PERCEPTIONS OF GREEN SPACES AND SUBURBAN IDENTITY:

THE AESTHETICS AND SAFETY OF

NATURALIZATION IN EVERETT, WASHINGTON

by

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ABSTRACT

Perceptions of green spaces and suburban identity:
the aesthetics and safety of naturalization in Everett, Washington

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Suburban and edges of urban communities have expanded over the past century. These areas consume more resources than dense urban cores, have greater environmental impact, and are often characterized by impervious surfaces and manicured green spaces. The documented benefits from increasing green spaces has motivated efforts to increase the naturalization of urban and suburban areas. However, we lack substantial research on how targeted communities perceive such green spaces. In this study, 40 residents of Riverside neighborhood in Everett, Washington completed a survey about their self-identification and their perceptions of green spaces and naturalization. These residents self-identified more with urban and urban-suburban than suburban, and displayed relatively high concern for both safety and the environment. When rating images of wild, combination of wild and manicured, and manicured yards, these residents were more likely to favor green spaces with wild and naturalized attributes rather than a conventional manicured lawn. The respondents also perceived combination yards as more safe than conventionally manicured lawns. These results support future naturalization projects that utilize more combination designs of manicured and wild aesthetics due to its perceived attractiveness and safety.

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Chapter One
Introduction

Suburban areas have increased in population and extent over the past half century.

Metropolitan areas have increased in density and geographic spread--more people live in

suburban areas in the past half-century than ever before. With increasing media coverage

of climate change and an overall increase of knowledge of environmentalism and

sustainability, urban and suburban areas are transitioning towards building green and

incorporating sustainable design. City Planners are adopting Environmental Planning into

their catalog of Planning techniques. How suburban residents perceive these

Environmental Planning projects, in particular the use of green spaces, shapes the

interactions an individual has with their environment, behavioral responses, and the use

of their physical environment.

Urban and suburban areas are human-created environments that are physically and

geographically distinctive from one another. High density urban areas are popularized in

Urban Political Ecology and Urban Planning, two fields that study and shape human built

environments and their relationships with how people use them. 'Urban' is often used as

an umbrella term that incorporates all cities within a non-rural metropolitan area.

Suburban cities, also referred to as satellite cities or edge cities, are not considered truly

metropolitan by professionals and scholars, and have been largely ignored in these areas of study and expertise.

The modern human establishment of suburbia is a new way, both in form and function, in which humans use their physical space. The suburban realm in the United States is uniquely conceptualized in pop culture and scholarly research. It exists between metropolitan, urban, and rural areas, characterized as largely dependent on relative range to dense urban areas. Urban Planning professionals have yet to agree on how to define suburban areas. This lack of definition stems from the fact that there are different kinds of suburban areas with different characteristics and features (Forsyth, 2012). This means that there are many potential definitions for the term, ranging throughout the suburban spectrum (Groves, 2011).

Due to this lack of definition, suburban areas have largely been ignored in studies of this nature, leading to an increased need to find out how suburban communities in the United States perceive green spaces. Perception and acceptance of green spaces is an important component for city planners and developers to recognize, as climate change and human activity puts pressure on the environmental integrity of urban and suburban areas. Proximity to green spaces is associated with a wealth of physical and emotional health benefits. Identifying how suburban nature is viewed can support how suburban areas are developed to best serve its residents. Increasing the knowledge of how green spaces can be used more effectively to maximize well-being, aesthetics, and ecological landscapes can assist planners and developers to maximize future development and revitalization.

This project seeks to advance the knowledge of suburban perceptions of naturalization in Everett, Washington. Naturalization is the process of increasing green spaces in urban and suburban areas that are more sustainable than conventional planning development (Randall, 2003). Green and naturalized spaces can serve many purposes, active play, walking, parks, playgrounds, school fields, trees lining roadways, and yards and gardens of homeowners (Parsons, 1995). Increased green spaces have been noted by many researchers to increase the overall wellbeing of the inhabitants nearby. Studies addressing increasing green spaces have mainly focused on highly dense urban centers, mainly outside of the United States.

My research was broken into two main questions:

1. How do residents in Everett, WA perceive where they live within the suburban spectrum?

2. How do these same residents perceive the safety and attractiveness of different kinds of green spaces?

To define a suburban space, this thesis will profile the current suburban landscapes in the United States, the Pacific Northwest, and consider how scholars approach defining suburban spaces. Due to the lack of definition of suburban areas, particularly in fringe spaces near urban cores, this study seeks to use the personal definitions of how residents describe their areas through use of a survey combined with historical scholarly thought of how these areas are described. While exploring how

residents define their physical and geographic space, this thesis will also investigate how suburban residents perceive their natural surroundings.

The definition of nature to an individual in a strictly urban area may differ from what an individual views nature to be in a suburban or rural area. These perceptions of nature and the environment shape the way in which people interact with their physical surroundings. How nature is defined within the context of urbanity is relevant to how cities are formed and how humans interact with the spaces of their city. Individual perceptions of nature influence how people utilize, view, and interpret their surroundings. These perceptions shape relationships between the environment and how people use nature specific activities and benefits. The benefit of understanding perceptions of green spaces more comprehensively allows researchers, the public, and urban planners to be able to communicate better, have a more nuanced view of planning projects and naturalization.

Since Urban Political Ecology acknowledges the socio-political-natural connection of humans and human built spaces, socio-economic and racial backgrounds should not be ignored in this this study. Although not a part of the study specifically, these backgrounds will be considered in the chosen suburban areas to help shape how the respondents reflect their geographical location. These unique backgrounds and their corresponding locations (suburban locations based on Urban Planning research) have not been studied in a comparative form in the context of identifying nature perceptions. This study would add to the scholarship of identifying how nature is perceived, while providing a broader framework based on human localities.

This study assists political ecologists, urban planners, geographers, and environmental behaviorists in future studies on naturalization in suburban areas. Researchers could more broadly evaluate in what ways a suburban nature definition preferences influence how suburban residents interact with nature and their built environments. It could also help to bridge the understanding on how perceptions of green spaces broaden the understanding of how residents perceive naturalization projects. In identifying how nature and green spaces are perceived and whether certain areas are seen to be more natural than others, perception of nature can guide what forms of green spaces are more accepted by suburban residents. Identifying how suburban nature is viewed can support how these areas are developed to best serve suburban residents. This study will also fill in an important gap in current research for both identifying suburban zones in Snohomish County, and gathering data of nature perceptions for suburban residents.

Chapter Two
Literature Roadmap

The following literature review begins by examining how the terms suburban, green spaces, naturalization, and nature are used by urban planners and scholars. This chapter will explore definitions of these terms, providing a basic overview of how the terms are used by professionals and scholars. This section will also provide working definitions for how these terms will be throughout the rest of this thesis.

Once these terms are better understood, I will examine the historical context of suburban development. This section discusses the transition of United States urban settlements in the middle to late 20th Century, provides descriptions of this new growth, and how the change in location and settlements shaped how green spaces are used and grown. To understand suburban and urban development in the modern era, it is essential to recognize the influence of New Urbanism, a planning methodology that shaped development in the past century and today. New Urbanism is a theoretical framework that allows for city planners to further develop urban cores with a focus on preserving environmental space (Ellis, 2002). New Urbanism contextualizes how urban, suburban, and rural areas are perceived to many professionals and scholars.

Next discussed is suburban development in the Puget Sound region. As suburban areas have grown and changed throughout the United States, the Puget Sound region in the Pacific Northwest has experienced its own set of changes based on industry, development, population growth, and geographic boundaries.

After exploring the history of suburban development, New Urbanism, and suburban development in the Puget Sound, the following section discusses the environmental costs of suburban development. In response to these environmental costs, the benefits of naturalization will be explored, as they provide positive physical and emotional health benefits (Priego et al, 2008). These benefits are linked with the geographical features of a nature setting, visual perceptions, and ability to use nature for recreation or play (Priego, 2008). Interacting with nature and 'green space' contributes towards improved welfare for citizens (Sang et al, 2016).

Despite the myriad of benefits from green spaces, naturalization projects have been criticized by the public. In identifying how nature is aesthetically perceived and whether certain areas are seen to be more natural than others, perception of nature can guide what forms of green spaces are more beneficial to residents near-by. Identifying how suburban nature is viewed can support how these areas are developed to best serve suburban residents.

In addition to aesthetics, scholars have also examined how the public identifies the safety of naturalized areas. Safety concerns have been raised as these 'natural' landscapes appear to some as dangerous for children, women, and the elderly (Randall, 2003). Particularly in parks, naturalization of public spaces is controversial for how safe that public space is perceived. When naturalized areas are perceived as both aesthetically

appealing and safe, it is more likely that urban planners can reap the benefits of increasing naturalized spaces.

Defining Terminology of Suburban, Green Spaces, Naturalization, and Nature

Suburban

Suburbia: the place where over half the population of the United States call home (Lopez, 2014). The monumental changes of American moving from urban zones to suburban caused political, social, environmental, and economical transformations. Suburbanization represents shift in planning theory and political governing that descended from the socioeconomic platforms of the early 20th century. The term 'Suburban' is present in popular culture to describe the in-between areas of urban core and rural landscapes. Despite its frequent usage, urban scholars have yet to agree how to define suburban areas, although a common theme exists based on the suburbs' relative proximity to a metropolitan area and relative newness (Forsyth, 2012). The range of meanings of suburban only expands when other fields and popular culture share their definition (Forsyth, 2012).

The U.S. census doesn't specifically classify a suburb versus a denser urban city, causing difficulty in distinguishing a national numerical population who occupy suburban spaces (Forsyth, 2012; U.S. Census Bureau, 2015). Although the bureau doesn't use 'suburban' as a classification, they do delineate between two kinds of urban densities. The U.S. Census Bureau (Urban and Rural Geography U.S. Census Bureau, 2017) classifies two types of urban areas as:

- Urbanized Areas (UAs) of 50,000 or more people;

- Urban Clusters (UCs) of at least 2,500 and less than 50,000 people

Rural areas encompass all population, housing and territory not included within one of the two urban areas above (Urban and Rural Geography U.S. Census Bureau, 2017).

The Federal Government mandates that the Census Bureau and the Office of Management and Budget use this rigid form of classification to afford uniformity across governmental entities (Groves, 2011). This uniformity allows for statistics to be used throughout different factions of the Federal Government. Representatives from the U.S. Census Bureau note the rigidity of the definitions of urban densities, and state on their website that there are many definitions of urban, suburban, and rural, each suitable for different uses (Groves, 2011). It is also recognized that many suburban areas have populations that are above 50,000 people, leaving there no distinguishing element between urban and suburban. Despite noting the suburban spectrum, the Census Bureau is committed under Federal regulations to stand by these definitions (Groves, 2011).

The American Planning Association (APA) is another body that recommends widely used definitions and classifications, like the U.S. Census Bureau. The APA is an international organization established in 1978 that unites professional urban planners and those interested in the Planning profession (About APA, 2017). This organization promotes using regulatory 'codes' that promote sustainable urban form (Duany & Talen, 2002). Regulatory codes allow for Planners to classify certain elements of a city, such as commercial districts, single-family homes, and agricultural land.

In the early 2000s, the APA developed regulatory codes that used transects, images that display the differences between codes and shows immersive environments (Duany & Talen, 2002). Below are two different transects, a Wedge Transect (Fig. 1) and a Rural-Urban Transect (Fig. 2). The Wedge Transect shows a view of the world we

occupy, with no set boundaries between urban, suburban, and rural. This is transect is

used more often to display larger trends than for regulatory codes (Center for Applied

Transect Studies, 2017). The second transect (Fig. 2) is an example of how Planners

distinguish different kinds of zones, providing lines that determine urban, suburban and

rural areas (Center for Applied Transect Studies, 2017). Each zone on this figure is

labeled, with T3 being the designation for 'Sub-Urban' Zone.
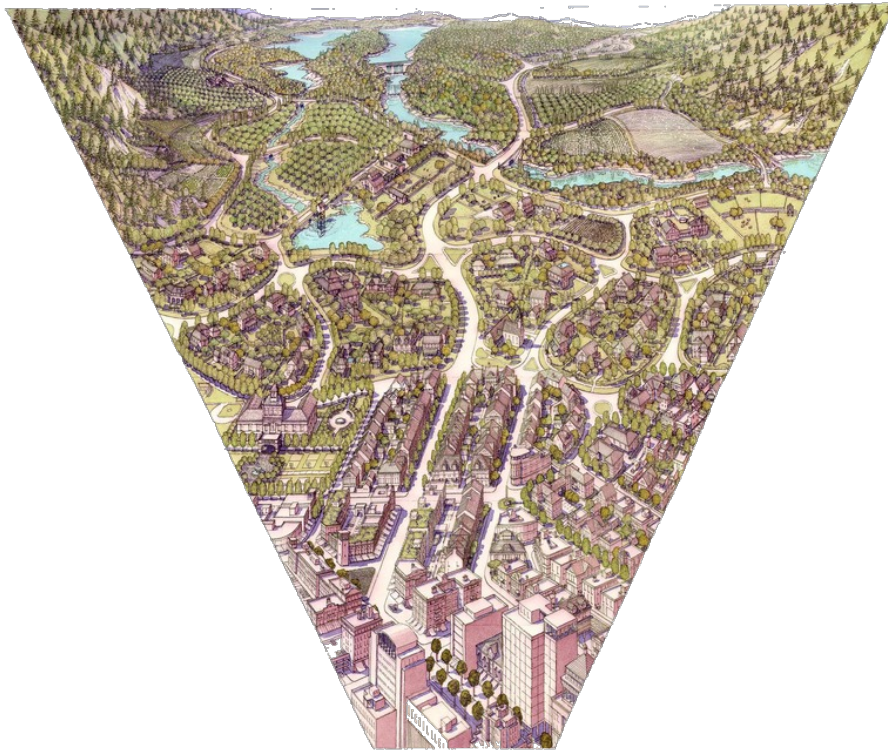
Figure 1. Wedge Transect. This transect shows the gradients between urban, suburban, and rural. The figure has no distinct lines between the gradients
(Center for Applied Transect Studies, 2017)
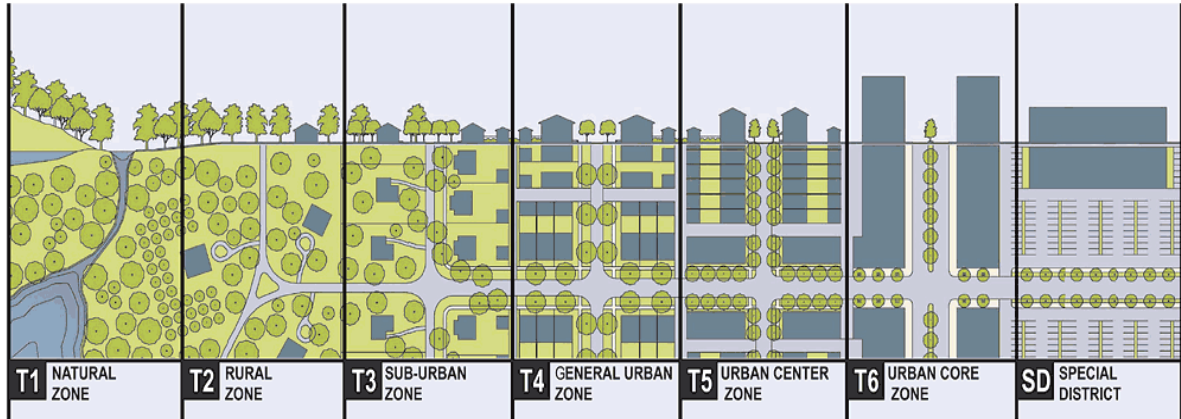
Figure 2. Rural-Urban Transect. This transect dissects urban, suburban, and rural areas with distinct lines. Each zone represents an individual transect.

