FROM DIVIDING TO CONNECTING

The meshing of ecological functions and inclusive resources in public space design

HANA KETTERER

Department of Landscape Architecture

University of Oregon

June 2021

FROM DIVIDING TO CONNECTING

The meshing of ecological functions and inclusive resources in public space design

Hana Ketterer

APPROVAL

Project Chair: Liska Chan

Project Committee: Chris Enright and Kory Russel

Submitted in partial fulfillment for the Master of Landscape Architecture

Department of Landscape Architecture
College of Design
University of Oregon
June 2021

The University of Oregon is located on the traditional indigenous homeland of the Kalapuya people. Following treaties between 1851 and 1855, Kalapuya people were dispossessed of their indigenous homeland by the United States government and forcibly removed to the Coast Reservation in Western Oregon. Today, descendants are citizens of the Confederated Tribes of Grand Ronde Community of Oregon and the Confederated Tribes of the Siletz Indians of Oregon.

ABSTRACT

This project develops design strategies for landscape architects, planners, city officials, and public space designers that improve the provision of public space resources. Productive public landscapes that combine ecosystem services with inclusive community resources have potential to create more socially and ecologically resilient cities. Landscape architects have a major role in shaping how public spaces integrate these networks. Currently, there are 135 public parks in Eugene, Oregon. Yet they are used primarily for recreational purposes. With so many people facing precarity, I propose that a reassessment of what public space can provide for human and non-human users of a city. The design strategies I propose include 1) building urban food forests as novel ecosystems, 2) re-imagining urban waterways as a social and ecological artery, and 3) developing a cadence of amenities. As a speculative design project, I applied these design strategies through four facets of coexistence in public space: 1) spatial design and environment, 2) operations and maintenance, 3) program and activation, and 4) rights, rules, and accountability (Huttenhoff 2021). Using these design strategies, I developed a network of productive urban public spaces along Amazon Creek in Eugene, Oregon. Each space exemplifies a program of learning, harvesting, or sharing. Reframing Amazon Creek as a social and ecological artery of the city allows for human and non-human users to gain tangible resources such as food or habitat to support social infrastructure and ecological function. The strategies are intended to be transferable to projects and sites in a variety of locations that re-establish the potential of urban public space.

In memory of Gene Reck. I would not be where I am today without your guidance and mentorship.

ACKNOWLEDGEMENTS

Thank you to my project advisor, Liska Chan, for your continuous feedback, guidance, and all-around enjoyable conversations. Thank you, Chris Enright, for welcoming us our first summer and seeing us out our last term, I am incredibly thankful to have come full circle with you.

Thank you to my amazingly talented cohort. I feel very lucky to have learned and grown alongside you these last three years, we have come a long way from this summer trip to Portland.

Thank you, Iván. I could not have done the past three years without you. You push me to be a better person and designer every day.

And lastly, thank you to my family and friends who have supported me from afar, your love and encouragement means so much to me.

Table of Contents

LIST OF FIGURES

Graphics credit to Hana Ketterer, unless otherwise noted in text.

01 INTRODUCTION

"Inclusion is not bringing people into what already exists; it is making a new space, a betteer space for everyone."

-George Dei

INTRODUCTION AND SCOPE

Providing welcoming and unhindered access to public parks is not only a fundamental action towards environmental justice, but also for functional urban social and ecological systems (Beardsley 2007). I share Nina Marie Lister's stance that by definition, our urban environments need to respond to the local environmental and social concerns of the community (2007). Access to gather in public space is a right (Kingwell 2009), and often, our society's vulnerable populations are excluded from this right. While the term vulnerable populations encompass many members of our communities, people experiencing homelessness are a vulnerable community that rely heavily on public space and a focus of this project. In 2019, Eugene, Oregon reported the highest number of people experiencing homelessness per capita in the country with lack of stable and affordable housing as a leading cause of homelessness (Turner et al. 2019). While around 65% of the homeless population spends the night in shelters (Turner et al. 2019), public space needs to provide accessible space to gather and resources for people experiencing homelessness to access during the day. Urban parks currently lack amenities, resources, and comfort for this community. Furthermore, there are active measures in place to exclude people experiencing homelessness from public parks, such as hostile architecture and no loitering laws. Until homelessness is solved, landscape architects, especially those who design public space, have a duty to design equally for the people using public space for pleasure and those using it for survival.

Additionally, with rapid urbanization, cities have a responsibility to serve their people and local ecosystems using resilient design (Ahern 2016). In alignment with this assertion, this project seeks to provide not only inclusive social resources for all members of the community but also ecosystem services for local ecologies. Drawing from concepts of urban ecology such as those conceived of by ecologist Richard Forman, and applied by Kate Orff, and Jack Ahern and intersecting them with inclusive resources in public space, this research provides key design strategies for combining these concepts and applying them to urban public parks. These strategies are tested through an urban park and riparian network along the Amazon Creek in Eugene, Oregon. Specifically, the possibilities of how urban space can serve social and ecological networks of a city are explored. While the primary need for people experiencing homelessness is a house, this project is not intended to provide housing for the unhoused. Instead it is intended to provide resources in public space for people experiencing homelessness through local ecosystem and social services. Until the systemic causes of homelessness are addressed, our communities need equitable access to coexist in public spaces regardless of their living situation.

SIGNIFICANCE

Contemporary landscape theorist, Nina Lister, states that intersecting the needs of our community's vulnerable populations with ecosystems services is an essential step in the landscape architecture profession, serving both the ecological and social cultures of our cities (2007). As landscape architects, when we improve our public spaces for our community's most vulnerable, we are improving for everyone (Huttenhoff 2021). This research contributes knowledge to the field of landscape architecture by developing tangible design strategies to integrate both urban ecological functions and inclusive social resources in urban park design. Recent research lead by SPUR and Gehl discuses that as designers of public space, it is our responsibility to create spaces that serve every user and celebrate their differences in the way they use public space (Huttenhoff 2021). Celebrating these different needs within an urban public space is essential to contribute to resilient cities socially and ecologically (Yao and Xu 2017, and Klinenberg 2018). For one, public space is where the unintended and unscripted interactions happen, contributing to resilient sociocultural cities (Beardsley 2007 and Klinenberg 2018). Common ground in a city provides for exchanges in ideas, resources, and culture; "there is a huge potential in the rich encounters and activities that make up the metropolis" (Chatterton 2010, p. 627).

Moving towards a future projected to have a significant population increase in cities, we must understand the need for new concepts and structures of urban nature in its form and function (Ahern 2016). The physical infrastructure of our cities currently divides and lacks the ability to socially unify, "social infrastructure is the missing piece of the puzzle, and building places where all kinds of people can gather is the best way to repair the fractured societies we line in today" (Klinenberg 2018, p. 11). Landscape architects play a significant role in developing how to contribute to this shift and demand on urban nature to "feed, clothe, shelter, buffer, inspire, rejuvenate, and otherwise sustain a population of 10 billion humans" (Ahern 2016, p. 11). Specifically, through food and water landscapes, these re-imagined urban park design strategies can serve local ecosystem services and the needs of vulnerable populations to provide inclusive public space design that serves as social infrastructure for all users.

INQUIRY and METHODS

This research is lead by the following questions:

How can urban ecological function in public space design provide inclusive community resources?

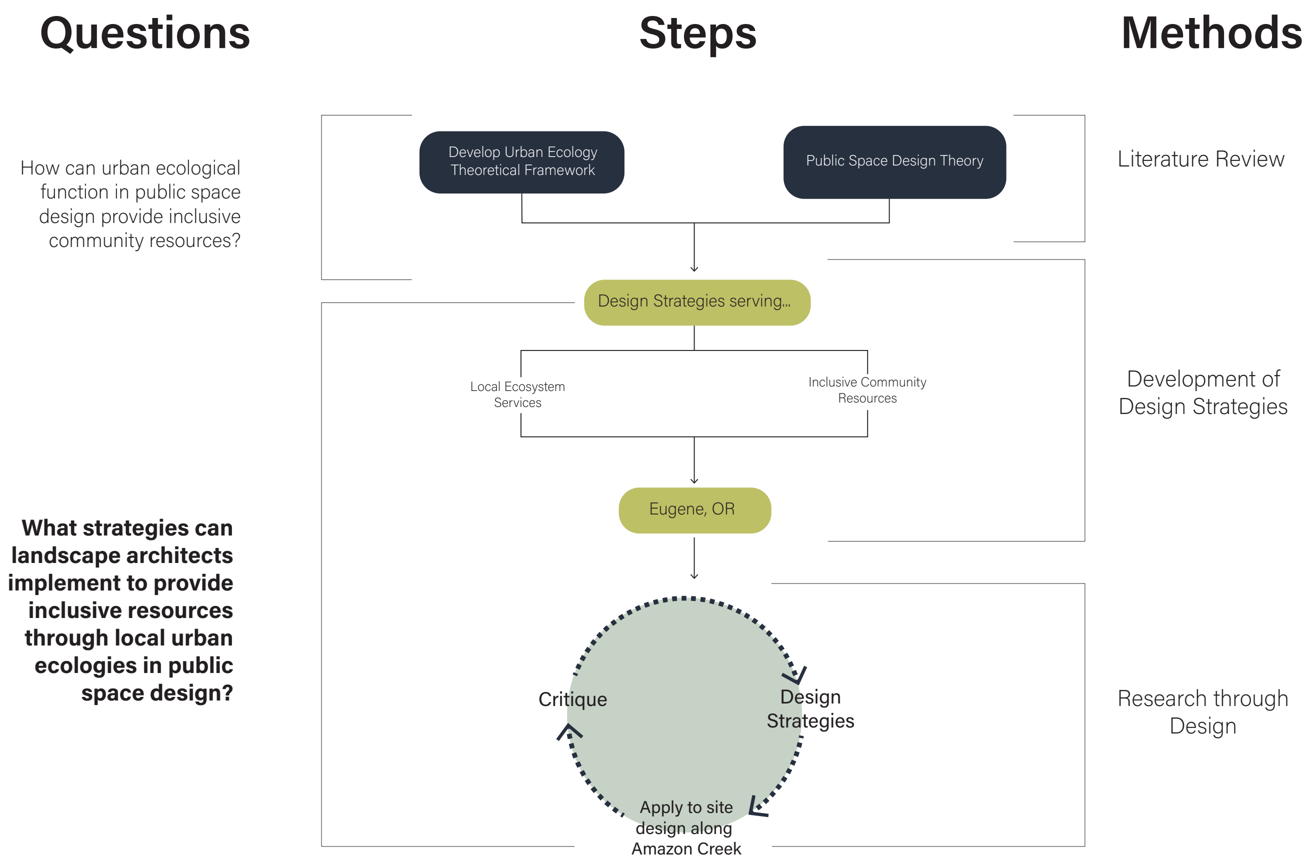
What strategies can landscape architects implement to provide inclusive resources through local urban ecologies in public space design?

