A PATH MORE TRAVELED

A case for increased active recreation opportunities in Oregon's small communities

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Submitted in partial fulfillment for the Master of Landscape Architecture,
Department of Landscape Architecture, University of Oregon

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ABSTRACT

Physical activity is a main component of preventing and controlling chronic diseases associated with sedentary lifestyles. When built environments are developed to prioritize vehicle transportation, coupled with increased mechanization of everyday activities, sedentary lifestyles and associated chronic diseases become more prevalent. This project builds a case for the implementation of linear parks as a prescriptive element to provide increased active recreation opportunities in small communities that are affected by inactivity-related chronic diseases. Small communities are affected by this issue, but can be limited in funding and planning resources.

This project defines linear parks and provides a linear park typology accompanied by conceptual park designs for adaptation into other communities. A two-part linear park siting method, consisting of a GIS-based landscape search analysis and small-scale suitability analysis, is outlined and applied to the small community of Roseburg, Oregon as an example study area on which to test the method and applicability of linear park types. The results of the method are mapped and discussed to provide guidance to future small communities that want to increase active recreation opportunities.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank my project chair, Chris Enright, for your unwavering support, solid advice, and continued encouragement throughout this process. From my very first explorations in GIS to the final document, I have truly appreciated your help and support more than I can say.

To Garrett, thank you for your understanding, patience, support, and help to ease the stresses of my life when I was home. It's been a long journey, (literally, about 25,000 miles driven between the two of us), and I can't wait to start our next adventure together.

To Howie, thank you for your contagious energy and happiness, much-needed snuggles, excited greetings, patience with my absence, and ability to keep me going through the last four years.

To my family, thank you for your continued support through this journey. From a young age, you taught me that the good things in life don't come easy—they are earned with honest hard work and dedication. This notion has movtivated me through the many rough patches of my education, and will continue to do so post-graduation. Thank you for always believing that my hard work would pay off.

To my fellow classmates, grads and undergrads, thank you for all the friendships, laughs, support, memories, advice, and lessons. I have learned as much from all of you in the last three years as I have from classes. I wish the best for all of you!

To Arica Duhrkoop-Galas and Dave Hulse, thank you for your support with this project. It helped shaped and direct this project in so many ways.

To the rest of the wonderful faculty that has supported me along the way, thank you so much! It's been a pleasure to learn from all of you.

Last, but certainly not least, thank you to Noriko Corrado and Chris Ammerman from the City of Roseburg and Kathy Thompson from Douglas County for supplying a wealth of GIS data and parks information.

CONTENTS

Chapter 1: Health, the Built Envrionment, & Small Communities

Chapter 2: Linear Parks & Project Methods

Chapter 3: Creating a Network

Chapter 4: Linear Park Conceptual Designs

Chapter 5: Recommendations & Lessons Learned

Appendix A

FIGURES

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

No Tables or Figures

CHAPTER 1:

HEALTH, THE BUILT ENVIRONMENT, & SMALL COMMUNITIES

1.1 PROJECT SIGNIFICANCE

It has been recognized since the early 19th century that the built environment plays a critical role in the health of its residents (Purdue et al. 2003). However, prescriptive criteria for parks and open space planning and design are lacking (Koohsari et al. 2017). For instance, standard park types and associated sizes are established by the National Recreation and Parks Association (NRPA) (Mertes and Hall 1995). However, they lack specificity in prescriptive elements, allowing park planners and designers to reach the minimum size standards, without further attention given to intended park use (Koohsari et al. 2017). This allows area parks to be developed in isolation, without a holistic plan for an entire park system. This issue is exacerbated in smaller communities where park planning and funding is scarce.

Small communities are often lacking in spaces designed for outdoor active recreation and active transportation (Hansen and Hartley 2015 and Dickman et al. 2016). For the purposes of this project, outdoor active recreation is defined as any form of outdoor activity that requires physical effort and is carried out by individual choice for the purposes of enjoyment, health improvement, transportation, and/or various other reasons (Nugent 2013). While active transportation (for example, bicycling) is not the focus of this project, many active recreation spaces can also be used for active transportation; therefore, it is mentioned at times. Many small communities also have health issues that can improve with increased physical activity (Warburton et al. 2006). For example, according to the County Health Rankings website, Douglas County, Oregon has an adult obesity rate of 31% (almost 33,400 of 107,685 people), and physical activity is one of the modifiable risk factors known to improve and prevent obesity (Warburton et al. 2006).

Many factors can contribute this lack of outdoor active recreational opportunity, however, limited planning and financial resources are among the most prominent (Tulipane 2016). Since numerous health benefits are associated with active recreation, and since linear parks are associated with greater physical activity than non-linear parks (Brown et al. 2012), this project will focus on identifying potential linear park sites in a small community as opportunities for outdoor active recreation.

This project builds a case for the implementation of linear parks as a prescriptive element to provide increased active recreation opportunities in small communities that are affected by inactivity-related chronic diseases. It will also explore the potential of linear parks to connect existing parks to create an interconnected park system. Figure 1.1 identifies the relationships among the major themes of this project including the new approach this project takes to prescribe linear parks as a solution to inactivity-related chronic diseases in small communities.

This project is focused in Roseburg, Oregon as an example community to explore the potential of siting linear parks within an existing park system. Roseburg serves as an example area to test geographic criteria, park types, and design elements of linear parks with the goal of establishing a preliminary, replicable, and adaptable framework for similar small communities to follow for implementing a park system that incorporates linear parks.

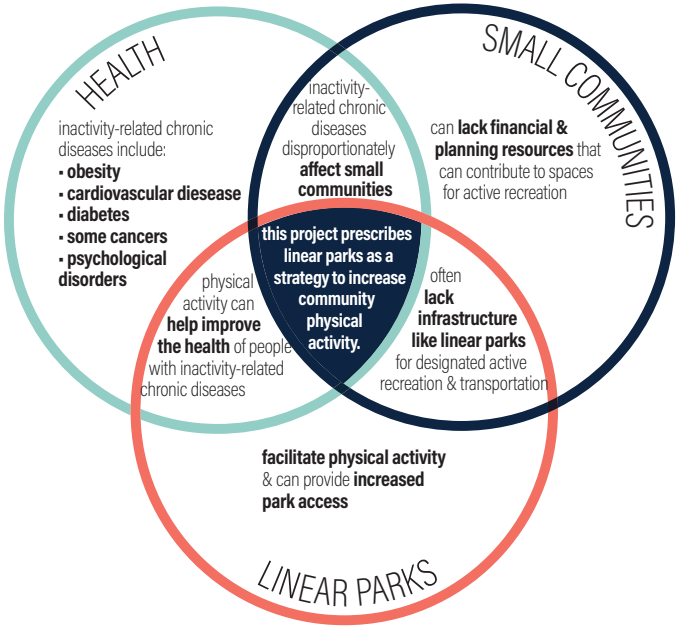

Figure 1.1: This diagram situates this project within its contributing themes.

This exploration will be guided by the following research questions and sub-question:

1. What are linear parks?

2. What are different types of linear parks?

3. How can linear parks be integrated into the park network of small communities?

    3a. Can a GIS-based landscape search analysis and a small-scale suitability analysis help site linear parks?

1.2 HEALTH ISSUES RELATED TO LACK OF PHYSICAL ACTIVITY

It is no secret that many health issues are associated with the lack of physical activity (Warburton et al. 2006). Chronic diseases such as obesity, cardiovascular disease, diabetes mellitus, hypertension, some cancers, and osteoporosis share physical inactivity as a "modifiable risk factor" (Warburton et al. 2006). Despite this, most adults do not participate in the recommended weekly 150 minutes of physical activity (Sallis et al. 2012).

In "Health benefits of physical activity: the evidence", a review of relevant literature, Warburton, Nicol, and Bredin (2006) discuss the "irrefutable evidence of the effectiveness of regular physical activity in the primary and secondary prevention of several chronic diseases". In their review, the authors discuss primary and secondary prevention of death and chronic diseases related to physical activity. The following points derive from their review:

- Physical activity has been shown to primarily and secondarily prevent cardiovascular-related deaths, as wells as deaths from any cause.
- "... being fit or active was associated with a greater than 50% reduction in risk [of death from any cause and from cardiovascular disease]."
- The effects of increasing physical activity appear to be "graded, such that even small improvements in physical fitness are associated with a significant reduction in risk [of premature death]".

- Even in patients with established cardiovascular disease, physical activity was "effective in the secondary prevention of cardiovascular disease and is effective in attenuating the risk of premature death among men and women."

Similar results were shown for the prevention of type 2 diabetes (Warburton et al. 2006), which affects over 29 million Americans and is a concern for the 86 million Americans who are in the pre-diabetes phases (Levi et al. 2015):

- For every energy expenditure increase of 500 kcal per week, there was an associated decrease in incidence of type 2 diabetes by 6% in a "large prospective study".
- Physical activity of moderate intensity "(>= 5.5 METs (metabolic equivalent) for at least 40 minutes per week)" has been shown to protect against the development of type 2 diabetes in middle-aged men, "with an even greater effect among those at high risk" (people who are overweight).
- "...modest weight loss through diet and exercise reduced the incidence of [diabetes] among high-risk people by about 40-60% over 3-4 years."

As seen in Table 1.1 (Levi et al. 2015), there are inequalities in the rates of obesity among minority populations. For instance, obesity rates among Black and Latino adults are higher than that of White and Asian adults in America. This highlights the inequities in obesity rates among races and ethnicities (Levi et al. 2015), which can be exacerbated when coupled with the already-disproportionate rates of obesity in small communities (Hansen and Hartley 2015).

Further, in the "State of Obesity: better policies for a healthier America 2015" report compiled by the Trust for America's Health, authors state that nearly 30% of adults and 17% of young people aged 2 to 19 years were considered obese. Physical activity has been shown to help obese and overweight people lose excess weight and improve their body composition (Levi et al. 2015).

Table 1.1: Rates of obesity & overweight among ethnicities. Adapted from Levi et al. 2015, p. 23.

Obesity & Overweight Rates for Adults, National Health & Nutrition Examination Survey (NHANES), 2011 to 2012 (with American Indian/Alaska Native Rates per 2008 Indian Health Services)

	White Both Genders	Latino Both Genders	Black Both Genders	Asian-American Both Genders	Native American/Alaska Native Both Genders	White Men	Latino Men	Black Men	White Women	Latino Women	Black Women
Obese	32.6%	42.5%	47.8%	10.8%	54%	32.4%	40.1%	37.1%	32.8%	44.4%	56.6%
Obese & Overweight	67.2%	77.9%	76.2%	38.6%	81%	71.4%	78.6%	69.2%	63.2%	77.2%	82%

Note: The Centers for Disease Control and Prevention uses the term Hispanic in analysis. White = Non-Hispanic Whites; Black = Non-Hispanic African Americans.

Though these reports highlight the importance of physical activity for the prevention and control of chronic diseases, more research is necessary to determine prescriptive elements such as how much, what types, and frequency are necessary to be most effective for each disease where physical activity is a modifiable risk factor (Warburton et al 2006). It is clear, however, that physical activity is a major component in preventing and controlling chronic diseases. Provision of safe and accessible spaces within the built environment that are well suited for active recreation can be one way to help address this issue.

1.3 THE BUILT ENVIRONMENT

The built environment can be broadly defined as "the human-made space in which people live, work, and recreate on a day-to-day basis", ranging from buildings and roads to parks and open spaces (Roof 2008). Its form and structure influence our daily lives—how we get from where we are to our destinations, what amenities are available to us within walking and driving distance, where we live, and the types of housing available.

What Shapes the Built Environment?

The built environment is shaped by land use planning, zoning, and local policies of the cities and towns in which we live. According to The World Bank (2015), zoning:

- is a tool for land use planning in that it "determines the location, size, and use of buildings and decides the density of city blocks."
- regulates the built environment and ensures complementary uses in an area.
- ordinances further shape the build environment by specifying uses and development allowed within a zone.

Policies are larger-scale guiding principles that cities and municipalities establish to guide their functioning, development, zoning and planning (Purdue et al 2003). Policies can influence the built environment by guiding zoning and land use planning efforts. For example, if a city has a policy that encourages active transportation for its workers, it would likely have codes and ordinances that call for the provision of bicycle lanes along streets.

Health and the Built Environment

The built environment also plays a significant role in our health (Roof 2008, Purdue et al. 2003, Sallis et al. 2012, Koohsari et al. 2013). Historically, public health heavily influenced the built environment (Purdue et al. 2003). During the 19th century, thousands of workers crowded industrial cities with unsanitary living conditions. As a result, rates of disease and epidemics rose while life expectancy decreased (Purdue et al. 2003). To improve conditions, sanitary engineers worked to develop comprehensive sewer systems and building designs increased fresh air. Parks and open spaces developed in response to public demand for recreational areas and to "reduce social stress which was threatening the existing social order and political system" (Maruani and Amit-Cohen 2007). In these ways, among others, the built environment was successfully changed to improve health conditions. In the 20th century, zoning ordinances began to take hold—industrial uses were often separated from residential uses, and building heights, densities, and setbacks were specified (Purdue et al. 2003). Later in the 20th century, however, the connection between the built environment and public health weakened as the

focus for public health shifted to individual human behavior. Today, chronic diseases, rather than infectious diseases, are the primary public health problem, and planning departments often lack public health officials to address these issues (Purdue et al. 2003).

As stated earlier, most adults do not meet the minimum recommended guidelines for physical activity (Sallis et al. 2012). This lack of physical activity is influenced largely by societal changes over the last several decades. As communities developed, "suburbs" became commonplace, and now about half of Americans live in suburban areas (Purdue et al. 2003). By design, transportation in suburban areas relies heavily on automobiles rather than facilitating walking or biking (Sallis et al 2012, Purdue et al. 2003). Furthermore, mechanization, computerization, and automation of daily activities and processes have reduced physical activity in the workplace (Sallis et al 2012). Many communities rely on built environment networks developed for vehicle transportation (Dickman et al. 2016), and unless the built environment is shaped to facilitate changed behavior that increases physical activity, behavioral change is unlikely to occur (Sallis et al. 2012).

Provision of spaces for active recreation primarily occurs through the development of parks and open spaces. These spaces are designed with a variety of features including sports fields, open grassy areas, walking paths, and play structures. In the United States, departments on municipal, county, state, and federal levels manage and administer parks (Sallis et al. 2012). Many cities follow the National Recreation and Parks Association (NRPA) standards to allocate land for parks. NRPA standards set a specific amount of land per perceived level of service (Baud-Bovey & Lawson 2002). However, NRPA standards lack prescriptive elements that can better facilitate active recreation, like park geometry and features.

Given that the built environment has the potential to influence health on a population level (Sallis et al. 2012), it is critical that the built environment is developed to provide active recreation and transportation opportunities. For example, a community with few active recreation options within the built environment will likely have fewer residents who participate in regular physical activity than a community with an extensive bicycle and pedestrian path or trail system. However, it is extremely difficult to retrofit the developed built environment, especially because "prescriptive evidence for planners and policy-makers about 'how much' and 'what types' of infrastructure is required to support health and wellbeing is lacking" (Koohsari et al. 2013, 295). This project will focus on the provision of spaces for active recreation, though there are many other influences that the built environment has on our health.

1.4 SMALL COMMUNITIES

This project is set in the context of small communities in Oregon. For the purposes of this project, small communities will be defined as communities of 30,000 people or less that are not located within a metropolitan area of a large city.

Efforts to provide urban areas with active recreation and transportation infrastructure have resulted in many successful projects like the High Line in New York City, The 606 in Chicago, and the Dequindre Cut Greenway in Detroit (LaFarge 2012). This project focuses on small communities because active recreation and transportation infrastructure is often lacking in small communities, where residents could benefit

from similar efforts (Dickman et al. 2016). Though urban areas are growing, small communities can face similar challenges as urban areas, but solutions for them are fewer.

Small communities present a unique set of challenges and opportunities for active recreation and transportation. Small communities usually have fewer financial and staff resources for planning and development than do urban areas, and some do not engage in "planning, zoning or creating building codes" at all (Nelson 2012). This can lead to communities doing the minimum to meet codes and regulations or providing short-term solutions to problems that could be better solved with long-term planning efforts focused on improving the residents' quality of life. Furthermore, people in small communities tend to have lower median household incomes than people in urban areas (US Census 2010). Thus, with a small population paying small amounts into tax revenues, municipal funds for additional parks could be limited.

Despite the financial and planning limitations facing small communities, these communities present a unique set of opportunities. Some small communities are located near natural resources—forests, rivers, lakes, and mountains—all of which provide a unique experience to residents and visitors through views, recreational opportunities, tourist attractions, and undeveloped land. With smaller populations than urban areas, small communities tend to have a slower-paced feel to them versus a hustling and bustling city with a large population. For small communities, it is important to embrace existing assets and use them to leverage opportunities for economic growth and improving quality of life for residents (Johnson et al. 2015). The built environment can play a large role in this through the provision of strategically located and designed parks and open spaces. Allocation of these spaces depends on a variety of variables, one of which is the parks planning model the governing body follows for park development.

1.5 PARKS PLANNING MODELS

Provision of open space is important to quality of life (Maruani and Amit-Cohen 2007). Planning and development approaches for open spaces vary, but most stem from "special characteristics as a type of land use" as a function of utility (Maruani and Amit-Cohen 2007). Several models have been identified in the planning and development of parks and open spaces. There are four models relevant to this project:

Opportunistic model – a model of open space development where resultant parks and open spaces result from opportunities that "pop up" rather than are planned for systematically. A variant of this approach is the "space left over after planning (SLOPE)". The results of SLOPE are remnant parcels, left over after all other land uses have been designated, being allocated for open space. These spaces are often small, difficult to access, irregularly shaped, and inadequately suited for open space (Maruani and Amit-Cohen 2007). However, this does not entirely eliminate their potential to become successful open spaces.

Space standards model – this model uses a quantitative approach to size parks and open spaces based on anticipated user population. This model is common and fairly straightforward to implement. It also "does not require acquaintance with the characteristics of complex social or ecological systems," as it is purely quantitative. Other variants of this model exist and attempt to address additional user needs. The NRPA follows a variant of this model.

Shape-related models – these models are based on the shape and spatial arrangement of the park. Examples of this include greenbelts and linear parks and can be implemented on various scales.

Park system model – beginning at the end of the 19th century, this model aims to develop "a set of functionally interrelated open spaces—sometimes interconnected physically—in a given geographical area"(Maruani and Amit-Cohen 2007). Hierarchy can also be used to create this system—small pocket parks up to large regional parks—where open space plans are related to "the spatial distribution of neighborhood units, their size and structure—data that are readily available, and therefore this model is widely used" (Maruani and Amit-Cohen 2007).

1.6 NRPA STANDARDS

The NRPA uses the space standards model and has created a set of standards to allocate space for parks based on an anticipated "level of service" (Mertes et al. 1996). As stated earlier, this approach is common, but often lacks prescriptions for amenities, park spatial organization, use, and other features that could maximize user experience. This could leave communities with a large field of grass designed without purpose that rarely gets used but meets the standards for park size. Furthermore, many areas with growing populations no longer meet the standard because their population exceeds the level of service that is standard for their existing parks (Maruani and Amit-Cohen 2007). What, then, do these communities do when they cannot expand their park sizes?

1.7 LINEAR PARKS

While the term "linear park" is used frequently, it lacks a common definition. This lack of definition adds confusion and ambiguity to their design. For this project, linear parks will be defined as public parks with semi-permeable to permeable edges that contain a designated travel surface and a minimum perimeter to area ratio of 3:1. This derives from information collected from the literature review (Kullman 2012, Brown et al. 2012, Maddox 2016).

Linear parks are developed based on the shape-related models. Their popularity has been increasing, especially after the development of parks such as the High Line in New York City and the Bloomingdale Trail in Chicago. Linear parks provide increased access, facilitate physical activity, and can connect people and places (Maddox 2016 and Brown et al. 2012). For these reasons, linear parks will be the focus of this project as a means to provide active recreation opportunities through increased access and the facilitation of physical activity.

Increased Access

Because of their geometry, linear parks provide greater access to the surrounding areas (Maddox 2016). Figure 1.2 demonstrates the efficacy of linear parks to provide greater perimeter access by showing the increased perimeter-to-area ratio as parks become longer and narrower. The shape of linear parks also provides opportunities for their incorporation into existing park systems, as well as a means to effectively create connections between parks. Linear parks can be developed along rivers, creeks, streets, railroads, and other topographic features, whereas locating an equally-accessible square park within an existing city or community would likely involve

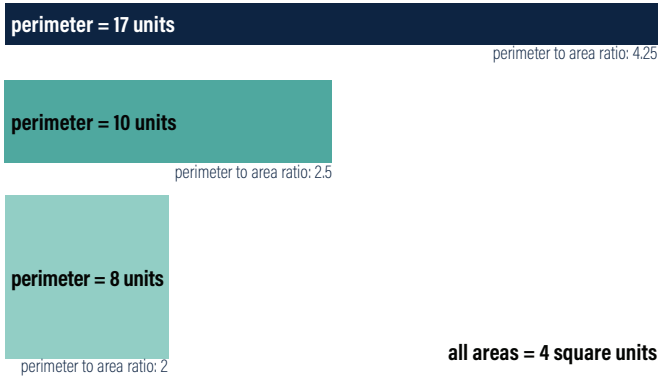

Figure 1.2: This figure demonstrates the efficacy of linear park shapes to provide greater perimeter access than those parks of less linear shapes (adapted from Maddox 2016).

relocating people and/or businesses and creating justice issues (Maddox 2016).

Facilitation of Physical Activity

In "Using participatory GIS to measure physical activity and urban parks benefits", Greg Brown et al., Morgan Faith Schebella, and Delene Weber (2012) gathered recreational information from subjects via postal questionnaires that identified "declared presence" at recreational sites and characteristics of their activity at each site. Thirteen types of physical activities were identified and then classified into low, moderate, and high intensity:

Low: slow walking/strolling; resting/sitting; standing activity; yoga/stretching

Moderate: moderate-paced walking; fast-paced walking; cycling slowly; moderate intensity sport; using playground/ fitness equipment

High: jogging/running; cycling briskly; high intensity sport; boot camp or fitness program

The researchers then identified the level of physical activity most commonly associated with each park type identified in the study (based on the NRPA park definitions: neighborhood, school, community, natural, sports, and linear) and found that linear parks were associated with the greatest amount of high intensity physical activity. They also found that community parks were associated with the greatest amount of low-intensity physical activity.

1.8 ROSEBURG, OREGON

Roseburg, Oregon is a small community of about 22,000 residents located in Douglas County, Oregon (Figure 1.3). The area is known for its timber production, close proximity to the Umpqua National Forest, Umpqua River, rolling oak-covered hills, and the Wildlife Safari game park.

The area's economic driver was historically the timber industry, however that industry declined in the 1980s (Lehner 2012). The area also suffered economically from the 2008 nationwide market crash. Since then, Roseburg's economy has diversified through the development of numerous wineries and breweries and the establishment of industrial warehouses for transport (Coca Cola, UPS, Winco). The timber industry still plays a large (if not the largest role) in Roseburg's economy. The City of Roseburg has recently directed efforts into improving

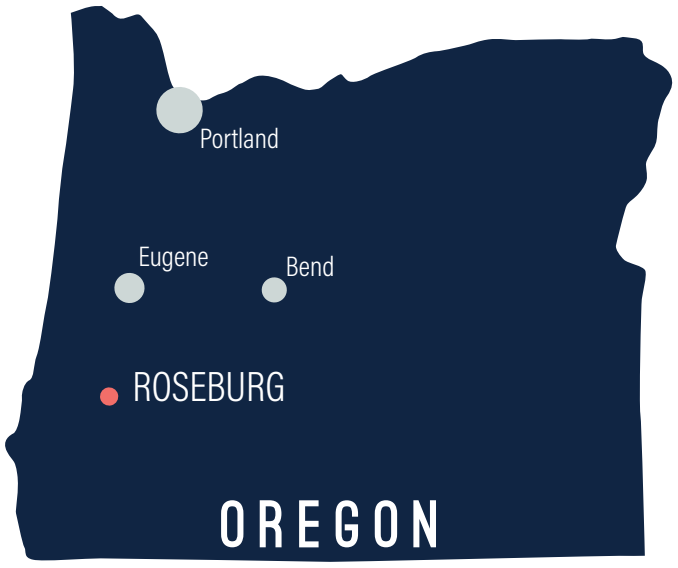

Figure 1.3: Roseburg, Oregon is located south of Eugene and Portland.

the downtown area, and several associations have been established to help businesses grow and thrive.

In Douglas County, about 20% of adults are physically inactive (County Health Rankings & Roadmaps 2017). Further, the area suffers from high obesity rates—as previously noted, about 31% of people in Douglas County, including Roseburg, are obese (County Health Rankings & Roadmaps 2017).

Roseburg has an existing set of parks and open spaces that range from small neighborhood parks to a large community park. Most of these parks are isolated—not connected to other parks or open spaces—do not meet the NRPA standards (McIntyre et al. 2007), and serve a only small portion of the community, leaving several neighborhoods without park access.