(Center for Applied Transect Studies, 2017)

T1 Natural Zone	Surface waterbodies, protected wetlands, protected habitat, riparian corridors, purchased open space, conservation easements, transport corridors
T2 Rural Zone	Flood plain, aquifer recharge areas, steep slopes, open space to be acquired, corridors to be acquired, buffers to be acquired, legacy woodland, legacy farmland
T3 Sub-Urban Zone	**Medium slopes, woodlands, most residential habitat of a community, buildings consist of single-family, detached houses, office and retail buildings are permitted on a restricted basis, buildings are a max of two stories, open spaces are rural in character**
T4 General Urban Zone	The generalized, but primarily residential, buildings consist of single-family, detached houses and row houses on small and medium-sized lots, limited office buildings and lodging are permitted, retail is confined to designated lots, typically at corners
T5 Urban Center Zone	The denser, filly mixed-use habitat of a community, buildings consist of row houses, flex houses, apartments, and offices above shops, office and retail buildings are lodging are permitted, buildings are a max of five stories, open spaces consists of squares and plazas
T6 Urban Core Zone	The densest residential, business, cultural, and entertainment concentration of a region, buildings consist of row houses, apartments, office buildings, and department stores, buildings are disposed on a wide range of lot sizes, surface parking lots are not permitted on frontages

Table 1. Main characteristics of Transect Zones adapted from Duany and Talen's APA article, "Transect Planning" (2002, p. 255).

Duany and Talen (2002), characterize each zone along the rural-urban transect (Table 1). Their table has been adapted for this thesis to show the most relevant information for this study. These transects are examples of the guidelines used by Urban Planning professionals who map out and design cities (Duany & Talen, 2002). T3 is the tiered transect zone that represents suburban areas, and is widely used throughout the United States by Urban Planners.

In addition to transects, urban planners utilize zoning and planning data, to create 'zoning maps' to that mark density and land use. These maps often color code the tiers of T1 through T6 to display the characteristics of a city. Figure 3 is an example of a Community Plan that utilizes all six transects, along with designations of districts, civic areas, and grid patterns (Duany & Talen, 2002). Maps such as this one could be used for a neighborhood, city, county, or even up to a regional level, depending on the desired scale.
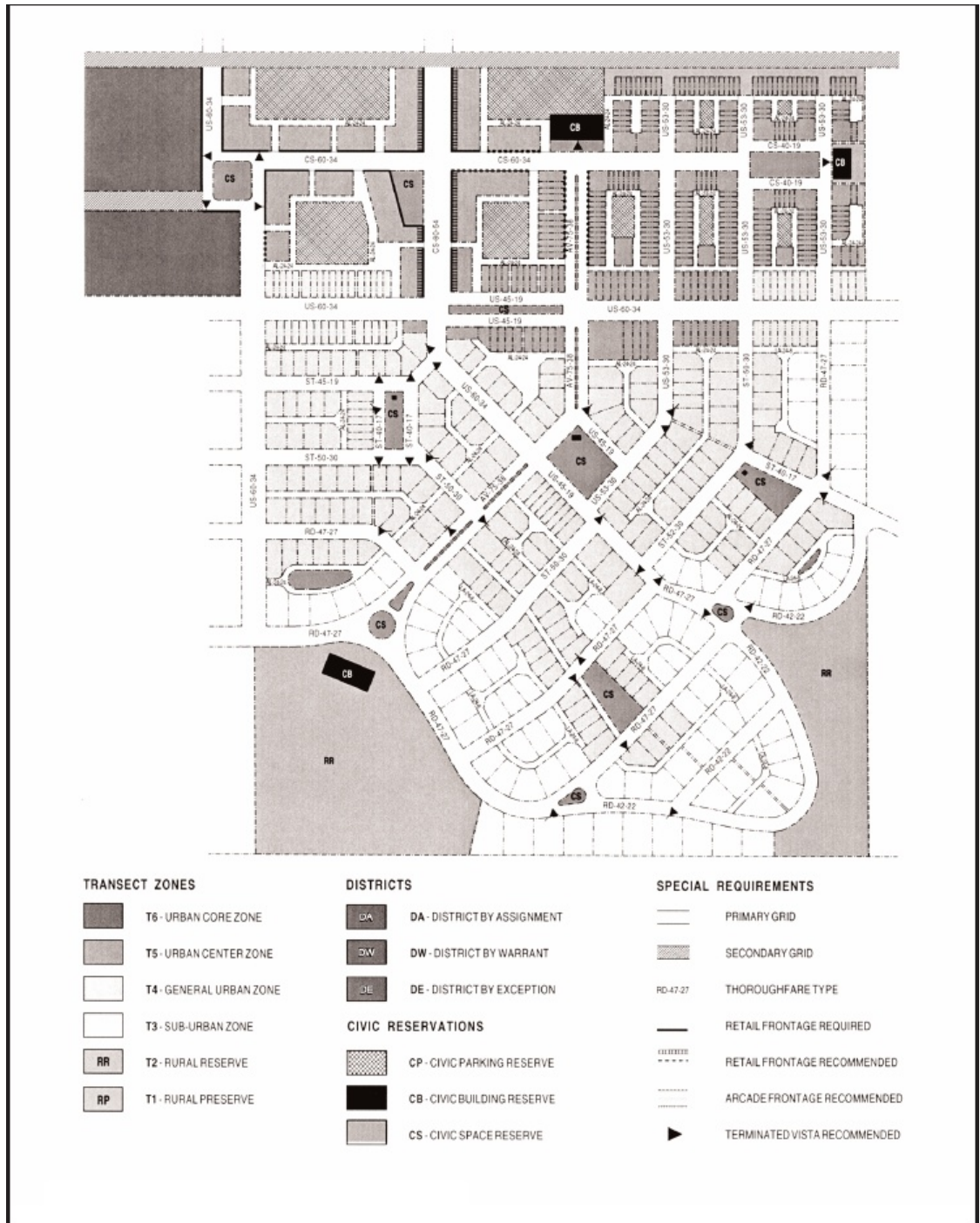
Figure 3. Example of a Community Plan map using Transect Zones, Districts, Civic Reservations, and Special Requirements.

(Duany and Talen, 2002, p. 261).

To expand upon the Federal Government and American Planning Association definitions, scholars provide their own explanation of suburban, with boundaries that are specific to their study area (Groves, 2011; Forsyth, 2012). These definitions range from mapping density to administering perception studies. Classifications of suburban areas are also molded by different stereotypes of suburbia. The following are examples of some of these academic descriptions.

Many scholars consider suburban sprawl to be a space-time context of development, shaped by its density and spatial distribution (Moudon & Hess, 2000; Barnes et al., 2007). Often suburban definitions incorporate multiple dimensions, leading to increased complexity that further fragments the ability for comparative study (Forsyth, 2012). The areas that suburban growth represent are not dense urban centers, and are often referred to as edge cities, metrocenters, and suburban zones (Moudon & Hess, 2000; Duany, Plater-Zyberk & Speck, 2010). Despite these varied terms, scholars have found that there are substantial areas of medium-density multifamily housing that are not categorized or represented in literature (Moudon & Hess, 2000; Short et al., 2016).

Moudon and Hess (p. 243, 2000) recognized a broader sphere of suburban spaces as indicating "that residential functions in maturing suburbs not only densify, but also nucleate." The authors cite that at regional levels, suburban clusters represent low-level concentrations of activity. These land-use based activities are representative of land-use planning models from the early 20th century (Moudon and Hess, 2000). These clusters of suburban nucleation represent a modern take on suburbanization, allowing for a flexible definition based on the regional landscapes and uses of the land to develop.

Cities and urban centers are a part of a wider system of social and political relationships that exist in many different scales (Scott & Scorper, 2014). Within the context of the whole city and its region, diversity and individual distinctions of its characteristics influence its urban/suburban/rural classification and type of city (Scott & Scorper, 2014). The modern delineation between urban and suburban is largely reliant on the historical development from the past century. Design elements such as those seen in early suburban settlements still exist today, as the geographic spread of population occurred mainly after 1950 (Moudon & Hess, 2000).

Suburban areas are stereotyped as areas that are made up of middle-class families with children, living in private detached houses, with low density and open space (Forsyth, 2012). Suburbs are also framed as either being positive (low density, increased green space) or negative (uncultured, environmentally harmful), based on their definitions (Forsyth, 2012). Suburban areas are often considered to be irresponsible, poorly-planned developed sites that are harmful to the environment, increase traffic, and increases taxes, and some scholars go so far as to refer to it as a cancerous growth or virus to urban development (Barnes et al., 2007).

The lack of understanding urban, suburban, and rural divides has complicated efforts of measuring the stages and kinds of urbanization and managing natural resources impacted by land change (Short Gianatti et al., 2016). Improving this understanding of how urban to rural gradients are measured and defined is important for addressing environmental problems and managing natural resources (Grimm et al., 2000; Pickett et al., 2011; Short Gianatti et al., 2016). Among studies that currently define these urban gradients, there is little consistency in methods being used to define urban, suburban and

rural (Raciti et al., 2012; Short Gianatti et al., 2016). Measuring these three areas include using population density, density of roads and impervious surfaces, and linear distance from an urban core (Short Gianatti et al., 2016). Despite the commonalities for measuring the urban-rural divides, literature on this topic is still dependent on comparability to previous studies and how 'urban' is defined in each study (Raciti et al., 2012; Short Gianatti et al., 2016).

This divide in suburban and urban areas helps to define urbanized areas. Since suburban and urban areas are not necessarily characterized by their design or density alone, the characteristics that shape each area also classify these zones (Short Gianatti et al., 2016). Suburban areas lack a clear definition, in part due to the varied ways that they have quickly developed over the last century. A lack of centralized definitions of the elements of sprawl, characterized by their time and space components, leads to a lack of comprehensive literature on the topic. Without boundaries or descriptors for individual types or elements of suburban zones, studies about suburban areas cannot be directly compared unless their individual definitions are similar (Forsyth, 2012). When the opinions of researchers, policy makers, activists, and the public disagree over how to define suburban areas and sprawl, efforts to mitigate or decrease this type of land development are complicated (Barnes et al., 2007).

An example how these studies are defined comes from a paper by Robinson, Newell & Marzluff (2005, pg. 57), who described the differences between Urban, Suburban, and Rural lands in their paper, "Twenty-five years of sprawl in the Seattle region.":

"**Urban**: Buildings cover the majority of land. Building density is high and includes multi-family housing, multi-storied buildings, commerce, and industry. High-density single-family housing on relatively small lots (<0.2 ha) is also common.

Suburban: Building density is moderate and lawns and other vegetation are often readily apparent. Lawns and gardens are generally more extensive than within urban areas. Single-family housing predominate on small to moderately-sized lots (0.1-1.0 ha). Multi-family housing, basic services, and light industry are scattered throughout. Structures over two stories tall are uncommon.

Rural: Building density is relatively low and surrounded by agricultural lands. Settlement is sparse, primarily single-family housing on moderate to large lots (.5-20 ha)."

Another description for suburban zones are defined as: "A pattern of land-use/land-cover conversion in which the growth rate of urbanized land significantly exceeds the rate of population growth over a specified time period." (Barnes et al., 2007; Powell et al., 2007). This definition lacks specific numbers to define suburban areas, but instead displays growth trends. Many scholars use this definition, or a version of this definition, to approximate suburban areas through their historical growth. This description also allows scholars to observe different rates of population and urbanized land growth in comparison to each other, using the significant difference to define a suburban space based on its contextual growth.

A different kind of description for suburban areas relies on the residents of suburban zones to classify their perception of where they live. Definitions of suburban areas that rely entirely on physical and geographic boundaries and population density often ignore the socio-political aspects of self-characterization (McIntyre et al., 2000; Coulton et al., 2001; Priego et al., 2008; Short Gianatti et al., 2016). A growing body of scholarly research suggests that residents' perceptions of their surrounding environment

are important in understanding how the spaces in which they occupy are classified (McIntyre et al., 2000; Coulton et al., 2001; Short Gianatti et al., 2016). To help describe suburban areas, Anacker (2015) articulates suburbia to be that "suburbanites themselves are the arbiters of what is suburban" (Anacker, 2015, p. 25).

There is a current gap in literature for studies to incorporate resident perception into the body of suburban classifications. Short Gianatti et al. (2016) conducted a study to link the abstract perceptions of urban, suburban, and rural to their geospatial characteristics counterparts. Residents of different areas were asked to define where they were, and the authors compared their responses to the existing classification of the space based on the popular literature understanding of urban, suburban, and rural (Short Gianatti et al., 2016). The authors argued that this method was particularly useful in capturing the social and ecological processes that help in providing a meaningful measure of urbanization. This method can also be used to scale-up sociological studies and assist the development of conservation policies (Short Gianatti et al., 2016, p. 825). When the authors used the perception data along with population density and characteristic maps, they were able to model a 'decision tree' that better directs how to classify an area as urban, suburban, and rural.

Further exploring how individuals classify themselves, Kolko (2015) devised a survey to predict where people would want to live in the future. Due to the lack of definitions for urban and suburban areas, a survey was developed by an online housing economics site, Trulia.com to find out the definition of suburbia by the American population (Kolko, 2015).

The study used responses from 2,008 adults and evaluated where they live based on their own description (urban, suburban, or rural), then cross-evaluated their responses against their given zip codes. 26% described themselves as urban, 53% as suburban, and 21% stated they were rural (Kolko, 2015). The survey found that self-reporters of urban areas were better able to align themselves with density based definitions of urban and suburban areas determined by official city boundaries. Suburban residents were less likely than urban residents to be able to align themselves with the pre-determined city boundaries (Kolko, 2015). This gap shows that Urban Planning definitions for urban-suburban-rural divides are better recognized by urban residents than suburban residents, and that suburban residents are less likely to agree with how City Planners designate their zone.

Increasingly, scholars are adopting sociological elements of perceptions studies to better understand suburban boundaries (Coulton et al., 2001; Forsyth, 2012; Short Gianatti et al., 2016). Further questioning of suburban boundary perception has developed to better understand how neighbors define their location and how individual differences can attribute to their differences of urban and suburban definitions (Coulton et al., 2001). Coulton et al (2001) set up a pilot study to better understand how residents perceive their boundaries. The authors used a set of small neighborhoods and used the Census Bureau's boundaries to establish their own smaller geographic boundaries. Respondents in these designated neighborhoods were asked to draw on a map their own version of how they saw their neighborhood boundaries (Coulton et al., 2001). The study found that residents were more likely to have a more expansive or different perception of their neighborhood boundaries than the Census maps (Coulton et al., 2001). Although

this survey did not ask for their perceptions on whether they were urban or suburban, this study represents a need for further perception studies to create a more accurate representation of neighborhood and suburban boundaries.