The primary method of inquiry for this project was research through design. A literature review defined concepts around urban ecology and public space design. These definitions and concepts lead to the development of three key design strategies to apply through public space design. These design strategies were applied to a network of site designs along Amazon Creek in Eugene, Oregon through speculative design.

Figure 1.1 Methods Workflow Diagram

LITERATURE REVIEW

The literature review process combined books, articles, and conversations with members of the community relevant to the main concepts of this project: urban ecology, public space design and how it can provide inclusive resources for the community. Literature included defining urban ecology primarily through ecologist Richard Forman and professor and researcher Jack Ahern. Defining public space design theory pulled from a wide range of existing knowledge. This included, but is not limited to, the study of park design through the essays and case studies of Large Parks, edited by Julia Czerniak and George Hargreaves with contributions from landscape architecture practitioners and theorists. In addition to park design, the theory of a right to the city was explored through The Arsenal of Exclusion and Inclusion, by



Interboro, and complemented by many other public space theories and perspectives. Improving physical public space cannot be discussed without including the understanding of social infrastructure. Palaces for the People by Eric Klinenberg outlined the importance of physical design supporting the improvement of social infrastructure in cities. Lastly, the research by SPUR and Gehl discussing four facets of coexistence in public space provided a lens for these concepts and design strategies to be applied. Outlining these existing concepts and definitions was a key step to gathering fundamental knowledge on these topics to support a theoretical framework for developing design strategies and moving towards design.

CONCEPTS TO STRATEGIES

Through literature review, conversation, and classification of existing concepts, the gap in knowledge was identified as the meshing of ecological functions and inclusive resources in public space design. To address this gap, three design strategies were developed to provide tangible ways to intertwine these existing theories. The design strategies are 1) building urban food forests as novel ecosystems, 2) re-imagining the urban waterway as a social and ecological artery and 3) developing a cadence of amenities. The first strategy urban food forests as novel ecosystems was developed through combining Clark and Nicholas' and Beacon Food Forest's implementation strategies of productive landscapes. Secondly, the strategy of re-imagining the urban waterway was formed through existing strategies implemented by Kate Orff and SCAPE and revisiting Jack Ahern and Richard Forman's ecological water concepts. Lastly, developing a cadence of amenities grew from the social infrastructure theory of transient communities and networks. Providing amenities in public space, such as restrooms and seating, already exists but there is still more potential for amenities that compliment a social and physical network of a city. While these three strategies are not all encompassing of what is needed for inclusive public space design, they are the foundation that guided speculative design in this project.

SITE BASED KNOWLEDGE

To successfully apply these design strategies, place-based knowledge is necessary. An extensive look at Eugene, Oregon for existing environmental and social systems was performed to understand how to better integrate these systems with each other and supplement existing resources. Providing inclusive resources in public space requires identifying the communities' most vulnerable populations. In Eugene, a vulnerable community is people experiencing homelessness. Once this was identified, mapping existing social resources serving people experiencing homelessness developed a spatial narrative that can be built upon. This site analysis informed opportunities to implement these design strategies along Amazon Creek to develop an ecological and social artery for the city.

SPECULATIVE DESIGN

Speculative design provides us an opportunity to explore the "what if's" of our profession. As stated by Dunne and Raby;

"one is to use design as a means of speculating how things could be-speculative design. This form of design thrives on imagination and aims to open up new perspectives on what are sometimes called wicked problems, to create spaces for discussion and debate about alternative ways of being, and to inspire and encourage people's imaginations to flow freely." (2014, p. 2)

Employing research through design, I applied the three design strategies, developed in the previous stage of research, across different scales to speculate a different future for Amazon Creek. This process produced an urban design strategy and three site scale designs. Through this speculation, this project generated knowledge for landscape architects and design practitioners on how urban public space design can provide multi-functional landscapes for its community's social and natural environments. Discussion and critique of the site designs along Amazon Creek is provided to determine the success of these design strategies and how to improve upon them in future implementations.

02 CONCEPTS and DEFINITIONS

Urban Ecology

Public Space Design

"Moving forward, we need to think analytically about the interconnectedness of social and physical systems, knit these strands together, and derive new territories for action."

-Kate Orff

URBAN ECOLOGY

Richard Forman's work has provided accessible urban ecology concepts for many practitioners, including landscape architects. This section outlines those concepts and introduces how they led to ecological design strategies applied by many landscape architects, especially Kate Orff and Jack Ahern, whose work I will describe in Chapter 03. Kate Orff's research and writing centers around the theory of "urban landscape design as a form of activism" (Orff 2016). She frames ecology as an opportunity to synthesize disciplines between landscape architects, urban designers, community organizers, etc. to use ecology in the built environment to impact social infrastructure and change from the community up. SCAPE uses a systems-based practice to join social and natural systems through their projects (Orff 2016). Jack Ahern is a recently retired professor for University of Massachusetts, Amherst in the Landscape Architecture and Regional Planning Department. His research centers around novel urban ecosystems and landscape ecologies and applying those concepts to urban planning and design.

Richard Forman defines urban ecology as the "interactions of organisms, built structures, and the physical environment where people are concentrated" (Forman 2015, p. xii). Forman frames urban ecology into four defining features: land uses, built structures, permeating anthropogenic flows, human decisions/activities. Each feature is defined by a series of attributes, seen in Figure 2.1.

From there, Forman lays out ninety urban ecology principles that describe typical conditions of ecological patterns in the urban environment, (which are recorded in the Appendix). These principles can be used to guide design decisions to improve ecological patterns in the urban environment. Some of the principles explained by Forman describe ideal situations, while others depict conditions in urban ecology that could be improved. For example, "stormwater runoff largely from impervious surfaces and low-friction pipes dominates water flows, and hardly any water cycling/recycling occurs within an urban area" (Forman 2016, p. 1659) is a principle describing an existing condition that can be used to guide improvement of water quality in urban areas. Some principles can be drawn upon and combined with others or pushed further to improve urban ecology and provide resources in public landscapes. These include "trees cool air by shading wall, sidewalk and street, by transpiring water, and by accelerating airflow between tree crown and wall" and "diverse types of urban agriculture provide a distinctive flora, abundant herbivore populations, and nutrient-rich soil and water" (Forman 2016, p. 1657). The broader, organizing categories these 90 principles fall under are as follows: habitats, biodiversity, plants and vegetation, animals/wildlife,

Land Uses Water-supply sources area, development and suburban areas, residential areas, commercial and industrial areas, greenspace patches, green corridors and "stepping stone" sequences	**Built Structures** Buildings, roads and streets, pipes and pipelines, impervious surfaces, concentrated diverse structures
Permeating Anthropogenic flows Human-produced chemicals, human wastewater, human-produced noise and light, vehicles	**Human decisions/activities** Past societal actions/activities (or general evolution of an urban area), current societal actions/activities, individual decisions

Figure 2.1 Urban Ecology Attributes Forman's categorizations of urban ecology attributes into four groups/features (Forman 2016)

soils and organisms, chemicals and organisms, air and organisms, water and organisms, greenspaces, residential, commercial, industrial areas, and city and ring-around-the-city. All 90 principles, with distinctive ones identified that guided further research, are recorded in the Appendix.

Very commonly habitat fragmentation arises as urbanization and density increases. Fragmentation decreases the landscape's ability to sustain healthy native wildlife species through the diminishing size of habitat patches in urban areas, increased isolation of patches and complete habitat loss due to invasive species take over (Hennings and Soll 2010). Implementing patches, corridors, and the matrix are landscape ecology strategies used to tackle issues of habitat fragmentation and is further discussed in the Design Strategies chapter. Definitions are as follows:

Patches are defined as "a relatively homogenous nonlinear area that differs from its surroundings" and provide many ecological functions such as "wildlife habitat, aquifer recharge areas, or sources and sinks for species or nutrients" (Ahern 2007, p. 271).

A **corridor** is "a linear area of a particular land cover type that is different in context and physical structure from its context" (Ahern 2007, p. 271).