Roseburg has an adopted Comprehensive Parks Master Plan (2008) that guides and details plans to expand the community's park network, including several trails. The Parks Master Plan describes the desire for trails and paths in the results of a Visioning Workshop and community survey:

- Trails were identified by Visioning Workshop participants as one of two top priorities for the community
- Current use of parks involves walking for pleasure and exercise
- Survey participants expressed a desire for "an accessible multi-use network of trails along the river and in parks"; also that additional riverfront paths were necessary
- Trails and paths along the river and through the area's ridges and hills were desired

These results demonstrate the community's desire for increased recreation opportunities in the form of trails, especially those that could engage with the area's natural features.

This community was chosen because its population size falls into the "small community" category, its economic situation is characteristic of many small towns in Oregon, the availability of GIS data, and its proximity to the University of Oregon allowied for site visits.

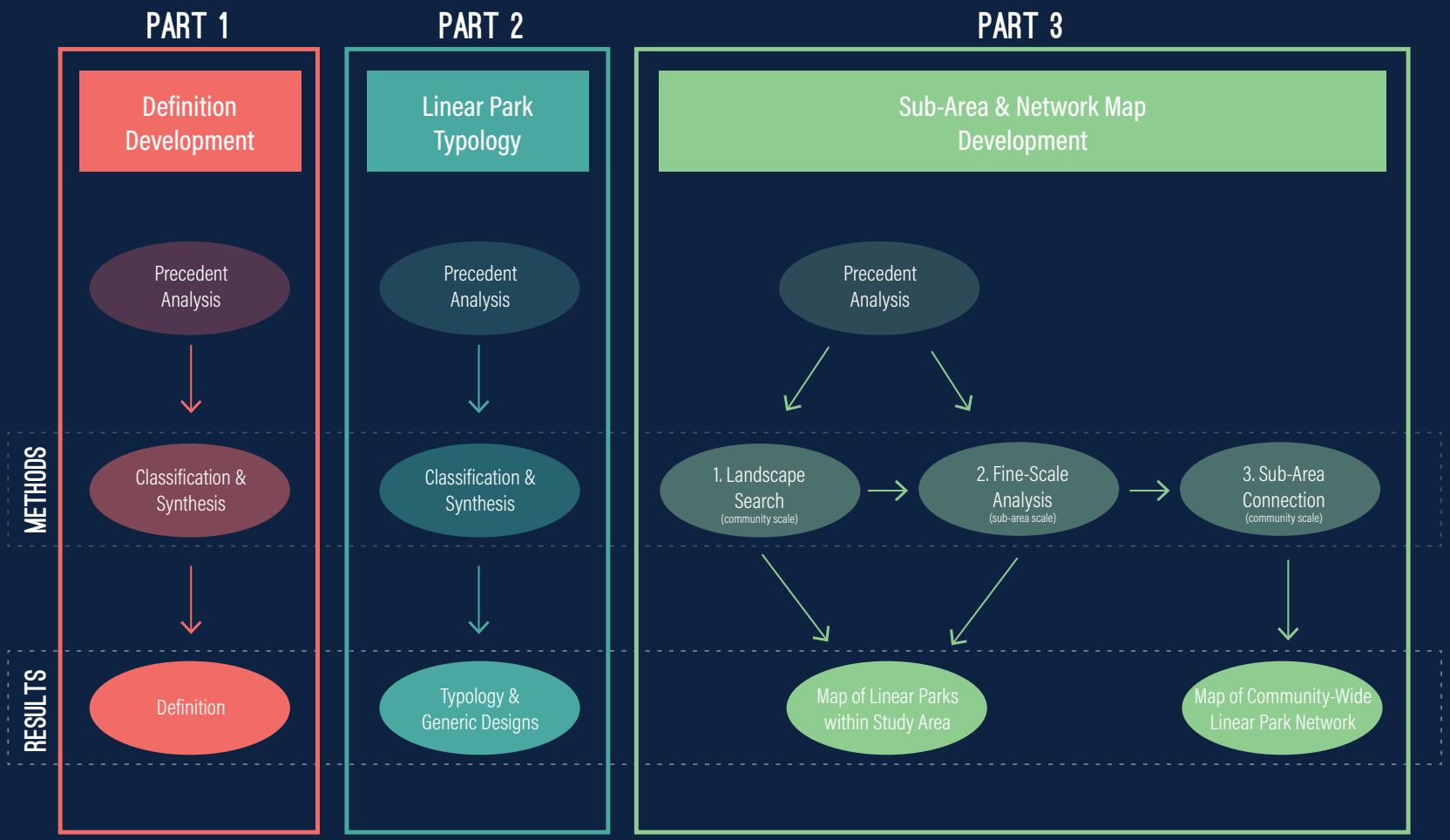

Figure 1.4: This figure diagrams the project's main parts and their associated methods & results.

1.9 PROJECT PROCESS & METHODS: ANSWERING THE RESEARCH QUESTIONS

Relevant literature was reviewed to inform the development of a linear park definition and a linear park typology. I then used geographic information systems (GIS) to first perform a landscape search analysis in the example community of Roseburg, Oregon to identify available sites within the landscape for linear park development. This process is derived from a site search analysis developed by Malczewski (2004). I followed the landscape search analysis with a small-scale suitability analysis to determine where linear park segments should be located, as well as the linear park type best suited for the segment. This process is illustrated in Figure 1.4.

This project's goals are to answer the following questions:

1. What are linear parks?
- Objective 1: Define linear parks and identify linear park types
  - Strategy: Literature Review, Classification, Synthesis

2. What are different types of linear parks?
- Objective 1: Identify linear park types
  - Strategy: Literature Review, Classification, Synthesis

3. How can linear parks be integrated into the park network of small communities?
- Objective 1: Develop transferrable and adaptable method that other communities can use to help site linear parks.
  - Strategy: Landscape Search Analysis and Fine-Scale Suitability Analysis

3a. Can a GIS-based landscape search analysis and a small-scale suitability analysis help site linear parks?
- Objective 1: Identify potential sites for linear parks in Roseburg, Oregon
  - Strategy: Landscape Search Analysis (GIS)
- Objective 2: Evaluate identified sites to determine what type of linear park is best suited for that site
  - Strategy: Fine-Scale Suitability Analysis

1.10 CHAPTER SUMMARY

This chapter has explained the link between the built environment and sedentary lifestyles that contribute to a number of chronic diseases, including obesity, diabetes, and cardiovascular disease. The efficacy of linear parks to facilitate active recreation and increase access to recreation spaces has also been established. The lack of active recreation in small communities was discussed, as was the purpose for choosing the example community of Roseburg, Oregon. In the next two chapters, methods to define linear park types with their associated siting criteria and the landscape search and suitability analysis processes will be discussed. The last chapters will discuss results and a linear park development framework for small communities who seek to increase their active recreation opportunities and park connections with linear parks.

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CHAPTER 2:

LINEAR PARKS & PROJECT METHODS

2.1 INTRODUCTION

The purpose of this chapter is to explain the steps I took to answer the research questions posed in Chapter 1. The process is separated into three main parts—one for each set of research questions. The first part addresses the definition of linear parks, the second addresses their classification, and the third part addresses the GIS process to site them in the landscape.

These methods are largely based on classifying existing information from precedent studies and relevant literature into linear park-related categories. Synthesis of this information results in a new typology of linear parks with criteria describing where they might best fit in the landscape. This research strategy falls under Elen Deming and Simon Swaffield's (2011) theory and method of research considered typology—"a taxonomic classification scheme applied comprehensively to entire categories of built form, relative to social and cultural practices."

2.2 LINEAR PARKS

While many people may have an understanding of what a linear park is, the term "linear park" lacks a common definition and understanding. This section's goal is to answer the first set of research questions: what are linear parks? What are the types of linear parks? And what are the siting criteria for each linear park type? To address these questions, I reviewed relevant literature for precedent definitions of linear parks and linear park types.

Definition Development

This process involved reviewing relevant literature for the definition of linear park. Many articles I reviewed did not define the term when using it as the subject of their research. I used the following sources to develop my linear park definition:

David Maddox, "Justice and Geometry in the form of Linear Parks": In this article, Maddox does not define linear parks, but he points out the greater perimeter to area ratio that linear parks have versus other park types. He also highlights that this greater perimeter gives park access to a greater number of people.

Karl Kullman, "Thin parks / thick edges: towards a linear park typology for (post)infrastructural sites": In his article, Kullman reviews edge permeability of linear parks. He classifies different linear park types based on edge condition and function within an urban area. While he does not directly define the term "linear park", he does provide information that contributed to the development of the definition for this project.

Further, a Google search provided this definition from John Spacey in "6 Types of Linear Park": "...an urban park that is considerably longer than it is wide." Though this definition is applied to an urban context, it reinforces the idea of a greater perimeter to area ratio described by Maddox.

Definition Breakdown

For this project, and as a synthesis of the above information, linear parks will be defined as *public parks with semi-permeable to permeable edges that contain a designated travel surface and a minimum perimeter to area ratio of 3:1.*

The first part of the definition, "public parks with semi-permeable to permeable edges" derives from Kullman's linear

park types and his discussion of the permeability of linear park edges. The latter part of the definition, "a minimum perimeter to area ratio" derives from Maddox's discussion of the increased access that accompanies parks with greater perimeter to area ratios. The specification of a travel surface comes from my analysis of linear park types from the literature review and the shared feature of a designated travel surface. For the purpose of this project, a travel surface can be considered an area clear of vegetation and other obstacles that has a constructed surface meant specifically for pedestrian or bicycle travel. Further, the assignment of a minimum perimeter to area ratio derives from the need to ensure that the park provides enough linear travel surface to be a motive space.

Linear Park Types

To establish a classification for linear parks, I reviewed relevant literature for precedent linear park or path types. Table 2.1 summarizes and describes the linear spaces proposed by each source.

I reviewed the following sources' linear space types to classify common themes, features, widths, purposes, and contexts:

City of Kelowna, British Columbia, Linear Parks Master Plan: This master plan document provides "long-term direction for the planning and construction of a well coordinated, sustainable, and environmentally responsible trail network spanning the entire City, to provide recreational opportunities and to accommodate the alternative transportation for a diverse range of trail users." The Plan, created by Catherine Berris Associates, reviews the needs and wants of the community, provides six types of "trails" (Table 2.1), siting and trail design guidelines, and prioritization and phasing of trail implementation. While Kelowna does not fall into the population range for small communities in this project, this plan was included in the precedent analysis for its clear classification of linear parks and calls for their use in ways similar to my intentions for this project.

City of Roseburg Comprehensive Parks Master Plan: This master plan document inventories, assesses, and provides guidance for the development of new parks as well as the improvement of existing parks. Completed by MIG, this plan, adopted by the City of Roseburg, includes a trails component comprised of a proposed network of trails and a trail typology of four different trail classifications. This project considers the proposed trail network, and will note where proposed trails align with the Parks Master Plan proposed trails. This plan was included in the precedent analysis because of its direct applicability to Roseburg, the focal community for this project, as well as the application of trails as linear spaces throughout the built environment.

Small Town & Rural Multimodal Guide: This guide, developed by Alta Planning + Design, reviews the importance of multimodal networks in small communities. It classifies several different types of linear spaces relevant to this project (Table 2.1). The guide also provides relevant safety information. It was included in the precedent analysis for its classification of linear spaces for pedestrian and cyclist transportation and its orientation toward small communities.

Karl Kullman's article "Thin Parks/thick Edges: Towards a Linear Park Typology for (Post)infrastructural Sites": In his article, Kullman classifies different linear park types based on edge condition and function within an urban area. While aimed

Table 2.1: Overview of linear park precedents examined for this project.

LINEAR PARK PRECEDENTS	CONTEXT	LENGTH	WIDTH	SEPARATE FROM STREET	FACILITY DESCRIPTION
Kelowna Linear Parks Master Plan					
Major Multi-Use	major citywide routes	not specified	3.0 - 4.5m	yes	a high-use, hard surface, off-street path
Roadside Corridor	major city routes	not specified	3.0 - 4.5m + 2m buffer	yes	a high-use, hard surface, path directly adjacent to streets
Standard Multi-Use	main & secondary neighborhood routes	not specified	2.0 - 3.0 m	yes	a moderate-use, hard surface, off-street path; narrower than the major multi-use path
Narrow Multi-Use	connection to major route	not specified	1.2 - 1.5m	yes	a low- to moderate-use, hard surface, off-street path; narrower than the standard multi-use path
Nature Trail	low-use areas	not specified	0.5 - 1.2m	yes	a narrow, low-use, soft surface path through natrual areas
Small Town & Rural Multimodal Guide					
Sidepath	"routes ... inhospitable to walking/ bicycling"; adjacent to streets	not specified	8 - 12'	yes = 5' min. buffer	A sidepath is a shared use path located immediately adjacent and parallel to a roadway; good for high-speed roads.
Shared Use Path	non-street adjacent, urban, suburban, nature	not specified	10 - 12' + 2' shoulder	yes	an off-street, hard surface multimodal path often in natural contexts with low interaction with vehicles.
Yield Roadway	slow, low-volume roads; rural, suburban	not specified	12 - 20'	no	a low-volume, low-speed roadway where pedestrians and vehicles share the same space.
Karl Kullman's Park Types					
Filter	high density urban	not specified	not specified	no	"semi-permeable membrane" that "selectively edits through-flow of matter and energy across the small expanse of the site".
Programme sink	both high & low density	not specified	not specified	yes	"filled with precisely defined functional uses, usually in the form of sports courts and fields."
Conduit	high & low density; old infrastructure alignments	not specified	not specified	yes	"channel for rapid non-vehiclular movement."
Suture	urban	not specified	not specified	not specified	"employed to stitch up an urban rupture or 'wound' that is usually infrastructural in origin..."
Stage	high density urban; low density suburban	not specified	not specified	yes	"a necklace of events or spectacles"
Pedestal	not context dependent; scenic surroundings	not specified	not specified	yes	"a linear setting for externalized spectacles or panoramas"
Thicket	high density urban; low density suburban	not specified	not specified	yes	"a dense impediment to passage in any direction..."
City of Roseburg's Comprehensive Parks Master Plan					
Regional Trail	not context-specific	not specified	12' minimum + buffers	yes	multiple uses and connects "adjoining jurisdictions or destinations"; surface of asphalt or concrete.
Local Trail	not context-specific	not specified	6 - 10' + buffers	yes	""backbone' of city's trail network", accommodates multiple uses, paved or crushed aggregate surface.
Rustic Trail	neighborhood-oriented	not specified	4' minimum + buffers	yes	links to the other types of trails; primarily for pedestrians, cyclists, and equestrain users; "stable, accessible surfacing".
Semi-Primitive Trail	sensetive-open spaces	not specified	18" min - 4' max + buffers	yes	usually requires little maintenance and intended to be used by hikers, cyclists, walkers, and equestrian users; compacted earth surface.

at urban linear parks, this article was included in the precedent analysis for its specific classification of linear park types, as well as the identification of different functions that linear parks can serve.

For this project, as a synthesis of precedents and an attempt to fill gaps in knowledge or application of linear parks, I established the linear park types seen in Table 2.2 that are compatible with small communities for active recreation opportunities.

Linear Park Typology Development Discussion

Street Side Path (Figure 2.1): largely based on the idea of Alta's "Sidepath", this linear park type was developed to provide a comfortable and pleasant pedestrian and cycling experience along streets where the speed of traffic and level of vehicle use could decrease the comfort of non-vehicle street users. This linear park type also adopts contextual suitability from Alta's "Sidepath". It adapts the minimum width provided by Alta to be narrower to account for the smaller population and thus potentially fewer users in small communities who may not need a minimum 8' path.

Lane Conversion Path (Figure 2.2): This linear park type developed out of my observations of roads built to a capacity that is not met by daily traffic with a minimum of four lanes (two each direction)—for example, roads that were built for heavy traffic and large log trucks when the timber industry played a large role in the community's economy, but current traffic volumes are lower and truck traffic has decreased, leaving the road underused by vehicles. My idea is to convert one or more lanes of the road into linear park space. The contextual suitability for these linear parks is flexible, but is dependent upon existing roads with four or more lanes, thus likely in commercial and industrial areas, and potentially in residential areas. The width range for this linear park type was based on an average of a typical street lane width plus the potential width of a typical 6' sidewalk.

Improved Sidewalk (Figure 2.3): based on Alta's sidewalks, this linear park was developed to provide an option for sites that already have an existing bike lane, vehicle traffic speed is less than 35mph, and the right of way or inability to acquire property does not provide enough space for a Street Side Path. This linear park adapts the traditional idea of a sidewalk to be more pleasant for pedestrians by meandering the travel path where possible, using stamped, patterned, or otherwise artistic concrete, adding vegetation, and where possible, creating greater separation from the street.

Off-Street Multi-Modal Path (Figure 2.4): based on a combination of Alta's "Shared Use Path" and Kelowna's "Standard Multi-Use", this linear park type offers a context-adaptable travel surface for pedestrians and cyclists that is separate from the street. The width range is adopted from Alta's "Shared Use Path".

Pedestrian-Only Trail (Figure 2.5): based on Kelowna's "Nature Trail", this linear park type adopts minimum widths and buffers from Kelowna's Linear Parks Plan, but adapts the context to be more widely applicable than only in "natural" areas. For this linear park type, the context has been extended to residential, commercial, and industrial.

Table 2.2: Linear Park Types developed for this project.

LINEAR PARK TYPES	Park Description	Context	Width	Length	Street Separation	Street Suitability	Primary Purpose
Street Side Path (based on Alta's "Sidepath")	Street side multimodal path with hard travel surface and vegetated buffer from street for anticipated heavy use areas. Includes benches every 200 ft. and wayfinding maps. Ideal for areas where traffic moves faster and separation from vehicles provides greater comfort to pedestrians and cyclists.	- Commercial - Residential	8 - 12' + optional 6' buffer from street	1/2 mile including connections	Physical & visual for both cyclists and pedestrians	- Roads with minimum 16' ROW on one side - Roads with speeds of 25-55 - All roads with speeds >35mph	1. Connection 2. Destination
Lane Conversion Path	A below-use vehicle lane converted into a multimodal linear park (traffic lane + existing sidewalk when possible). Ideal for high use commercial areas and where roads were overbuilt & streets are not used to design capacity. One side of street only. Includes vegetated buffer from street, benches, trash bins, and wayfinding maps.	- Commercial - Industrial - Residential	10 - 30' (based on downtown Roseburg road width)	1/2 mile including connections	Physical & visual for both cyclists and pedestrians	- Low use roads with minimum 10' lane widths - Roads with speeds of 25-55	1. Connection 2. Destination
Improved Sidewalk (based on Alta's "Sidewalk")	Hard surface pedestrian path. Ideal for low to moderate use localities where bike lanes are sufficient but the right of way is not large enough to accomodate a Street Side Path.	- Commercial - Industrial - Residential	6 - 8' + buffers where possible	1/2 mile including connections	Physical & visual for pedestrians provided by curb	- Roads with speeds of 25-35 mph - Roads with existing bike lane	1. Connection 2. Destination
Off-Street Multimodal Path (based on Alta's "Shared Use Path" & Kelowna's "Standard Multi-Use")	Hard surface multi-modal path with benches, trash bins, and wayfinding maps. Ideal for low- to moderate-use neighborhoods and new development.	- Residential - Commercial - Industrial - Natural	10 - 12' + 12 - 24" buffers where possible	1/2 mile including connections	Physical & visual for both cyclists and pedestrians	Not Compatible	1. Connection 2. Destination
Pedestrian-Only Trail (based on Kelowna's "Nature Trail")	Soft surface pedestrian-only trail with minimal amenities. Ideal for low-use, shorter connections between buildings or properites, in natural areas, and new development.	- Natural - Residential - Commercial - Industrial	18 - 48" + minimum 12" buffer per side	1/2 mile including connections	Physical & visual for pedestrians	Not Compatible	1. Destination 2. Connection

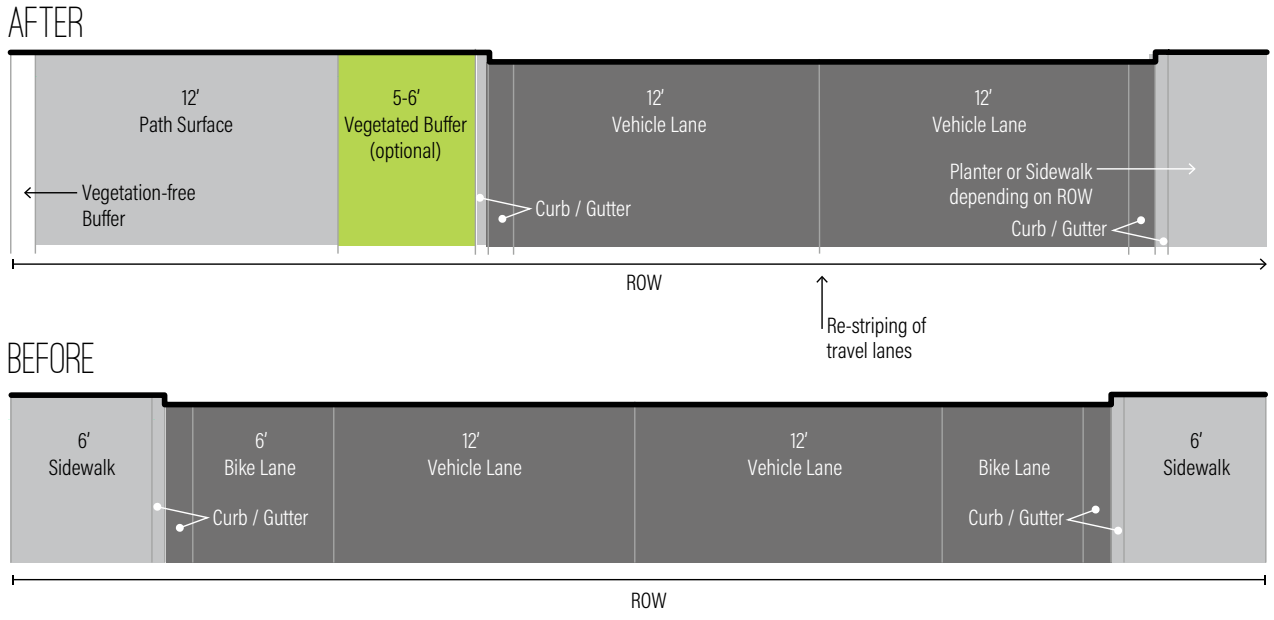


Figure 2.1: Generic section of Street Side Path.

Linear Park Siting Criteria

Siting criteria for the linear park types were derived from precedents and synthesized with each linear park's features and intended use. Width ranges, minimum lengths, potential contexts, purposes, and street compatibility were established in the linear park type designation process. Some criteria remain intentionally indefinite or variable—such as providing a range for widths—to allow for greater siting potential. The following categories were used to classify information from the precedents and literature review for each linear park type:

Context: Residential, commercial, industrial, or natural areas.

Length: One specific addition to this table that is absent in the other linear park types is the inclusion of a minimum length. This component is necessary to ensure that the parks provide adequate length for adult users to meet the minimum Center for Disease Control (CDC) recommended amount of weekly activity. The minimum is based on the CDC's recommendation of 150 minutes of physical activity for adults per week (CDC 2016).