The changing landscape of The United States, the ebbs and flows of populations moving in and around cities, have contributed to this nebulous definition of the suburbs. Unfortunately, there is no common consensus how to define different suburban areas, leading to the problematic outcome that studying suburbia is discounted by researches (Barnes et al., 2007; Forsyth, 2012). Despite this issue, researchers are increasingly improving how suburban zones are characterized, classified, and described. Given the diverse array of definitions for suburban, scholars suggest that using more specific terminology to define different areas that a suburb might encompass to honor their diversity and sociological impacts (Forsyth, 2012).

For the purpose of this study, suburban will be used to designate a T3 Zone area, as specified by the APA (Duany & Talen, 2002). The term will also be used to reflect the perceptions from the survey results from the residents in the Riverside Neighborhood.

Green Spaces and Naturalization

While discussing the effects of suburban sprawl, scholars refer to the vegetation and the landscape as green space. Green spaces can be represented by parks, lawns, gardens, and areas with growing plants, among other examples (Jennings & Gaither, 2015). Expanding green spaces are attributed towards improving physical health, mental health, increasing community support, and improving neighborhood aesthetics (Wolf,

2014). Because of suburban development, green spaces in suburban areas are decreasing (Brabec et al., 2002; Robinson et al., 2005; Powell et al., 2007).

The term naturalization is based off of the assumption that green spaces are perceived as being 'natural' while human built spaces are the opposite, leading to naturalization being synonymous for increasing green spaces (Grimm et al., 2000; Priego et al., 2008). Naturalization is the process of moving a designated area away from 'unnatural' conditions towards more 'natural' conditions, resembling the ecosystem that existed before humans influenced that specific environment (Grimm et al., 2000; Priego et al., 2008).

Urban nature is where these green spaces exist in human built regions, such as urban and suburban zones (Priego et al., 2008). Naturalizing, aka increasing urban greenery, is notable for improving the environmental, social, and physical aesthetics of that area (Grimm et al., 2000; Priego et al., 2008). Naturalization of suburban areas can be increased in local public areas and at private residences. The role of perception of these naturalized areas is a key component to increasing green spaces on the governmental and public side, as residents rely on visual, safety, and community preferences (Jorgensen et al., 2002; Priego et al., 2008). Individual perceptions of nature influence how people utilize, view, and interpret their surroundings. These perceptions shape relationships between the environment and how people relate to their surroundings, using nature specific activities and benefits (Parsons, 1995).

When examining naturalized areas, scholars compare 'wild' to 'manicured' areas. How vegetation is cared for and managed is directly related to how that vegetation is perceived. Wild and manicured differ in their definition and perception on an individual

level. Scholars and planners use these terms to describe the differences between naturalized and non-naturalized spaces, with wild areas being associated with naturalized and non-naturalized with manicured areas. The perception that non-naturalized areas reflect "order and industriousness" (Feagan & Ripmeester, 1999) has shaped how new urbanist planners have designed green areas.

Nature

Nature has various meanings, from both a historical and present perspectives. As cities have changed, the perception of nature has changed as well (Priego et al, 2008). Divergent conceptions of nature become a barrier for environmental communication and environmental value of an area, especially for urban planning. Urban residents may not have the same perception of what nature is, leading to problems for communicating building projects, development, use of space, master plans, and value of certain kinds of spaces. If people in suburban communities don't agree with the more common and popularized urban definition and use of nature, larger planning projects could negatively impact these areas more (Randall et al, 2003). Awareness of nature and its significance relative to an individuals' surroundings is also instrumental to communicating environmental problems on a local and global scale (Priego et al, 2008).

Nature is a term that is multifaceted in its conceptualization and its definition various from person to person. Per Noel Castree (2001), nature is either 1) external, 2) intrinsic, 3) universal, or 4) social. External implies that nature exists separate from human society. Intrinsic is a fixed nature, something that is an inherent quality for something or someone. Universal, the opposite of external, describes a nature residing everywhere and

in everything. It can also be the idea of 'mother nature'. Social nature remains more ambiguous—the idea of nature as a socialized entity, emerging from social interactions (Castree, 2001). These various definitions skew the way in which one conceives of and treats nature. For example, do we view nature as pristine, untouched, and untouchable? Can nature be something built by humans? Are urban parks "natural"?

The bond between human developed spaces and this relative view of nature are inherently intertwined, as brought to life by popular authors in the urban political ecology field (Lefebvre, 1976; Jacobs, 1992) who state that human built environments are as natural as pristine nature, since humans are natural beings. These authors found a source of contradiction in the idea that cities and other built environments were viewed to be theoretically separate from the earth. These assumptions connect nature to humanity in a unique light, which provides a basis in which the environment that humans have built is socially and physically natural (Swyngedouw, 2005). Today, many urbanized areas are implementing city beautification programs to increase quality of life (Wolf, 2014).

The revitalization of urban and suburban spaces is connected to how humans interact with their environment and some cities are framing this increased connectivity as an amenity (Wolf, 2014). Other municipalities, particularly in more suburban areas, are less likely to adopt the diversification of plants that naturalization encourages (Sandberg & Foster, 2005). Naturalization can also be viewed as bourgeois that is targeted towards wealthier residents of suburban neighborhoods (Castree, 2001; Sandberg & Foster, 2005). Although naturalization has these associations of elitism, naturalized areas cost less for maintenance than traditional lawns that require pesticides, weed-pulling, and watering (Sandberg & Foster, 2005). The perception that naturalized areas are a threat to the order

of a societally influenced definition of natural lawns is a challenging element for naturalization (Sandberg & Foster, 2005).

This thesis recognizes the different academic definitions of nature, but will utilize a conventional interpretation for the purposes of this study. As a working definition, nature and natural will be used to represent non-human built areas, but encompasses wild and manicured green spaces. Naturalization, in this case, is increasing green space that is not built by humans, such as buildings or sidewalks. Naturalization in this study represents green spaces that can be managed by humans, but is living vegetation of some kind. In the survey, residents are asked to apply their own definitions of 'green space' since no definition is provided.

History of Suburban Development

The history of suburban development from the past century is essential in understanding how suburban areas exist today. Planning theory and suburban settlements cemented how neighborhoods and communities established, including the laws and codes surrounding those areas. Suburban areas are unique to human settlement; therefore, this brief historical outline presents the major trends and developments that helped to shape modern suburban neighborhoods.

The Great Depression marked a change in how urbanization progressed. In August of 1929, the economy contracted and began one of the largest economic depressions ever experienced in the United States, lasting from 1929 to 1939 (Rosenberg, 2003). The Great Depression became the catalyst for the creation of the New Deal, a federal commitment to implement policies that would improve government, economic, social and labor policies. Scholars concur that the Great Depression was a major motivator for the United States government to promote policies that would increase homeownership to stimulate the economy.

Before the depression hit, increased production and labor productivity stimulated investments in new plants and equipment and new residential construction (Rosenberg, 2003). Despite this growth, wages and salaries were slow to rise with the growing progress. Many attribute this to the attacks on unions by employers, which caused unionization rates to fall from 12.1% in 1920 to 7.2% in 1929 (Rosenberg, 2003). In addition to rising labor productivity in the years before the Great Depression, automobile development increased three-fold in the 1920s (Rosenberg, 2003). Throughout the growth in the 1920s, the top 5% of the population prospered significantly due to income

inequality (Rosenberg, 2003). Owing to this wealth disparity, the economy became dependent on the top 5% to invest in new plants and equipment.

The second element which helped to prime the Great depression was increased level of credit purchases. Nearly 75% of all automobiles were bought using credit, which dramatically grew personal debt (Rosenberg, 2003). Personal debt from automobiles and home mortgages grew faster than disposable income in the 1920s, which rose to being 30% of overall disposable income by 1929 (DuBoff, 1989, pp. 88). The increase in consumer debt along with income inequality fostered the severity of the Great Depression and the housing policies that developed from it.

In 1921, the home ownership rate hovered around 41%, a number that Secretary of Commerce then Herbert Hoover saw as problematic (Rome, 2005). Hoover sought to increase the percentage of homeowners in the United States as a mission of retaining and supporting social order (Rome, 2005). To help rehabilitate a post-war nation, Hoover applied engineering solutions to increase the efficiency of homebuilding throughout the 1920s (Rome, 2005). These solutions dramatically increased the amount of homes built, with 1925 peaking at 937,000 homes annually, which was nearly twice the homes built in the previous records established pre-1922 (Rome, 2005). By the late 1920s, homeownership rate grew to 47.8% (Historical Census Housing Tables, 2017). When the Great Depression hit, homebuilding slowed to only 93,000 built homes in 1933. Along with the growing number of foreclosures reaching the thousands per week in the early 1930s, homeownership rates fell back down to only 41% (Rome, 2005). Despite these major setbacks, the Federal Government still sought to increase the levels of homeownership during the 1930s, particularly without government intervention. Instead

of investing in federal programs to stimulate growth as an initial response in the early 1930s, Hoover instead encouraged business owners and builders to create mass-produced housing stock that would be cheaper and faster to build (Rome, 2005).

The combination of the slow rate of built homes pre-1920s and the Great Depression left nearly a third of the nation living in substandard dwellings and slums after 1929 (Rome, 2005). Increasing homeownership through mass-produced housing stock was a direct effort to move Americans to homes that were safer and more affordable. Mass-production from builders was a means to prevent federal intervention, and to preserve conservative capitalistic ideals while avoiding social programs similar to those in Europe (Rome, 2005). As a result, the modern housing industry was born to create mass-produced homes across the United States. The Federal Government, in response to the Hoover's housing goals and the depression in the early 1930s, designated massive funding and energy to the creation of homes for individual homeownership (Rome, 2005). As the country reeled from the Great Depression, increased car production and reliance on automobiles from the 1920's required new infrastructure to accommodate it (Rosenberg, 2003). Suburbanization was fostered by the advent of the automobile, which in turn brought an increased amount of spending on new housing (Rosenberg, 2003). The reaction of debt from rising credit and the Great Depression caused massive disparity and poverty-stricken conditions for countless Americans.

A shift occurred in how the federal government approached housing with Franklin D. Roosevelt's presidency in 1933. The Roosevelt administration created The New Deal, a program to help lift the nation out of the Depression (Rome, 2005). The New Deal encouraged affordable homeownership through creating the National Housing Act of

1934 and the Federal Housing Administration (FHA), which was a Federal guarantee to private lenders (Duany, Plater-Zyberk & Speck, 2010; Rome, 2005). The Federal National Mortgage Association, also known as Fannie Mae, bought mortgages that allowed banks the freedom to lend even more funds. The minimum 20-year loan dramatically increased owner-occupied dwellings which established a housing boom (Rome, 2005).

The push from the government to invest in private homeownership and to focus on urban renewal, especially in response to the trying times of the depression, motivated families to make the shift from urban life to suburban life. Federal Housing Loans became more accessible to families, and housing stock was increasingly being built outside of urban cores (Rome, 2005; Duany, Plater-Zyberk & Speck, 2010). This change took people out of the cities and into the newly constructed homes with long, winding streets, set-back houses, and little evidence of the troubles that large cities faced. The dream of personal homeownership was solidified in the 1940s as the economy began to dramatically recover. From the years 1934 to 1974, the percentage of owner occupied dwellings increased from 44% to 63% (US Census Bureau, 2017).

Early suburban settlements were characterized by their efforts to eschew the industrial landscape that many large cities had adopted due to the industrial revolution. One of the early plans for suburban neighborhoods was developed by Clarence Perry, who idealized a self-contained neighborhood unit in a garden setting (Laurice & Macdonald, 2017). This Garden suburb was centered around a school and community center, and was bounded by arterial streets where apartment buildings, retail, and services with parks distributed throughout (Duany, Plater-Zyberk & Speck, 2010; Laurice &

Macdonald, 2017). The suburban neighborhood was concentrically laid out to optimize

access vehicle movement and aesthetic beauty from the rounded curves of cul-de-sacs to

the plentiful parks that separated spaces, all leading to single-family units around the

outside of the core of each (Duany, Plater-Zyberk & Speck, 2010; Laurice & Macdonald,

2017). These neighborhoods were planned to create separate spaces: residential separated

from residential, schools separated from commercial, pedestrian separated from

automobile. Suburban areas were largely dependent on post World War II policies that

allowed for planners and real-estate developments to code subdivision standards into

policies that are still present today (Laurice & Macdonald, 2017).

As the New Deal and the FHA funded Americans into newly built homes, new

land was carved out to build single-family dwellings. Homes were built away from urban

areas, creating new satellite cities connected by roads (Duany, Plater-Zyberk & Speck,

2010). Housing grew quickly throughout the 1940s and 1950s, as builders completed

over 15 million homes. This growth amounted to more than twice the amount of growth

during the 1940s and six times the amount during the 1930s (Rome, 2005).

One of the first notable examples of a suburban development division was in

Levittown, a hamlet of the Town of Hempstead in New York (Duany, Plater-Zyberk &

Speck, 2010; Hales, 2014). Founded by builder-entrepreneur William Levitt in 1951,

Levittown was a planned community with building designs reflecting cost-effectiveness

and speed of completion (Rome, 2005). Levittown resembled a garden suburb's

aesthetics, but could achieve the look with far less cost and effort. Levitt utilized time and

labor-saving machinery, even when the techniques were expressly prohibited by the

unions, and the sites for the homes were set up like an assembly-line (Larabee, 1948). In

addition to the housing design, Levittown stood out as consisting of an entirely Caucasian

neighborhood (Hales, 2014). The Levittown leases forbid any non-white individuals to

purchase, lease, or rent homes in the neighborhood (Larrabee, 1948; Hales, 2014). The

unique design of Levitt's neighborhood, mass-production capabilities, along with many

of the problematic racial policies, became popularized as suburban zones expanded

(Rome, 2005). Levitt's neighborhoods were partly popularized from the media push for

homeownership for post-war families, which marketed homeownership as a definitive

way to fulfill the American Dream (Duany, Plater-Zyberk & Speck, 2010; Hales, 2014;

Rome, 2005).

Suburban growth exploded in the 1950s and tapered off in the 1960s, although

non-metropolitan growth was still favored over urban growth (Schnore & Alfred, 1963).

Suburban areas grew nearly 4 ½ times as quickly as the cities that they surrounded. These

suburban edges around an urban center captured approximately 75% of the total increase

of populations moving from rural to metropolitan areas (Schnore & Alfred, 1963). Urban

areas, as a result of this movement, experienced population and economic resource

decreases (Schnore & Alfred, 1963; Duany, Plater-Zyberk & Speck, 2010).

Social and economic inequality persisted, especially into the 1970s. Urban

communities that were pushed away from the newly built suburban communities felt the

pressure of income inequality and urban unrest. The lack of affordable housing in

acceptable condition as well as a lack of jobs in city centers from major companies

moving to the suburbs caused a stratification of class, race, and socioeconomic status

(Lichter, Fuguitt & Heaton, 1985).

Planners began to design cities around the new format—open space, cluster housing, and hierarchical roads (Duany, Plater-Zyberk & Speck, 2010). A major transportation shift occurred as well, as wide-spread residential spaces and increased automobile traffic prompted roads and vehicle infrastructure to be built at an accelerated rate. The 1956 Interstate Highway Act bulldozed through cities to make way for the primary mode of travel: the personal vehicle (Duany, Plater-Zyberk & Speck, 2010). The country in this time expanded outward rather than up (Schnore & Alfred, 1963). This encouraged the nation to build massive highways and freeways to allow for people to get around. Roads also dominated the individual cities as mixed-use housing disappeared in favor of isolated zones of single-family housing with large grocery and department stores in remote sections of the city (Duany, Plater-Zyberk & Speck, 2010).