The matrix is "the dominant land cover type in terms of area, degree of connectivity and continuity, and control that is exerted over the dynamics of the landscape" (Ahern 2007, p. 271).

	Remnant / Restored Native	Abandoned / Ruderal	Horticultural / Formal	Green Infrastructure
Definition	Discrete patches remaining from pre or early stages of urbanization, or restored with moderate changes in species composition and vegetative structure	Spontaneous, non- or minimally managed, highly variable in vegetative structure and species composition, highly dynamic	**Intentionally made and managed for human use(s), particularly for aesthetic, social and recreation values**	**The biotic component of some green infrastructure in combination with ecologically-engineered substrates and surfaces**
Examples	Urban forest patches, marshes, riparian corridors, restored woodlands, wetlands	Brownfields, abandoned / derelict lands, transportation verges, dross capes	**Parks, public and private gardens, cemeteries**	**Created wetlands, bioswales, green roofs, blue belts, many green infrastructure practices**
Principal Ecosystem Services	Specialist habitat, nutrient cycling, climatic buffer, steppingstones, stormwater infiltration, reference ecosystems, research and education	Generalist / exotic species habitat, some nutrient cycling, climatic buffer, stormwater infiltration	**Climatic buffer, recreation, social venue, urban agriculture, moderate hydrological functions**	**Variable - predominantly based on hydrology, stormwater management, water quality, nutrient sequestration and climate mitigation**
Design and Managment Considerations	Adaptation to climate change? Potential invasion by exotic species?	Highly dynamic – but manageable – vegetation composition and structure, potential source for invasive species, public perception management	**Energy and labor intensive, generally high cultural acceptance, difficult to justify in a sustainability-conscious context**	**Safe-to-fail risk/opportunity to test novel concepts and combinations, monitoring and cost accounting particularly important**

Figure 2.2 Novel Urban Ecosystems Table adapted from Ahern's novel Urban Ecosystems (2016, p.14) Bolded are the areas of focus for this project

Novel urban ecosystems are a landscape typology discussed by Jack Ahern that have the potential to assist cities in becoming more sustainable and resilient (2016). Novel urban ecosystems, as defined by Ahern, are "ecosystems that persist or arise in cities, resulting from – and structured by – intentional or indirect human management actions [...] with unique species composition and structure influenced by biotic introductions and invasions; and that provide a suite of ecosystem services / disservices resulting from interactions of biota with the altered abiotic urban environment" (2016, p. 13). Ahern's further classification of typologies within novel urban ecosystems can be seen in Figure 2.2 and is used to inform design strategies. These urban ecology concepts discussed directed further research that developed public space design strategies, seen in Chapter 03.

PUBLIC SPACE DESIGN

Given the large amount of public land in U.S. urban areas and how little change there has been in the ways we use and perceive it, requires a re-evaluation as to how it is being used and how it can better serve the local communities and ecosystems that exist in the public realm (Nordahl 2009). As landscape architects, we have the privilege to shape and define not only the ways in which communities interact with existing public space design, but also the ways in which we all can view evolving public space in the future (Lindner and Meissner 2019). Having the ability to envision the potential of urban space is not the only way to shape a city; "urban life is shaped not only by the urban visions of planners, architects, or cartographers, but – just as significantly – through everyday actions of inhabitants [...]" (Lindner and Meissner 2019, p. 4). There is richness in the urban environments we create that stems from people living together, sharing resources, communicating, exchanging goods and ideas (Chatterton 2010). Our place, as public space designers, is to allow and celebrate those interactions in its most natural form through design.

Our city's public spaces, specifically parks are meant to celebrate the "unscripted interactions" that happen between all members of the community (Beardsley 2007). According to Nina-Marie Lister, large public parks need to be designed through an adaptive ecological design approach, which is defined as "sustainable design: long-term survival demands adaptability, which is predicated on resilience" (Lister 2007, p. 36). When applying an adaptive ecological design approach to public parks, one cannot just rely on ecological survival as a measure of success, but also economic health and cultural vitality to deem a park as thriving (Lister 2007).

Therefore, public space design needs to encompass ecological and programmatic complexity for both biological and social communities to interact and thrive (Lister 2007).

Public spaces are just that: Public. Yet designers regularly design spaces that exclude certain members of the community. Physical and spatial design elements in public parks significantly impact user perception and behavior in these spaces (Huttenhoff 2021). This happens in many forms; one example is hostile architecture. One case of hostile architecture, as seen in Figure 2.3, is a bench discouraging individuals to sleep or sit on it in a certain way. This is scripting a particular way of using and existing in public space, exclusive design. This specific example is a strategy designing against people experiencing homelessness. This leads me to the following question: On a site scale, how can our designs better reach the members of our community that have often been designed out of spaces for so long?

Figure 2.3 Example of Hostile Architecture (source: Ethan Levey)

Ways to exclude certain users from public spaces vary. They can be physical, like the ones I described above, or in the form of signifiers. One such example is loitering. The definition of loitering varies but generally, loitering is occupying a public space for an elongated time with no apparent purpose (Armborst et al. 2017). The specifics and legality of this differs from state to state but essentially it allows for and encourages unfair law enforcement, "anti-loitering efforts notoriously target teenagers, the homeless, and people of color" (Armborst et al. 2017, p. 232). In Oregon, no loitering efforts concentrate on school property or outdoor space of businesses. There are additional strategies to ban loitering without posting "no-loitering" signs, this includes resident-only parks (Armborst et al. 2017, p. 232). No matter the mask it is hiding behind, these movements all fall under exclusive design, intentionally restricting access to public space to certain members of the public, commonly allowing this restriction based on perception. As landscape architects, we hope for people wanting to spend time in our designed public spaces for no other reason than to just spend time in the outdoors. While, legally, these are difficult hurdles for public space designers and landscape architects, these unfortunate regulations shape the cities we exist in and design for. We can attempt to combat these exclusions through encouraging interactions that celebrate our differences in public space rather than displaying what some may subjectively perceive as undesirable behavior.

Behavior described above can be regularly seen throughout Eugene. People experiencing homelessness has been an increasing circumstance all over the country, but especially in Eugene in recent years. As I discussed previously, people experiencing homelessness often are designed out of public space through hostile architecture, exclusive design, or policing such as no loitering laws. Public space has a much greater potential to provide resources for all members of

We can attempt to combat these exclusions through encouraging interactions that celebrate our differences in public space rather than displaying what some may subjectively perceive as undesirable behavior.

the community, specifically vulnerable populations such as people experiencing homelessness, through inclusive design strategies. This concept led further research into stigmas behind homelessness as well as resources these communities desire in public space.

Becoming homeless is the result of multiple complex factors and does not happen overnight (Williams et al. 2018). These circumstances include but are not limited to structural factors (i.e. lack of affordable housing), systems failures (i.e. lack of support from health care systems), and unique individual and family circumstances (Williams et al. 2018). While the road to homelessness is so complex and specific to everyone, a leading cause is the increase of housing costs and lack of affordable housing. Housing affordability is defined by comparing a household's income to the cost of housing. If a household spends 30% or more of its income on housing, it is referred to as "cost burdened", when it is 50% or more it is "severely cost burdened" (Williams et al. 2018).

While the primary need for people experiencing homelessness is a house, there are many other ways public space designers and planners can design public space more catered towards homeless communities. An individuals' living condition does not warrant them being denied the use of public space (Huttenhoff 2021).

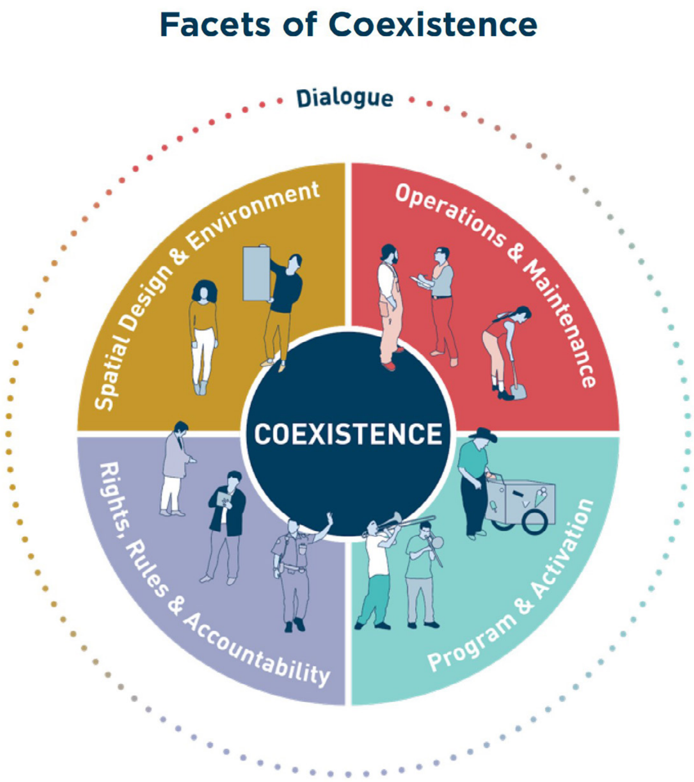


Figure 2.4 Facets of Coexistence in Public Space (source: Huttenhoff 2021)

Houseless communities move and exist completely in the public realm, their private tasks and belongings live in public space (Erlhoff et al. 2008). Until the unhoused are housed, all members of the community need to coexist in public space. Recent research by SPUR and Gehl on coexistence in public space lead to four overarching facets to guide public space design: 1) spatial design and environment, 2) operations and maintenance, 3) program and activation, and 4) rights rules and accountability, (Huttenhoff 2021) as seen in Figure 2.4. My design strategy is strongly influenced by these four facets. The design strategy implementation along Amazon Creek is discussed as a systems approach through these facets.