This calculation uses walking as a baseline exercise because

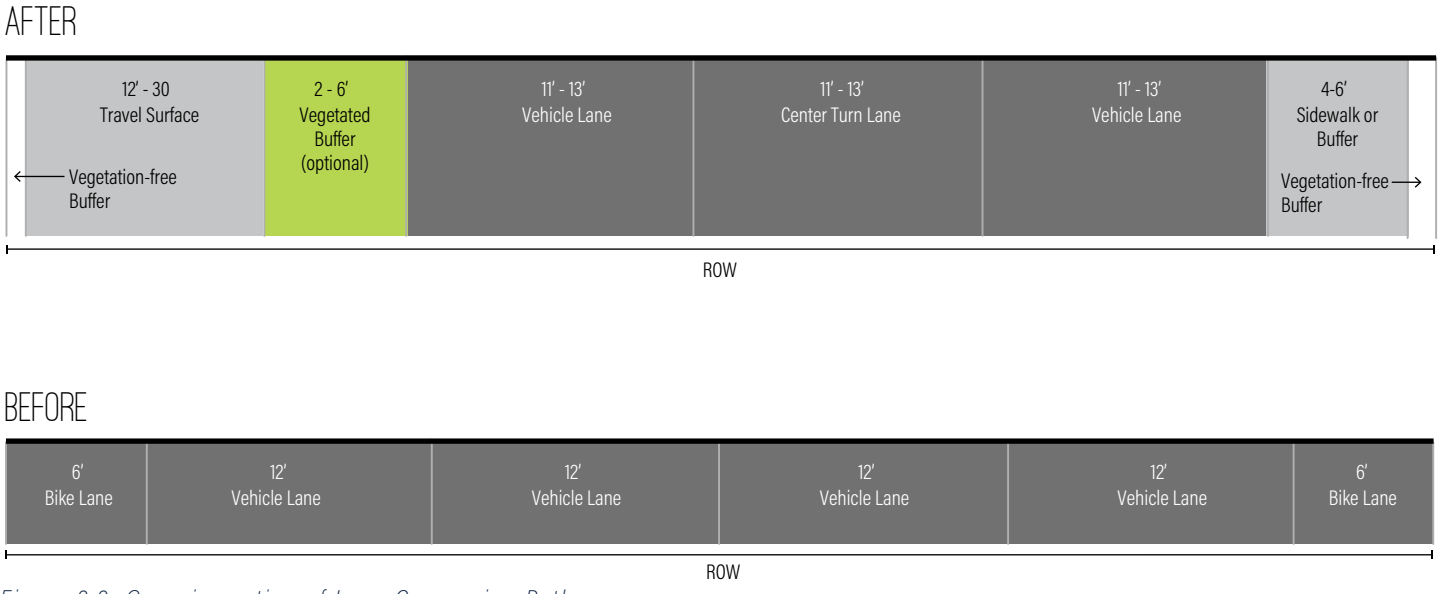


Figure 2.2: Generic section of Lane Conversion Path.

walking is safe and healthy for most adults to participate in and the most accessible form of exercise for the most people (CDC 2016). To meet the recommended 150 minutes of activity, an adult would need to walk about 20 minutes per day. At an average walking speed of 3 miles/hour, one would walk about one mile in 20 minutes. If a person were to walk out ½ mile and back ½ mile at a minimum, that totals one mile, and thus, most minimum lengths of the linear park types are ½ mile; loop lengths are ideally one mile minimum.

Width: Based on a synthesis of *Alta's Small Town a Rural Multimodal Network Guide* and the *Kelowna Linear Parks Master Plan*, the widths for each linear park type were established. As stated earlier, a range of widths is given, allowing for flexibility and adaptability in the application of the park types.

Separate from Street: All facilities are separate from the roadway for pedestrians; however, some park types take advantage of existing bike paths for cyclists. For instance, in areas where the right of way is narrow, but there is an existing bike path, this area could be a good candidate for an improved sidewalk to accommodate both pedestrian and cyclist needs.

Street Compatibility: Alta's *Small Town a Rural Multimodal Network Guide* states that survivability for a pedestrian struck by a vehicle traveling at 35mph is 68%, while the likelihood for

Figure 2.3: Generic section of Improved Sidewalk.

survival for a pedestrian struck by a vehicle traveling at 45mph is only 35%. For this reason, I am proposing that for linear parks along streets with speeds above 35mph, pedestrian and bicycle infrastructure should be separated from the street by either a physical or painted/visual buffer, to discourage vehicle encroachment (Dickman et al. 2016). This idea is translated into the linear park the types including the Street-Adjacent Path and Lane Conversion Path.

Purpose: Linear parks can be connections, destinations, or both. The main purpose of connections is to provide a linear park connection to a destination (another park or area of interest). Destinations act as the focus of the excursion and are usually in the form of loops. Some park types can be either a connection or destination; the more appropriate purpose is listed first in the column.

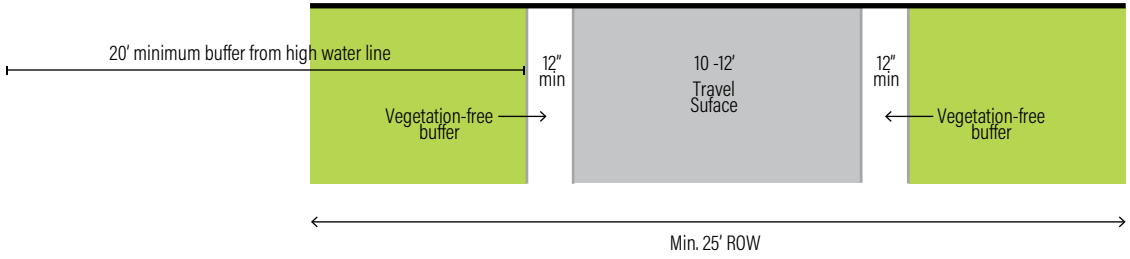


Figure 2.4: Generic section of Off-Street Multi-Modal path.

2.3 PRECEDENT ANALYSIS: BELLINGHAM INTER-URBAN TRAILS SYSTEM

In addition to the linear park-specific precedents I analyzed, I also reviewed the Bellingham, Washington Park, Recreation, and Open Space Plan to better understand their incorporation of trails into the built environment. Bellingham is a small city of almost 90,000 residents located in the far northwest corner of Washington on the Puget Sound. I became familiar with the city while I attended Western Washington University for my undergraduate degree. With a well-connected trail system spanning the entire city, I chose to use this community as a precedent to highlight the potential of a citywide active recreation network. Though it is not considered a "small community" as defined earlier in this project, there are important themes and ideas that can be identified and translated into small communities.

From a review of the Bellingham Park, Recreation, and Open Space Plan (PRO Plan) I identified several key linear park-related themes described below.

Parks and trails should be within walking distance from residences.

- The Bellingham Parks Plan calls for trails to eventually be located within ½ mile from every residence, making them at most a 10-minute walk away.

Translation into this project: While the Bellingham PRO Plan used a ½-mile minimum distance from a park for residence, this project starts by using a ¼-mile buffer around parks to identify priority areas, and then aims to provide a linear park segment within ½ mile from 75% of residences.

Connectivity is a must

- It is important to provide connections to parks and active recreation opportunities with paths or trails that also connect to on-road systems.

Translation into this project: for communities that are already heavily developed and lacking available open space, ensure that on-road systems (street-side paths, improved sidewalks, and lane conversion paths) provide users separation from traffic and include necessary features to provide comfort and interest to

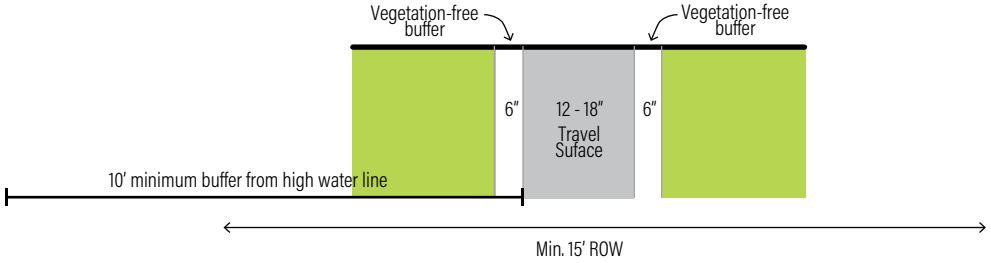


Figure 2.5: Generic section of Pedestrian Only Trail.

users such as shade structures, benches, trash cans, sufficient lighting, and orchestrated views.

Parks and paths should be accessible for people of all ages and abilities.

- For parks to be used for active recreation, they must appeal to people of all ages and physical abilities.

Translation into this project: the linear parks proposed in this project are based on walking, a form of recreation that most people are capable of performing. They follow ADA standards to ensure accessibility for people who may need a wheelchair or walker for mobility.

Parks and paths must also be accessible to the most people possible.

Translation into this project: permeable edges ensure that parks and paths are accessible.

Parks and paths should promote physical and mental health.

- For community members to be active and receive the benefits of being outside and exercising it is necessary to provide opportunities to do so.

Translation into this project: This project uses recommendations for physical activity requirements from the CDC to provide a minimum linear park length, thus ensuring ample opportunity for residents to meet the daily activity recommendations. This project also leverages views, access to waterways, and connections to nature as a means to provide an experience that draws users to linear parks.

Parks and recreation opportunities should be considered necessary as elements of a baseline quality of life.

- Bellingham's PRO Plan considers parks and open space as a necessary component of quality of life.

Translation into this project: prioritizing the provision of active recreation spaces as part of the fundamental elements of the built environment, including providing these spaces within all new development.

Though it would be ideal, not all paths and parks have to be connected to each other.

- While connections allow for increased access for more people to use parks and paths, the development of the built environment can make providing a 100% connected network impossible.

Translation into this project: I divided the study area into small sub-areas to ensure that each sub-area was provided with enough linear park space for residents to meet the CDC recommended amount of weekly physical activity if they choose to do so.

2.4 LANDSCAPE SEARCH ANALYSIS

The goal of this section is to explain the process taken to answer the first part of the sub-question for the third research question: can a GIS-based landscape search analysis help site linear parks?

To identify eligible landscapes for linear parks, I performed a GIS-based landscape search analysis, a derivative of Malczewski's site search analysis (Malczewski 2004). In his article, Malczewski (2004) explains that a site search analysis is conducted to determine a set of "candidate sites" for a particular activity. For this project, the goal is to identify where in the landscape linear parks might go, and therefore the process to identify eligible spaces for linear parks will be referred to as a "landscape search analysis" rather than a "site search analysis". Figure 2.6 outlines the steps performed in the landscape search analysis.

I identified my "study area" to be Roseburg, Oregon, the example community reviewed in Chapter 1. With GIS tax lot parcel, zoning, and street data provided by the City of Roseburg's Planning Department, I preliminarily identified broad context types, applicable to any community, to be residential, commercial, industrial, or natural. Existing parks, Public Reserve Space, Residential Open Space, and city-owned lots were also identified. This process is described below. Figure 2.6 also demonstrates this process.

The general process is as follows:

- Identify "study area"
  - GIS data: City limits boundary
- Identify existing parks & a ¼-mile buffer around each
  - City parks GIS layer; create ¼-mile buffer around each park using buffer tool
- Identify city-owned parcels, Public Reserve space, and Residential Open Space
  - GIS data: parcel/taxlot information; select by attribute "City of Roseburg" for ownership and make this into it's own layer
- Identify city right-of-ways
  - GIS data: parcel/taxlot information to use the "measure" tool to determine distance

This broad-scale process results in areas of the landscape within the study area that are most available for linear parks. These results are shown in Figure 2.7. Though the landscape search did not identify specific sites for linear parks, it narrowed the potential landscape areas that could serve as linear parks.

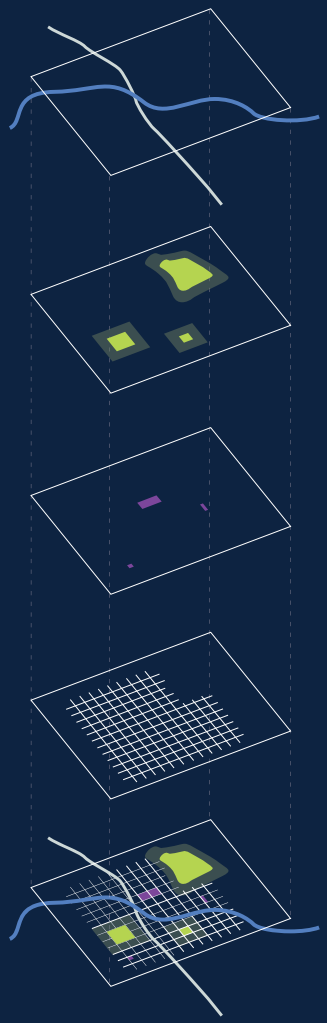
2.5 COMMUNITY SUB-AREAS

To conduct a finer grain analysis for identification of linear park sites, it was first necessary to classify Roseburg into smaller sub-areas. Analyzing the community by sub-area allowed me to better understand significant spaces, contexts, and characteristics of each sub-area before determining the proposed site and linear park types for that sub-area.

Sub-Area Assignments

Using maps and aerial photography, I looked for natural and/or human-made features that would help divide the community into smaller sub-areas (Figure 2.8). City limits, topography, major roads, water bodies, and existing neighborhoods were considered to identify these (sub-area names were assigned based on major roads or landmarks within them):

LANDSCAPE SEARCH PROCESS



Identify Study Area

Identify existing parks & 1/4-mile buffers

Identify open space, public reserve space, and city-owned lots

Identify right-of-ways

RESULTS: areas of the landscape that are most available for linear parks

Figure 2.6: Diagram of Landscape Search process.

LANDSCAPE SEARCH ANALYSIS RESULTS

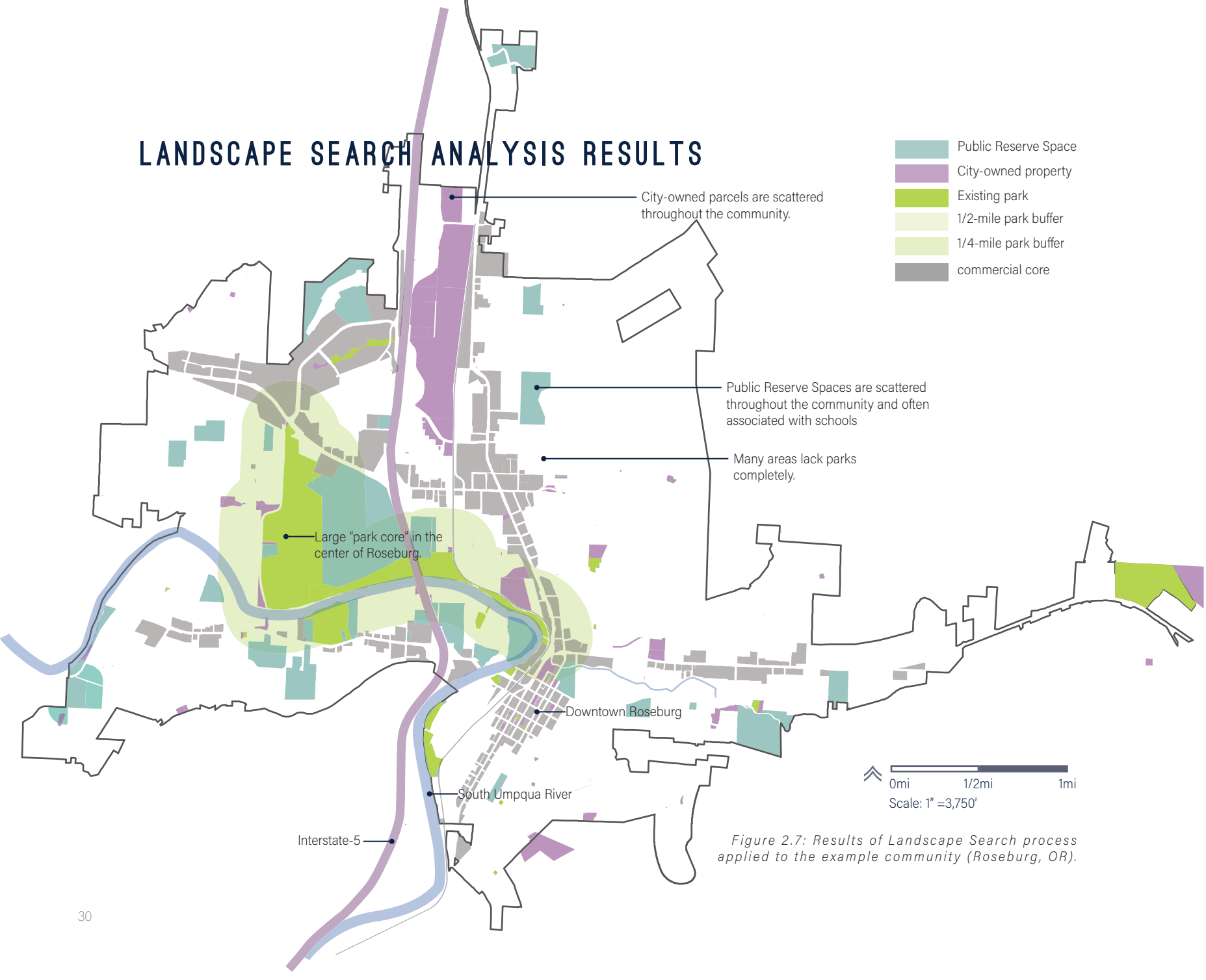


Figure 2.7: Results of Landscape Search process applied to the example community (Roseburg, OR).

North Roseburg Sub-Area

This sub-area includes the northernmost residential areas of Roseburg. This part of the community is somewhat isolated from the main parts of town and is characterized by the railroad, several lumber mills, Costco, and a few single-family residences. This area will not be considered for its own linear park because there is not enough of a user group within the city limits.

- Bounded to the North, East, and West by the city limits
- Bounded on the south by Edenbower Boulevard

Airport Sub-Area

This sub-area is mostly characterized by the Roseburg Municipal Airport. Residences in this sub-area are mostly single family, however there are several multi-family housing complexes and assisted care communities. Mercy Medical Center is located within this sub-area and is zoned as Public Reserve space. This sub-area's commercial core includes Wal-Mart, Sherm's Thunderbird Market, Roseburg Valley Mall, and several more small stores. Bridges over Interstate-5 (I-5) at Edenbower Boulevard and Garden Valley Boulevard connect the east and west portions of this sub-area.

- Bounded to the east by Highway 99/NE Stephens St.
- Bounded to the west and southwest, and south by steep topography, the South Umpqua River, and I-5
- Bounded to the North by the city limits

JoLane Sub-Area

This sub-area includes Joseph Lane (JoLane) Middle School, several multi-family housing complexes and mostly single-family residences including Mt. Nebo Trailer Park. It has a commercial core along Hwy 99/NE Stephens St., which includes Safeway, Coastal Farm & Ranch, multiple car sales lots, and other small businesses. This sub-area begins to move up into the surrounding oak-covered hills with single-family development.

- Bounded to the North and East by city limits
- Bounded to South by steep topography
- Bounded to the West by Hwy 99/NE Stephens St.

Beulah Sub-Area

This sub-area is comprised of mostly single-family dwellings with several multi-dwelling units. It is characterized by moderate topography and is somewhat tucked into the hills across from Downtown Roseburg. The topography and major roads surrounding this area make it distinct enough to be its own sub-area.

- Bounded to the North and East by steep topography
- Bounded to the West by Hwy 99 and the South by Hwy 138

Diamond Lake Sub-Area

This sub-area includes most of the commercial, industrial and residential properties along Diamond Lake Boulevard / Hwy 138 running East/West and connects to Umpqua National Forest. Most of the residences are single-family, however there are multiple-family complexes within the sub-area. This area is dominated by several lumber mills, car sales lots, mini storage facilities, and municipal facilities offices.

- Bounded to the West by steep topography
- Bounded to the East, North, and South by city limits

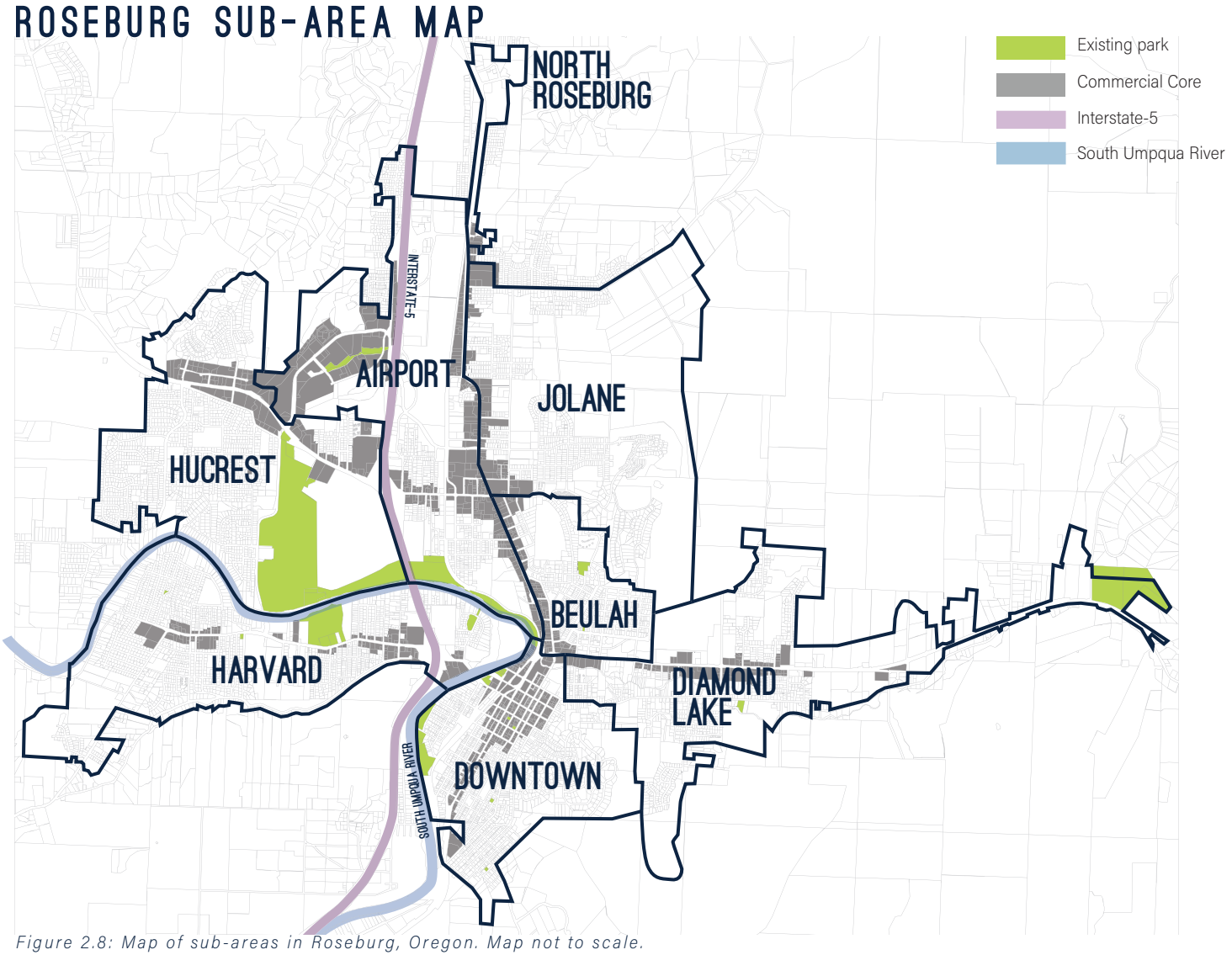


Figure 2.8: Map of sub-areas in Roseburg, Oregon. Map not to scale.

Downtown Sub-Area

This sub-area is characterized by the commercial core that comprises downtown Roseburg. There are several multi-family dwelling units downtown, and around its periphery are mostly single-family homes. Development has extended into the steep hills to the southeast.

- Bounded to the North by Hwy 138
- Bounded to the East by city limits and steep topography
- Bounded to the South by city limits and steep topography
- Bounded to the West by the South Umpqua River and city limits

Harvard Sub-Area

This sub-area includes the commercial core that extends along Harvard Avenue, as well as the mostly single-family residences that extend beyond the commercial core.

- Bounded to the North and East by the South Umpqua River
- Bounded to the South and West by city limits

Hucrest Sub-Area

This area is dominated by single-family homes and is the only sub-area where most residences are laid out without following a typical "grid" pattern. This area contains a commercial core along Garden Valley Boulevard, including several churches, Fred Meyer, fast food restaurants, and chain retail stores.

- Bounded by steep topography and city limits to the North
- Bounded by city limits to the West
- Bounded by the South Umpqua River to the South
- Bounded by I-5 to the East

At this point in the GIS analysis, finer scale suitability analysis was necessary to determine the linear park type that was most suitable for needs of each sub-area.

2.6 SMALL-SCALE SUITABILITY ANALYSIS

This section addresses the third research question's sub-question: can small-scale suitability analysis help site linear parks? For fine-scale suitability analysis, I used GIS-based street and parcel information, as well as photo interpretation, Google Street Views, and site visits. I performed the following steps to identify the potential linear park route. This process is documented in Figure 2.9.

For each sub-area, I:

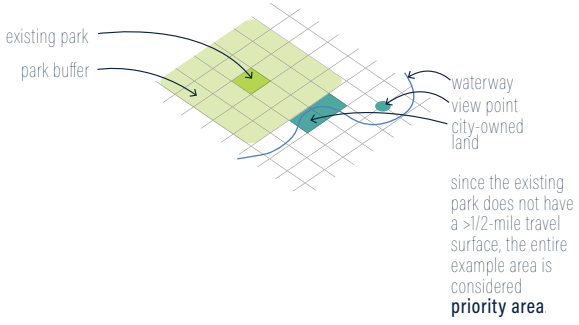
- Re-examined existing parks, as well as the ¼-mile buffer around each park:
    - Outside of the ¼-mile existing park buffer: Sub-areas were examined for a potential user group. For this project, I am considering user groups to include anyone who might use a linear park (residents, nearby workers, tourists, or other visitors), but primarily focusing on Roseburg residents. For example, if a sub-area was comprised of an industrial area with no nearby residences, hotels, or existing parks, the area would not be considered for a linear park. If there was an anticipated user group, for instance a large multi-family housing development, these areas were considered priority areas because of their lack of nearby park. For each priority sub-area, the goal was to either a) provide a minimum ½-mile connection to an existing park or b) create a destination loop within the sub-area that may or may not connect to the larger park system. This process will

SMALL-SCALE SUITABILITY ANALYSIS PROCESS

This diagram demonstrates the process used to site and assign linear parks within each sub-area. For this diagram, the "example area" is a portion of a generic sub-area shown diagramatically to demonstrate the process.

