor in peoples' lifestyle decisions. So this would also likely equate to some reduction in vehicle ownership do to the added cost of owning a vehicle.

On the private side, it is likely that little will change while off-street parking spaces

are being so well utilized. Even in situations where a development over supplies, developers have the opportunity to under supply parking in subsequent developments in the same neighborhood under the assumption that vacant parking from the original development can be offered to residents of the new one.<sup>2</sup> Still, as explored above, the provision of off-street parking, especially in places where land is scarce, is very expensive. As the region continues to struggle for more affordable housing, reduction in off-street parking supply could help to keep costs down which could in turn keep rents down.<sup>3</sup>

A promising new tool being explored is to offer developers the opportunity to forgo parking provision in exchange for providing building users with transit passes and memberships in car and bikeshare services.<sup>4</sup> This both offers opportunity for reduced construction cost and provides that extra incentive for residents to better utilize alternative transportation options.

It is recommended, based on the findings of this study, that areas designated for housing and employment growth strongly consider on-street zoning permits for overnight parking, that developers continue to be offered opportunities to reduce parking supply where frequent and reliable transit has been provided, and creative incentive programs such as the one describe previously continue to be explored.

### **7.3 Limitations of Research**

It must be acknowledged that the methodology in this research has limitations. First, vehicles parked on-street were documented only within the boundaries of the HUB Urban Villages, not outside. This assumes that all residents who live within the HUB Urban Village who park on-street are able to, and chooses to, park within the HUB Urban Village. This is

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<sup>2</sup>Record, T. (2014, January 29). West Seattle development: Leon Capeloutos second Junction project starts Design Review tomorrow. West Seattle Blog. Retrieved 17, 2015, from <http://westseattleblog.com>

<sup>3</sup>Office of Mayor Murray. (2015, March 26). Mayor Murray announces goal of 20,000 affordable housing units. City of Seattle: Office of the Mayor. Retrieved May 17, 2015, from <http://murray.seattle.gov>

<sup>4</sup>Dawid, I. (2015, March 11). Seattle Densification Strategy: Build Apartments Without Parking. Planetizen. Retrieved 17, 2015, from <http://www.planetizen.com>

a poor assumption. Specifically, for the purposes of this report, there were several large, TOD-style mixed-use developments very close to the edge of the Urban Village Boundaries, such as the Avalon Bay Apartments in Ballard. There may have been some residents of these buildings who parked outside of the urban village boundaries where vehicle information was not collected and so this potential spillover was missing from the analysis. There are several obvious changes that could have been made to methodology to correct for this, such as documenting vehicles parked within a buffer distance of each large, mixed-use development. Each of these alternative methodological options, however, present their own share of deficiencies.

On the subject of vehicle documentation, there was some space for human error. License plates were collected using the voice memo function of the iPhone which was then transcribed onto an excel spreadsheet later to be sent to the Washington State Department of Licensing for processing. There were several points where the voice recordings were indecipherable due to microphone malfunction, wind noise, and passing vehicle noise disturbance. Further, there were several points at which, while transcribing, certain letters were difficult to decipher between. This became apparent when 60 of the license plate numbers in Ballard came back as non-existent and 23 in West Seattle (that is 2.4% and 2.5% respectively).

The methodology executed here also assumes that all residents who live within the HUB Urban Villages and park on-street, were at home with their vehicle parked during the middle of the night on the night when licenses were collected. It also inaccurately assumes that all vehicles parked on the street at night were in the possession of their owner. These assumptions omit those who work night shifts and drive to work, those borrowing vehicles from friends and family, those who have recently moved but not updated their license and information, and those who were just out late in these urban villages. While each of the inaccuracies presented are likely insignificant in their practical implications, when they are all taken into account together, they have the potential to misrepresent the situation.

The final piece of research that presented room for error was with the information received through surveys of leasing offices for the large, TOD-style mixed-use developments. The methodology assumes that the person surveyed was well informed and gave accurate



information. Unfortunately, when asking questions about topics such as occupancy rate, sometimes leasing companies have ulterior motives in the facts and figures they choose to present. Further, on one occasion, a leasing agent answered about half of the questions in the interview but did not know the answers to the rest of the questions. She suggested calling back in a half hour to speak with one of her superiors. When her superior was contacted the entire interview was repeated and several of the pieces of information disclosed by the first interviewee were contradicted. This challenged the confidence of all of the information received.

#### **7.4 Areas for Further Study**

As mentioned above, this study did not do any parking analysis in the commercial parking areas of mixed-use buildings. Along with that, it also did not explore the potential for sharing parking between uses, especially in parking structures that did not separate by use. An example here may be that if the commercial use parking has no regulation, some residents may park there for free overnight for no charge. In the short run, exploration of these aspects of mixed-use developments would fill in the remainder of the conversation of mixed-use development parking requirements and supplies, and their effects on on-street parking in the neighborhood.

Looking years ahead, as stated previously, each study area is still in the process of rapid growth. As figures 5.9 and 5.13 show, there are significant numbers of households that have been permitted but not yet come online. A handful of large, TOD-style, mixed-use developments in each study area are currently under various stages of construction. As new buildings open and more people move into the neighborhoods, on-street parking will become more troublesome, which will also likely change the dynamic of off-street structured parking use. It is highly encouraged that the process executed here be repeated in a few years to see how this situation is progressing.

Finally, it is recommended that further analysis be done of micro housing developments and their effects on on-street spillover parking in the future. As more micro housing devel-

opment continue to come online, it will be useful to know if they are having as minimal an effect on adjacent on-street parking as was found here. Their powerful utility in providing affordable housing to those who are willing to live in such close quarters should warrant them some better understanding; especially as public policy begins to make them harder to develop.