01 **Spatial Design and Environment:** This facet focuses on the relationship between the physical space and human experience, this includes elements such as seating, lighting, wayfinding, etc. Typically, this facet is envisioned and developed by urban designers, landscape architects and engineers, yet it needs to respond to the behaviors of the people using the space.

02 **Operations and Maintenance:** The groups responsible for maintenance are often different than those who design the space. This facet includes repairs, landscaping, cleaning and waste management, all carried out by public works, parks department, volunteer groups, etc.

03 **Program and Activation:** Parks and public space have the opportunity to re-imagine the programming that activates the space to draw people in. "The opportunity for such public space managers is twofold: to create invitations for many types of users – including the unhoused – and to assign responsibility for program management to the most appropriate stakeholders." (Huttenhoff 2021)

04 **Rights, Rules, and Accountability:** While everyone has, or should have, the right to access and use public space, there are behaviors that unacceptable or unsafe in public space that should be codesigned by communities to allow for a safe and functional space.

An article entitled "The Homeless Want More Than Housing" articulates specific resources desired by people experiencing homelessness (Gilmartin 2016). Some desired resources are physical infrastructure in the right of way (such as speed bumps and curbs that narrow the street to cause for slower traffic, and more shaded sidewalks). Others are simple, like storage units, drinking fountains and charging stations (Gilmartin 2016). Additionally, other resources can be incorporated into and strategized with local urban ecologies to provide benefits not only to the homeless communities, but also the local environment. These resources include vegetable gardens or fruit trees (Gilmartin 2016). Landscapes have the potential to provide resources and connect communities to existing social infrastructure and programming to supplement it. Not only are physical resources such as fruit bearing trees and storage units in public space desired by people experiencing homelessness, but also social gathering spaces to build community (Kingery-Page and Brown 2019). Creating a landscape that can support the building of social ties and communities should be an important goal for landscape architects in public space designs.

"Public spaces should be comfortable and engaging for people with homes and – until we solve homelessness – for those without homes."

-Michelle Huttenhoff, 2021

03 DESIGN STRATEGIES

Urban Food Forest as a Novel Ecosystem

Re-Imaginging Urban Waterways

Cadence of Amenities

> “Structurally integrating ecosystem services into landscape planning, management, and design is critical to improving urban landscape sustainability and resilience, and improving human well-being.”
>
> *-Kyle H. Clark and Kimberly A. Nicholas, 2013*

CONCEPTS TO STRATEGIES

After I gathered existing research in urban ecology and public space design through literature review, I generated three design strategies to apply to urban public space. Within each existing concept I took note of key themes, issues, and opportunities that informed three main design strategies of: building Urban Food Forests as Novel Ecosystems, Re-Imagining Urban Waterways as a social and ecological artery, and developing a Cadence of Amenities, as seen in Figure 3.1. My goal with these strategies is for landscape architects to incorporate them into public space design, no matter the client, program, or audience. As discussed in Chapter 02, SPUR and Gehl's facets of coexistence in public space will provide a lens through which design implementation of these strategies is discussed in Chapter 05.

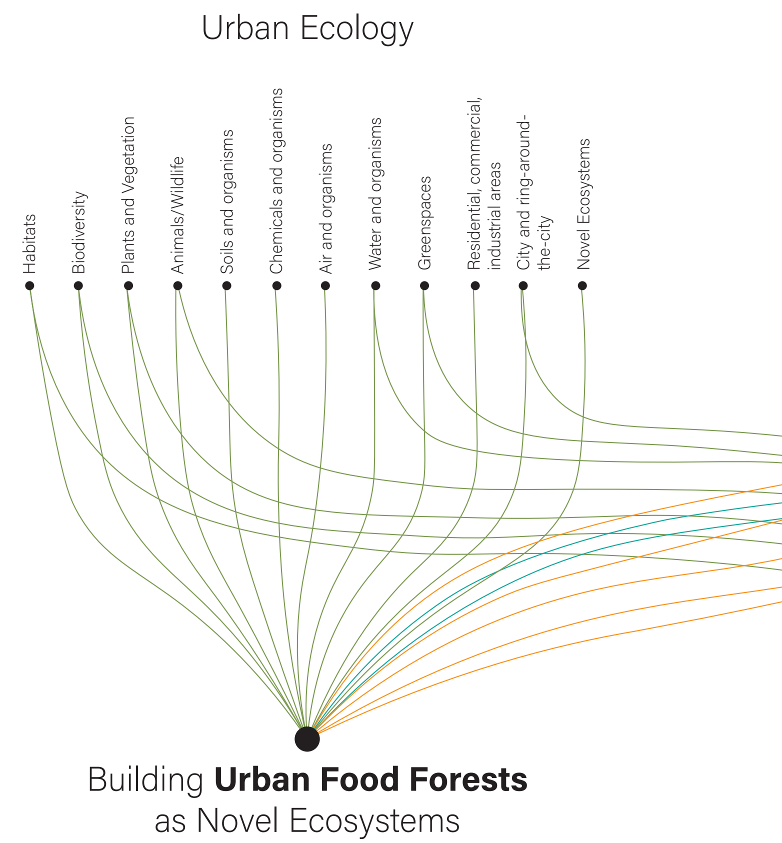
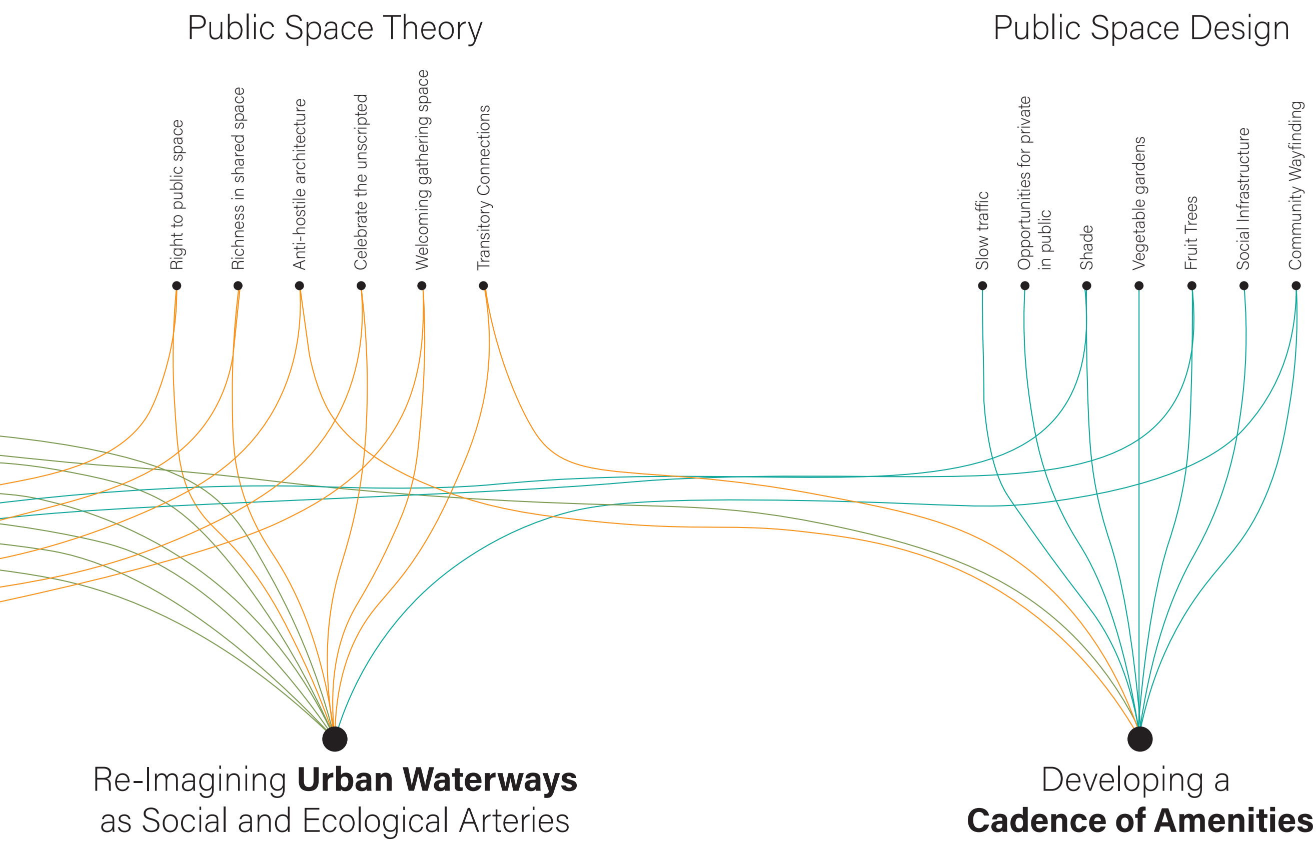


Figure 3.1 Concepts to Strategies
Diagram showing existing knowlege guiding design strategies

> "Building real connections requires a shared environment - a social infrastructure."
>
> *-Eric Klinenberg, 2008*



URBAN FOOD FOREST AS A NOVEL ECOSYSTEM

According to Clark and Nicholas (2013), there is a large untapped potential for urban food forests to serve local ecologies while also providing resources for communities in public space. Currently, cities are still highly dependent on land from rural communities to produce food, goods, and resources. This is due to the compartmentalized effects of zoning on cities, which prohibited agriculture within urbanized neighborhoods, followed by suburban sprawl that pushed agriculture activities even further (Nordahl 2009). Multifunctional landscapes will be a key player in the shaping of a resilient future for our social and natural environments. Urban food forests can provide ecosystem services for local ecologies as well as resources and services for the social culture of a city (Nordahl 2009).