REVIEW & IDENTIFY:

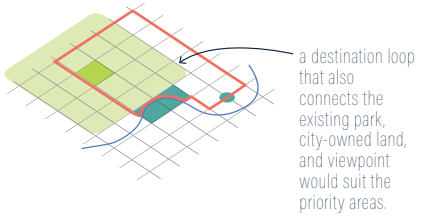
existing parks & associated buffers
priority areas
areas of interest: views, natural features, waterways, schools, commercial cores
city-owned parcels
public right-of-ways
Residential Open Space
Public Reserve Space



CONNECTION OR DESTINATION:

establish destinations or connections between existing parks, priority areas, and areas of interest using city-owned parcels, ROWs, open space, and public reserve space where applicable or necessary

consider:
user experience, accessibility to user group, needs for property acquisition or owner permission, minimization of driveway and cross street conflicts, & environmentally sensitive areas



ASSIGN:

use linear park typology to assign the most suitable park type for each path/park context-based segment within the sub-area

consider:
ROW width, segment context, road speed, AADT (average annual daily traffic—used where applicable), existing sidewalks & bike lanes, and environmentally sensitive areas

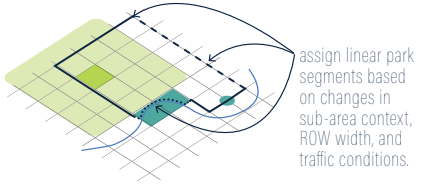


Figure 2.9: Diagram of small-scale suitability analysis.

be discussed in the fine-scale analysis section later in the chapter.

- Inside of the ¼-mile existing park buffer: The parks associated with the ¼-mile buffer were examined to determine if a ½-mile minimum travel surface was provided. If not, these were also considered priority areas.

- Reviewed Public Reserve Space, Residential Open Space, and City-owned lots
- Identified areas of interest (views, natural features/waterways, schools, churches, commercial cores), public right-of-ways,
- Assessed need for connections or destinations
- Created ≥½-mile linear connections between existing parks and areas of interest where possible, beginning with priority areas
  - If existing park does have a sufficient travel surface, create connections outside of the ¼-mile buffer to the existing park
  - If existing park does not have sufficient travel surface, use existing park as a "landmark" or stopping point along the new linear park
- Created ≥ 1 mile loop destination parks, beginning with priority areas
  - Prioritized areas that are not adjacent to I-5
  - Examined road speed, right of way width, and non-street options for connections. Followed linear park typology to assign the most suitable linear park type for each context and segment within the sub-area.
  - Used Public Reserve lands and city-owned lots where possible to create parks or paths
- Measured proposed linear park for sufficient length
  - Ensure that most residences (about 75%) within the sub-area are ≤ ½ miles from linear park

The contexts within each sub-area helped narrow the potential choice for linear park. Within each sub-area, connection and destination routes were proposed to provide each sub-area with either a connection to an existing park whose travel surface totaled ≥ ½ mile or a destination whose travel surface totaled ≥ ½ mile. These routes were examined to identify approximate right-of-way (ROW) distances—measured from parcel line to parcel line, street speed limits from GIS data, and sub-area context—commercial/residential/industrial/natural and need for connection/destination. The process is diagrammed in Figure 2.9. Ultimately, linear park suitability and siting per sub-area were decided on a case-by-case basis, incorporating the landscape search analysis and fine-scale suitability analysis.

2.7 CONNECTING THE SUB-AREAS

The last and final step of this process involves analyzing the community to ensure connectivity between sub-areas. This process followed the same steps as the small-scale suitability analysis, but focused on connecting the linear parks proposed for each sub-area to ensure connectivity for the community as a whole. The results of this process are documented in Chapter 3.

2.8 SUMMARY

This chapter discussed the literature review, analysis, and synthesis processes I used to develop a definition for linear parks, as well as a typology for linear parks. It also described the steps I took using GIS analysis to identify sub-areas within an area of interest, the assignment of priority areas, and the small-scale suitability analysis process to help determine linear park sites and which linear park type could work best for each site.

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CHAPTER 3:

CREATING A CONNECTED NETWORK

3.1 INTRODUCTION

The results of this project are discussed in the following pages. To best understand these results, it is necessary to revisit the research questions that motivate this project:

1. What are linear parks?
2. What are different types of linear parks?
3. How can linear parks be integrated into the park network of small communities?
    3a. Can a GIS-based landscape search analysis and a small scale suitability analysis help site linear parks?

It is also important to remember that Roseburg, Oregon was used as an example community in which to test these questions and the methods associated with answering them. The following results are not intended to interfere with the City's execution of the Parks Comprehensive Plan and are not meant as a proposal.

3.2 METHODS REVISITED

As described in Chapter 1, one of the intended products of this project was a replicable method that small communities in Oregon can use to identify sites to create a linear park network. This method involved a 4-part process of 1) defining linear parks, 2) classifying linear parks, 3) locating linear parks in the landscape first using a GIS-based landscape search, and second a sub-area-scale fine-scale analysis, 4) connecting linear parks to create a community-wide network. This method was described step-by-step in the previous chapter. The intent of this method is to be adaptable and replicable. A definition and typology were developed for this project, however these can be used or modified as necessary to fit the needs of other communities. The same is true for the third and fourth steps of the method. These steps are replicable, but can easily be adapted to meet the needs of other communities.

3.3 SUB-AREA LINEAR PARK MAPS

This section shows the linear park type maps for each sub-area of Roseburg, Oregon resulting from the methods described in Chapter 2. The process will be described for each map. The first page spread for each sub-area reviews important features of the sub-area including existing parks, whether or not the sub-area contains priority areas (areas not currently served by parks with linear travel surfaces of sufficient distance), areas of interest, relevant zoning, challenges, and opportunities. The second page spread for each sub-area describes the decisions that were made to determine linear park sites and to assign linear park types. Beginning with the northernmost sub-area (refer to Figure 2.7 for a map of all sub-areas) and moving clockwise, sub-area maps will be described, followed by a brief description of major takeaways for each sub area, if applicable.

NORTH ROSEBURG
SUB-AREA

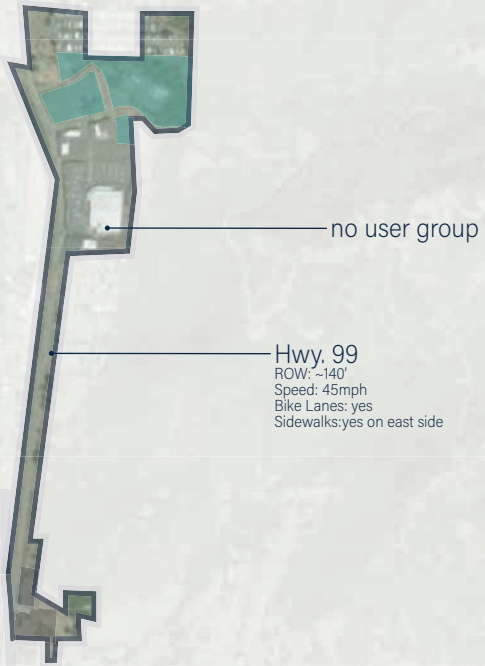


Figure 3.1: Map of North Roseburg Sub-Area

0mi 1/2mi 1mi
Scale: 1" = 1,875'

This sub-area is unique in that it contains less than 10 residences within the city limits. This indicates a lack of user group, and the North Roseburg sub-area was not considered for linear parks for this reason (Figure 3.1).

MAJOR TAKEAWAYS

Because there are enough residences just outside of the city limits to constitute a user group, it was difficult to conclude that this sub-area should not receive a linear park. The scope of this project is limited to within the city boundary, however if projects like this are carried out in the future, flexibility looking beyond city limits could enhance the connectivity of the linear park network. This could also contribute to the creation of a regional linear park system.

AIRPORT
SUB-AREA

Figure 3.2: Map of Airport Sub-Area existing conditions.

REVIEW & IDENTIFY

FIGURE 3.2

Gaddis Park: This park has a travel surface that ties into the bike path along the river and Deer Creek Park, making both of their travel surfaces >½ mile.
Deer Creek Park: This park ties into Gaddis Park and contains a riverside bike path to Stewart Park.
Charles S. Gardiner Park: This park runs along a small creek, but its travel surface falls short of the ½-mile minimum.

Priority Areas: The majority of the northern half of the sub-area is considered priority.

Areas of Interest: Existing parks, Roseburg Memorial Gardens, Roseburg Airport, South Umpqua River, commercial cores along Stewart Parkway, Stephens St., and Garden Valley Blvd.

Public Reserve & City-Owned Lots: See Figure 3.2.

ROWs: In this sub-area, ROWs are limited to streets.

Challenges:

- This sub-area is bisected by Interstate-5, which limits access to either side of the sub-area to bridges over I-5.
- The proposed path uses the bridges over I-5, so adding weight to these bridges for linear park features could be a barrier for implementation, depending on the load capacity of the bridge.

Opportunities:

- NW Stewart Parkway is a 4-lane road whose average annual daily traffic (AADT) is lower than what the road was built to accommodate (ODOT 2018). This provides opportunity for a lane conversion park along a segment of this route.
- City-owned Public Reserve space is located at the northernmost tip of the sub-area. Currently, the land is undeveloped and appears to contain a potential wetland, making this space an opportunity for education on wetlands while providing a space for people to experience nature.
- ROW widths along NW Aviation Dr. and NW Edenbower Blvd. are wide enough to accommodate a Street Side Path along one side of the road.
- Public Reserve space on the far west side of the sub-area is located on steep hills. This area is close to many assisted living communities and owned by Mercy Medical Center, so there is opportunity for eventual linear park development. For this project, however, this space was not considered for linear park placement at this time because it is not publicly owned.
- Linear park connections can be made to both Charles S. Gardiner Park and Gaddis Park.

AIRPORT
SUB-AREA

Figure 3.3: Map of Airport Sub-Area with linear parks.

CONNECTION / DESTINATION

FIGURE 3.3

This sub-area received both: because most of the sub-area is not within ½-mile of an existing park with a linear travel surface, I prioritized creating a destination loop. However, because some of the existing parks do have a linear travel surface (Gaddis Park, Deer Creek Park, Charles S. Gardiner Park), it was important to provide a connection to these parks.

- A 2.4-mile destination loop stretches north-south along Edenbower Blvd., Aviation Dr., and NW Stewart Pkwy. to reach residences at the northenmost tip of the sub-area and also connect to the existing parks.
- A Street Side Path connects the loop to the existing parks to the south.

ASSIGN

FIGURE 3.3

For this sub-area, lane conversion parks, street side paths, and pedestrian-only trails were assigned based on context, ROW width, and environmentally sensitive areas.

MAJOR TAKEAWAYS

Even if a destination loop is provided, it is important to consider a connection to nearby parks and paths.

JOLANE
SUB-AREA

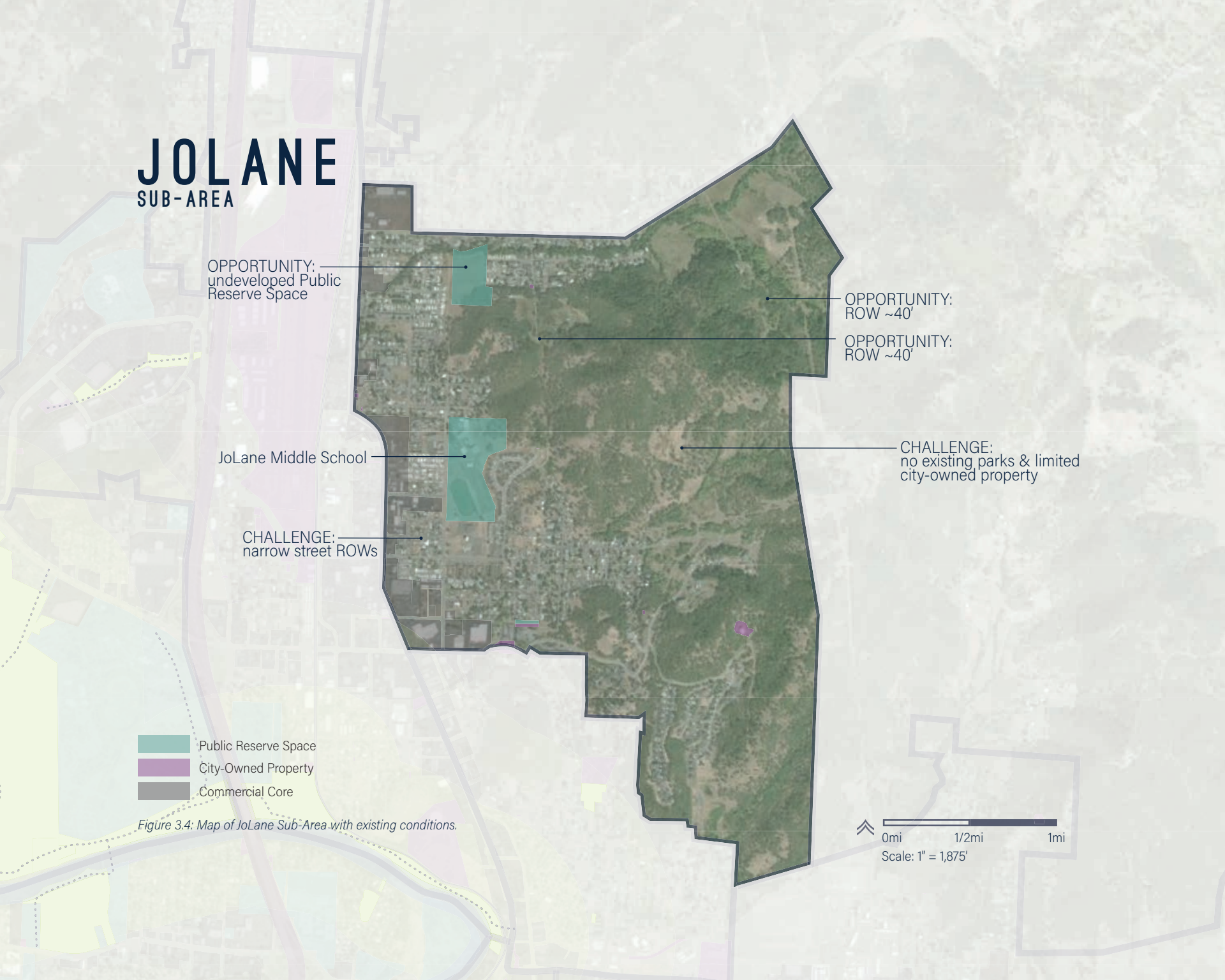


Figure 3.4: Map of JoLane Sub-Area with existing conditions.

REVIEW & IDENTIFY

FIGURE 3.4

Existing Parks: This sub-area contains no existing parks, making the entire sub-area a priority area. While some of the sub-area falls within the 1/4-mile park buffer of a park within an adjacent sub-area, residents within the buffer would have to travel a distance greater than 1/4-mile to reach the existing park.

Areas of Interest: JoLane Middle School, views all along Rocky Ridge Dr.

Public Reserve & City-Owned Lots: There is a large lot in the northern portion of the sub-area zoned Public Reserve, and there are very few city-owned lots.

ROWs: several ROWs run through the hills and provide a possible opportunity for a long linear park in an undeveloped setting.

Challenges:

- The lack of existing parks and city-owned land makes it difficult to find property into which the linear park can be linked. This also means that most of the lots are privately owned—property acquisition or owner permission could be difficult to obtain.
- ROWs for many streets in this sub-area are fairly narrow, especially in areas along Rocky Ridge Dr., where there are expansive views of the valley. Narrow ROWs limit the linear park type that can be used or make it impossible to site a linear park without acquiring property or owner permission to develop a linear park .
- For undeveloped areas that are assigned a pedestrian-only trail or off-street multimodal path, it could be difficult to keep trail users from straying into private property without the use of fences or other means of trail containment that would increase the cost of linear park development substantially.
- For creation of the secondary trail, property acquisition or property owner permission would be necessary.

Opportunities:

- Undeveloped Public Reserve space located in the northern portion of the sub-area provides an area to develop as part of the linear park system.
- ROWs between undeveloped private properties provide an opportunity to create a linear park that travels through natural areas, an experience that is unique to this sub-area.

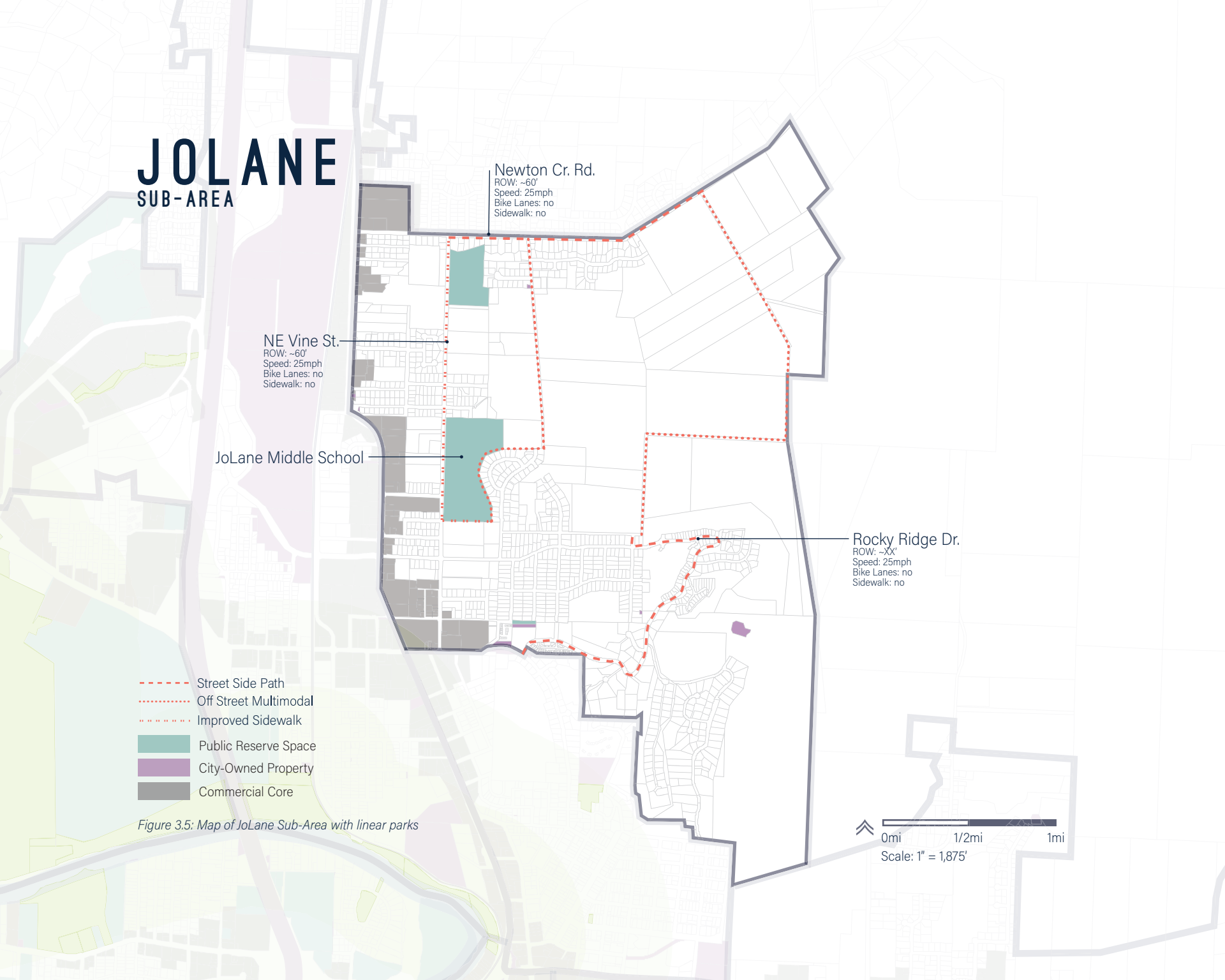


Figure 3.5: Map of JoLane Sub-Area with linear parks

CONNECTION / DESTINATION

FIGURE 3.5

Because this sub-area has no existing parks, a destination loop was created. This loop connects JoLane Middle School and the Public Reserve space in the northernmost point of the sub-area to create a 2.4 mile loop. A longer, 2.6-mile secondary route that runs through the surrounding hills and connects to the neighboring sub-area's linear park is also proposed.

Route 1: connects JoLane Middle School and northern Public Reserve Space to create a 2.4-mile destination loop
Route 2: uses existing ROW & easments to connect residents to undeveloped areas

ASSIGN

FIGURE 3.5

Linear park segments that travel through undeveloped areas were assigned an off-street multi-use path because of the natural context and a ROW width of about 40'.
Linear park segments along Newton Creek Road were assigned a street side multi-modal path because of the residential context and ROW width of about 60'.

MAJOR TAKEAWAYS

In sub-areas that are heavily developed with many challenges, a long-term plan for property acquisition or sub-area driven planning process may be necessary.

BEULAH
SUB-AREA

City-owned property
Existing park
1/2-mile park buffer
1/4-mile park buffer

Figure 3.6: Map of Beulah Sub-Area

0mi 1/2mi 1mi
Scale: 1" =1,875'

REVIEW & IDENTIFY

FIGURE 3.6

Existing Parks:

Beulah Park: This park does not contain any travel surface.
Commercial Park: This park also does not contain a travel surface.

A large portion of the sub-area falls within the buffer of Deer Creek Park of the adjacent sub-area. Accessing Deer Creek Park from the Beulah sub-area involves crossing Highway 99 with few opportunities to cross with the assistance of traffic signals.

Areas of Interest: Existing parks, viewpoints from the top of NE Beulah Ave., and commercial cores.

Public Reserve & City-Owned Lots: The City of Roseburg owns the lot directly north of Beulah Park and several other small lots.

ROWs: ROWs in this sub-area are generally narrow along residential roads, however some are wider at the top of NE Beulah Ave., along Commercial St., and NE Jackson St.

Challenges:

- Steep hills characterize this sub-area, which could make active recreation extremely difficult for people who are just beginning to become active, elderly, or otherwise physically limited.
- ROW widths along NE Beulah Ave. are only about 50', but are on steep slopes, so making the linear parks could mean cutting and/or filling until adequate width is met, which can be expensive.

Opportunities:

- The sub-area has existing central planters along SE Jackson St. and NE Commercial Ave. that could be easily converted into linear park space.
- ROWs between existing residences allow the creation of a loop.
- There is a wide ROW area at the top of NE Beulah Ave. that could provide an area for a viewpoint that terminates the linear park.

BEULAH
SUB-AREA

Street Side Path
Ped-only Trail
City-owned property
Existing park
1/2-mile park buffer
1/4-mile park buffer

0mi 1/2mi 1mi
Scale: 1" =1,875'

Figure 3.7: Map of Beulah Sub-Area with linear parks

CONNECTION / DESTINATION

FIGURE 3.7

This sub-area lacks existing linear travel surfaces, so a connection between Beulah Park and Commercial Park was established. This connection also provides a ~¾-mile loop that can serve as a destination loop. The connection also leads up to a viewpoint of the valley from NE Beulah Ave.

ASSIGN

FIGURE 3.7

Pedestrian-only trails were assigned as additions into the existing Beulah Park area and the Public Reserve space adjacent to it, street-side paths were assigned to NE Beulah Ave. because it lacks existing sidewalks and bike lanes, and off-street multimodal paths were assigned to the areas that are currently planters.

MAJOR TAKEAWAYS

While steep slopes can present a challenge, they could also present opportunities if amenities such as mini parks with panoramic valley views can be provided.