Planning professionals adapted to the new suburban requirements through changing the style of politics and government bodies to better serve suburban communities as well as the now-wasting urban cores. Suburbs possessed different forms of governments that displayed measurable differences in social and economic characteristics (Schnore & Alfred, 1963). With these different types of governing came the array of societies and demographics of the people who inhabited its area. The changeover shifted the biases held by many political figures (Duany, Plater-Zyberk & Speck, 2010). Suburbanization brought significant changes politics, policies, and government subsidies that benefited mainly white, middle class citizens (Lubienski & Dougherty, 2009). The shift of demographics and social classes from the cities to the outward suburban areas altered how local governments approached zoning and code enforcement, as well as how tax dollars funded public resources such as schooling and

parks (Lubienski & Dougherty, 2009, Duany, Plater-Zyberk & Speck, 2010).

Opportunistic hoarding of social, economic, and educational goods proliferated in

suburban areas, resulting in a major divide between suburban and urban areas (Rury &

Saatcjoglu, 2011).

Year	Population Suburban	Population Urban
1970	49,101,068	84,283,519
1980	69,967,436	84,680,392
1990	85,239,692	92,431,065
2000	101,295,542	102,952,391
2010	114,357,186	111,554,393

Table 2. Total population of US Metropolitan Areas, 1970-2010.
In a study that measured suburban sprawl (Lopez, 2014), the author used the U.S.
Census data and tract population maps to determine suburban and urban areas. Tracts
with populations between 200 and 3500 per square mile were defined as suburban, and
greater than 3500 were determined to be urban (Lopez, 2014, p. 6).

By the 1990s, nearly half of the American population occupied a suburban neighborhood, as seen in Table 2 (Sharpe & Wallock, 1994; Moudon, & Hess, 2000; Lopez, 2014). More than 95% of the United States Population growth took place in suburban areas outside of cities in the 1970s and 1980s (Robinson, Newell & Marzluff, 2005; Lopez, 2014). An earlier study found that over half of the American population occupied a suburban neighborhood in 1990, which grew from 35.2 to 101.5 million people between 1950 and 1980 (Sharpe & Wallock, 1994).

Today, suburban growth has transformed massive areas of agricultural and open land to accommodate a relatively modest growth in population (Moudon & Hess, 2000). Suburban areas occupy significantly more land than dense urban areas with multi-storied landscapes (Grimm et al, 2000; Robinson, Newell & Marzluff, 2005). The result of the scattered, lower-density development, also called sprawl, has had significant effects on the land and its resources. In addition to its environmental impacts, suburban growth has significantly higher economic and social costs than dense urban areas, particularly regarding transportation and infrastructure costs (Robinson, Newell & Marzluff, 2005).

New Urbanism

New Urbanism is a theory of planning that stemmed from critiques of suburban development. It is a commonly used planning method that works to create livable, sustainable communities. The Charter of New Urbanism states that urban planning professionals believe that modern metropolitan regions should be revitalized and enhanced with infill development, sustainable transportation options, well-defined edged cities, and compact development to preserve environmental space (Ellis, 2002). Its roots extend from the City Beautiful Movement, a system developed in the turn of the 20th Century that emphasized comprehensive and democratized city planning that increased aesthetic and sanitary conditions (Talen, 2005). New Urbanism is defined by the Congress of New Urbanism as "the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy" (Charter of New Urbanism, 2012).

The growth of urban and suburban areas is a major driver of land change (Grimm et al., 2000; Short Gianotti et al., 2016). This urbanization, the movement and expansion of populations, has shaped the current landscape of the United States today. Throughout this urban growth, Urban Planners have used a variety of planning theories to direct their designs. These theories help to dictate how land is distributed for specific purposes, and shapes the way in which areas are developed.

Modern urban planning theory used in the United States has developed throughout the 20th Century, beginning in the 1920s with major influence from the Chicago School of Urban Sociology (Scott & Scorper, 2014). This sociology-based

theory of social organization as capitalism was criticized in the 1960s and 1970s, until

Marxist ideologies shaped new planning theory as a painting of class struggles (Scott &

Scorper, 2014). The 1980s brought new arguments about the city and the process of

urbanization, including feminism, gender and race dimensions. These arguments were the

foundation for challenging past social motivations for urban development (Scott &

Scorper, 2014). Within these new dimensions, planners particularly focused on how

neighborhoods were socially disparate and how neighborhood development and

displacement impacted political governance (Scott & Scorper, 2014). These trends

brought forth the modern concept of neo-liberal urban planning.

New Urbanism works by developing a system of 'smart codes' that allow

planners to incorporate these principles into pre-existing as well as newly developing

communities. Codes create rulebooks for planners to make decisions for developing and

designing all areas. These codes focus on bringing elements of sustainable design,

connectivity, and transport to address environmental impacts from previous

developments. New Urbanism also seeks to mitigate social and environmental

inequalities, a commonly reflected statement in New Urbanist literature (Duany, Plater-

Zyberk, and Speck, 2000). Environmental urban planners employ New Urbanism for its

contemporary ability to adapt to growing population density within cities and to

incorporate sustainable design. Although New Urbanist planning has succeeded in its

goals to mitigate many social and environmental inequalities, there are inadequacies in its

abilities to counter the problems that it seeks to solve. Many of the studies investigating

this topic intermingle and conflate the effects of environmental urban planning on class

with race, as the two are closely related in observed effects.

By the turn of the century, major shifts in neo-liberal urban planning advanced to embrace a new look at how cities functioned. This most recent urban planning trend marks the beginning of neoliberal dominance over the political process of urban settlement (Scott & Scorper, 2014). New Urbanism's focus on neighborhood design influenced urban design plans that created urban villages. These areas are reminiscent of early suburban planning principles that idealized a core of retail, schools, and community center, connected throughout arterial roadways surrounded by varying density levels of residential units (Laurice & Macdonald, 2017). Notable modern urban villages that reflect these designs are St. Paul (Minnesota), San Diego (California), and Seattle (Washington) (Laurice & Macdonald, 2017). An example of neighborhood urban villages in Seattle are Ballard, Fremont, West Seattle Junction, and North Rainier (City of Seattle, 2005).

Suburban Development in the Puget Sound

The Puget Sound regional urban and suburban areas are characterized as an Urban Growth Area (UGA) that encompasses King County, Snohomish County, Pierce County, and Kitsap County (Moudon & Hess, 2000; APA, 2017). The central Puget Sound region grew by 2.1% between 2016 and 2017, adding 82,000 people to the total population of 4 million in 2017 (Puget Sound Regional Council, 2017). 2017 marked the second year that the region experienced population growth that exceeded 80,000 in a single year, a marked increase in growing trends (Puget Sound Regional Council, 2017). All the counties within the UGA experienced growth; King County experienced the most growth at a rate of 2.3% with Snohomish County as a close second at 2.1% (Puget Sound Regional Council, 2017). Overall, King and Snohomish County have experienced a population growth of 1.4 million in 1970 to 2.5 million in 2005 (Powell et al, 2007).

In a study that sought to classify the growth of suburban areas in the Puget Sound, the authors defined the suburban region as the Puget Sound Urban Growth Area, excluding dense older central cities (Seattle and Tacoma) (Moudon & Hess, 2000). The authors claimed that the central Puget Sound area is a model example of urban planning theories, since the region experienced a three-fold increase in population and a five-fold increase in geographic spread since the 1950s (Moudon & Hess, 2000). Within the past 40 years, the ratio of people residing in urban cores and in suburban areas has been reversed, creating a situation where less than 35% of the population lives in older urban cores such as Seattle and Tacoma (Moudon & Hess, 2000). Due to this decentralization and geographic spread, housing communities and metropolitan functions compete for funding and resources (Moudon & Hess, 2000).

Despite the continuing growth throughout the region in the 1990s, The UGA lacked definitions to categorize population densities in varies zones, or the housing types and their various distributions (Moudon & Hess, 2000). The authors identified that central Puget Sound residential development tends to agglomerate near commercial uses. Within these agglomerations, high density areas existed, with 20% of the designated region's population occupying only 8% of the total land area (Moudon & Hess, 2000). These high-density areas held nearly twice as many people of color than the remaining 80% of the population in less dense, suburban areas (Moudon & Hess, 2000). Incorporating the elements of population clusters, Moudon & Hess (2000) identified 85 suburban clusters that represented the region, finding that a significant portion of these clusters lived in multi-family housing, such as apartments or condominiums, rather than the strict single-family housing that is typically assumed. The authors continued to characterize these clusters as representative of early suburban planning from the 1920s and New Urbanism methods.

A unique element of the Puget Sound's suburban development is the way in which these developments lacked much intent. The suburban clusters in the Puget Sound were a part of regional development since the 1960s (Moudon & Hess, 2000). Despite the plan for regional development, only a small amount of the suburban areas were planned communities from their origination. The suburban clusters that were not regionally planned became 'opportunistic forms,' expanding without intent. This opportunistic growth was the result of the combined interests of retail and apartment building industries and the expanding market of suburban single-family subdivisions (Moudon & Hess, 2000). New Urbanist planners in the region zoned for expansion to promote these

industries and housing markets, but did not provide a formal plan for these developments

to function within (Moudon & Hess, 2000). The hybrid suburban design of zoning

restrictions with free-form development is representative of the region. Suburban clusters

in the Puget Sound region are both densifying and nucleating, often in combination with

commercial functions (Moudon & Hess, 2000).

Environmental Costs of Suburban Development

This suburban growth has sparked a national debate on how suburban areas should be managed, further developed, and how employment and retail activities function within the suburban systems (Moudon & Hess, 2000). The decentralization of employment centers and residential areas requires additional resource use and infrastructure development to occur, placing greater pressure on cities and states to invest in serving these suburban areas (Duany, Plater-Zyberk & Speck, 2010). These investments for infrastructure are inherently political when considering the stakes of who pays for the infrastructure, who benefits from the infrastructure, and how much capital is devoted to suburban areas (Moudon & Hess, 2000). The question of equitability and sustainability are routinely discussed among urban planners of large-scale development planning projects (Duany, Plater-Zyberk & Speck, 2010). As suburban sprawl grows, so does the increasing concern for its effects on the environment, political and social spheres, and the current infrastructure used for transport.

Suburban living has also attributed to additional economic, emotional, aesthetic, and physical costs for its residents. Barnes (2007, pg. 6) outlines the individual negative attributes of suburban development:

"Unfavorable economic costs include higher taxes, higher costs of providing infrastructure, adverse fiscal impacts on local governments, ill-health from air pollution generated by traffic, and reduced worker productivity. Emotional costs include loss of community spirit and values and loss of a sense of place. Aesthetic costs include less leisure time and more ugly, monotonous suburban landscapes. Physical costs include over-crowded schools, increased traffic congestion, longer

commuting times, and more aggressive driving patterns."

The increase of suburban areas caused many environmental impacts. Forests, agricultural land, and wetlands are converted into built areas. Water ways are negatively impacted through increased pollution. Wildlife areas are reduced, decreasing habitat availability, and overall habitat quality (Mckinney, 2002; Robinson, Newell & Marzluff, 2005; Barnes, 2007). By the year 2000, suburban sprawl was responsible for 51% of all wetland loss in the United States (Robinson, Newell & Marzluff, 2005; US Fish and Wildlife, 2000). Such habitat loss degrades and fragments the remaining natural areas, which makes the landscape more susceptible to damage from invasive species and natural events (Robinson, Newell & Marzluff, 2005). Fragmentation in suburban areas increases where vegetation in single-family homes consists of altered green spaces of lawn rather than native ground cover (Robinson, Newell & Marzluff, 2005). Suburban development has high environmental, social, and political costs.

Suburban and urban areas actively contribute to climate change and are susceptible to its effects (Grimm et al, 2000). Increased traffic and residential urbanization produce increased levels of carbon dioxide (Ziska et al, 2003). The decreased levels of green spaces and increased areas of impervious surfaces causes warming and reduced air filtration from plants, which becomes a public health concern (Ziska et al., 2003). Suburban areas are also more vulnerable to extreme heat events than in urban areas, which are seen in increasing levels due to climate change (Stone, Hess & Frumkin, 2010). Suburban areas are more likely to have a loss in green spaces (loss in evapotranspiration), increased impervious dark surfaces with low albedo (surface reflectivity), and increased heat from personal engines (vehicles, generators) (Randall et

a.l, 2003; Stone, Hess & Frumkin, 2010). These elements combined can intensify warming during extreme heat events (Stone, Hess & Frumkin, 2010). Climate change also impacts suburban areas on a water management level, as projected increases of heavy rainfalls and raised peak volumes of water threaten suburban areas where drainage issues exist (Semadeni-Davies et al., 2008).

As suburban sprawl spreads, it actively changes the land around it. In addition to affecting wildlife and habitat, land cover change fundamentally effects how water and nutrients are cycled (Powell et al, 2007). Roadways and homes in urban and suburban areas change soils and groundcover to impervious pavement for roadways, parking lots, and residential use. In fact, impervious surfaces have been recognized as an indicator of the intensity of the urban/suburban environment and has served as an element in which to define these spaces (Brabec, Schulte & Richards, 2002). In areas with large amount of impervious pavement, groundwater is not filtered through the soil (Barnes, 2007; Powell et al, 2007). The amount of land with native wildlife and green cover that has been converted to urban and suburban space has led to decreases in areas for water, or runoff, to be absorbed and cleaned by the natural systems (Brabec et al, 2002). Stormwater runoff from impervious surfaces collects pollutants and sediments as it heads to drains, streams, and local waterways (Brabec et al, 2002). This increased pollution is often not treated when it goes down storm drains, and is increasingly polluting the waterways that it enters. This pollution directly impacts the systems, harming the biotic and abiotic wildlife (Brabec et al., 2002; Pickett et al., 2011).

Efforts to mitigate this pollution from water runoff have mainly come from local jurisdictions who implement programs to incentivize use of stormwater management

tools for private residences (Davis et al., 2009; Freeborn et al., 2012). Use of low impact development (LID) tools such as rain gardens, bio-retention gardens, and pervious pavement help to divert stormwater into the ground where it can be treated, rather than going directly into local waterways and drains (Davis et al, 2009, Freeborn et al, 2012). LID offers increased environmental protection for often less cost than other sources of stormwater and climate mitigation development, but it experiences barriers due to political bias, professional training for installation, and personal choices for aesthetics (Coffman, 2002; Turk et al., 2014). Aesthetics of the greenery that make up these LID projects is essential to the success and acceptance from the general public (Turk et al, 2014). Understanding how green spaces are accepted in suburban areas is essential towards furthering mitigating the effects of suburban sprawl. The benefit of defining nature more comprehensively allows researchers, the public, and urban planners to be able to communicate better, have a more nuanced view of planning projects and direct the growth of certain kinds of planned areas.