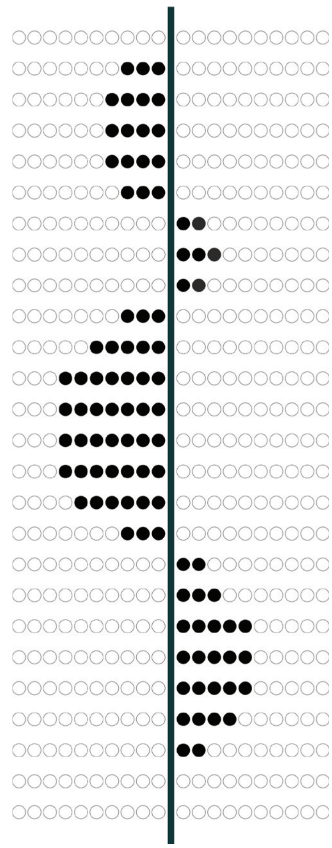


Figure 3.2 Urban Food Forest Diagram

Urban food forests provide ecosystem services such as improving air quality, water and micro-climate regulation, oxygen production, erosion control, nutrient-rich soil, and biodiversity habitat (Clark and Nicholas 2013, Forman 2016). Socially, urban food forests can provide opportunities in public space for cultural and recreational resources through harvesting, maintenance, and food all on common, public ground (Clark and Nicholas 2013), while also contributing to a more sustainable socio-ecological future (Lindner and Meissner 2019). Nordahl, comparing flowers to fruit, states; "if flowers can be an accepted symbol of goodwill and inspire all who gaze upon them, can fruit become an accepted symbol of equity, for all to eat?" (2009, p. 2) Providing food in public space must first come with a change in what we expect from plants in public space; they cannot just be for aesthetics, but also have the ability to provide resources such as nutrition (Nordahl 2009).

Additionally, growing and cultivated food in community gardens or food forests creates stronger, more resilient social ties and helps create an inclusive and resilient space (Hou 2017), another resource people experiencing houselessness are seeking (Kingery-Page and Brown 2019 and Huttenhoff 2021). The social significance of urban gardening ranges from health and access to fresh food to improving community development and resilience (Hou 2017). Nordahl argues "food choices in our urban surrounds can give citizens a more bountiful life" (2009).

Ecosystem Services	Social Resources
improving air quality	public space for cultural and recreational resources through harvesting, maintenance
water and micro-climate regulation	food all on common, public ground
oxygen production	cultivating food in community gardens or food forests creates stronger, more resilient social ties
erosion control	helps create an inclusive and resilient space
nutrient-rich soil	
biodiversity habitat	
(Clark and Nicholas 2013, Forman 2016)	(Hou 2017, Clark and Nicholas 2013)

CLARKS AND NICHOLAS

Specific design strategies for urban food forests have come from a variety of sources including Kyle Clark and Kimberly Nicholas and the Beacon Food Forest located in Seattle, WA. Clark and Nicholas's approach to urban food forests suggests the intersection of urban forestry, urban agriculture, and agroforestry create a novel landscape in urban environments (2013). Their definition of urban food forestry is "the intentional and strategic use of woody perennial food-producing species in urban edible landscapes to improve the sustainability and resilience of urban communities" (2013). Clark and Nicolas' strategies are as follows:

01

Emphasis on multifunctional species that serve urban forestry through air quality, water and climate regulation, oxygen production, erosion control, and biodiversity habitat and urban agriculture through increasing community food security, public health, social capital, and microenterprise opportunities, and lastly, integrating agroforestry to further ecosystem services (Clark and Nicholas 2013)

02

Planting fruiting trees at high-density (1 m spacing or less, "fruiting walls") includes advantages such as much shorter trees (2-3 m high) with more accessible fruit and lower maintenance requirements and is able to achieve substantial yields within the first two to four years, and full production by year five. This allows for more accessible engagement from members of the public to interact with and access this public produce (Clark and Nicholas 2013)

03

Clarks and Nicholas created a reference table of perennial food-producing plants including urban trees, shrubs, and vines (this table can be found in the Appendix). It is used to help determine the plant list for the site designs along Amazon Creek in Eugene, Oregon. While assessing other plants suitability not included in this table due to the geographic difference between their study area and mine, I can refer to their criteria which includes:

1) Fit for human consumption
2) Commercial cultivation and breeding for human food
3) Wide recognition and marketing
4) Fruit or nut palpability when eaten raw
5) Edibility without special preparation (peeling or cooking)

(Clark and Nicholas 2013)

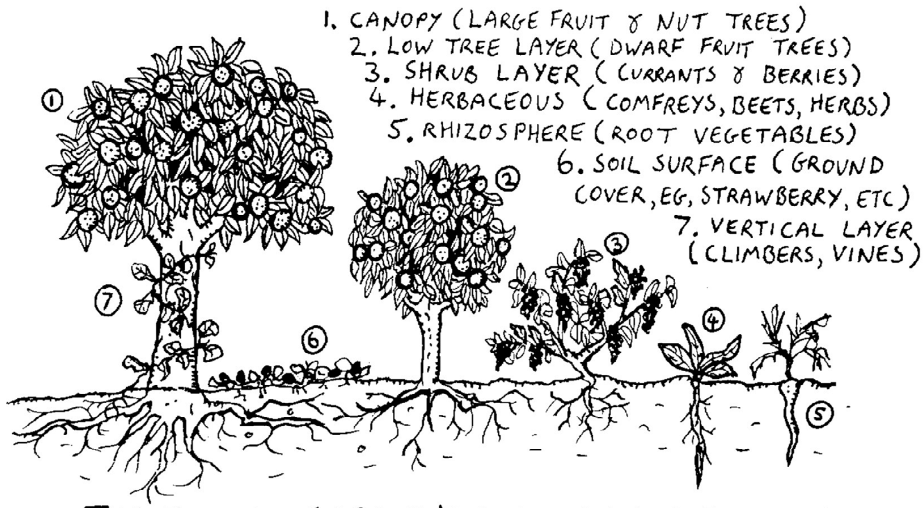
BEACON FOOD FOREST

Beacon Food Forest is located in Seattle, Washington and is a grassroots project almost entirely powered by volunteers. It identifies as a demonstration site and learning community that re-imagines the potential of what urban green spaces can offer. Working with a 7-acre plot of land, the design process was based on the principles and ethics of permaculture. Their planting strategy includes a seven-level beneficial guild for a forest garden, as seen in Figure 3.3. The seven levels include: a canopy, a low tree layer, a shrub layer, a herbaceous layer, the rhizosphere, the soil surface, and a vertical layer. Currently just over 3 acres of the land are being used as a food forest, giving garden, and P-Patch plots (plots managed by the city of Seattle and acquired through volunteering time). A majority of those 3 acres are deemed "open harvest", which means anyone can forage freely from the site. Beacon Food Forest partners with the city's Department of Neighborhoods to help provide utilities and run the P-patch community garden program. This partnership acts as a precedent of how to integrate similar productive landscapes into Eugene communities and organizations.

In 2019, 7,072 volunteer hours were recorded. While there is a staff at Beacon Food Forest, a lot of their maintenance is dependent on volunteers and P-Patch plot owners. Community engagement is a huge aspect of their mission to inform and encourage as many community members as possible to harvest, volunteer, and engage with the food forest. Educational classes are also a part of the programming hosted by volunteers. There was an estimated 2,823 lbs of fruit, vegetables, and herbs that were harvested in 2019. The breakdown of the produce contribution is seen in Figure 3.4.

Figure 3.3 Beacon Food Forest's Seven Level Benefical Guild (source: Beacon Food Forest)

Figure 3.4 Beacon Food Forest 2019 Yields (source: 2019 Annual Report)



THE FOREST GARDEN: A SEVEN LEVEL BENEFICIAL GUILD

Quantity (lbs)	Produce	Quantity (lbs)	Produce
50	Apples	1200	Helix Garden (beans, peas, beets, kale, chard, collards, squash, tomatoes)
10	Artichokes	20	Horseradish
150	Aronia	20	Honeyberries
1	Asparagus	100	Jostaberries
30	Autumn Olive	1	Kiwi
100	Blackberries	20	Medicinal Herbs
50	Blueberries	3	Medlar
20	Boysenberries	30	Mulberries
10	Burdock	2	Nettles
1	Butternuts	3	Peaches
250	Cardoon	20	Pears
2	Chocolate Berries	2	Persimmon
20	Culinary Herbs	200	Plums
50	Currants	125	Quince
30	Elderberry	75	Raspberries
10	Figs	8	Rhubarb
10	Fuki	1	Seabuckthorn
3	Goji Berries	1	Shipova
5	Goumi	150	Sunchokes
15	Grapes	10	Thimbleberries
5	Edible Flowers	10	Wineberries
TOTAL		**2823 lbs**	