DIAMOND LAKE
SUB-AREA

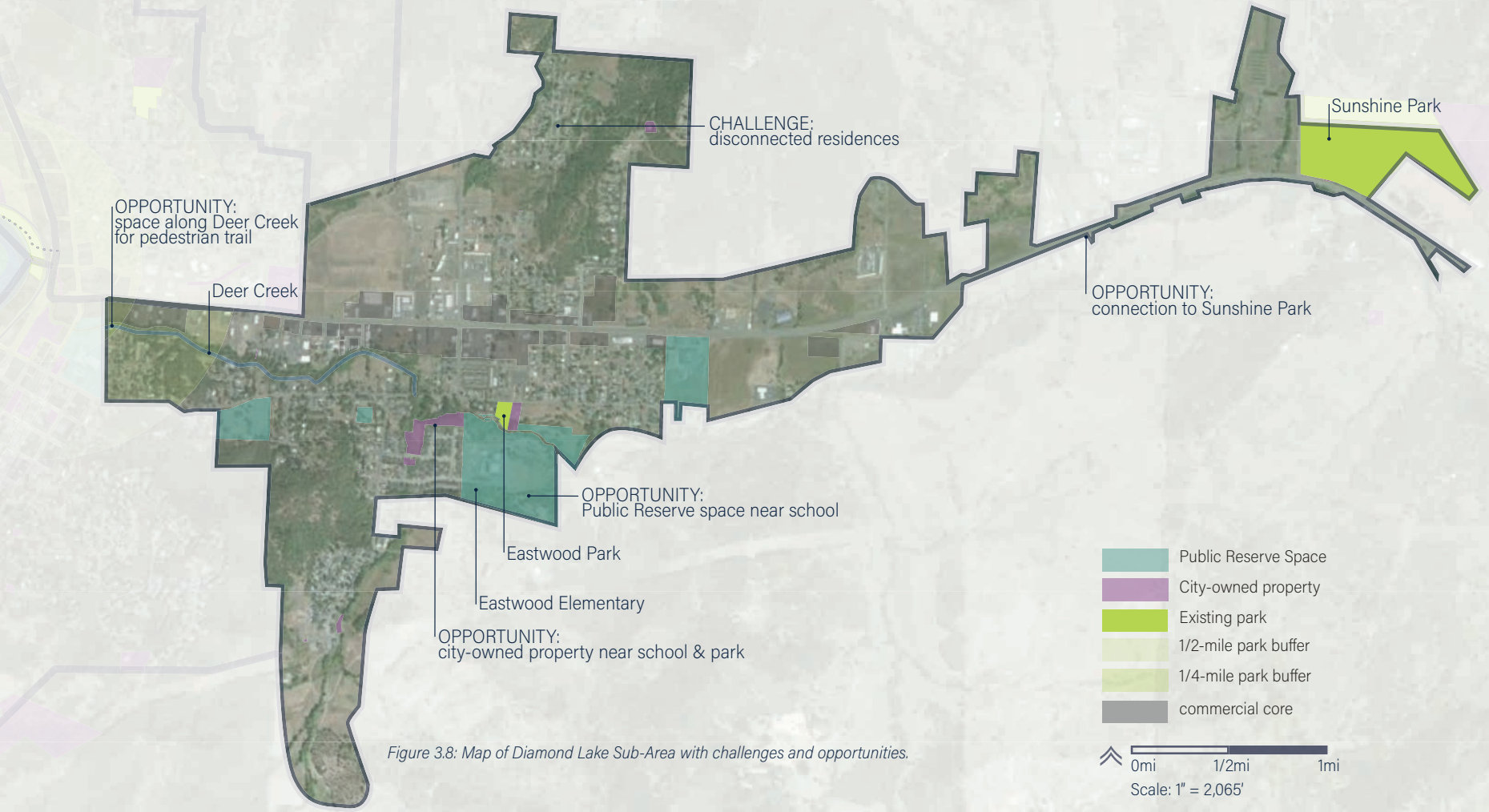


Figure 3.8: Map of Diamond Lake Sub-Area with challenges and opportunities.

REVIEW & IDENTIFY

FIGURE 3.8

Existing Parks:

Eastwood Park: This park contains no linear travel surface of suitable length.

Sunshine Park: This park contains no maintained linear travel surface, however there is a 0.6-mile informal trail that travels up the side of a hill that connects to the park. This park is located at the easternmost edge of the city limits with no bike paths or pedestrian paths connecting it to the city.

Areas of Interest: Existing parks, Deer Creek, Eastwood Elementary School, commercial core along Diamond Lake Blvd.

Public Reserve & City-Owned Lots: The City of Roseburg owns several small parcels. The majority of the Public Reserve Space belongs to the local School District and is home to Eastwood Elementary School.

ROWs: ROWs in this sub-area are generally narrow along residential roads.

Challenges:

- Several housing developments are disconnected from the rest of the sub-area.
- Highway 138 bisects this sub-area. As an ODOT road, possibilities for adding linear parks along it or transforming it into a lane conversion park could be limited or impossible.

Opportunities:

- Public Reserve land at Eastwood Elementary School connects to nearby Eastwood Park; these spaces are bisected by Deer Creek. This creates an opportunity to further develop and add programming to Eastwood Park with pedestrian-only trails that connect to Eastwood Elementary School and continue along Deer Creek, which eventually connects to an existing trail in Downtown Roseburg. The Roseburg Comprehensive Parks Master Plan also details this route.
- Highway 138 bisects this sub-area. However, it is currently a 5-lane road. Several businesses that the road once served have closed and its AADT range of 5001-10,000 (ODOT) is below the traffic capacity for which the road was built, making this segment of the road a candidate for a lane conversion park that connects to Sunshine Park. The Roseburg Comprehensive Parks Master Plan also details this route for trail development, but does not specify what type of path or trail would travel to Sunshine Park.

DIAMOND LAKE
SUB-AREA

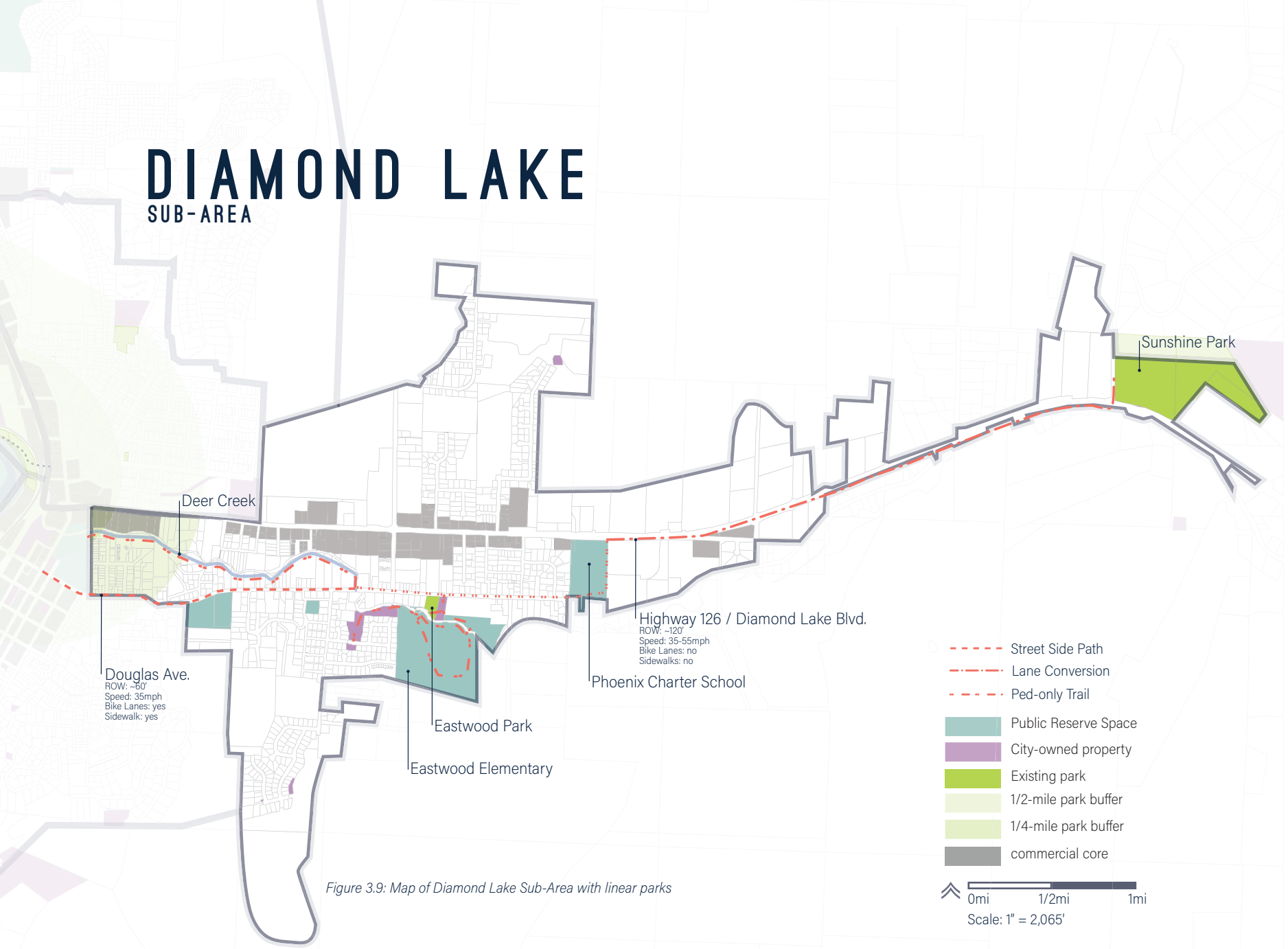


Figure 3.9: Map of Diamond Lake Sub-Area with linear parks

CONNECTION / DESTINATION

FIGURE 3.9

Since neither of the existing parks provide a linear travel surface and since there was a clear opportunity for a connection to Sunshine Park, I prioritized making this connection, as well as leveraging the existing Public Reserve space as park space. The result is a connection and a smaller 0.5 mile destination loop.

ASSIGN

FIGURE 3.9

This sub-area was assigned pedestrian-only trails next to Deer Creek, throughout Eastwood Park, and adjacent to Eastwood Elementary School, a lane conversion park from the Phoenix Charter School to Sunshine Park, and street side paths along Douglas Avenue.

MAJOR TAKEAWAYS

- In sub-areas that are lacking existing linear travel surfaces, it might make more sense to prioritize a connection instead a destination loop, as the connection could link to a destination or act as a destination itself.

DOWNTOWN
SUB-AREA

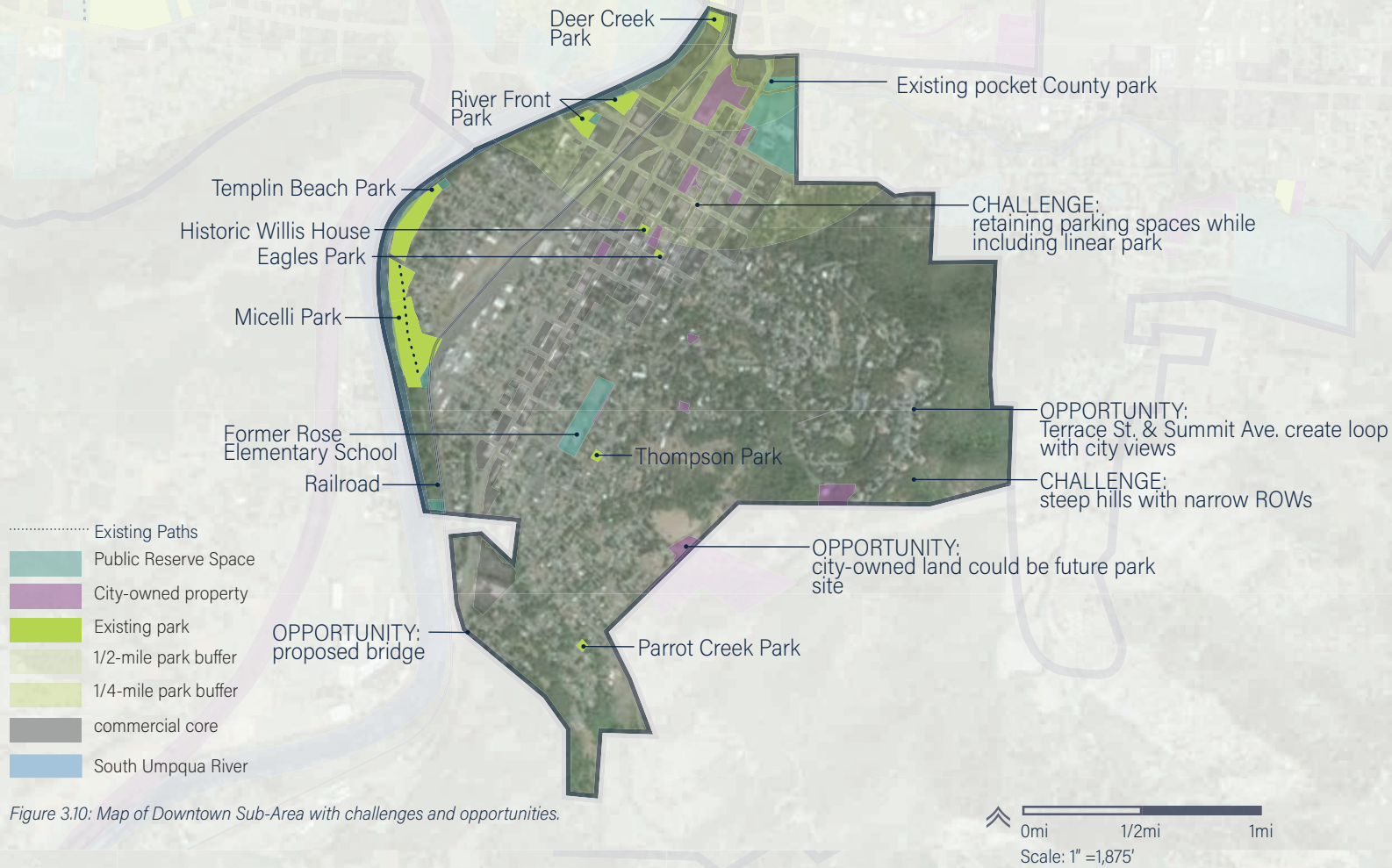


Figure 3.10: Map of Downtown Sub-Area with challenges and opportunities.

REVIEW & IDENTIFY

FIGURE 3.10

Existing Parks:

Micelli Park: contains a travel surface of < ¼-mile. This park is adjacent to the South Umpqua River.

Templin Beach Park: does not contain a travel surface. This park is adjacent to the South Umpqua River and Micelli Park.

Riverside Park: contains a travel surface of about 1/10-mile. This park is adjacent to the South Umpqua River, but is separated from Templin and Micelli Parks by several residential lots.

Deer Creek Park: though only a small portion of this park is within the Downtown Sub-Area, this park contains a bike path along the river that totals just under 2 miles in length.

Thompson Park: this park does not contain a travel surface; it has a small play area and several sports fields. It is adjacent to Rose Elementary, which is no longer in service.

Eagles Park: this small park contains no travel surface.

Parrot Creek Park: this park is situated adjacent to Parrot Creek, but as a small neighborhood park, it does not contain travel surface.

While this sub-area contains the greatest number of parks, none contain sufficient travel surface, leaving the entire sub-area a priority area.

Areas of Interest: Existing parks, South Umpqua River, Douglas County pocket park near Deer Creek, Downtown Roseburg, views of the city and valley from hills on the eastern side of the sub-area.

Public Reserve & City-Owned Lots: The City of Roseburg owns small lots adjacent to Newton Creek; much of the existing Public Reserve space is occupied by schools and the Roseburg Golf Course.

ROWs: ROWs in this sub-area are generally narrow.

Challenges:

- The South Umpqua River limits access to western parts of the community to bridges, which can be difficult to alter.
- The Railroad creates a barrier to parts of the community.
- The linear parks that I have sited in the downtown area include removing some parking spaces. If small communities have people who travel from far out of town and rely on parking, this could make parking a greater challenge if fewer spaces are available.
- The hills on the eastern side of the sub-area are steep with several narrow ROWs.

Opportunities:

- According to the Oregon Department of Transportation GIS website, there is a proposed bridge over the South Umpqua River that connects the downtown area to the Douglas County Fairgrounds (ODOT 2018). Including a linear park on this bridge could connect to the bike path that passes through the Fairgrounds.
- Since there are already several parks along the South Umpqua River with linear travel spaces, connecting them could help make a more complete path while increasing the travel surface to be >½ mile.

DOWNTOWN
SUB-AREA

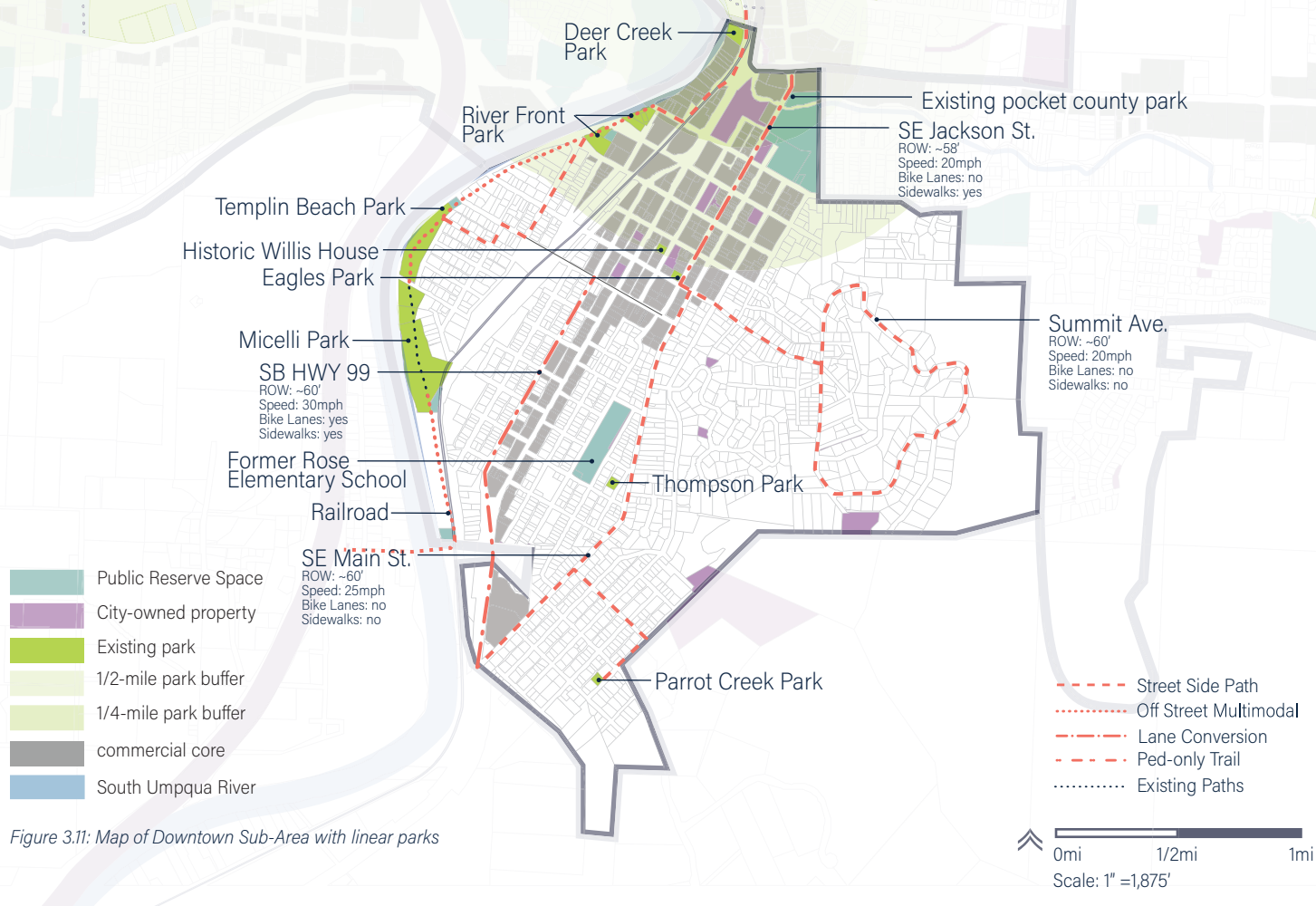


Figure 3.11: Map of Downtown Sub-Area with linear parks

REVIEW & IDENTIFY CONTD.

- There are several homes along the east side of the South Umpqua River that are sandwiched by the existing parks. These homes are also in the 100-year floodplain. In a long-term plan, these properties could eventually be purchased and converted into park space. This would eliminate homes being in the floodplain while providing a riverside park connection to existing parks.
- The City of Roseburg owns 16 acres of undeveloped land just outside of the city limits along the southeast boundary of the sub-area. If developed into a park, it could provide space for trails and an opportunity to connect into the linear park network.

CONNECTION / DESTINATION

FIGURE 3.11

Because the whole sub-area is a priority area and contains several important areas of interest, both connections and destinations were created. The downtown commercial core was prioritized for a destination, as well as the parks along the river, while the linear parks in the residential areas were prioritized as connections.

ASSIGN

FIGURE 3.11

Lane conversion parks, off-street multimodal paths, street side paths, and improved sidewalks were assigned to this sub-area.

MAJOR TAKEAWAYS

Though linear parks in this project are focused on providing active recreation opportunities, they can also be valuable amenities for commercial areas because they offer a non-vehicle mode of transportation that can change the experience of shopping and/or draw in a broader array of customers.

HARVARD
SUB-AREA

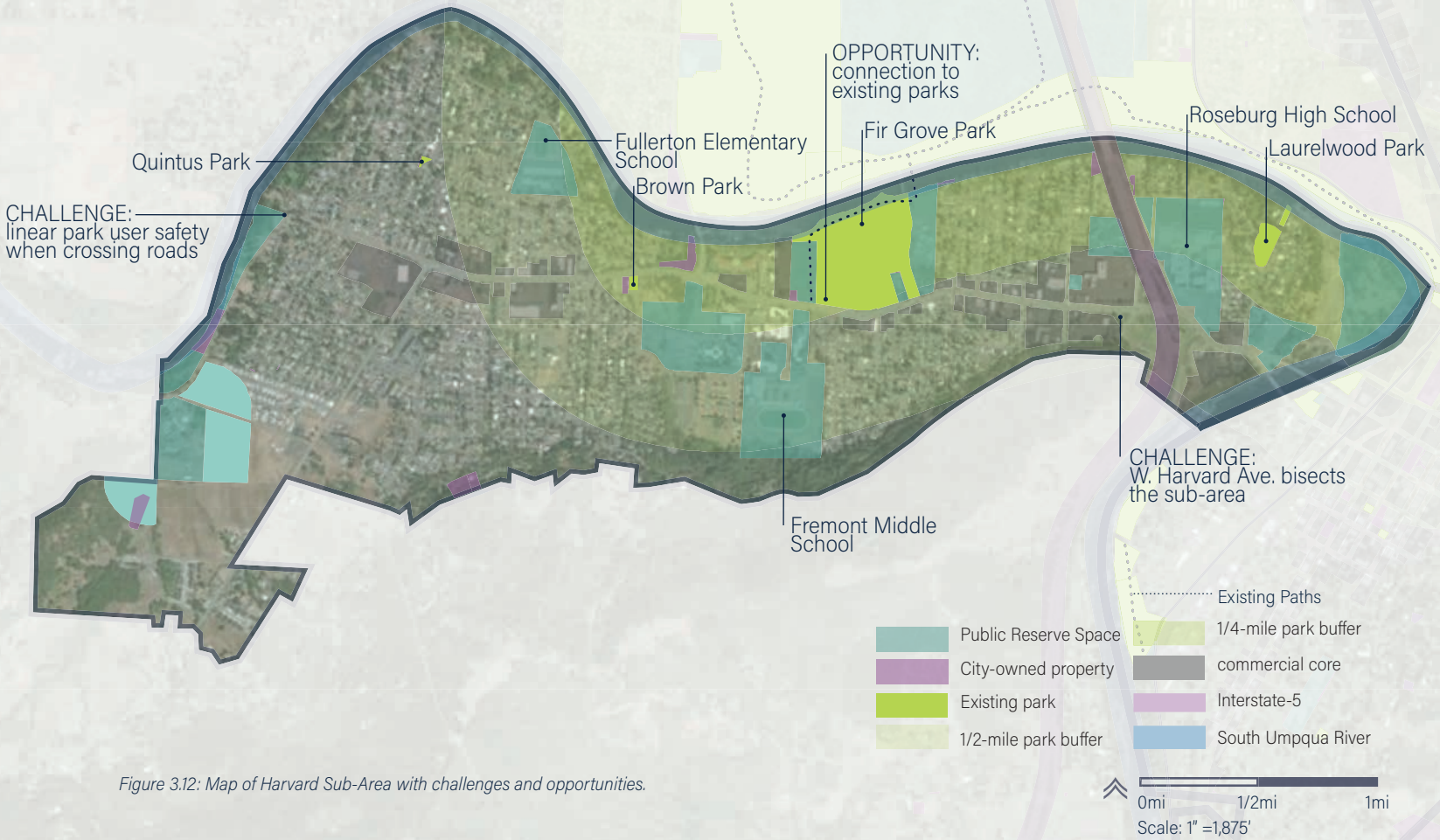


Figure 3.12: Map of Harvard Sub-Area with challenges and opportunities.

REVIEW & IDENTIFY

FIGURE 3.12

Existing Parks:

Laurelwood Park: This park does not have a ½-mile travel surface.

Brown Park: This park does not have ½-miles of travel surface.

Quintus Park: This park does not have a ½-mile travel surface.

Fir Grove Park: This park does not have a ½-mile travel surface, but connects to the paths that run through Stewart Park and Riverfront Park, both of which are in the neighboring Hucrest sub-area.

While none of the sub-area's parks contain a travel surface >½-mile, most of the northern half of the sub-area falls within the buffer of the parks to the north. However, access to these parks is limited to the Stewart Pkwy. bridge and Stewart Park Dr. bridge, thus reducing the access to these parks. This makes most of this sub-area priority.

Areas of Interest: Existing parks, Fullerton Elementary School, Fremont Middle School, Roseburg High School, South Umpqua River, commercial core along W. Harvard Ave.