Benefits of Naturalized Areas

Exposure to nature has positive physical and emotional health benefits (Parsons, 1995; Priego et al., 2008; Zhou & Parves Rana, 2012; Wolf, 2014). These benefits are linked with the geographical features of a nature setting, visual perceptions, and ability to use nature for recreation or play (Priego et al, 2008). Interacting with nature and green space contributes towards improved welfare for citizens (Wolf, 2014; Sang et al., 2016). Naturalized environments, those with more 'wild' green spaces, contribute towards the health and wellbeing for adults and children, contributing toward improved mental and physical health (Flouri et al., 2014). Environmental aesthetics are associated with positive effects on cognitive processing and stress reduction, even when viewed from a window (Parsons, 1995). Health benefits are also associated with their recreational opportunities, such as green walkable environments like connective walking corridors and parks allow for increased exercise and physical activity (Priego et al., 2008; Wolf, 2014) Naturalized spaces with trees are thought to influence behavior to choose walking and biking over driving in streets with more tree canopy (Wolf, 2014).

Exposure to green spaces is also linked to how people perceive environmental problems (Priego et al., 2008). Naturalizing urban and suburban spaces are associated with improving resident's overall physical health. Increased green spaces also provide significant air-quality and energy-conservation benefits, that reduce the amount of carbon dioxide, greenhouse gases, and other ground-level pollutants that can impact health (Randall et al., 2003). In identifying how nature is perceived and whether certain areas are seen to be more natural than others, perception of nature can guide what forms of green spaces are more beneficial to near-by residents.

Increased green spaces are also associated with a reduction in mental and physical stress (Bratman, Hamilton & Daily, 2012). Walkable green environments were shown to increase life satisfaction for seniors and even are associated with increasing overall lifespan (Takano, 2002; Wolf, 2014). Naturalized areas are positively associated with relaxation, revitalization, psychological restoration, improved mood, improved attention, and reduced stress and anxiety (Bratman et al., 2012; Zhou & Parves Rana, 2012; Wolf, 2014). Ulrich et al. (1991) found that stress—measured by pulse, blood pressure, and facial muscle activity—was most quickly recovered from when patients were presented with naturalized outdoor environments. Modern lifestyles require constant attention of a diverse array of inputs that require full the individual's full attention, including driving, phone use, work, school, etc., that leave many feeling fatigued with difficulty concentrating (Wolf, 2014). Exposure to green areas have been shown to give this part of the brain a change to rest and restore with involuntary interactions with natural places (Wolf, 2014). Walking in a natural setting versus an urban one is also shown to provide greater positive and lesser negative emotional responses, suggesting that naturalized areas are aesthetically preferred and provide greater health benefits (Hartig et al., 1993; Parsons, 1995).

Green spaces are an important part of the nutrient and water cycling processes (Powell et al, 2007; Jennings & Gaither, 2015). As discussed in the previous section 'Suburban Environmental Impact,' reduced vegetative cover increases the risks associated with climate change, polluted stormwater runoff, increased extreme heat, and overall pollution (Randall et al., 2003; Nassauer et al., 2004; Powell et al., 2007; Barnes, 2007; Stone et al., 2010). Manicured lawns are green spaces, but require additional

pesticide use and water to maintain (Sandberg & Foster, 2005). Instead, naturalization

encourages diversifying the kinds of green spaces to embrace using native plants that

would decrease the need for pesticides and water, while also helping to manage

stormwater runoff (Sandberg & Foster, 2005).

Naturalized areas also require a reduced amount of materials for maintenance, such as

energy and gas for mowers, water, fertilizer, and pesticides (Randall et al, 2003). The

reduced use of these products helps to save time and cost both for suburban residents on

private property and for local governments maintaining public spaces (Randall et al,

2003). For example, buildings with trees around their structure have reduced heating and

cooling costs ranging from 10%-50% than isolated buildings (Randall et al, 2003). Green

spaces and increased naturalization are associated with increased health and recreation,

leading to reduced obesity levels that lowers the cost of healthcare (Jennings & Gaither,

2015).

Aesthetics

The aesthetics of naturalization improves quality of life through increased exposure to green spaces (Priego et al., 2008; Yang et al., 2014). Examples of this exposure include a walk down a suburban street, sitting in a garden, or using a park for recreation and relaxation (Crow et al., 2006; Priego et al., 2008). The aesthetics of these natural surroundings is an important community feature that that contributes towards resident's appreciation of their neighborhood (Crow et al., 2006; Priego et al., 2008; Yang et a.l, 2014). The scenic beauty, cleanliness, and pleasant sounds attributed to naturalized spaces are all within the category of aesthetic preference (Priego et al, 2008). The perceived aesthetics and ecological benefits from naturalized areas have mainly been studied separately, although scholars note the benefits of both in terms of health and sustainability (Yang et al., 2014).

In a study that sought to understand the value of urban nature (Priego et al, 2008), the authors found that access to green spaces was a key element in the survey respondent's link to achieving full personal development, regardless of socio-cultural status. Understanding the kinds of nature that are most aesthetically pleasing to residents in particular socio-economic states, neighborhoods, and regions is essential in increasing their overall well-being (Priego et al, 2008). Although aesthetic preferences are less tangible as metrics of observing naturalization, since lawn care and gardening are entrenched in current culture, the benefits of understanding suburban aesthetics is essential for increasing overall naturalization (Randall et al, 2003).

Green spaces in suburban areas are typically highly manicured areas that require large water and chemical demands (Randall et al, 2003; Feagan & Ripmeester, 1999; Sandberg & Foster, 2005).

Native green spaces are less common in suburban neighborhoods because of historical suburban aesthetic planning (Randall et al, 2003). Despite the reduced naturalization, suburban areas typically have a higher amount of green spaces than urban areas due to the density and developmental history of urban neighborhoods. Some scholars attribute the aesthetics and increased levels of green spaces to be a major reason why suburban residents choose to live where they do because it is greener than in more urban areas (Randall et al., 2003; Priego et al., 2008). In 1999, Feagan and Ripmeester discovered that suburban societies are attached to the conventionally manicured lawn. Responses from their survey yielded the findings that suburbanites associate order and industriousness with conventionally manicured lawns, and that alternatives to conventional lawns were met with disdain (Feagan and Ripmeester, 1999). Lawn care is perceived as a status symbol internalized by society to represent cultural and societal adhesion to the norm (Sandberg & Foster, 2005).

Nassauer et al. (2001) also found that public preference over ecological landscapes were mainly based on the level of how manicured they were. A healthy stream with woody debris was found to be considered 'messy', and that mown grass areas were preferred over taller grass along streams (Nassauer et al., 2001). Many scholars and policy writers believe that ecologically sustainable green spaces, spaces that are more natural and wild, are perceived to be less attractive than other kinds of green spaces (Parsons, 1995). These examples demonstrate that the aesthetics of naturalization

can't be simplified into a list of its benefits to be accepted by suburban residents (Randall et al, 2003). Instead, naturalization should be informed by public attitude and perceptions to make residential and public green spaces more acceptable to society (Randall et al, 2003).

Nassauer et al. (2004) conducted a study evaluating how agricultural design in a suburban neighborhood would impact public perceptions of attractiveness. The researchers compared images of agricultural spaces that varied in ecological effectiveness in suburban areas in the upper Midwest states. This visual preference survey showed the potential alternative futures of 'green' space design from the view of a window of a suburban home, placing ecological benefits alongside aesthetic design. The images showed conventional design versus a more ecological design. The conventional design showed increased individual septic systems and wells, a higher density of homes and roads, and a lack of indigenous plants and ecosystems. The ecologically beneficial image displayed an increase of open green spaces, increased indigenous plants and ecosystems, and increased spaces that were not human altered. The main goal of the ecological future scenario was to maintain more rural spaces, enhance habitat connectivity and congruency, improve water quality, and reduce inputs of pollutants in storm water systems (Nassauer et al., 2004, p. 4).

Respondents were broken up into two groups, those with a self-determined environmental bent and the general public. Survey takers were not informed about the design benefits of an ecologically improved space, but were only asked to rate attractiveness out of a seven-point scale, with 4 being neutral. Out of the 336 adults surveyed, the environmental group members perceived the ecological designs as

significantly more attractive than the general population. Conversely, the general public found the conventional design area more attractive than the environmental group. Overall, the ecological landscapes were perceived as more attractive than the conventional developed design (Nassauer et al., 2004).

In another study evaluating tools for generating and evaluating neighborhood greening, Randall et al. (2003) looked at the alternatives for conventional suburban development green spaces through GIS. The study focused on management of existing spaces as well as the development of future suburban areas. Claiming that residents of suburbanites live where they do because it is more green than in urban cities, the study proposed future research for understanding how to make naturalization more acceptable, through aesthetics and safety, to urban and suburban residents (Randall et al, 2003). Nassauer et al. (2004) asked a similar question about how landscapes and naturalized spaces could be better accepted aesthetically in order to create further naturalization.

Safety

The perceived safety of green spaces is another important element in determining the acceptance of that space in a neighborhood. The aesthetics of green spaces is tied into the perception of how that space is viewed as being safe. The link between safety and the aesthetics of an area is biologically linked; humans have a predisposition to associate negative events with spatially restricted natural environments (Ulrich, 1993; Parsons, 1995). Humans therefore have a natural aversion to areas that present themselves as containing hidden dangers and limit opportunities to escape (Ulrich et al., 1991; Ulrich, 1993; Foster et al., 2013).

Fear of crime and safety concerns are related to residents' overall emotional health as well (Foster et al., 2013). Studies of safety perceptions found that conventional suburban areas with curvilinear street layouts were perceived to be safer than those in more traditionally planned grid street layouts or hybrid communities (Wood et al., 2008; Foster et al., 2013). When fear of crime and safety is prevalent in a community, even crime levels are relatively safe, communities reduce their social and physical activities as well as their acceptance of features that appear to be less-safe (Foster et al, 2013). Acknowledging safety concerns is important to the progression of increasing naturalized areas, both private and public.

Safety studies often use visual representations to understand an individual's perceptions of safety and aesthetics of a particular space (Jorgensen et al., 2002). Spatially restricted areas are thought to be perceived as the opposite to wide and open areas, such as wild areas versus more manicured ones (Ulrich, 1993). Human's predisposition to spaciousness is viewed as an evolutionary adaptive response to avoid

hidden predatory threats, which agree with research findings that show when presented

with an element of danger, humans are more likely to fear naturalized areas than open

ones (Ulrich et al., 1991).

Fear of the safety of naturalized areas was even given the term 'biophobia' by

heavily cited researcher Roger Ulrich, who authored several papers on the associated

with psychology, aesthetics of nature, and fear (Ulrich, 1993). This fear of enclosed

natural spaces is directly tied to the acceptance of naturalization, and understanding how

perceptions of designed naturalized spaces is crucial for future sustainable growth

(Parsons, 1995; Ulrich, 1993; Randall et al, 2003). Increasing the amount of research of

how humans relate to natural settings has immense social and scientific significance to

understand what is lost when natural areas are eliminated and what benefits naturalized

areas present (Ulrich, 1993).

The evolutionary fear argument of open-spaces versus more spatially restricted

environments is often addressed as 'site line' observations in scientific studies (Ulrich

1993, Jorgensen et al., 2002). Stress tests that evaluate psychological responses to

varying landscapes use site lines to determine how far people can see and how responses

are associated with that distance of viewing (Ulrich, 1993, Jorgensen et al., 2002). In

studies that evaluated the preferences for tree density in public spaces, site line studies

were able to find the most aesthetically pleasing density arrangement (Schroeder &

Orland, 1994; Jorgensen et al., 2002). Although these studies specifically evaluated the

aesthetic preference of these naturalized areas, scholars note the two are connected due to

differences in the users' cultural and social backgrounds (Jorgensen et al., 2002).

Throughout these site line studies, researchers found that a mix of vegetation types and

lower density greenery led to increased aesthetic and safety perceptions (Jorgensen et al., 2002).

Site line studies use enclosure of spaces, such as partial enclosure, full enclosure, and no enclosure, to describe the how wild or manicured a space appears (Jorgensen et al., 2002). The presence of vegetation and its perceived maintenance serves a way to understand how aesthetics and safety are related in visual preference surveys. Jorgensen et al. (2002), used pictures to evaluate the safety and attractiveness of each scene. The study used pictures of a familiar public park in the United Kingdom, drawing responses from residents from immediately surrounding areas. Using varying scenes of enclosure that displayed a more wild and dense vegetation versus more manicured and open vegetation, participants rated 15 pictures on a linear scale (Jorgensen et al., 2002). Results indicated that scenes with full enclosure (most naturalized, wild) had the lowest safety scores and the highest safety scores were associated with no enclosures (manicured, non-naturalized) (Jorgensen et al., 2002). Aesthetic preferences were less clear, but responded to the varying spatial arrangement and indicated partial enclosure to be the highest when examples were more dense and wild (Jorgensen et al., 2002). The study found that more open wood-land spaces were more safe than enclosed ones and that naturalistic areas were perceived to be less safe (Jorgensen et al., 2002). The authors suggest that further perception study of naturalization and enclosure is needed to better understand how focal points of trees and shrubs and the wildness versus manicured states contributes to perception and safety (Jorgensen et al., 2002).

Conventionally manicured and mowed areas are often seen to be safer than areas that have been more naturalized (Parsons, 1995; Randall et al, 2003). These perceptions

are particularly shared by children, women, and the elderly (Randall et al, 2003). Since acceptance of these green spaces on private property in suburban areas are determined by their occupants, the design of more natural landscapes need to consider what these stakeholders perceive as safe (Randall et al, 2003; Madge, 1997). In urban areas in the United Kingdom, fear of parks due to their naturalized settings was a significant reason restraining their use (Jorgensen et al, 2002; Madge, 1997). This fear leads to the question of how the spatial arrangement of naturalized areas can better be accepted by their users (Parsons, 1995; Jorgensen et al., 2002; Randall et al., 2003). Understanding these user groups' preferences also increases the likelihood of neighborhood and community acceptance for naturalization in public spaces, which increases sustainable and ecologically beneficial areas (Jorgensen et al., 2002; Randall et al., 2003).

Developing an 'ecological aesthetic,' a term provided by Parsons (1995), poses a direct conflict to design for both aesthetics and ecological sustainability (Parsons, 1995). Naturalized areas are often framed as lacking in both safety and a reduced preference aesthetically, despite the numerous health and biological benefits (Parsons, 1995). Understanding human attitudes and perceptions of these naturalized green spaces is essential for developing them in the different areas that humans inhabit, from dense urban cores to less dense suburban areas (Parsons, 1995). The implications from future research about perceptions of green spaces has implications for landscape planning decisions and landscape management policy (Parsons, 1995), and could directly help the efforts of those seeking to increase naturalized areas. Social, cultural, population density, and gender differences were found to be a significant indicator of landscape preference and

perception, indicating a need for more specific perception studies to increase the

likelihood of naturalization acceptance (Jorgensen et al., 2002).

The need for a better definition for suburban gradient areas and the need for

understanding how residents in these suburban zones perceive and accept naturalization

led to the creation of this study. Increasing our understanding of how people in suburban

and edge urban areas self-identify will help to define this kind of suburban edge area,

which will help to direct further research, align suburban studies better for comparison,

and aid land-use planners. Understanding how these residents in their particular suburban

edge zone perceive different kinds of green spaces will help with the design and

acceptance of future public and private naturalization projects.