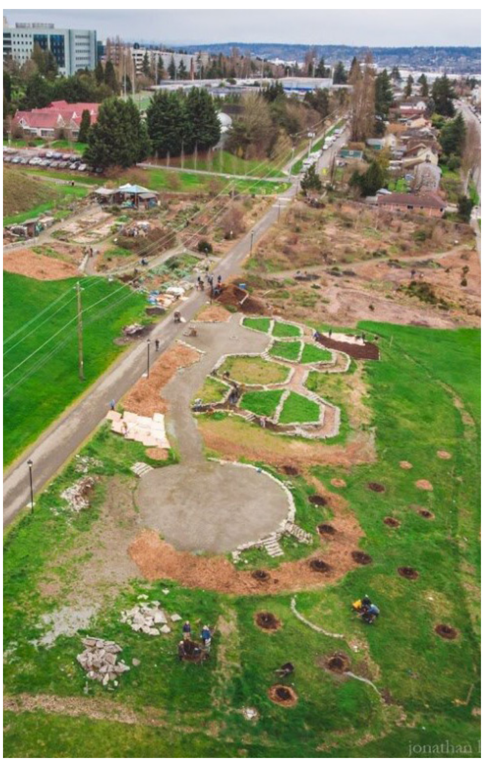
Beacon Food Forest's funding comes a variety of sources including the Food Forest Collective, GROW fiscal sponsor, grants, programming revenue, and donations. The funding covers two part-time employees of the Beacon Food Forest primarily through the Bullitt Foundation. These roles primarily focused on outreach, volunteer, and development coordination. These responsibilities take just as much time as physical maintenance of the land, emphasizing the need for planned maintenance and volunteer coordination for implementing urban food forest strategies on public land.

"He decides to plant the vine right behind a public bench, his logic being this location affords some protection to errant vandalism yet is close enough for people to reach their arm over the backrest if they want a quick snack."

-Darrin Nordahl, 2009

Figures 3.5-3.9 Beacon Food Forest site photos (source: Jonathan H. Lee)


BEACON FOOD FOREST HARVEST MAP
YOU ARE HERE
To Toilets (ramp)
Parking Lot
Sage
Hyssop
Chives
HERB SPIRAL
Lawn
To Toilets (up stairs)
GATHERING PLAZA
DEMONSTRATION & FOOD BANK GARDENS
Medicinal herbs
Children's garden
THREE BIN COMPOST
P-PATCH PLOTS
PLEASE DO NOT PICK HERE
MUSHROOM & HOPS HUT



RE-IMAGINING URBAN WATERWAYS

According to Kate Orff, urban hydrologic waterways and systems have great potential to provide improved ecological performance and social life of a city (Orff 2016). Urban rivers and creeks have an immense amount of potential to serve their immediate surroundings through filtering urban stormwater runoff, providing vegetal and aquatic life, as well as provide aesthetic and even recreational value to the urban fabric.

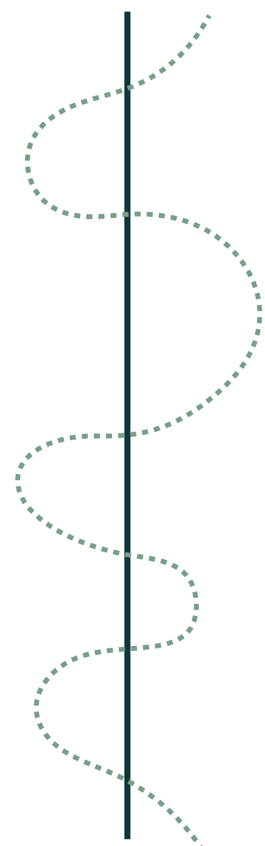


Figure 3.10 Urban Waterways Diagram

In the urban landscape, there are multiple opportunities for water systems to promote resilient urban public spaces (Yao and Xu 2017). When valued in the urban fabric, water is an environmental and civic common asset that can be leveraged to regenerate biological and social life. SCAPE's design process is "unlocked" by water through observing the way in which it reveals environmental and cultural histories in the built environment (Orff 2016). In cities, rather than desiring to restore water landscapes, we must look to revive. While still allowing the water to reveal its' history, reviving allows for creative and innovative design that moves us forward, rather than back. Additionally, reframing hydraulic systems in urban landscapes can improve ecological performance and spark interest in the community towards these systems (Orff 2016). Yao and Xu believe that a key design strategy to promote resilience of urban public spaces is to de-channelize water into natural, meandering rivers and streams (2017). Since water crosses all boundaries and scales, there is opportunity to plan and design with water from regional networks to interacting directly with the water at a site scale. Designing at the site scale in the public realm allows for strategies such as daylighting culverts, demolishing pavement, and adding more absorptive edges (Orff 2016). Looking at projects by SCAPE, such as Town Branch Commons in Lexington, Kentucky, as seen in Figure 3.11, we can draw from concepts and strategies for innovative design moves with water in public urban space.

Similar to Amazon Creek in Eugene, Oregon, the Town Branch has been hidden from the public and channelized for much of the city's recent history (Orff 2016). The primary concept for the Town Branch revival project is revealing the way in which water moves through the landscape and contributes to its' regional system. Revealing is accomplished through strategic actions of retaining, capturing, slowing, or even quickening for dramatic effect to align with urban space typologies (Orff 2016). Slowing the stream allows for understory shrubs and riparian habitat to establish (Orff 2016). Diverting and slowing the water helps to resolve the negative impacts that channelization and impervious surfaces have on urban waterways (Forman 2016). By introducing infrastructures such as filtration gardens and natural pooling provides for cleaner urban water systems and unique effects on public gathering (Orff 2016).

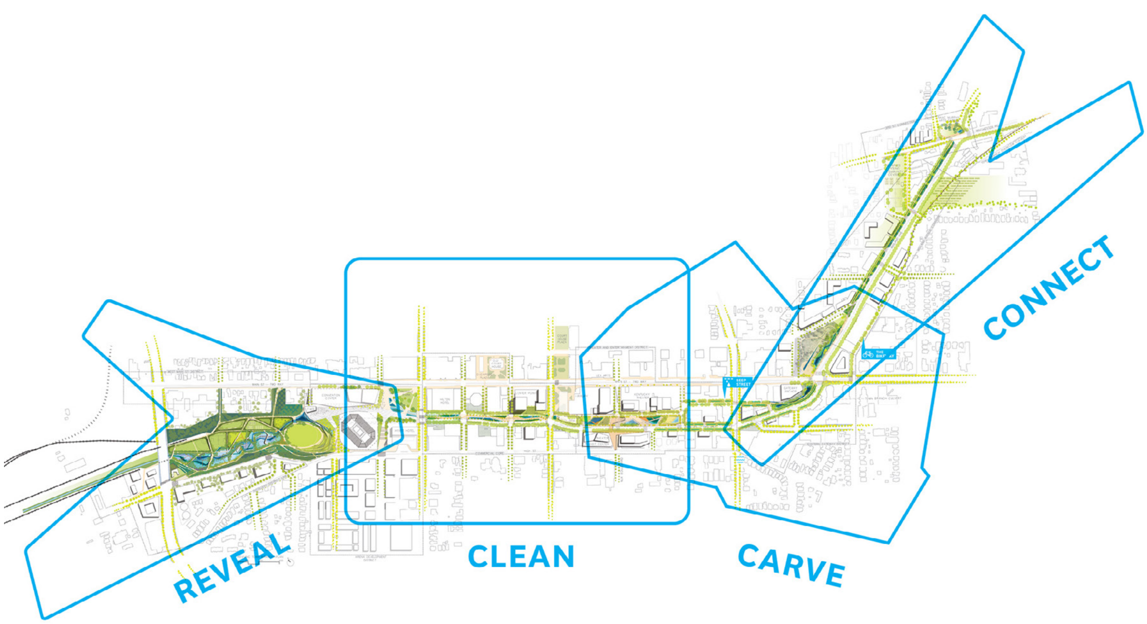


Figure 3.11 SCAPE's Design proposal for Town Branch Commons in Lexington, KY
(Source: https://www.scapestudio.com/projects/toward-urban-ecology/)

As it sits currently in the urban core, the Amazon Creek flows through an entirely impervious surface for approximately 12 blocks, which intensifies disturbance by humans and limits aquatic fauna through limited littoral and vegetation zones (Forman 2016), and limits the abiotic, biotic, and cultural (ABC) functions it provides (Ahern 2007). We can place Amazon Creek on Ahern's continuum of hydrological/stream types as it functions now, seen in Figure 3.12. Revealing and de-channelizing the creek can allow for an ecologically rich riparian corridor to revive the water and species it hosts, while also reconnecting the people of Eugene to its' local hydrologic systems and help improve its position on the continuum of ABC functions.

Since each function responds differently across the continuum, as designers we need to implement an array of strategies across one stream to best realize its ability to serve each function type (Ahern 2007). For example, one portion of Amazon Creek might better serve cultural functions while another best serves abiotic functions, etc. Green infrastructure interventions are a key part in re-imagining urban waterways and design for a successful urban riparian network.