Public Reserve & City-Owned Lots: This sub-area contains the city's only two Open Space parcels; it also contains several Public Reserve parcels and limited city-owned parcels.

ROWs: ROWs in the residential areas of this sub-area are generally narrow; along W. Harvard Ave., however, they become slightly wider, especially as Harvard travels out of town.

Challenges:

- West Harvard Avenue bisects this sub-area. W Harvard Ave. is a 5-lane road without bike lanes west of Umpqua St., which leaves cyclists to either ride on a busy road or on a narrow sidewalk with pedestrians. The ROW for this street is also already largely taken up by the vehicle lanes that measure about ~11' where the commercial core is located.
- This sub-area's linear parks involve several road crossings, both at intersections and outside of intersections. Park user safety is of major concern, so making these crossings as safe as possible with pedestrian refuges and crosswalk signals would be key.

Opportunities:

- Fir Grove Park contains large sports fields and is adjacent to the location of a new splash pad in the process of being constructed. This park connects to Stewart Park and Riverfront Park via a small bridge for people, bikes, and vehicles. Providing linear park connections to this area would give residents greater non-vehicle access to these nearby parks.
- Lookingglass Road could serve as a convenient connection for many residences. It currently contains bike lanes but no sidewalks. Lookingglass Road's speed limit of 40mph would make it necessary to separate bikes and pedestrians from traffic according the guidelines presented in this project.

HARVARD
SUB-AREA

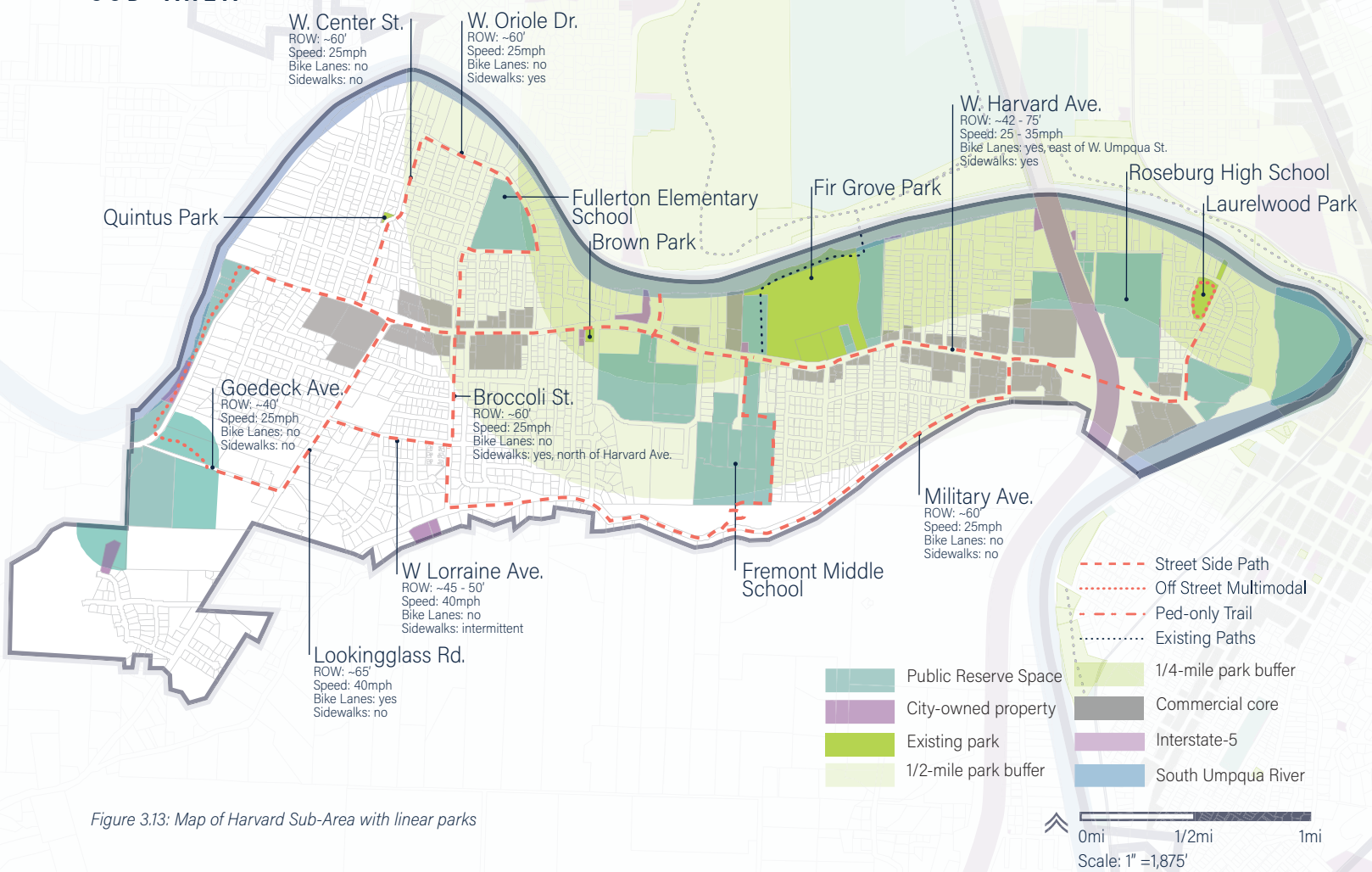


Figure 3.13: Map of Harvard Sub-Area with linear parks

CONNECTION / DESTINATION

FIGURE 3.13

Because of the proximity of this sub-area to large parks with travel surfaces > ½-mile and limited locations for linear park development, providing connections to the neighboring parks took priority. However, with the large size of the sub-area, it was also important to provide a loop for the easternmost residences of the sub-area who would have to travel > ½-mile to the neighboring parks.

ASSIGN

FIGURE 3.13

Street side paths were assigned along Harvard Avenue, in residential areas, and along Military Avenue; off-street multi-modal paths were assigned to areas within Laurelwood Park and public reserve space along the South Umpqua River.

HUCREST
SUB-AREA

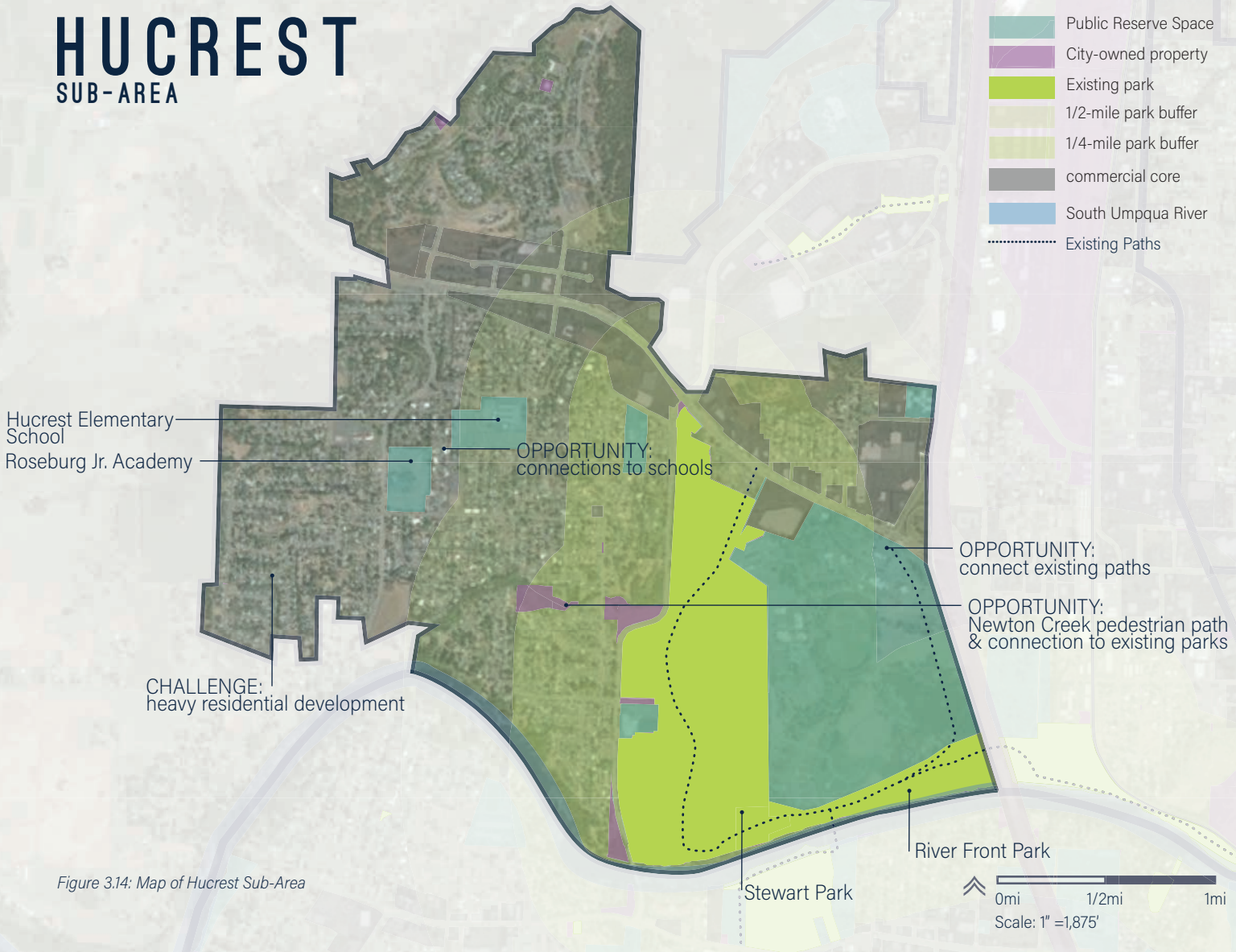


Figure 3.14: Map of Hucrest Sub-Area

REVIEW & IDENTIFY

FIGURE 3.14

Existing Parks:

Stewart Park: contains approximately 2.2 miles of travel surface for pedestrians and cyclists (including River Front Park's path).

Riverfront Park: contains approximately 0.5 miles of travel surface for pedestrians and cyclists.

Areas of Interest: Existing parks, Hucrest Elementary School, Roseburg Junior Academy, Roseburg Valley Mall / commercial core, views from north portion of Kline St.

Public Reserve & City-Owned Lots: The City of Roseburg owns small lots adjacent to Newton Creek; much of the existing Public Reserve space is occupied by schools and the Roseburg Golf Course.

ROWs: ROWs in this sub-area are generally narrow along residential roads.

Challenges:

- This sub-area is highly developed with single-family residences, limiting most linear park development to existing streets.
- Some streets do not have sidewalks or bike lanes, but the ROWs are too narrow to accommodate a linear park or have been heavily developed by the adjacent homeowners.
- In some cases, sidewalks on one side of the street would need to be eliminated to provide space for a wider linear park on the other side of the street. However, some streets in Roseburg currently have sidewalks on only one side of the street.
- Furthermore, it was difficult to determine the best side of the street for the linear park to be proposed; further analysis would be necessary to make final decisions about this issue to ensure proper consideration of stormwater and sewer systems.

Opportunities:

- Several city-owned lots provide access to Newton Creek and opportunities for a pedestrian-only trail. Though this can be accomplished without additional property acquisition, with property owner permission or acquisition of one lot, a more direct connection can be made.
- While there is currently a sidewalk along Garden Valley Blvd. that connects the existing paths in Riverfront Park to Stewart Park, it is too narrow to comfortably accommodate pedestrians and cyclists. West-travelling cyclists are forced to cross the street to the westbound bike lane to ride in usually-busy 35mph traffic to cross back over again to access Stewart Park. Transforming this sidewalk into a linear park could improve the user experience and safety of the pedestrians and cyclists that are using the existing paths as a loop by providing enough space for both modes and eliminating the need to cross the street to ride in busy traffic conditions.
- With two schools in the area, providing linear park connections to these schools could facilitate the active transportation of children (and potentially parents or teachers) to and from school.

HUCREST
SUB-AREA

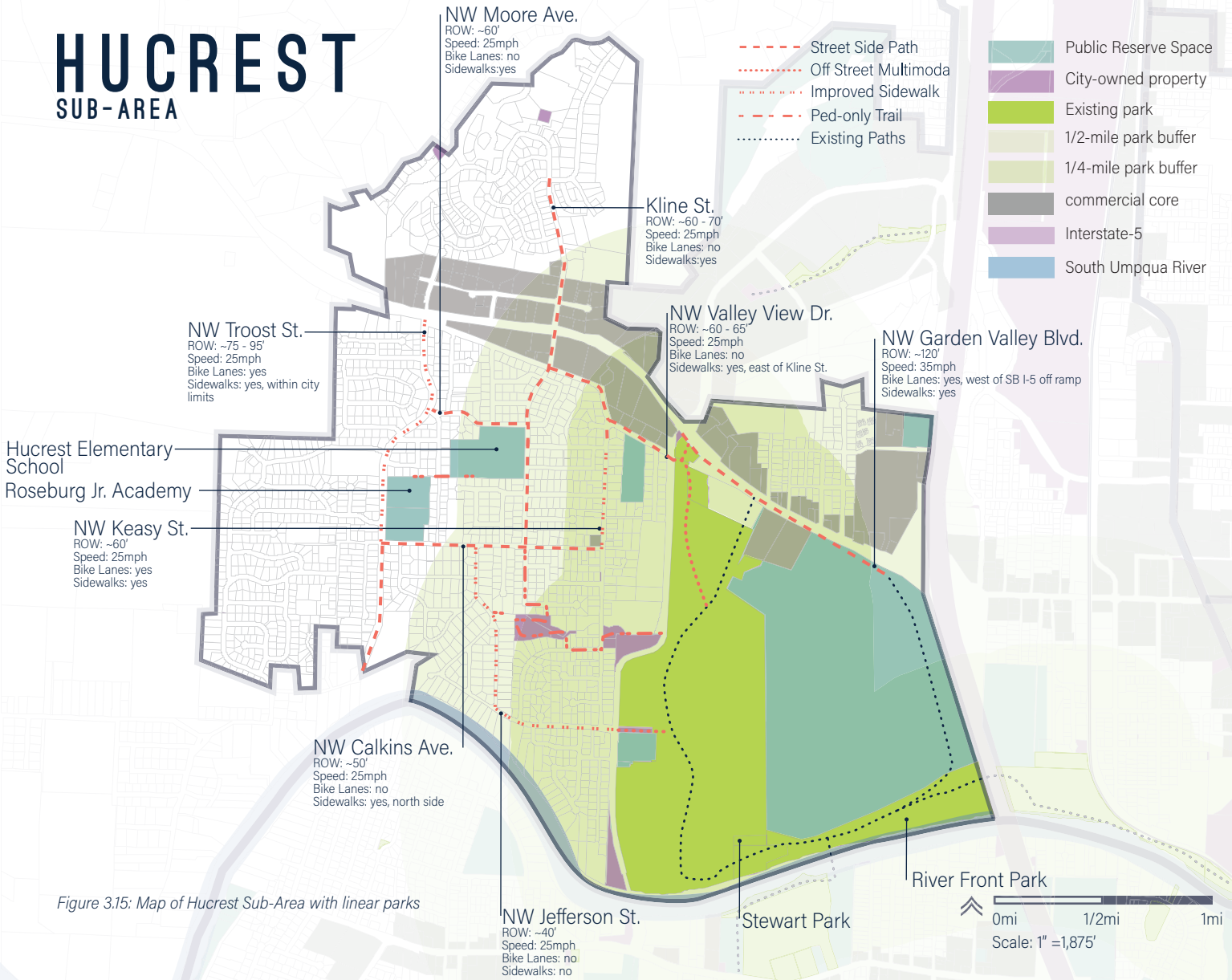


Figure 3.15: Map of Hucrest Sub-Area with linear parks

CONNECTION / DESTINATION

FIGURE 3.15

The existing parks within this sub-area do have sufficient travel surface to meet the CDC's recommendations for physical activity. Thus, providing connections to these parks was prioritized. For areas outside of the existing park buffer, creating a loop that also connects to the local schools and public reserve space was prioritized.

A secondary route potentially requiring property acquisition is proposed to further connect the southern portion of the sub-area.

ASSIGN

FIGURE 3.15

Linear parks assigned for this sub-area include improved sidewalks, street side paths, and pedestrian-only trails.

ROSEBURG NETWORK

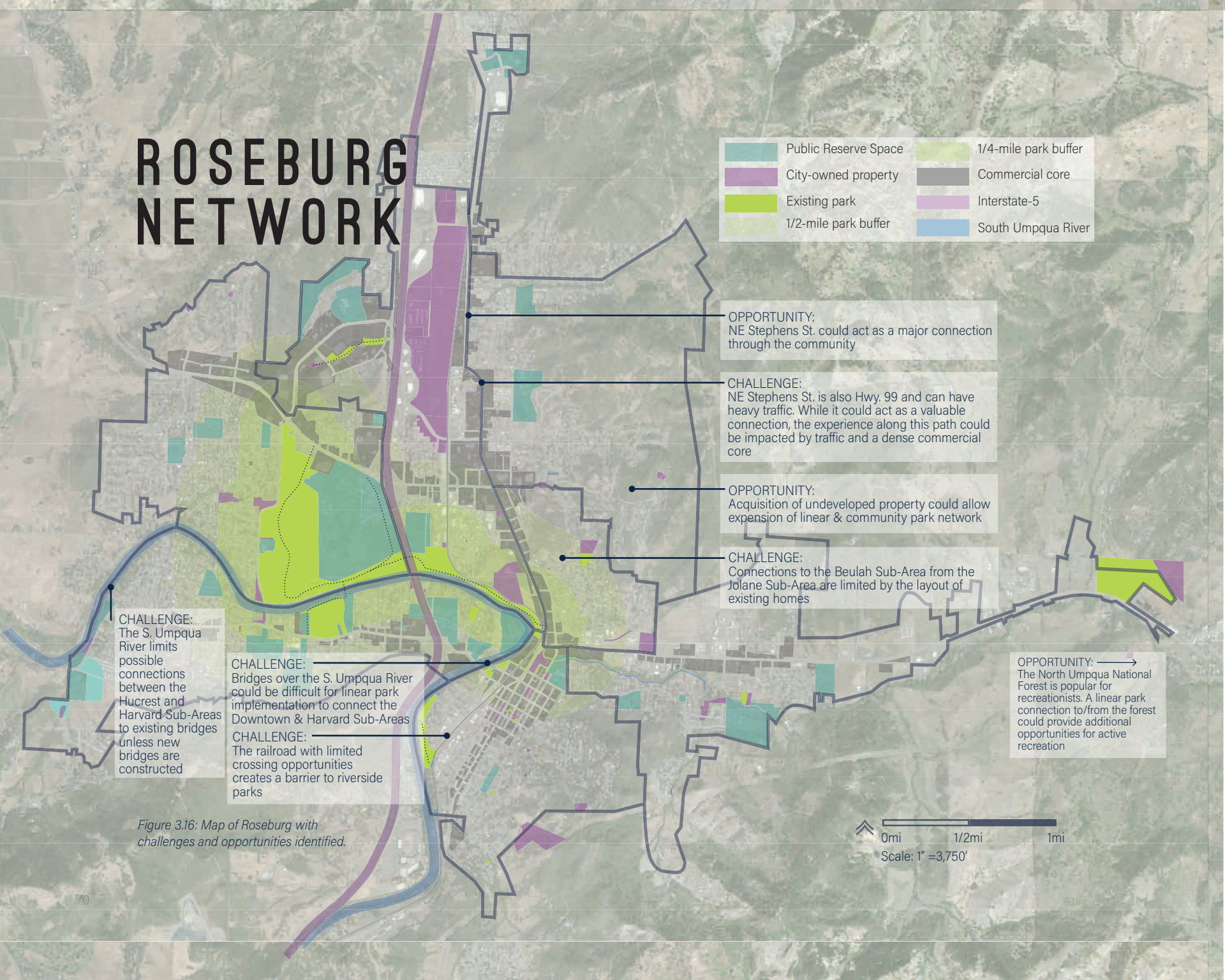


Figure 3.16: Map of Roseburg with challenges and opportunities identified.

REVIEW & IDENTIFY

FIGURE 3.16

Challenges:

- Connections between some sub-areas are limited to bridges and overpasses by I-5 and the S. Umpqua River.
- NE Stephens St. (Hwy. 99) can be heavily trafficked at times and is currently a commercial corridor. Development of a linear park along this route could impact traffic and while the presence of traffic could negatively impact the experience of the linear park for users.

Opportunities:

- NE Stephens St. acts as a collector street for many surrounding neighborhoods and could connect many people to other sub-areas.
- Looking beyond the city limits, there are opportunities to create linear park connections to the Umpqua National Forest, local wineries/vineyards, and existing bike paths in unincorporated areas of Roseburg or other surrounding communities (Winchester, Sutherlin, Oakland, Green, Winston.
- As part of a long-term plan, acquiring undeveloped property in strategic places could help expand linear park networks, as well as create additional community park space.

ROSEBURG NETWORK

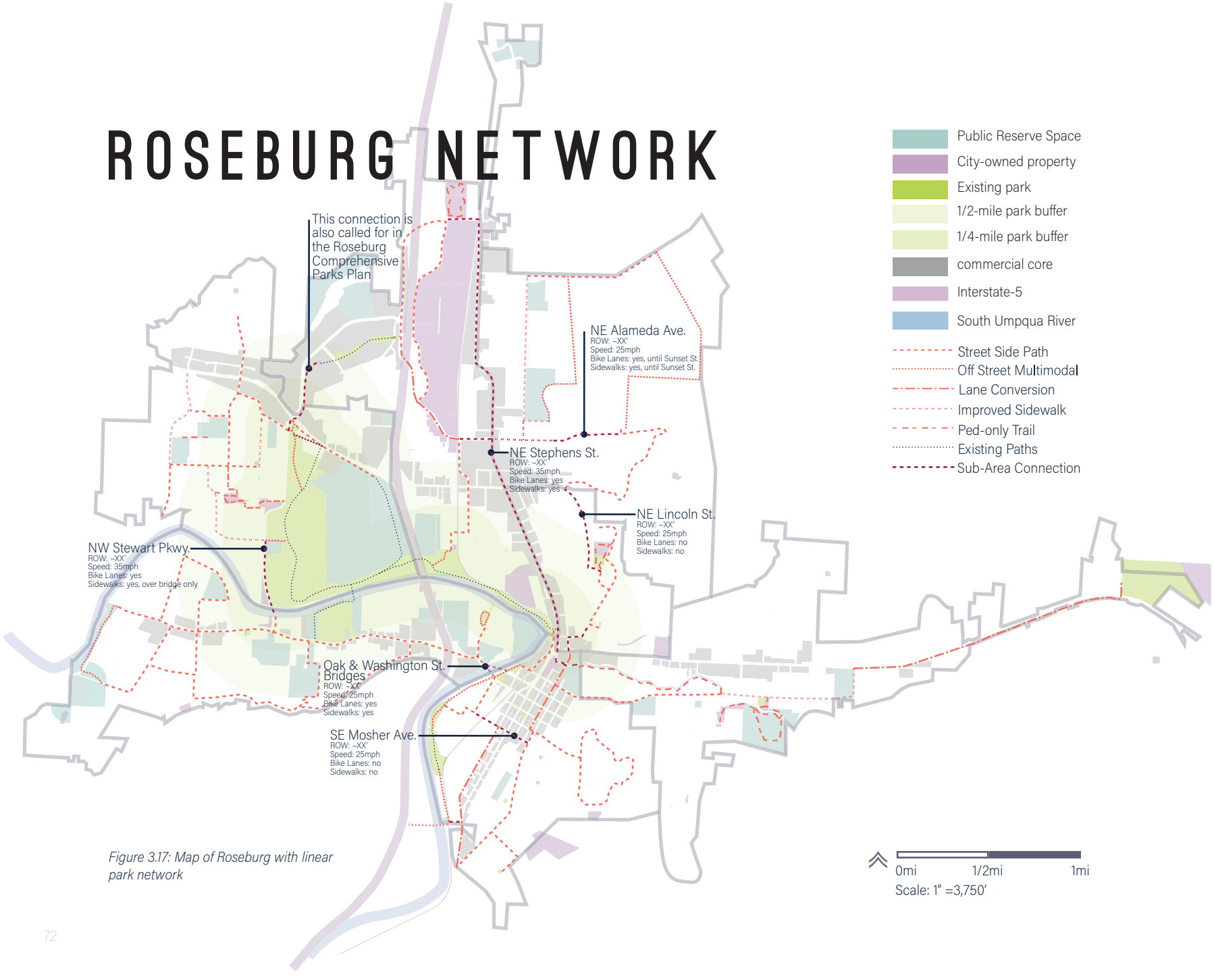


Figure 3.17: Map of Roseburg with linear park network

CONNECTION / DESTINATION

FIGURE 3.17

As the goal of this step was to link sub-areas, connections were created for this purpose.

ASSIGN

FIGURE 3.17

Linear parks assigned to connect the network include improved sidewalks and street side paths.