Chapter Three
Methods
This study used a visual preference survey in combination with a questionnaire to

identify how residents identified themselves within the boundaries of urban, suburban

rural, and how they perceive the aesthetics and safety of green spaces in their community.

Study participants were selected from Riverside neighborhood in Everett, Washington,

who participated in an online survey. The hypothesis underlying this study was that

residents would self-identify as suburban and that their preference of aesthetics and safety

of green spaces would most likely be in hybrid scenarios of wild and manicured.

Riverside Neighborhood, Everett, WA

Everett, Washington, is a growing city in the North Puget Sound. The City of Everett borders the Puget Sound and is within the boundaries of Snohomish County. In 2017, Snohomish County's population was 757,600, with a growth rate of 2.1% (Puget Sound Regional Council, 2017). Populations in Snohomish County are concentrated in lower elevations closer to Puget Sound waters, mainly in the City of Everett (Powell et al., 2007). Snohomish County houses the Snoqualmie and Skykomish watersheds, which convene together to form the Snohomish River that releases into the Puget Sound alongside Everett (Powell et al, 2007).

Everett's population in 2017 was 109,800. Since 2010, the city has experienced a 6.6% increase in population, making it one of the fastest growing cities in the region (Puget Sound Regional Council, 2017). Everett, WA is 75.8% White, 4.5% Black, and 8.2% Asian. Hispanic or Latinos of any race are 16.1% of the population (Everett Socio-Economic Voter Turnout, 2016).
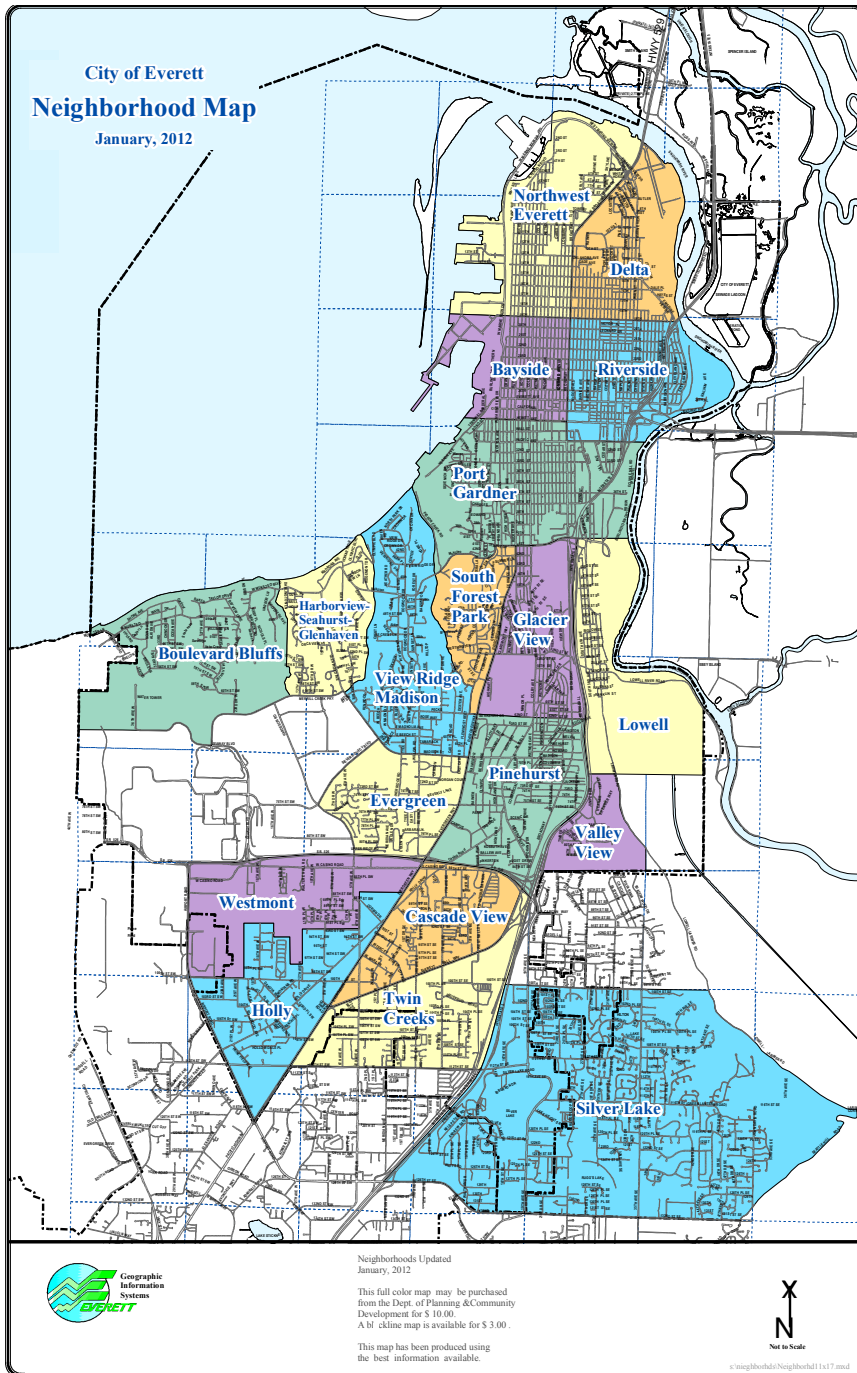
Figure 4. City of Everett Neighborhood Map (2012)

Everett faces an opioid crisis, and as of January 2017, has been in a civil lawsuit with Purdue Pharma for allowing OxyContin to be funneled through the black market (Lawsuit Against Purdue Pharma | Everett, WA - Official Website, 2017). In the official lawsuit documents, the city claims that it is facing increased arrests, prosecution, emergency medical services, and crime due to the drug epidemic in the city (Lawsuit City of Everett v Purdue Pharma, 2017). Safety is a key concern for the city, as increased crime has been a hot topic for news organizations, neighborhood associations, city government officials, and residents (Lawsuit Against Purdue Pharma | Everett, WA - Official Website, 2017). The perception of a lack of safety is notable for Everett residents, as general welfare is associated with being impacted by the perception of a lack of safety (Foster et al, 2013).

Everett's comprehensive plan recommends climate change action and sustainability initiatives, portraying environmental concern (Everett Mayor's Office, 2017). To help implement these initiatives, the city has a rain garden program that specifically targets stormwater management (Rain Gardens | Everett, WA – Official Website, 2017). The incentive program is for single-family private residences and advertises itself as a low-maintenance alternative to a lawn that can provide habitat for local wildlife, can help recharge groundwater, and can assist with drainage issues on private property (Rain Gardens, Everett, WA – Official Website, 2017). Programs that address green spaces, promotion of aesthetics, and target private residences can directly benefit from this research, as it will assist with targeting their audience for a preferred design.

The Riverside Neighborhood is in North Everett, one of the 19 neighborhoods within the city (Figure 4). The neighborhood contains 5 small parks, historic properties, and an active Neighborhood Association (Riverside | Everett, WA - Official Website, 2017). Over 40% of households in Riverside make less than $50,000 per year (Everett Demographic Maps, 2016). Out of the 19 neighborhoods in Everett, Riverside ranks 12th for population (approximately 4,900), and is 13th for population density (3,950 per square mile) (Statistical Atlas – Riverside Neighborhood, 2017). The lower density indicates that the neighborhood is not within the urban core.

Figure 5. Riverside Neighborhood Boundaries
(Riverside Neighborhood Association, 2017)

The neighborhood has a strong connection throughout social media and the Riverside Neighborhood Association. The neighborhood uses two main Facebook pages to communicate and a community cell phone 'App'. The neighborhood association page communicates information such as meetings, election information, and community news, and has a little over 350 members (Riverside Neighborhood Association, Everett WA. | Facebook.com, 2017). The other Facebook page, Take Back Our Neighborhood Everett – North (Facebook.com, 2017), is mainly used for community discussion and is not primarily focused on the Riverside Neighborhood, as issues are all for North Everett neighborhoods. The page has nearly 3,000 members and engages its users in community topics of concern such as crime, candidates and elections, housing affordability, the opioid crisis, and volunteer opportunities for concerned citizens (Take Back Our Neighborhood Everett – North, Facebook.com, 2017). The Nextdoor App has nearly 850 members all within the strict boundaries of the Riverside neighborhood. Discussion is frequent and reflects the 'Take Back Our Neighborhood Everett – North' page, but with a more direct focus on safety issues affecting neighbors (Nextdoor Riverside, 2017). This strong connection of communication between members displays that the identity of suburban classification is tied to the identity of being a Riverside resident.

Riverside is zoned by Snohomish County as primarily Suburban Residential and Single Family Detached Medium with a small segment devoted to Single Family Medium-Historic Overlay (Everett North Zoning and Future Land Use Map, 2012). Using conventional urban planning methods, Snohomish County Planning and Development Services classifies Riverside land use and future land use growth as

suburban in their most recent demographic maps (Everett North Zoning and Future Land Use Map, 2012).

Although it's classified as suburban, this active neighborhood fits definitions for suburban edge and urban neighborhood (Moudon & Hess, 2000; Duany & Talen, 2002; APA, 2017)in addition to its suburban medium-density classification by the city. An older neighborhood, Riverside was founded in the 1880s and has been expanding since the 1920s. The neighborhood has experienced decades of suburban growth (Riverside Remembers, 1985). The streets are grid-like, an example of traditional planning, but it's lower to medium density indicates a hybrid of urban and suburban (Wood et al., 2008; Foster et al., 2013). For the purposes of this study, Riverside is used as an example of a neighborhood that has been impacted by the growth of suburban development, but is part of an area that lacks academic definition due to its hybrid nature (Moudon & Hess, 2000; Forsyth, 2012).

Riverside can be classified as a suburban neighborhood because it fits the mold for suburban in the following examples. The neighborhood fits the APA classification of T3 Sub-Urban area (Duany & Talen, 2002), as designated by the city (Everett North Zoning and Future Land Use Map, 2012). On the academic level, Riverside fits with Newell & Marzluff's (2005) definition:

> **Suburban**: Building density is moderate and lawns and other vegetation are often readily apparent. Lawns and gardens are generally more extensive than within urban areas. Single-family housing predominate on small to moderately-sized lots (0.1-1.0 ha). Multi-family housing, basic services, and light industry are scattered throughout. Structures over two stories tall are uncommon.

Conversely, the neighborhood has characteristics that would not normally be used as an example suburban zone. The lack of cul-de-sacs and cookie-cutter houses means that Riverside does not share the conventional suburban aesthetics held by many (Forsyth, 2012; Duany, Plater-Zyberk & Speck, 2010). Therefore, Riverside is a neighborhood that falls outside uniform suburban definition.

The results of this study will help to define the neighborhood as suburban, urban-suburban, or urban by asking residents to self-identify their neighborhood. The study seeks to improve efforts for naturalization to residents in similar areas to Riverside.

Survey

The study consisted of two distinct components; the first a questionnaire and the
second a visual preference survey assessing attractiveness and safety (Appendix X and
Y). The questionnaire asked 9 questions, including self-identifying as 1. Urban, 2. Urban-
Suburban, 3. Suburban, 4, Suburban-Rural, and 5. Rural. This range was set to be more
expansive than a tradition urban-suburban-rural divide in order to get more detailed
information. The survey also gathered age range information, concern for environmental
issues, concern for safety issues, importance of green spaces in their neighborhood, and
yard design preferences. The yard design preference was labeled as gradient of
manicured to wild, 1. Manicured Cut Grass, 2. Grass with Some Plants, 3. Equal Parts
Grass and Plants, 4. Mostly Plants with Some Grass, and 5. All Plants.

These questions were meant to ascertain the possible predisposition to the visual
preference survey using language found in reference studies (Feagan & Ripmeester,
1999; Jorgensen et al., 2002; Nassauer et al, 2004; Randall et al., 2003; Schopfer et al.,
2005; Short Gianatti et al., 2016). All questions were closed answer with only one answer
allowed. The only question required was for respondents to either indicate what number
was on their paper survey or their cross streets to ensure they were within the boundaries
of the Riverside Neighborhood.

The visual preference survey is a popular tool used in planning, ecology,
environmental, land-use, and perceptions studies to evaluate perception of a given scene.
The pictures were labeled on a 5-point Likert scale (1 the least, 5 the most) for
attractiveness and safety, as found in the study by Jorgensen et al (2002). There were a
series of 16 pictures grouped into 4 sections. The four sections grouped as such:

1.) Lawn with little to no other kinds of vegetation, more manicured

2.) Combination of manicured and vegetation, hybrid

3.) Combination of manicured and vegetation, hybrid

4.) Mostly plants with some grass, more wild

The sections were all single-family residential homes in or near the Riverside neighborhood, taken directly from the sidewalk or road, profiling the front view of the house. Section 3 differed slightly, which had the camera angle of being in the middle of the road. It was hoped that pictures of similar neighborhoods would help support respondents to recognize the area the photographs were taken to prevent assumptions regarding the context of the pictures. This separate section was to view if there were any differences of perceptions based on increasing the site-line and street preferences, rather than just how the houses themselves were designed. The houses chosen were ones that had exaggerated features that could be easily recognizable via photograph. Each of the four sections has a variety of homes of different sizes, assumed affluence, and upkeep. The photographs used were taken on a late winter/early spring day in March 2017, with help from Wade Oberlin, an Everett resident. The weather was rainy and cloudy, a typical day during non-summer season in the Pacific Northwest.

Instead of handing out paper surveys to every respondent, sheets provided explanation for the survey and gave the link to the online survey. To reach a larger population of the study area, I provided the survey link and the same language as the printed sheet to the Riverside Neighborhood Association Facebook page, Take Back Everett – North Facebook page, and the Nextdoor App for Riverside Neighborhood. Since safety concerns in the neighborhood were heightened, I also alerted the

neighborhood of when I would be dispersing paper survey invitations through the Facebook pages and the Nextdoor App. Responses from reaching out online were all thankful; I was told by several residents that my presence may be alerted to the police if someone in the neighborhood had not read my messages. The additional sampling strategy of including residents who were hand-delivered invitations to the survey and residents using digital forums allowed for a greater level of response from different kinds of perspectives and different levels of preferred contact.

The study took place on a weekend in September 2017, where 225 surveys were handed out to approximately 5% of the neighborhood. This number was determined by feasibility of personal disbursement. Each survey had an identification number on the top corner for respondents to enter into the online survey. Houses for survey delivery were not randomly picked out ahead of time. Instead, this technique was followed to reach the largest area feasible:

a. Pick a 'quarter' of the neighborhood to make sure paper surveys were given to entire area

b. Go East and West down the blocks, turn Right (North) and circle the block. Continue West to the next intersecting block.

c. Approach houses in this order, if it failed one of these move to the next house. This technique averaged approximately every 4th house

   i. No gate

   ii. Safe steps/walkway

   iii. Does not have a 'no soliciting' sign

   iv. Has a secure place to leave survey

d. If all the qualifications passed, I left the survey in this order

    i. Door crack

    ii. Behind (and sticking up) mailbox next to door

    iii. Under door mat (sticking up)

e. If I encountered someone walking on the street or in front of their house, I would

    i. Introduce myself using the same language as my postings

    ii. Ask if they live in the neighborhood

    iii. Offer them the survey sheet

Out of the 6 respondents who I spoke to in person, 4 had recognized me from my social media posts and indicated they felt more comfortable with taking the survey because I had introduced myself. This series of methods allowed for more respondents to participate in the survey, even if their home restricted access to a paper invitation. Online respondents were required to list either the number on the survey from the paper invitation or their cross-streets before they could be invited to complete the online survey.