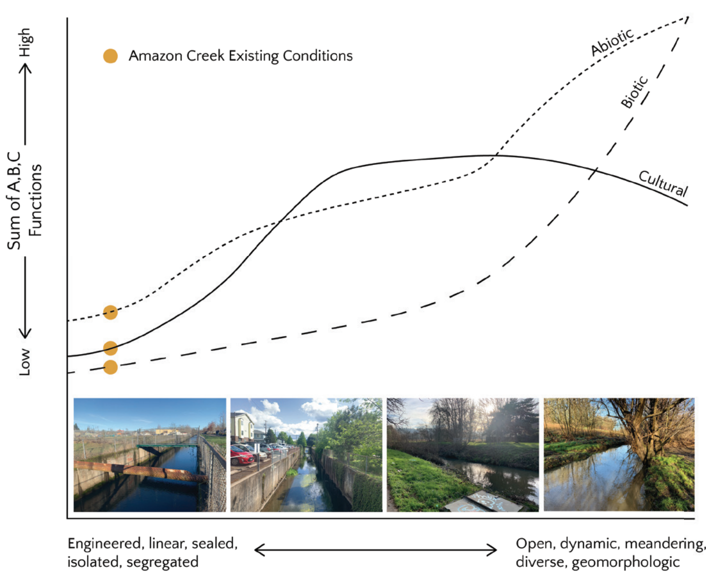
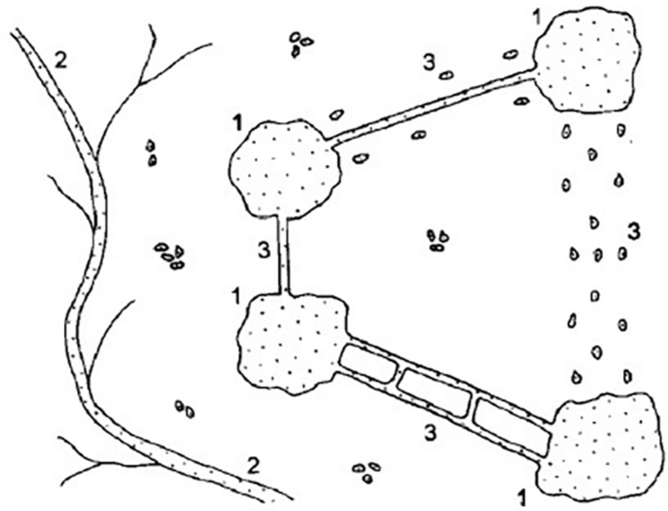


Figure 3.12 ABC Functions of Streams Adapted from Ahern's continuum of hydrological/stream types and associated abiotic, biotic and cultural functions applied to the study area of Amazon Creek

Figure 3.13
Forman's "indispensable" patterns for landscape planning: (1) large patches of natural vegetation, (2) stream/ river corridor, (3) connectivety between patches and stepping stones, and (4) small "bits of nature" (Forman 1995, p. 452)



Green infrastructure is an integral concept in successful public space design that links-built infrastructure with ecological functions and has the ability to achieve abiotic, biotic, and cultural goals of a community (Ahern 2007). According to Ahern, green urban infrastructure pulls from landscape ecology principles such as "a multi-scale approach with an explicit recognition of pattern: process relationships and an emphasis on physical and functional connectivity" (Ahern 2007, p. 267) to apply to urban design. A multi-scale approach applied to urban environments acts at the larger metropolitan region, districts and neighborhoods, as well as individual sites (Ahern 2007). Understanding how systems work at each of these scales is necessary to understand the existing hierarchy of urban operations such as transportation and non-human species movement through urban environments.

To address issues such as habitat fragmentation, we can strategically organize green infrastructure interventions into the urban fabric to fill these gaps (Ahern 2007). Interventions such as patches, corridors, and the matrix can be implemented, as defined by Ahern in the Concepts and Definitions chapter. These strategies can be complimented with Forman's indispensable patterns, as seen in Figure 3.13. Improving the riparian buffer not only provides habitat patches and corridors in the urban core, but also leads to better habitat connectivity from surrounding natural areas. "The optimal spatial arrangement of a cluster of steppingstones between large patches provides alternate or redundant routes, while maintaining an overall-linearly-oriented array between the large patches." (Dramstad, Olson, and Forman 1996, p. 38) Spatial forms of patches and corridors that address not only habitat fragmentation, but also other ABC functions are seen in Forman's indispensable patterns theory in Figure 3.13. Ahern lays out 5 key guidelines for planning and designing urban green infrastructure that are based on landscape ecology principles (2007).

01 ARICULATE A SPATIAL CONCEPT

Articulated as metaphors (ie. Green heart, ring city), they can structure and inspire the planning process, especially with public engagement and participation (2007).

02 STRATEGIC THINKING

"Protective, defensive, offensive, or opportunistic strategies" (Table 17.3 on p. 271), places planning in a broader context, aware of macro divers of change with respect to a particular goal in a certain place. "When the existing landscape is already fragmented, and core areas already limited in area and isolated, a defensive strategy is often applied." (2007, p. 271) While offensive strategies are based on a vision, opportunistic strategies seek new or innovative opportunities to provide ABC functions in and with urban infrastructure (2007).

03 THE GREENING OF INFRASTRUCTURE

Stormwater: rather than just controlling runoff, how can we improve and/or provide more ABC functions through green roofs, infiltration wells, vegetated bioswales, small ponds and created wetlands (2007)

04 PLAN FOR MULTIPLE USE

"How can new functions be added when the built environment has already displaced or replaced 'natural' areas and functions?" (2007, p. 275) One way is vertical integration, multiple functions can be stacked in one location. "Innovative scheduling can also be employed to integrate and coordinate the time dimension of ABC functions. Examples of infrastructure scheduling include limited human use of hydrological systems during periods of high flows, restrictions of recreational use of habitat areas during sensitive breeding periods." (2007, p. 275)

05 LEARN BY DOING

Transferability of ecological practices and concepts aren't seamless between different regions, climates, cultures, etc. A transdisciplinary approach is necessary to understand the specifics of regional ecological context to best apply strategies. For example, a corridor system for Koalas in Australia has extremely different needs to moose corridor in northeastern USA (2007).

CADENCE OF AMENITIES

According to Robert Garcia, Director of Center for Law in Public Interest in Los Angeles, webs of smaller urban parks providing recreation and facilities could better serve low-income and minority populations than larger, more distant parks (Beardsley 2007). Our cities' hard infrastructure currently isolates members of the community with transitory patterns based on the vehicle and planning strategies based on single-family homes, which are not accessible to everyone (Klinenberg 2018). While these systems and infrastructures are designed to be efficient, they isolate us and don't allow communities to build social ties. Physical infrastructure in a city has the ability to assist in community building and improving social infrastructure (Klinenberg 2018). Communities, especially Eugene, currently have successful social resources in place providing services to vulnerable populations, such as people experiencing houselessness (see Chapter 04: Existing Social Resources). What is lacking is the physical infrastructure and wayfinding that supports the existing social infrastructure opportunities. Successful urban design trends include providing networks or physical arteritis that connect people, neighborhoods, and resources that might otherwise remain divided (Klinenberg 2018). On a large metropolitan scale, New York City's subway system is an example of this. Subway travelers have formed "transient

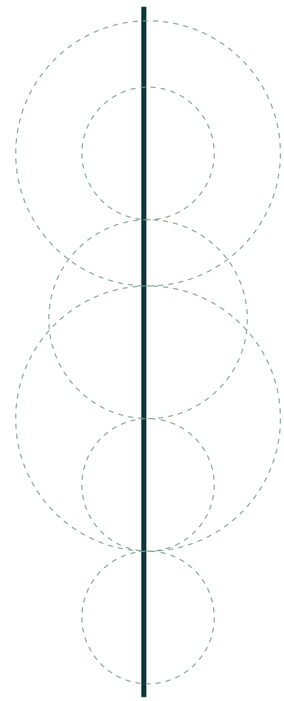
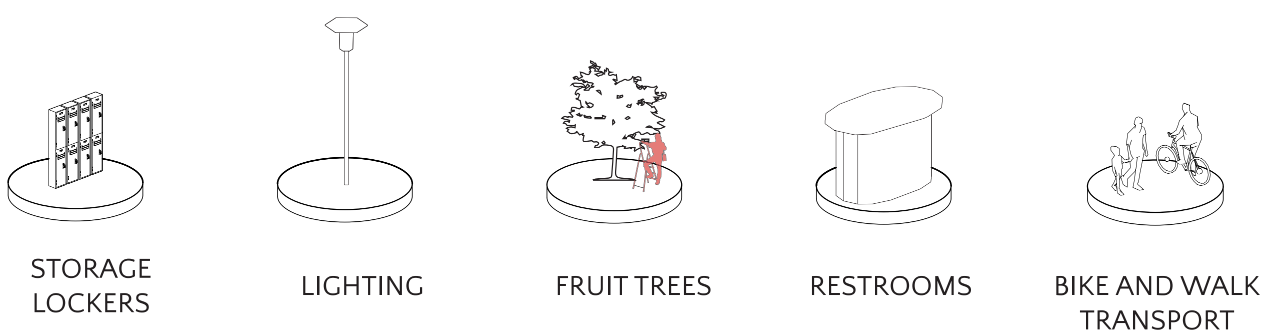


Figure 3.14 Cadence of Amenities Diagram

communities" as they commute on a crowded train "help[ing] passengers learn to deal with difference, density, diversity, and other people's needs. It fosters cooperation and trust. It exposes people to unexpected behavior and challenges stereotypes about group identity" (Klinenberg 2018, p. 18). This phenomena can be applied to a smaller, natural artery of a city like a river or creek to act as a physical connection to existing social and natural resources in the community as well as provide a social infrastructure through bike and walk transit as well as gathering.