3.4 CONNECTING THE NETWORK

As mentioned previously, though each sub-area was considered individually, it is still critical to examine the entire study area for connections to important destinations and to create a comprehensive, interconnected, linear park network. In the fine-scale analysis, connections to most important areas of interest were developed. The last and final step of this process was to create connections between sub-areas. These connections can be seen in Figure 3.17.

Defining routes for linear parks presented an array of challenges and opportunities for each sub-area. However, I was able to site linear parks that were long enough to provide opportunity for individuals to walk 1 mile per day in each sub-area.

CHAPTER 3 REFERENCES:

Oregon Department of Transportation (ODOT). "ODOT TransGIS". Accessed April 28, 2018. https://gis.odot.state.or.us/transgis/.

CHAPTER 4:

LINEAR PARK CONCEPTUAL DESIGNS

4.1 CONCEPTUAL DESIGNS

Though the linear park types developed for this project were briefly described in Chapter 2, the focus of this chapter is to explore their conceptual designs. The following depictions of the linear park types are to demonstrate what they could look like when implemented. The examples are situated in site-specific contexts in Roseburg's sub-areas (Figure 4.1), however the concepts behind these examples could be applied across a variety of locations and communities. It is important to note that every linear park site exhibits a particular suite of existing conditions that will impact the design of the linear park. For example, some sites have existing sidewalks and bike lanes, while others only have vehicle lanes. It is for these reasons that adaptability has been built into the linear park types. Conceptual designs are discussed regarding design considerations, safety considerations, and other park-specific considerations.

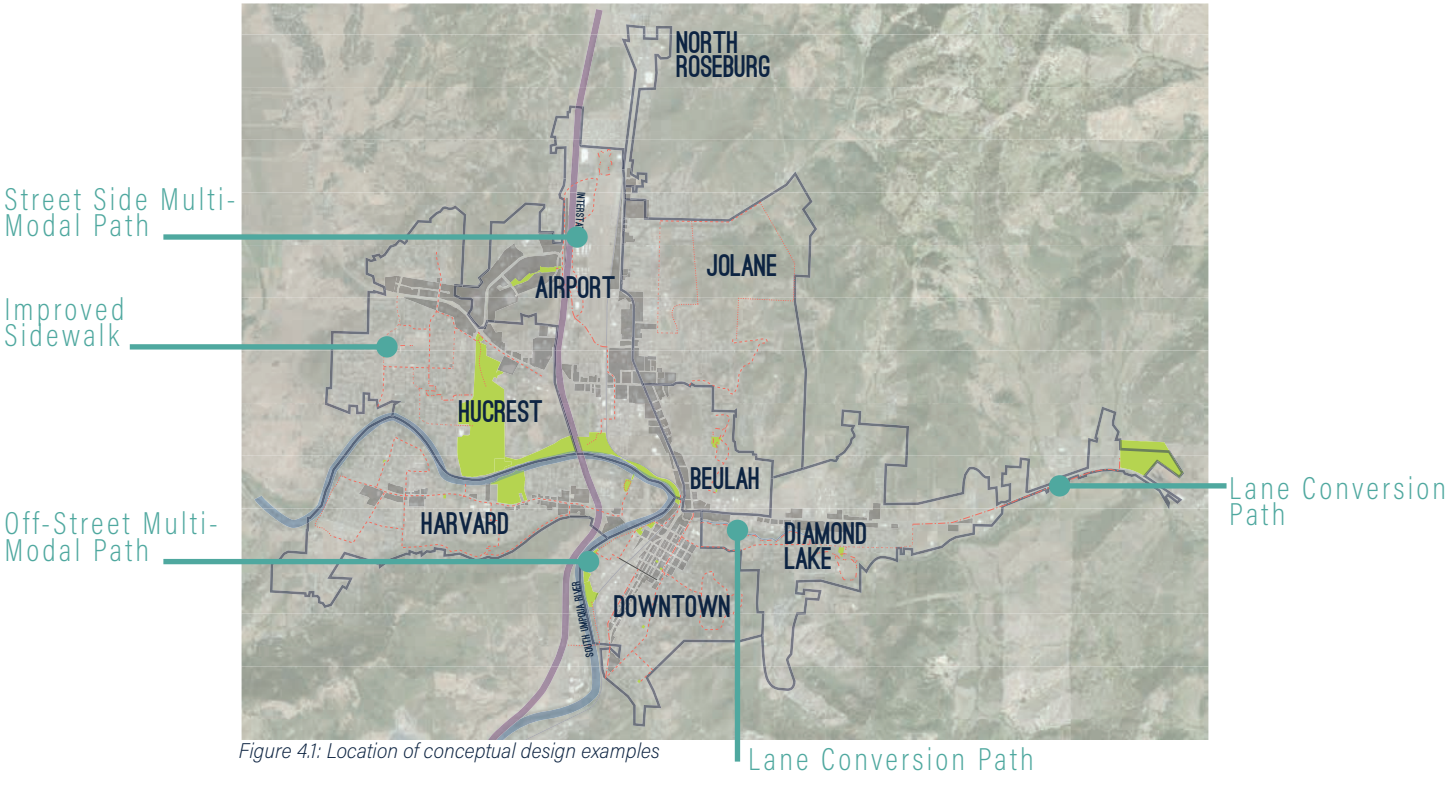


Figure 4.1: Location of conceptual design examples

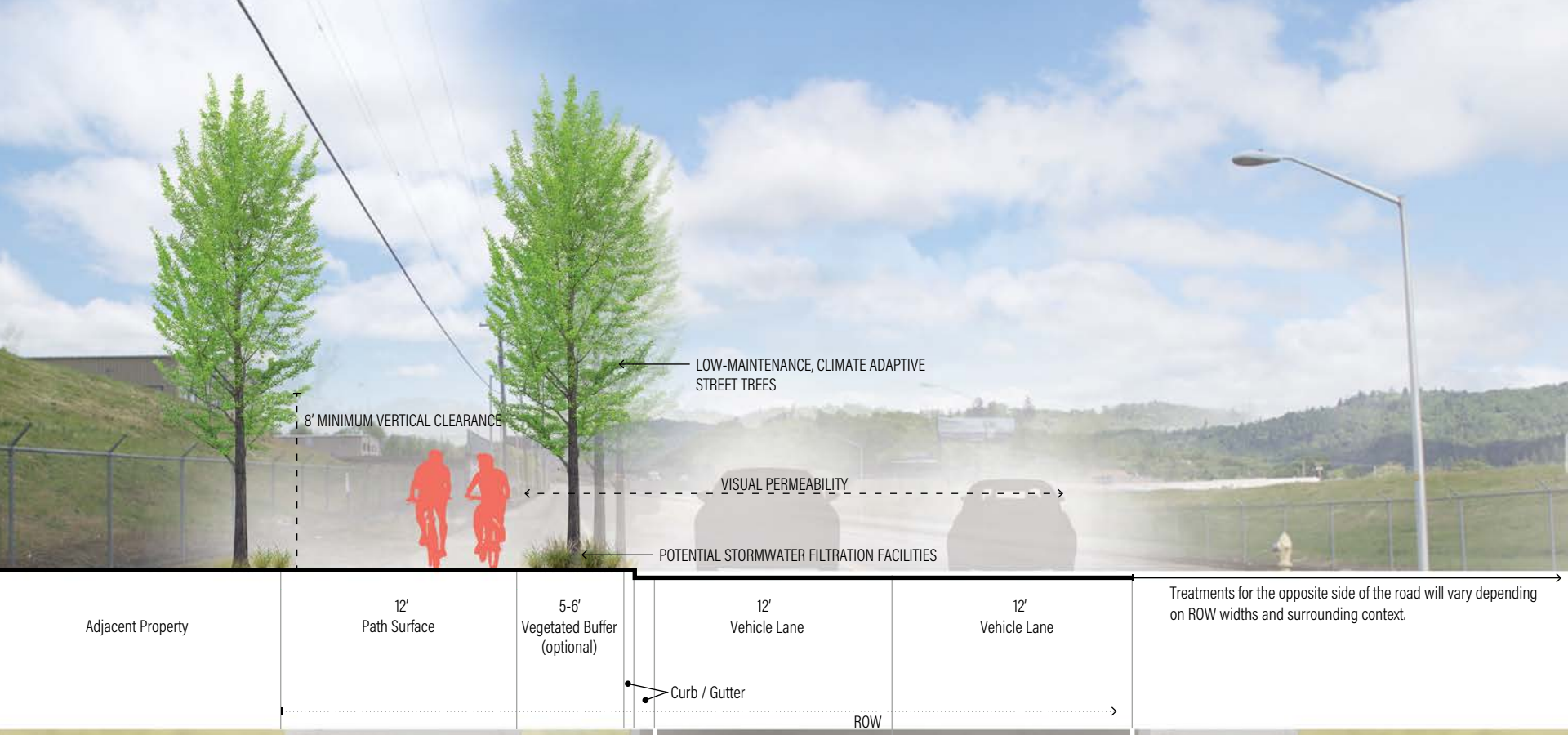


Figure 4.2: Illustration of a street-side path.

Scale: 1/8" = 1'0"

4.2 STREET-SIDE PATH

CONCEPT:

The idea behind this linear park type was to create a pleasant space adjacent to the street that can accomodate different modes of movement including cycling, walking, running, and skateboarding. This park type provides an opportunity to separate cyclists from streets with speeds greater than 35mph. This separation can appeal to those who are interested in cycling, but are uncomfortable riding next to busy or fast-moving traffic.

Design Considerations

This linear park type can be adapted to fit many situations. In some instances, it makes the most sense to consolidate existing sidewalks onto one side of the street to provide enough space for this type of linear park. Path surfacing should accommodate many different uses. Further, path alignment should essentially follow the adjacent street, but creativity in the design should be explored. For instance, the path can have a slight meander or be angular in a more urban context.

Safety

This linear park type separates pedestrians and cyclists from vehicle traffic with visual and/or physical barriers. This can make park users feel safer and more likely to use the park. Visual permeability ensures that park users can be seen by drivers and vice versa.

Other Considerations

Street Side Multi-Modal paths provide opportunities for vegetative buffers that can address stormwater runoff, provide visual diversity along the roadside, and create pleasant spaces for active recreationists.

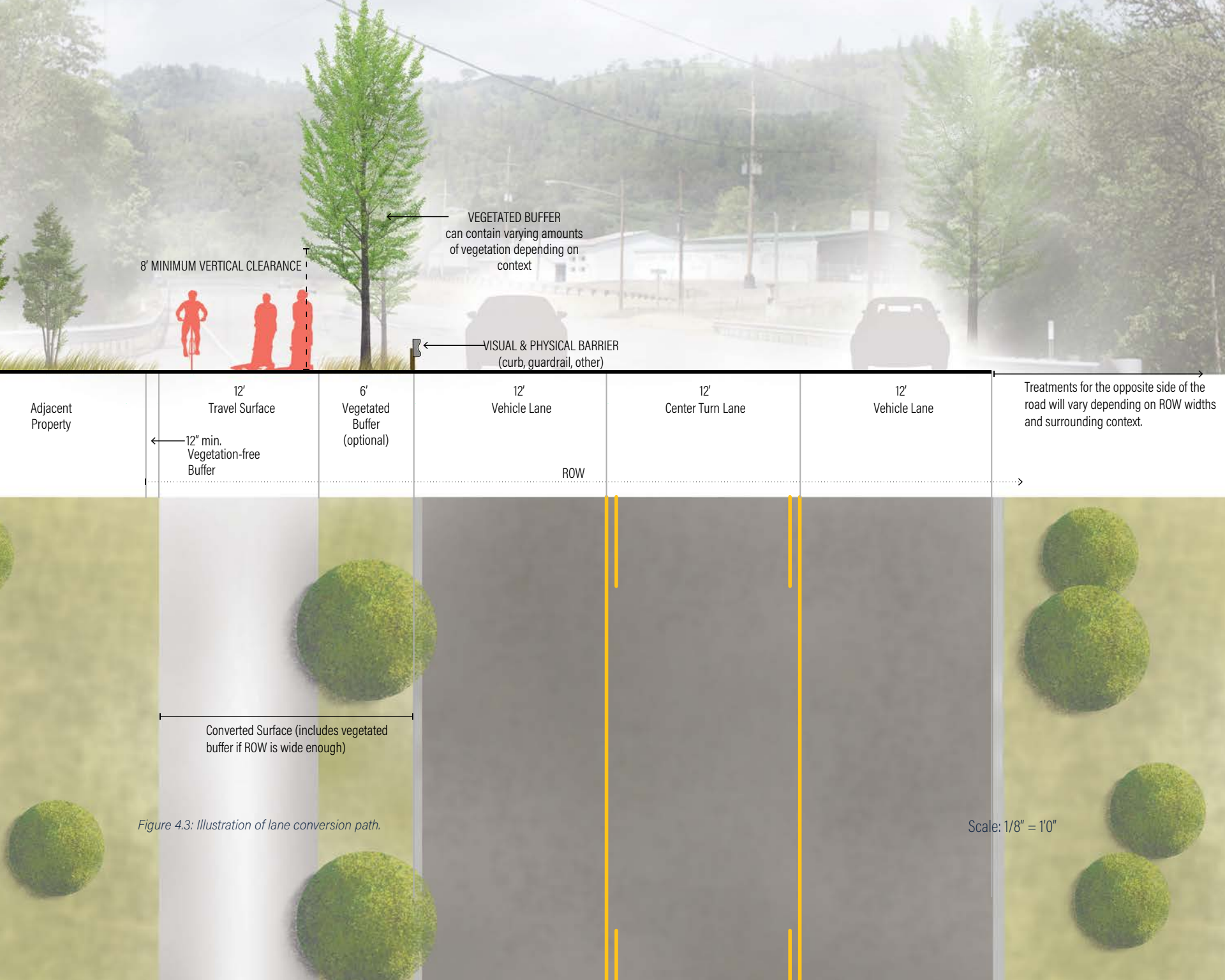


Figure 4.3: Illustration of lane conversion path.

Scale: 1/8" = 1'0"

4.3 LANE CONVERSION PATH

CONCEPT:

Lane conversion paths developed from the idea of re-purposing roads that are under-utilized for the number of vehicles they were built to accommodate. These linear parks re-claim one or two lanes of existing streets and re-purpose them into active recreation space.

Design Considerations

Lane conversion paths can be developed in a variety contexts and with roads that have a minimum of 4 existing lanes. Their level of development can be minimal, from re-striping and adding physical & visual barriers, to maximal with vegetated buffers, new travel surfaces, and small pockets for stopping and respite. Path surfaces should accommodate all anticipated uses and should be universally accessible.

Safety

Through converted traffic lanes, this linear park type separates pedestrians and cyclists from vehicle traffic with visual and physical barriers. This can make park users feel safer and more likely to use the park. Even with visual barriers, maintaining visual permeability ensures that park users can be seen by drivers and vice versa.

Other Considerations

Lane conversion parks provide opportunities for vegetative buffers that can address stormwater runoff, provide visual diversity along the roadside, and create pleasant spaces for active recreationists. With longer stretches of lane conversion parks, there is the possibility of creating habitat corridors for small mammals and insects. Vegetation could also provide nectar sources for pollinators. Further research is necessary to identify the environmental services potentially provided by this linear park type.

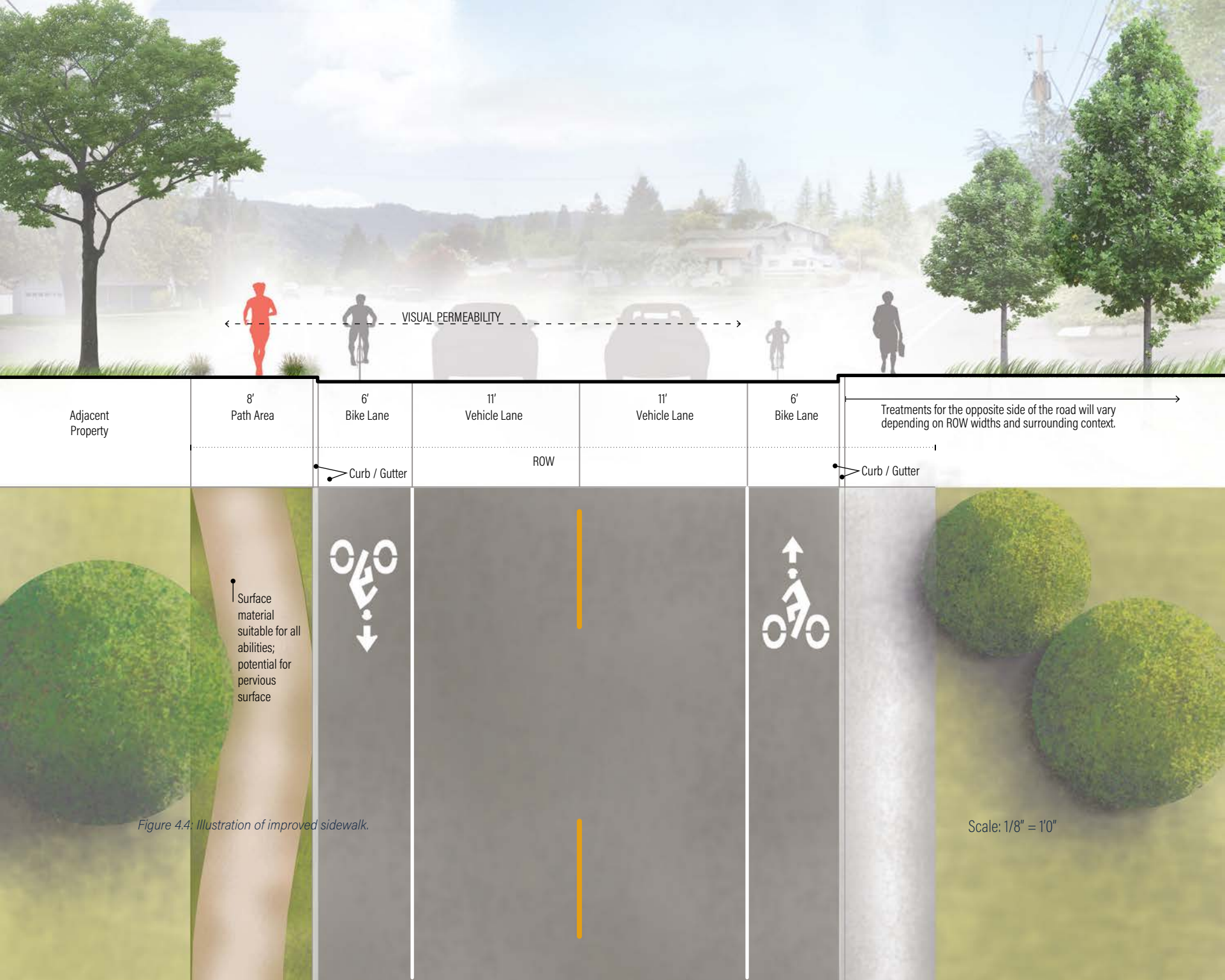


Figure 4.4: Illustration of improved sidewalk.

4.4 IMPROVED SIDEWALK

CONCEPT:

This derivative of a common sidewalk enhances the user experience with thoughtful design and the feeling of greater separation from vehicular traffic.

Design Considerations

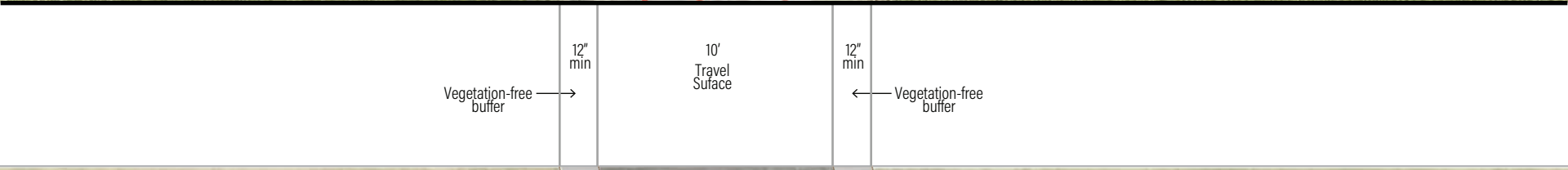
Improved sidewalks were developed to enhance the user experience by giving them more care in design and to provide simple elements that add comfort and visual variety. The path surface can meander and weave throughout the area designated for travel to increase experiential variety for path users. Void spaces created by the meanders can be planted with vegetation, surfaced differently, or otherwise treated differently than the travel surface. Stamped and/or stained concrete can also be featured in improved sidewalks.

Safety

Improved sidewalks are appropriate for streets with traffic speeds of less than 35mph that have existing bike lanes. This allows pedestrians to be separated from vehicle traffic and cyclists to travel in designated lanes alongside slower-moving traffic. Improved sidewalks have curbs that separate them from vehicle lanes, which provide a small, yet effective buffer from vehicles and cyclists.

Other Considerations

Though the example on the left shows an improved sidewalk on just one side of the road, it is possible to implement this park type on both sides of the road, given adequate ROW widths.



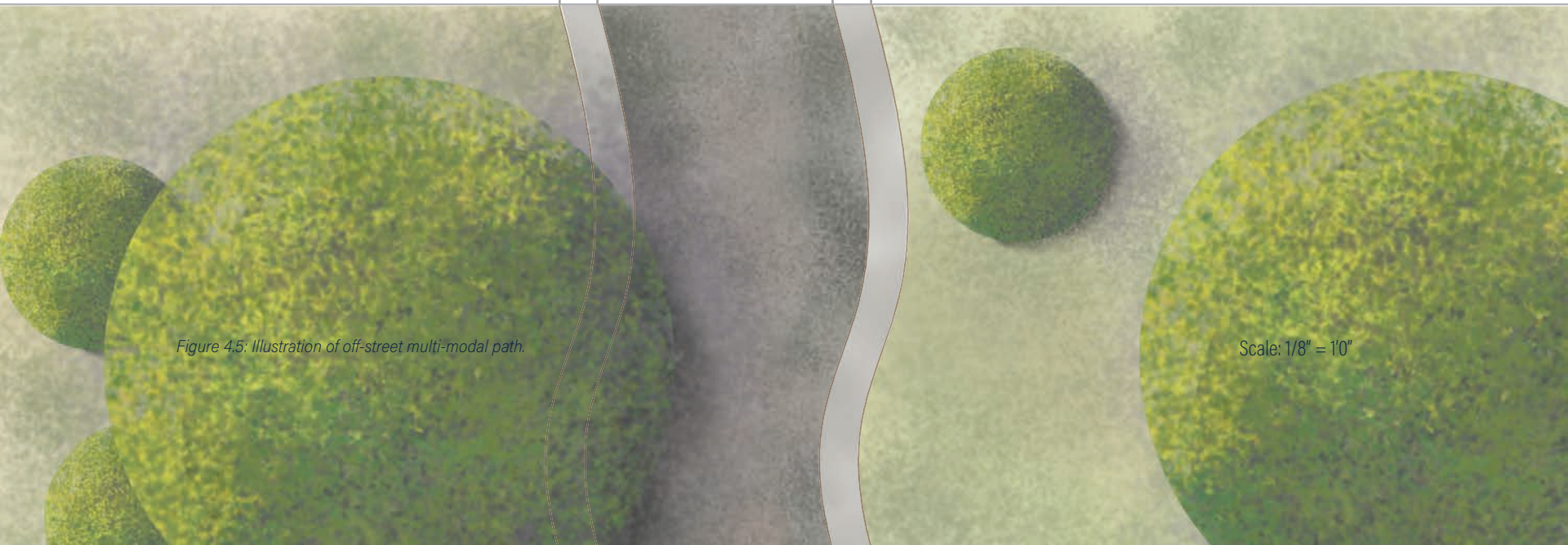


Figure 4.5: Illustration of off-street multi-modal path.

Scale: 1/8″ = 1′0″

4.5 OFF-STREET MULTI-MODAL PATH

CONCEPT:

Developed to offer a space for users that removes them from being next to a roadway, off-street multi-modal paths are meant to accommodate a variety of uses including running, walking, cycling, and potentially equestrian activities.

Design Considerations

Most appropriate for undeveloped areas, off-street multi-modal paths should provide users access to natural features such as bodies of water, expansive views, or preserved forest areas while acting as both connections and destinations. This park type could also provide an experience different than that of being in a developed area. These parks can be implemented in developed areas, but placement should avoid adjacency to roadways.

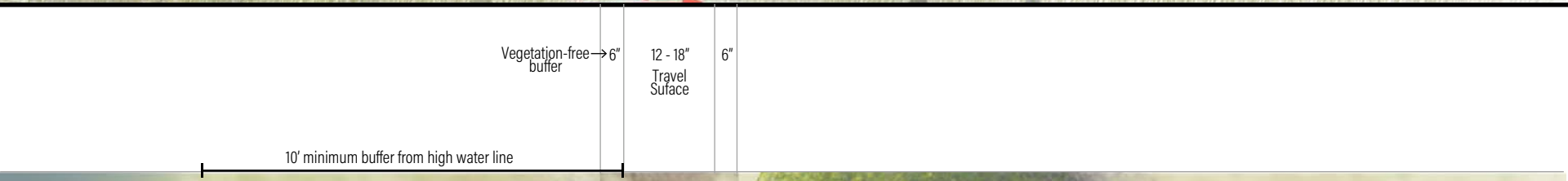
Path surfacing should reflect the context of the park. If the path travels through an undeveloped forested area, a compacted gravel surface would be appropriate. If the path is anticipated to receive heavy foot and cycle traffic in a developed area, a paved surface would be more appropriate. Universal accessibility is a priority for this path type.