Chapter Four

Results

The online survey generated responses from 52 individuals. The first question from the survey allowed for the results to be narrowed to only allow responses from individuals who had received paper invitations or provided cross-streets that were within the boundaries of the neighborhood. This resulted in 12 responses being excluded from the evaluation. The removed responses either did not provide cross streets or provided cross streets that were outside the boundaries of the neighborhood. The final usable responses were collected from 40 respondents (N = 40).
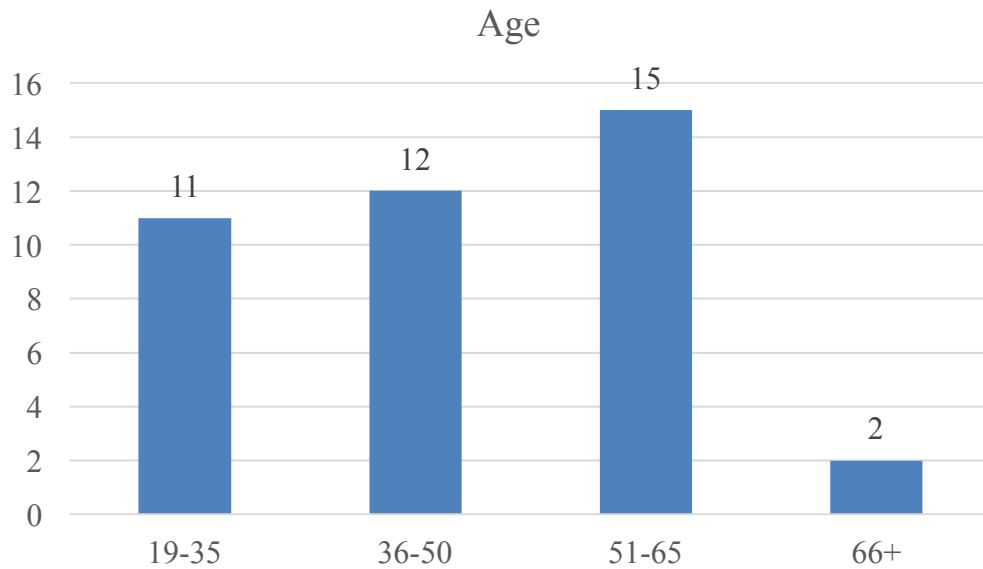
Figure 6. Age Range of Riverside Respondents

Demographic age data is displayed in Figure 6. There was an adequate age range of respondents that reflected the diversity of ages within the neighborhood. The ages tended to be older, with the 51-65 age group representing a plurality of responses, although there were only 2 respondents who were 66+. This spread of age responses leans slightly older than the age demographics of Everett, but may be more representative of Riverside, in which there is no specific data available (Everett, WA Demographics Census Data, 2017).

Self-identification results of the neighborhood trended towards urban (Figure 7), with nearly 43% of respondents identifying themselves and their neighborhood as urban. 35% identified as suburban-urban, and the remaining 22% defined their neighborhood and suburban. Residents tended to see themselves as more urban than suburban, but still being a large contingency that identified as suburban in some way.

Self-Identification of Neighborhood
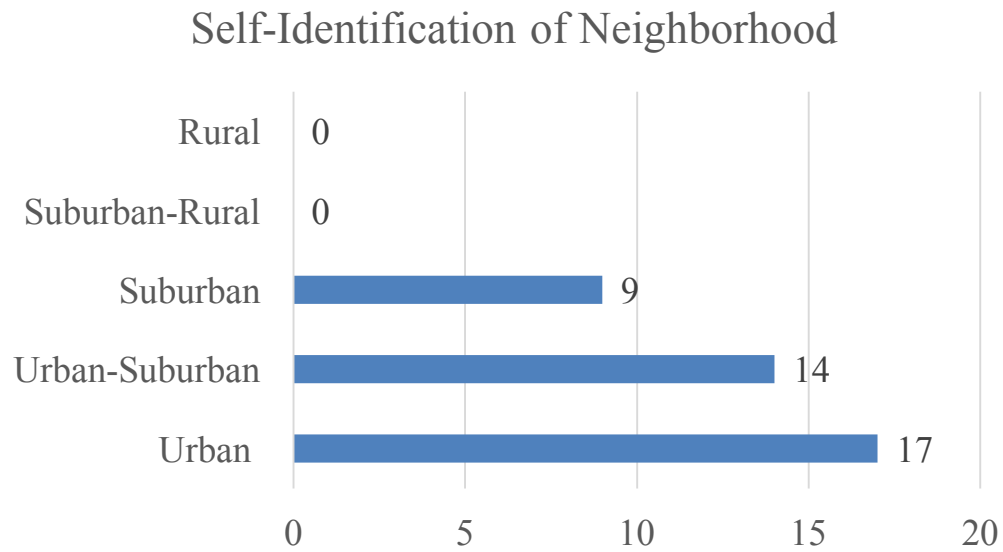
Figure 7. Self-Identification of Neighborhood Suburban Identity

Participants (Figure 8) showed that they were both concerned about safety and the environment, with environmental concern being ranked significantly higher than safety in 'very concerned' and slightly less-so than most concerned. In terms of landscaping, respondent preferences leaned towards mostly plants and equal parts grass and plants.

Environmental and Safety Concern Rating
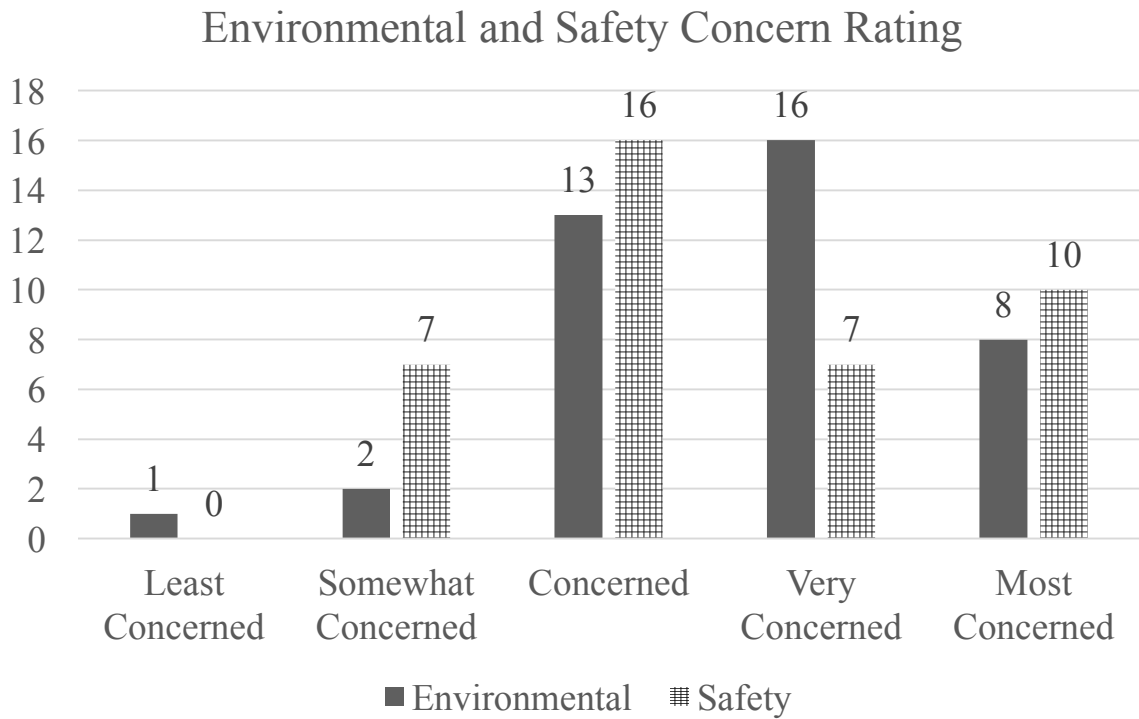
Figure 8. Environmental and Safety Concerns of Riverside Residents

Importance of Green Spaces
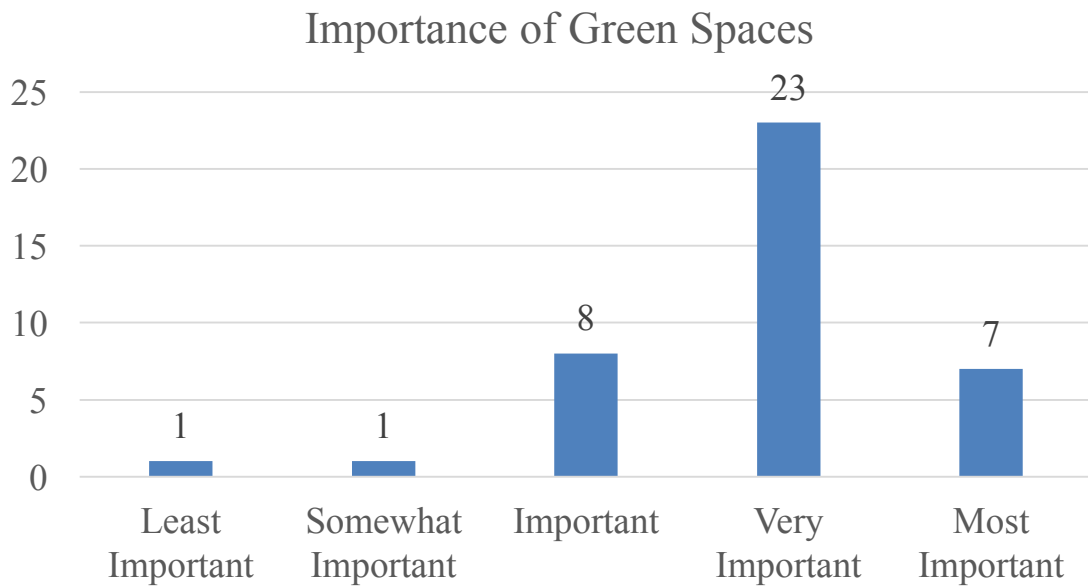
Figure 9. Importance of Green Spaces of Riverside Residents

Riverside residents appear to value green spaces (Figure 9). The respondents rated green spaces as being very important, with 38 of the responses being important and above and only 2 being somewhat important or least important.

Yard Design Preference
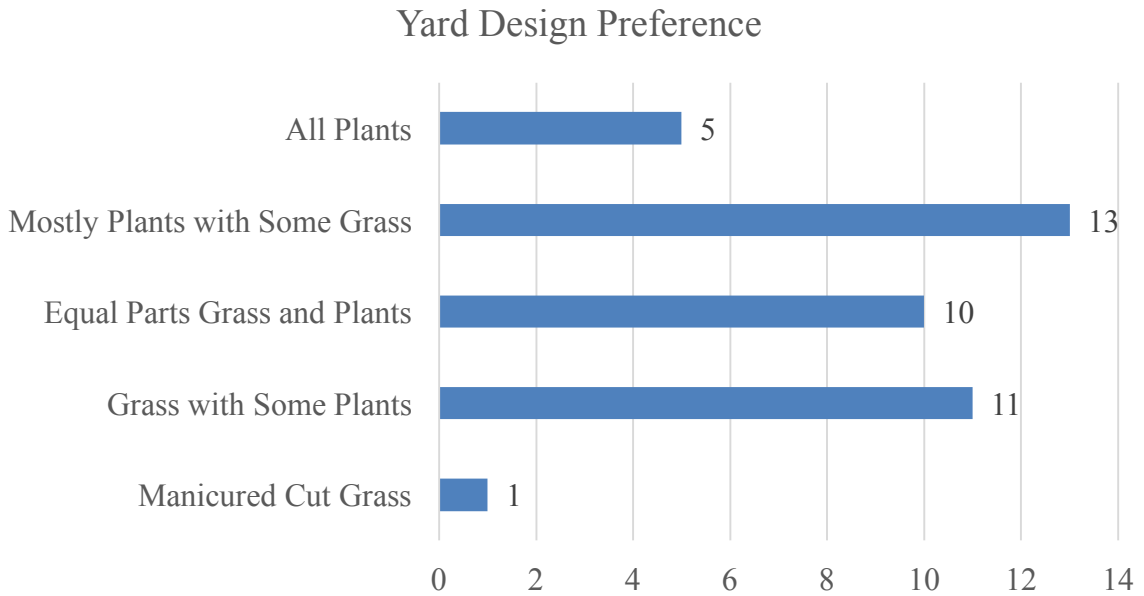
Figure 10. Yard Design Preferences of Riverside Residents

The yard design preference (Figure 10) indicates that combination yard design is the most preferential of yard designs. Riverside residents appear to prefer more wild and hybrid yard designs than traditionally manicured grass. This goes against traditional analysis that suburban residents prefer manicured yards (Feagan & Ripmeester, 1999; Sandberg and Foster, 2005). In fact, only two respondents preferred manicured cut grass over a combination of grass and plants.
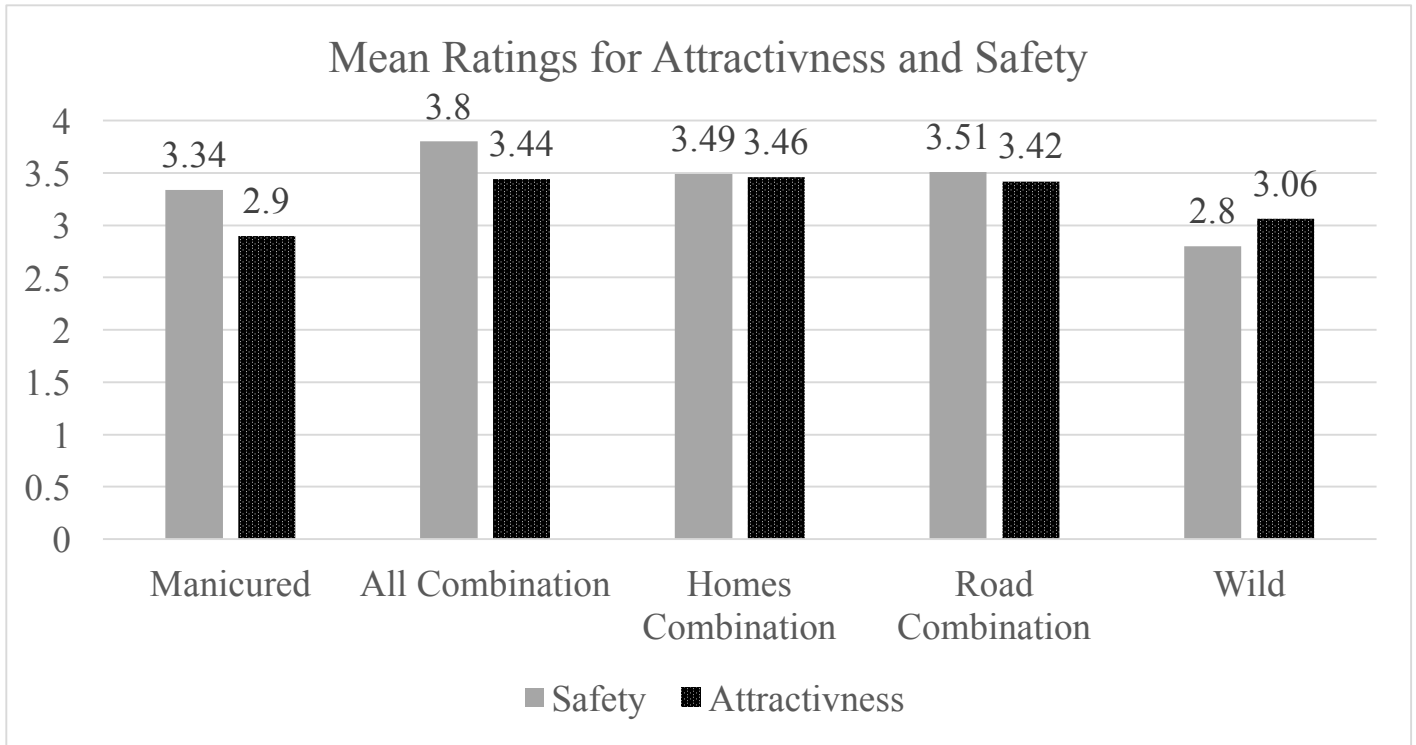
Figure 11. Visual Preference Survey Results of Mean Ratings for
Attractiveness and Safety

The substantive results of average means for manicured, combination (isolated

homes, roads, and all) and wild is displayed on Figure 11. The overall mean safety score

was highest for combination pictures (3.8) and for attractiveness (3.44). The lowest mean

safety scores were for the wild category (2.8). The lowest mean attractiveness was

manicured (2.9). Both the means for the combination category (houses combination and

road combination) ranked higher than wild for safety and attractiveness. The visual

preference survey revealed that combination yards were perceived to be both more safe

and more attractive.
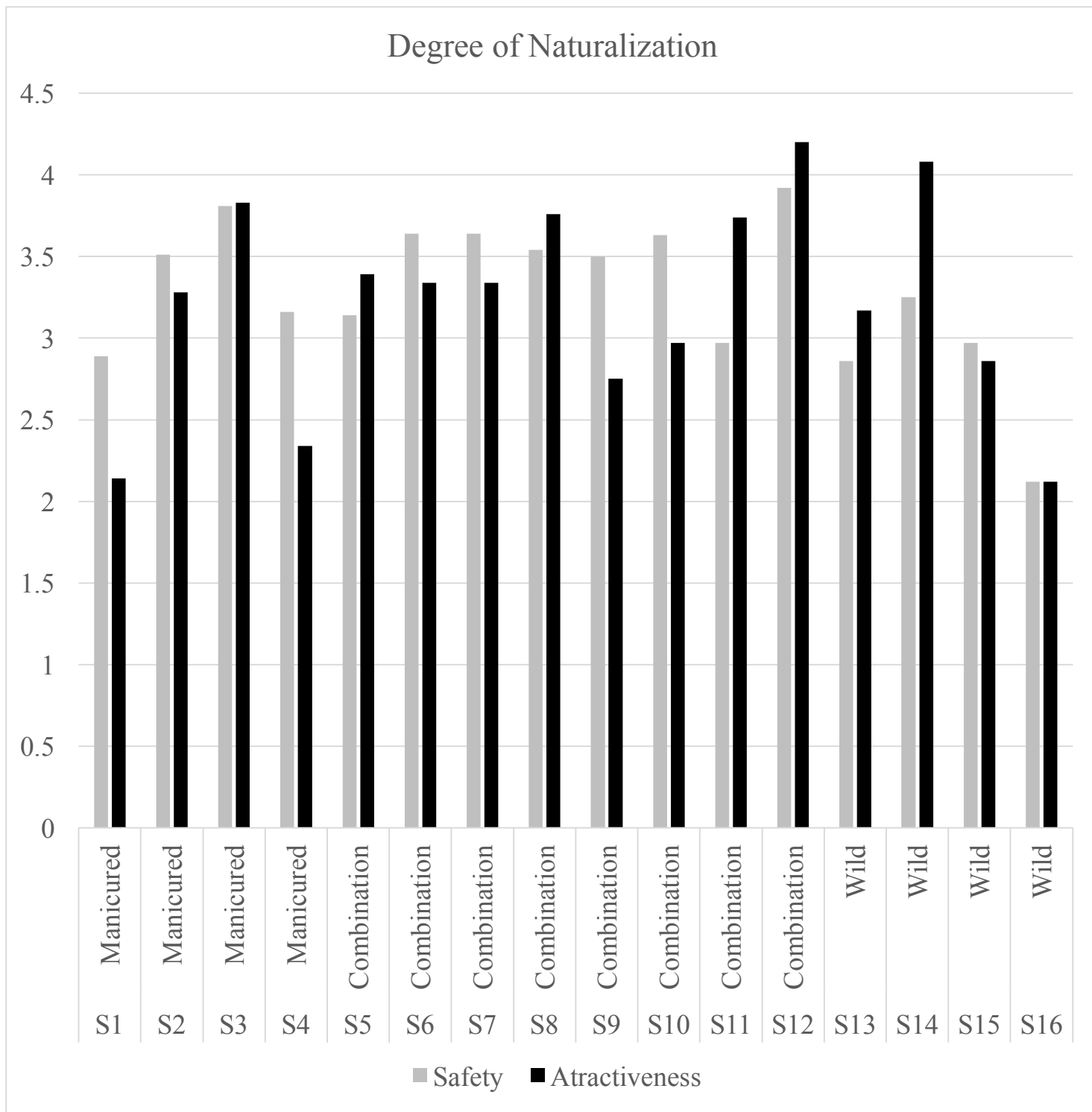
Figure 12. Visual Preference Survey Results of Detailed Mean Ratings for Attractiveness and Safety. Labeled by picture in survey and the corresponding classification of manicured, combination, and wild.

Figure 12 is a more detailed view of the mean ratings of the 16 photographs, with their designated category of either manicured, combination, or wild on the bottom. Two outliers, S1 and S16, that are below a 3.0 mean score for safety and attractiveness rating. There are little similarities in the two pictures, except for the fact that they are both extreme examples of manicured with no other vegetation (S1) and wild with little to no visible lawn (S16).

Chapter Five
Discussion

The results demonstrate that respondents view themselves as being more urban and suburban-urban than strictly suburban. These findings are compatible with the initial hypothesis that Riverside neighborhood was not perceived as a fully suburban zone, but one integrated with the urban edge. The survey shows that residents are integrated with the edge of their urban area, and don't see themselves as one specific definition. The results were somewhat surprising though that 43% of the respondents classified themselves as urban, directly conflicting with the idea that Riverside is classified as suburban by the county and as a traditional hybrid of suburban-urban through the literature (Moudon & Hess, 2000; Wood et al., 2008; Foster et al., 2013).

The difference in perception between urban and suburban show that a gradient is needed to better capture self-identification results. Since respondents identified strongly with a gradient of suburban-urban, it's likely that other neighborhoods that are designated as suburban would also show different residential perception results. Expanding how these areas are classified will help to better recognize how to increase sustainable planning and naturalization. These findings also support that further research is needed to understand how self-identification within suburban gradients affects perception and acceptance of naturalization (Parsons, 1995; Jorgensen et al., 2002).

The questionnaire revealed that the respondents were concerned with environmental issues and found green spaces to be important. This environmentally-inclined population is probably more likely to participate in naturalization incentive projects such as rain gardens, as well as continuing to increase in combination category of wild and manicured within their own lawns. City representatives would most likely have to appeal to this predisposition to environmental concerns to increase their naturalization projects.

The questionnaire also indicated that safety concerns were present, which could stem from the opioid crisis in the city. Further study is needed to confirm this assumption. Increased study of resident perceptions city- and neighborhood-wide would allow for a more comprehensive estimate of safety concerns and whether they are heightened in certain parts of the city where opioid use is more prevalent.

The questionnaire and the visual preference survey indicated that there was internal consistency between the self-reported yard design preferences and the visual display or yard designs. Yard design preferences yielded similar results to those of the visual preference survey. Respondents found that combination yard designs, a mix of plants and grass were the most appealing. Even when all grass (manicured) and all plants (wild) are directly compared against each other, manicured grass areas only received 1 response versus wild with 5 responses. This indicates that the visual preference survey was accurate in surveying the respondents in Riverside neighborhood, as their preference was already more likely to be favorable towards more naturalized areas than primarily open, manicured spaces.

The combination areas that represented a mixture of manicured and wild spaces ranked higher means on attractiveness and safety than either manicured and wild only. This data conflicts with previous studies that suggest that homes with manicured lawns would be considered safer and more aesthetically pleasing than any other kind of green space (Feagan and Ripmeester, 1999; Nassauer et al., 2001; Sandberg and Foster, 2005). This was a fairly surprising result, as previous studies indicated that more naturalized and wild spaces were seen as both less safe and less attractive (Nassauer et al., 2004; Sandberg and Foster, 2005).

One reason for this difference in results could be increased naturalization within Everett. The efforts by the city and state to increase naturalization projects have increased as environmental planning initiatives are now more accepted and utilized. It's also possible that the area in which past studies were based had a set of respondents who preferred more manicured areas, and that the Puget Sound Areas has a higher abundance of individuals who prefer combination yard designs and naturalization.

Chapter Six

Recommendations for Future Research and Conclusion

Landscape and naturalization preference studies are constantly evolving as new data demonstrates differences in socio-spatial perceptions. As definitions for suburban and urban areas continue to expand, so will the ability to categorize neighborhoods and suburban developments. As these areas become better defined, managing green spaces and increasing naturalization acceptance in public and private locations can be more successful since targeting similar areas with similar perceptions will be easier.

The findings show that visual attractiveness and safety cannot be fully considered in isolation from another. This supports the findings from Jorgensen et al. (2002), that suggested that more naturalistic vegetation could be used in parks and other suburban green spaces, if they were spatially arranged in a way that was attractive and safe to residents. Riverside residents' highly rated images could be used for future examples of naturalization projects that will be more likely to be accepted in the future.

Improving the acceptance of green spaces in suburban and urban edge neighborhoods will allow for more naturalization and Low Impact Development projects to be installed. Utilizing the combination designs that had high mean rates is likely to improve the chance of naturalization acceptance. The benefits of these naturalization projects include increased environmental health, mental health, and physical health of the

residents nearby (Randall et al., 2003; Nassauer et al., 2004 Bratman et al., 2012; Zhou & Parves Rana, 2012; Wolf, 2014).

The hypothesis that Riverside is primarily a suburban-urban edge area was confirmed by self-identification findings, but also proves the importance of increasing these kinds of studies in areas where residential areas differ in characteristics. These preliminary findings suggest that land-use managers, planners, and city representatives can be more aggressive in using environmental arguments for increasing naturalization in Riverside and similar neighborhoods, and will most likely have a positive reception for combination designs of yards.

Finally, I recommend that more surveys and research that utilize perception study techniques along with historical analysis to better inform the knowledge base. Understanding how suburban residents see themselves is essential for improving environmental conditions and habits.

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Appendices
Survey

Questionnaire

Confidential Online Survey Consent Form

You are being invited to participate in a research study titled, Perceptions of Neighborhood Green Spaces in Suburban Everett, Washington. This study is being done by Hilary McGowan from The Evergreen State College.

The purpose of this research study is to understand aesthetic and safety perceptions of green spaces that are wild versus manicured, in order to better serve neighborhood planners and development. If you agree to take part in this study, you will be asked to complete an online survey/questionnaire. This survey/questionnaire will ask about your opinion on the safety and attractiveness of pictures of green spaces from around Everett and it will take you approximately 10 minutes to complete.

You may not directly benefit from this research; however, we hope that your participation in the study may increase neighborhood planners' ability to increase overall attractiveness and perceived safety to suburban residents in the Puget Sound area. Increased green spaces have also been show numerous health benefits, including reduced pollution, reduced neighborhood resource use, and increased recreational opportunities. Planning these green spaces to maximize health benefits, attractiveness and safety and helps to maximize the overall welfare of residents in suburban areas.

Risks to you are minimal and are likely to be no more than mild discomfort with sharing your opinion. To the best of our ability your answers in this study will remain confidential. With any online related activity, however, the risk of a breach of confidentiality is always possible. We will minimize any risks by removing any signifying data such as your name, age, and neighborhood location. All raw data will be monitored and used only by Hilary McGowan for a Master's Thesis. The final report will be available on Ms. McGowan's final Thesis.

Your participation in this study is completely voluntary and you can withdraw at any time. You are free to skip any question that you choose.

If you have questions about this project or if you have a research-related problem, you may contact the researcher: Hilary McGowan, mcghil30@evergreen.edu. If you have any questions concerning your rights as a research subject, or you experience problems as a result of participating in this research project, you may contact John McLain, IRB Administrator at The Evergreen State College at 360.867.6045 or irb@evergreen.edu.

By clicking "I agree" below you are indicating that you are at least 18 years old, have read and understood this consent form and agree to participate in this research study. Please print a copy of this page for your records.

_I Agree
_I Disagree

2. What number is written on the top of the paper given to you that has information about this survey? If you don't have a number, please provide your cross streets.

   _____

3. Are you a resident of Everett, Washington?
   ____Yes
   ____No

4. What is your age?
   ___0-18
   ___19-35
   ___36-50
   ___50-65
   ___66+

5. What best describes your neighborhood?
   ___Urban
   ___Urban-Suburban
   ___Suburban
   ___Suburban-Rural
   ___Rural

6. How do you rate your concern about environmental issues?
   ___Lease Concerned
   ___Somewhat Concerned
   ___Concerned
   ___Very Concerned
   ___Most Concerned

7. How important is it to you to have green spaces in your neighborhood?
   ___Lease Important
   ___Somewhat Important
   ___Important
   ___Very Important
   ___Most Important

8. Are you concerned about safety in your neighborhood?
___Lease Concerned
___Somewhat Concerned
___Concerned
___Very Concerned
___Most Concerned

9. What is your yard design preference?
___Manicured cut grass
___Grass with some plants
___Equal parts grass and plants
___Mostly plants with some grass
___All plants

Visual Preference Survey

Please rate the following groups of images on a scale of 1 to 5 on attractiveness and safety.
1 is least attractive and safe
3 is somewhat attractive and safe
5 is most attractive and safe

S1

| Safety | 1 — 2 — 3 — 4 — 5 |
| Attractiveness | 1 — 2 — 3 — 4 — 5 |

S2

| Safety | 1 — 2 — 3 — 4 — 5 |
| Attractiveness | 1 — 2 — 3 — 4 — 5 |

S3

| Safety | 1 — 2 — 3 — 4 — 5 |
| Attractiveness | 1 — 2 — 3 — 4 — 5 |

S4

| Safety | 1 — 2 — 3 — 4 — 5 |
| Attractiveness | 1 — 2 — 3 — 4 — 5 |

S5

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5

S6

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5

S7

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5

S8

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5

S9

Safety   1   2   3   4   5
Attractiveness   1   2   3   4   5

S10

Safety   1   2   3   4   5
Attractiveness   1   2   3   4   5

S11

Safety   1   2   3   4   5
Attractiveness   1   2   3   4   5

S12

Safety   1   2   3   4   5
Attractiveness   1   2   3   4   5

S13

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5

S14

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5

S15

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5

S16

Safety   1   2   3   4   5
Attractiveness 1   2   3   4   5