Safety

Off-street multi-modal paths could travel through isolated spaces or far away from development. Wildlife, criminal activity, and health emergencies could all be causes for concern in this case. However, in areas closer to development, ample lighting to illuminate the path could help with visibility. It would be important for park users to know the safety concerns and be as prepared as possible for emergencies. Since these parks are intended for active recreation, it is important for park users to know their own physical limitations.

Other Considerations

In areas close to private property or environmentally-sensitive areas, it may be worth considering a type of fence or other method of containment to ensure that path users remain where they are intended to be.



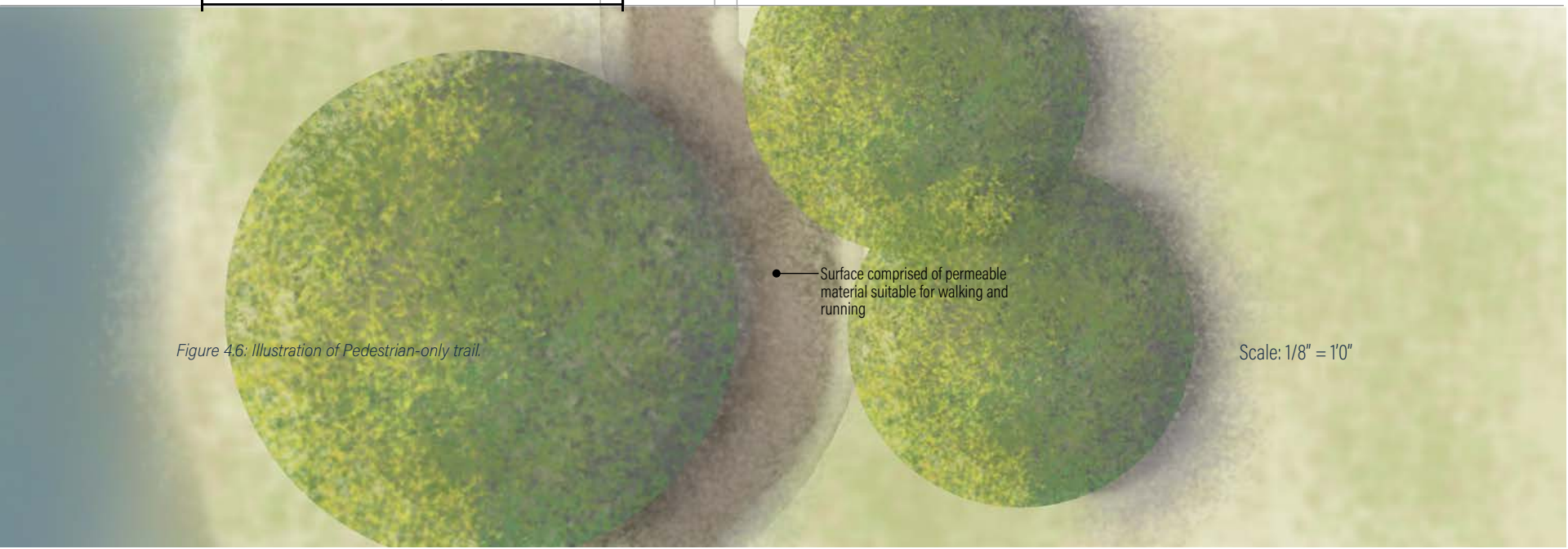


Figure 4.6: Illustration of Pedestrian-only trail.

Scale: 1/8" = 1'0"

4.6 PEDESTRIAN-ONLY TRAIL

CONCEPT:

These trails take their pedestrian users into areas that can be more difficult to access or have small right-of-ways. They were developed to expand the possibilities of linear park sites, especially along waterways and up steeper slopes.

Design Considerations

Also most appropriate for undeveloped areas, pedestrian-only trails should provide users a close-to-nature experience that gains them access to natural features such as bodies of water, expansive views, or preserved forest areas while acting as both connections and destinations.

Path surfacing should be permeable and suitable for running and walking.

Safety

Pedestrian-only paths could travel through isolated spaces or far away from development. Wildlife, criminal activity, and health emergencies could all be causes for concern in this case. However, in areas closer to development, ample lighting to illuminate the path could help with visibility. It would be important for park users to know the safety concerns and be as prepared as possible for emergencies. Since these parks are intended for active recreation, it is important for park users to know their own physical limitations.

CHAPTER 5:

RECOMMENDATIONS & LESSONS LEARNED

5.1 INTRODUCTION

This chapter reviews the research questions and whether or not they were answered. It then describes recommendations that I have developed from the project process, coupled with what I learned from reviewing precedents. Recommendations are categorized by their focus on and relevance to social, environmental, economic, planning/policy, and design considerations. Finally, major takeaways from the project are discussed.

5.2 RESEARCH QUESTIONS ANSWERED

This project explored the possibility of siting linear parks in small communities to increase active recreation opportunities. The following discussion reviews the research questions that framed the project and whether or not they were fully answered.

1. What are linear parks?

First, the question of what linear parks are and what the types of linear parks are was addressed. This definition is a product of a synthesis of precedent definitions. Assigning a specific minimum perimeter-to-area ratio can be helpful to establish the linear shape of a park, and additional research about the perimeter-to-area ratio at which park users become more active could help inform later iterations of this definition.

2. What are the different types of linear parks?

After a synthesis and classification of precedent linear park types, this project established a linear park typology for application in small communities. The linear park types used in this project worked well in the example community in which they were tested. If a community wishes to integrate linear parks into their park system, they could use the typology developed for this project as a starting point and adapt each linear park type to fit their needs, or they could develop a new linear park type that could better fit their needs. The linear parks developed for this project are meant to serve as a starting point for other small communities.

How can linear parks be integrated into the park network of small communities?

This project explored a two-step method to help site linear parks. This method was effective in helping to identify linear parks for the example community of Roseburg, Oregon.

Can GIS landscape search and fine-scale suitability analyses help site linear parks to promote active recreation in small communities affected by inactivity-related chronic diseases?

The short answer to this question is yes, GIS landscape search and small-scale suitability analyses were indeed helpful in siting linear parks in the example community of Roseburg, Oregon. However, this issue is much more complicated and further considerations are necessary to ensure that a linear park network meets the needs of the community. These considerations will be discussed in sections 5.4 - 5.8 of this chapter.

5.3 REPLICABILITY OF THE PROCESS

One of the goals of this project was to develop a method that other small communities could replicate and adapt to site linear parks in their community. Without the use of GIS, this project would have been difficult to complete. For communities who do not have GIS as a resource, this process would be difficult to replicate, though possible. Because of the heavy reliance on GIS for this method, I would argue that this process is not fully replicable. However, the ideas behind it are replicable, and can be adapted to suit the desires of small communities wishing to improve their active recreation network.

5.4 RECOMMENDATIONS FOR SOCIAL CONSIDERATIONS & PRIORITIZATION FACTORS

This section reviews the social considerations recommended for similar future projects.

1. Prioritize at-risk populations

Since people are the intended primary users of linear parks, and the motivation for implementation of linear parks is to facilitate physical activity, it is important to consider those who may be at greatest risk for inactivity-related chronic diseases (Hanson 2017). Mentioned in Chapter 1, at-risk populations include low-income families, African American, and Hispanic populations. These qualities can be mapped using GIS and US Census information. For example, the map in Appendix A shows median household income by census tract and park proximity. This map demonstrates that the highest income households are located near Stewart Park, while many low-income households are located away from any parks. On this map, it is necessary to note that the area directly to the east of Stewart Park contains mostly commercial and office spaces.

Another factor to consider is housing density. High density housing, like multi-family housing, often lacks yard space that residents can use to be outside and active. It is important to provide areas with high housing density with opportunities for active recreation. With map-able Census information, park development should be prioritized in areas with populations who are at highest risk for developing inactivity-related chronic diseases.

2. Prioritize areas without access to parks with 1/2-mile travel surface.

The method guiding this project implements the idea of prioritizing areas without access to parks with 1/2-mile minimum travel surfaces. While neighborhood and community parks play an important role in active recreation and community growth and development, they often lack programming that facilitates active recreation for adults, primarily paths or trails for walking, running, or biking. Gyms can be intimidating for beginners, inconvenient, unenjoyable for users, and/or expensive with monthly membership costs. It is important to prioritize the quality of life for all members of a community, and providing no-cost active recreation spaces can help address this issue.

3. Seek community input & participation

While a public process was not possible for this project because of limited time and resources, it is critical to seek community input when planning amenities for the people in the

community. Often, there are many residents and local experts who can contribute valuable knowledge and insights to the process. I would argue that only after a public process (surveys, community meetings and engagement, and/or charrettes with professionals) and a socially-based prioritization process, the GIS landscape search and fine-scale suitability analysis can be implemented to identify sites for linear parks.

4. Prioritize quality of life

The Bellingham PRO Plan states, "One of the major purposes of open space is to enhance the livability and character of a community by preserving as many of its natural amenities as possible, as well as providing wildlife habitat in urban areas." It is important to make the argument that open spaces are essential to improving the quality of life for residents through their provision of amenities and services that align with what people want in their lives. Many small communities are characterized by unique elements whose preservation would add to the area's quality of life—for instance if there is an iconic tree, landform, species or other feature the community knows and loves, celebrate this feature and preserve it for the future.

5. Consider current and future populations and uses

Long-term planning and thinking can eliminate the need for expensive retrofits to the built environment. Creating a linear park network for the community that can be implemented over time, as well as anticipating where new growth and development will occur and then building linear parks before housing development, will help prioritize amenities that contribute to an overall higher quality of life for community residents. This should be done while prioritizing social equality. Developing new linear park types or building flexibility into current linear park types will allow for future adaptation to changes in uses.

5.5 RECOMMENDATIONS FOR ENVIRONMENTAL CONSIDERATIONS

This section reviews the environmental considerations recommended for similar future projects.

1. Identify environmentally-sensitive areas for conservation/non-building development including steep slopes, important habitat for local species, riparian areas, flood zones (Bellingham PRO Plan 2016).

Identifying environmentally-sensitive areas for conservation provides an opportunity to connect community members to the non-built environment through the development of trails and linear parks in these areas. Residents and tourists could engage with the wildlife and vegetation in the area, potentially gaining a new understanding and appreciation for the natural systems and processes that shape their surroundings. This would also help identify sites that are not suitable for building development.

2. Consider areas that have regular flooding issues

Homes within the floodplain are vulnerable to flooding events. Purchasing property in the floodplain as part of a long-term plan or program for riverside linear park development could reduce flood risk for residences while providing active recreation opportunities for community members. These

actions could be supplemented by a voluntary incentives program for current floodplain property owners where they receive a financial or otherwise beneficial incentive to sell their property for linear park development.

3. Consider potential wildlife corridors

Wildlife corridors provide space for wildlife to travel, forage, and live. They can link to larger "open space anchors" that diversify views among developed areas while preserving ecologically important spaces on a larger scale (Bellingham PRO Plan 2016).

4. Use linear parks to adapt to a changing climate

Linear parks can help communities adapt to changing climates. Trees can provide shade when the temperatures get hotter in the summer, exchange carbon dioxide for oxygen, and slow peak stormwater flows by intercepting precipitation. Including stormwater facilities could help address runoff resulting from intense or increased storm events. Light-colored concrete surfacing can reduce heat absorption from the sun. Furthermore, it is important to choose plant species that can tolerate anticipated climatic conditions of the future.

5. Investigate the potential of stormwater filtration planters or bioswales in linear park vegetated buffers

While many small communities do not have populations large enough to require on-site stormwater treatment or filtration, these systems can add visual interest to the built environment, reduce the need for stormwater treatment, slow/reduce peak flows that contribute to flooding, filter environmental contaminants, and provide overall benefit to the landscape that often characterizes small communities. Pervious concrete or other surface options could also help decrease stormwater runoff.

5.6 RECOMMENDATIONS FOR DESIGN CONSIDERATIONS

This section reviews the design considerations recommended for similar future projects.

1. Consider all ages and abilities, as well as their leashed companions

Linear parks should be designed for all ages and abilities, as well as the pets that often accompany active recreationists. While the goals of the linear parks in this project are focused on providing active recreation opportunities for adults to prevent or treat inactivity-related chronic diseases, it is important to consider the needs of every member of a community. Including amenities for all ages (benches, small play structures, drinking fountains), ensuring that the parks are universally accessible (spaces for convenient wheelchair access, proper surfacing of travel surface, handrails where appropriate), and providing amenities for pets (doggy drinking fountains, poop bag dispensers, dog-urine resistant plants) can help make linear parks welcoming to all users.

2. Create destinations within linear parks

While linear parks should provide a comfortable and enjoyable experience themselves, design features should enhance this

experience. Including local artist's work, unique paving designs, neighborhood-specific benches, quotes from community leaders, references to historic events, or other community-specific elements can help park users connect to the space, create micro-destinations, and ensure that the linear parks are community-relevant and meaningful.

3. Ensure linear parks are suitable for use in all seasons

Linear parks should be interesting and comfortable for use in all seasons. Surfaces should be chosen to reduce slipping in rainy climates and minimize freezing, while provision of shade structures or trees should be considered for hot summers.

4. Provide adequate directions and wayfinding

When people do not know where they are going, they can be less likely to use a linear park network. Ensuring that each park segment is clearly marked and mapped for users with intermittent wayfinding can take away uncertainty and guesswork on the part of the park user.

5. Be creative, flexible, and adaptable with implementation

Every site has challenges and opportunities that can help or hinder project implementation. Creative problem solving and re-thinking the status quo could allow for opportunities otherwise overlooked. For instance, if a low-use street has sidewalks and bike paths on both sides, perhaps combining the areas onto just one side will provide enough space for linear park implementation.

5.7 RECOMMENDATIONS FOR PLANNING AND POLICY CONSIDERATIONS

This section reviews the planning and policy considerations recommended for similar future projects.

1. Go beyond the minimum standards, or implement higher minimum standards

When completing community projects, project leaders should strive to go beyond the minimum standards. When possible, planners and policy makers should create policies and ordinances that raise the minimum standards for parks, open spaces, amounts of vegetation—any action that will enhance the quality of life and the quality of the community. For example, when a community road improvement project comes up, advocate for the inclusion of linear parks or park-like qualities of that road segment instead of settling for the low-standard curb-gutter-6' sidewalk that places cyclists in high-speed traffic and pedestrians close by. While funding plays a large role in community projects, it is important to pursue non-traditional funding sources, additional grants, and donations to allow projects to go beyond minimum standards.

2. Consider policies that require linear parks in all new developments

Retrofitting the built environment is difficult and expensive (Koohsari et al. 2013). Planning linear parks into developments can avoid this while providing an amenity for future residents of the development.

3. Consider a regionally-connected linear park network.

Life for community residents does not stop at city limits, and neither should linear park networks. It is critical to think at all scales—site, block, neighborhood (or sub-area), city, region—to create a network that connects as many people as possible to as many destinations as possible. For example, Roseburg lies about 20 miles west of the Umpqua National Forest, which has trails, waterfalls, and camping and fishing opportunities. A linear park connection to this forest could greatly increase the active recreation opportunities for Roseburg residents. Similarly, the surrounding areas of Green, Sutherlin, Winston, and Oakland could all be reached by linear parks to provide a regionally-connected active recreation network.

Furthermore, considering an area's existing assets and then finding ways to better connect them could create tourist opportunities, as well as recreation opportunities. For example, Roseburg's location in the Umpqua Valley places it among many vineyards and wineries. Providing linear park connections or a destination loop to the wineries could create an economy-boosting tourist opportunity while facilitating active recreation.

4. Create programs, activities, and events that use linear park networks

Run/walk races, scavenger hunts, walking/running groups and many other activities can take place within the linear park network. This will likely increase usership by increasing exposure to the parks—once residents know the parks are there and where they go, they will be more likely to use them on their own.

5. Shift priority from vehicles to people and quality of life

While it is important to consider all modes of transportation when assessing quality of life, providing the opportunity for community members to safely recreate and transport themselves would enhance the quality of life for those who desire this currently non-existent opportunity. For example, give less priority to on-street parking where linear parks could otherwise be developed, especially in residential areas where houses have driveways for vehicle parking. Other aspects of linear park-related quality of life improvements should be researched and implemented where possible—for example, the concept of biophilia[1], Complete Streets[2], or the Dutch concept of the woonerf[3].

6. Partner with existing efforts and community organizations

Combined efforts can go much further than individual efforts. Partnerships among organizations, the City, County, or other community entities can help build a case and support for achieving similar goals. For example, the Blue Zones Project, a project based on improving the health of community residents to achieve longer lifespans and enhanced quality of life, has been working in Roseburg over the past year. It has been successful with coordinating walking groups, volunteer cleanup efforts, partnering with local grocery stores to provide healthy

1 This term was coined by E.O. Wilson in his book, *The Biophilia Hypothesis*, and refers to the "innate tendency to focus on life and life-like processes."
2 This idea focuses on a holistic approach to street design where people are are well-designed, pleasant, safe spaces for people as well as vehicles. https://smartgrowthamerica.org/program/national-complete-streets-coalition/.
3 Originating in the Netherlands, this concept focuses on creating combined spaces for all modes of transportation where reduced vehicle speed and increased driver attention is ensured through its design. http://www.sta-design.com/what-is-a-woonerf/.

checkout aisle food and drink options, and hosting events to engage the community in healthy lifestyles (Blue Zones Project).

7. Turn challenges into opportunities

As stated previously, every site has its own complex set of challenges and opportunities. Successful projects take existing challenges and turn them into opportunities. For example, a steep slope can present a challenge in making it universally accessible, however the viewpoint at the top can be a unique opportunity for visitors to experience their community and the surrounding area from a different perspective.

5.8 RECOMMENDATIONS FOR ECONOMIC CONSIDERATIONS

This section reviews the economic considerations recommended for similar future projects.

1. Seek non-traditional funding sources

Funding can come from many places other than tax revenues and transportation grants. It is important to search for any and all unique funding opportunities.

2. Actively seek support from the community regarding active recreation-related tax increases

Educating the community on the projects and amenities that will be funded by community tax revenues can help build support for tax increases. If people do not understand what their money is going toward, they will be less likely to support it.

3. Create volunteer stewardship groups to help maintain care for linear parks

Volunteer activities can have a huge impact on a community. If implemented successfully, volunteer efforts could reduce the municipal costs and resources devoted to maintenance and care of linear parks significantly. An "Adopt-a-Park" program could be implemented for linear park segments. Or community service efforts could be directed to linear parks in addition to existing efforts.

5.9 FURTHER RESEARCH

This project sought to explore the potential of linear parks to increase active recreation opportunities in small communities for the prevention and treatment of inactivity-related chronic diseases. Further research is necessary to determine the feasibility of implementing linear park projects, their design, their best locations, as well as their ability to prevent and treat inactivity-related chronic diseases if used in accordance with the CDC's recommended activity levels.

5.10 REFLECTIONS

This section briefly describes major project takeaways and lessons.

Planning ahead can save big in the long-term

Though stated earlier in the chapter, this has been one of the main lessons of the project. Planning linear parks into communities can prevent difficult retrofits in the future.

Re-evaluate and re-assign priorities based on what the community wants

The Roseburg Comprehensive Parks Master Plan states that, based on community feedback, additional trails and paths are desired for the community. While the Plan calls for some additional trails, much of the area is left without linear spaces in which to actively recreate or parks that are inconvenient to access. A public process that informs decision making for park projects and plans is necessary to ensure that future projects align with community desires and needs. Post-occupancy studies can help inform this process, as well.

More research, funding, and efforts should be devoted to ensuring the built environment provides a quality of life for people while addressing important and complex social, environmental, and economic issues.

In an ever-developing world, it is important to understand amenities and features that can improve the quality of life of a community. While vehicles are the primary mode of transportation for many people, it is important to consider other aspects of life when planning and designing communities so they are not only built to transport people efficiently, but provide desirable features for the community to enjoy. This idea, however, should not be implemented in a manner that harms ecological systems, nor be implemented in manner that exacerbates social injustices. With interdisciplinary collaboration among designers, engineers, scientists, landscape architects, architects, and planners, projects such as this should seek to provide holistic, long-term solutions to complex and sensitive issues that face communities today.

There is never going to be a perfect approach to perform projects like this, but the important thing is to explore ideas, build upon existing knowledge, challenge the status quo, turn challenges into opportunities, collaborate across disciplines, and always seek to make connections.

CHAPTER 5 REFERENCES:

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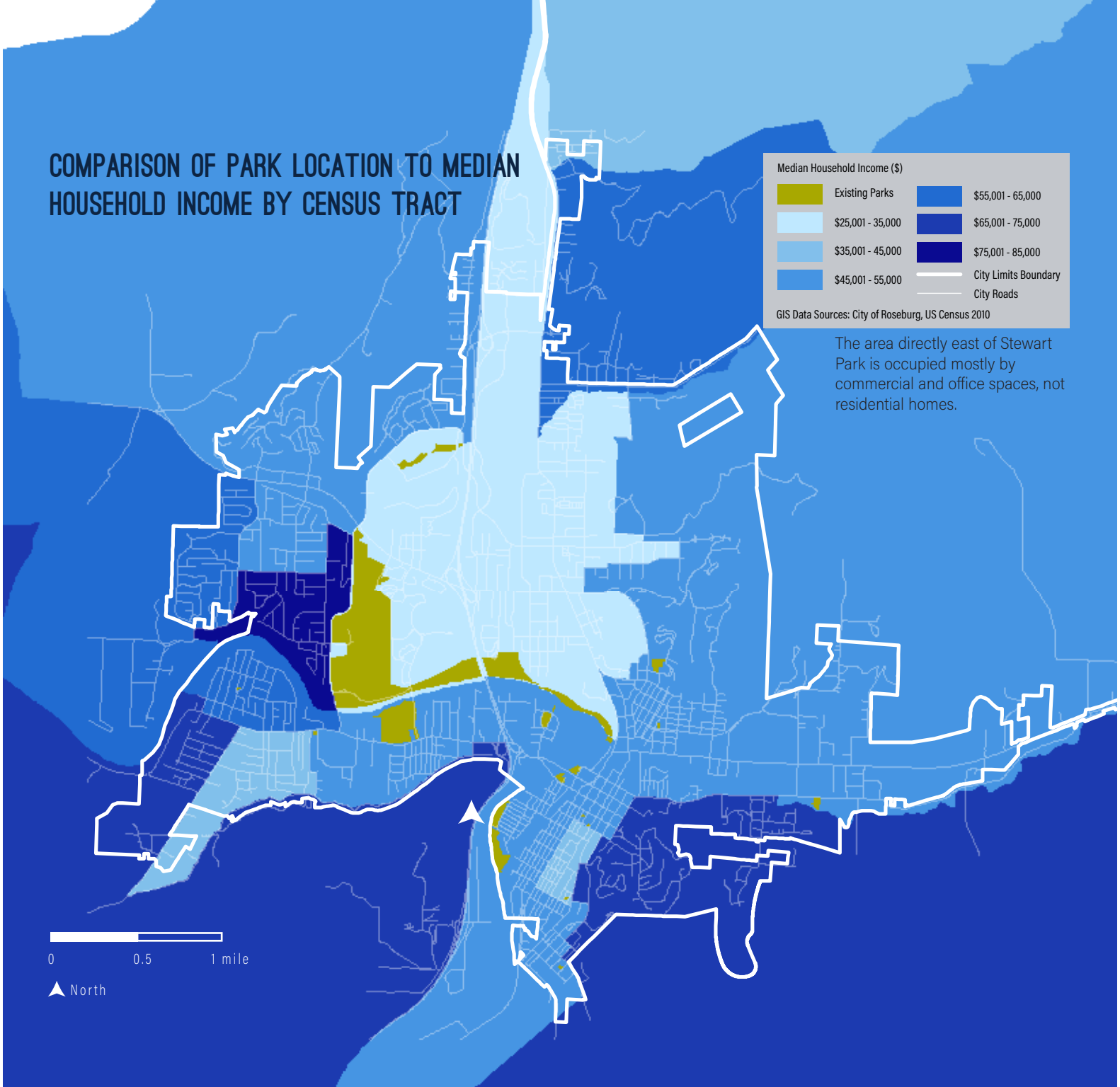
APPENDIX A

This appendix contains maps that I made in the initial exploratory phases of this project.

COMPARISON OF PARK LOCATION TO MEDIAN HOUSEHOLD INCOME BY CENSUS TRACT



The area directly east of Stewart Park is occupied mostly by commercial and office spaces, not residential homes.