Much like non-human species need habitat corridors and patches, this artery can also act as a corridor of amenities for human users. Supplementing wayfinding and connections to existing resources, a cadence of amenities can be developed on this social artery through a city. This corridor can be centered around a natural physical feature such as Amazon Creek that runs through the urban core of Eugene and currently acts as a major transitory corridor for all members of the community. Amenities included in this cadence can be seen in Figure 3.15. A cadence of amenities allows these resources to be evenly distributed throughout a city's multiple neighborhoods, no matter the demographics.

Figure 3.15 Amenities for Public Space Design



DESIGN STRATEGIES | OVERVIEW

Building Urban Food Forests as Novel Ecosystems

High density planting for sooner and more accessible yields

Multi-story production with multi-functional species

Use of food producing perennials throughout the whole site

Fruit or nut palpability when eaten raw, without special preparation

Open harvest of food forest

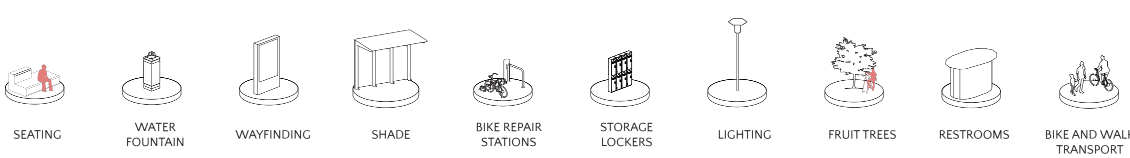
Partner with local communities for maintenance

Developing a Cadence of Amenities

Evenly distributed amenities

Space for programmed and passive social activities

Spatial design and Environment



Re-Imagining Urban Waterways as Social and Ecological Arteries

De-channelize water into natural, meandering rivers and streams

Articulate a spatial concept

Improve access and interaction with water

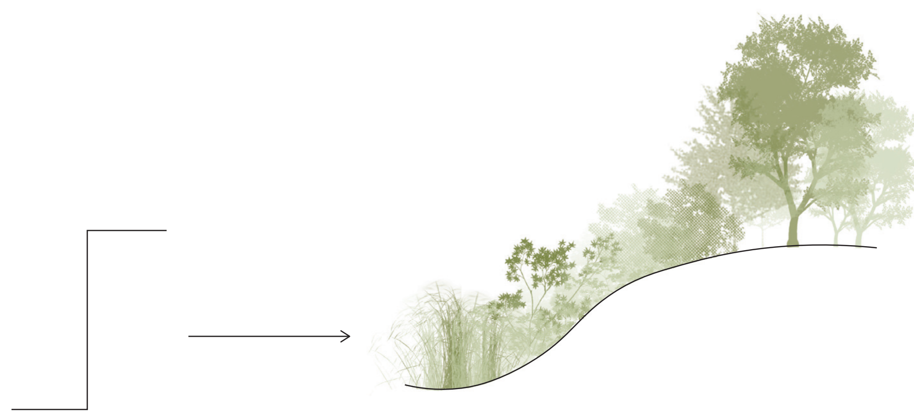
Re-frame hydrologic systems for ecological performance and public interest

Daylight culverts and demolish pavement

Slow water flow to allow for understory shrubs and riparian habitat to establish

Absorptive edges through filtration gardens and bioswales

Multi-scale and Multi-Use Approach



Concrete Channelized Creek

Absorbative Edges

04 STUDY AREA

Eugene, OR

Existing Social Resources

Amazon Creek

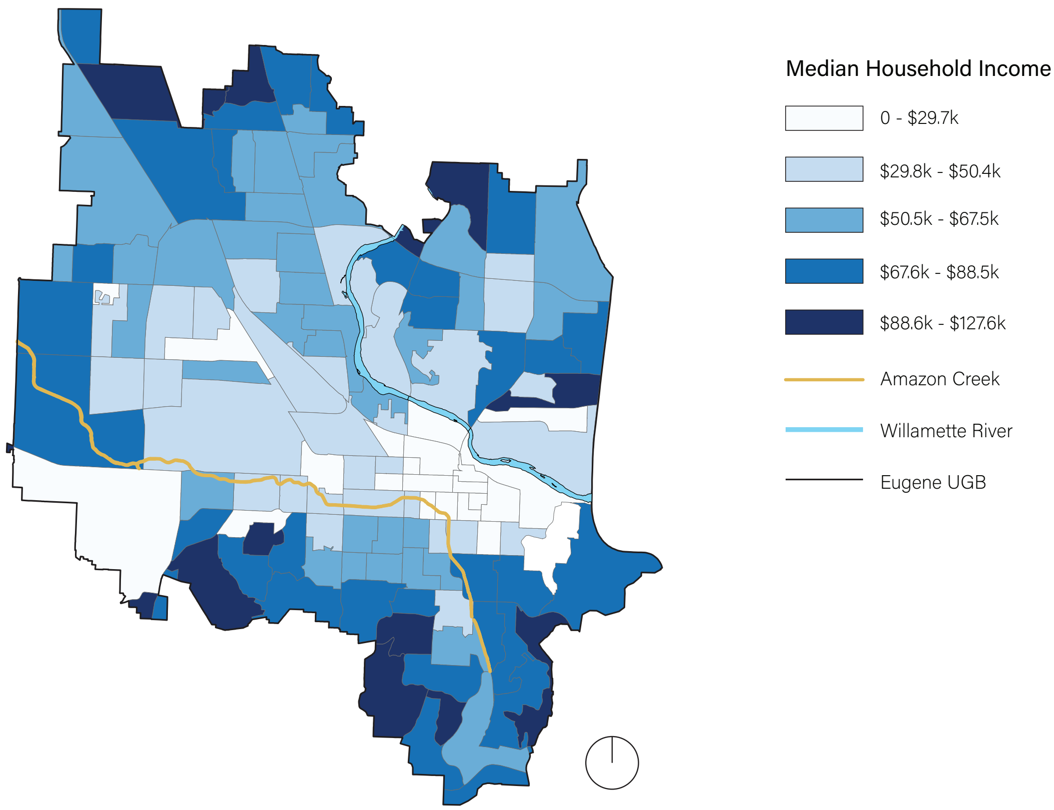
Design Scope

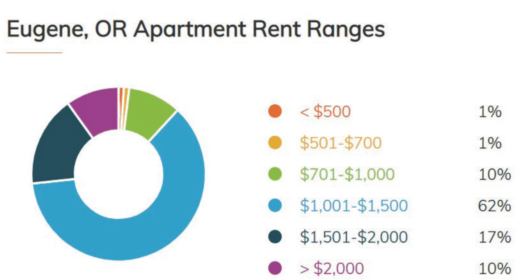
> "[...] parks provide the necessary room for contest and struggle that allow people an opportunity to produce their own meanings and uses for public space. Whatever their flaws, parks remain among the most reliable places we have for the unscripted interactions that oil the creaky machinery of democratic social life."
>
> *-John Beardsley, 2007*

EUGENE, OREGON

Eugene is located on the traditional indigenous homeland of the Kalapuya people, many of whom are now citizens of the Confederated Tribes of Grand Ronde and the Confederated Tribes of Siletz Indians. Eugene sits at the southern end of the Willamette Valley in Lane County with a population 165,997 individuals in 2018. Being a college town hosting the University of Oregon, home ownership is 47.9%. Eugene and, like a lot of other cities and states, suffers from lack of affordable housing with the cost to buy a house rising 73% in the last 20 years and rent prices up by nearly 50% (Eugene, OR Census Place 2020). As recent as January 2021 the average rent for an apartment in Eugene is $1,405 per month with an expected increase each year (Eugene, OR Rental Market Trends 2021). For a family to affordably rent a two-bedroom apartment and still have funds for other needs, they must earn around $23 an hour (Adams 2019). And for families or individuals who have no other financial choice but to rent, they are required to keep up with increasing rent prices that eventually become inaccessible.

Eugene has an interesting social landscape with a very wide range of median household income, and at the same time many people experiencing homelessness. Lack of affordable housing is one of the leading causes of homelessness and in 2019. Eugene ranked number one in the country for people experiencing homelessness per capita (Turner et al. 2019). Spatially, as seen in Figure 4.1, Amazon Creek in the urban core is directly surround by the two lowest brackets of median household income. Additionally, the urban core is where the highest concentration of people experiencing homelessness occupy. Amazon creek currently acts as a divider of Eugene, physically and socially.





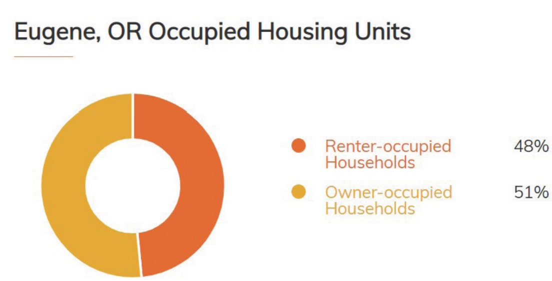


Figure 4.1 Eugene's Median Household Income in 2019 inflation adjusted dollars (data source: data.census.gov)
Figure 4.2 Eugene's Apartment Rent Ranges (image source: Data from the Census Bureau ACS 5-year Estimate)
Figure 4.3 Eugene's Occupied Housing Units (image source: Data from the Census Bureau ACS 5-year Estimate)

EXISTING SOCIAL RESOURCES

White Bird Clinic

"White Bird is a collective environment organized to enable people to gain control of their social, emotional and physical well-being through direct service, education, and community. White Bird provides compassionate, humanistic healthcare, and supportive services to individuals in our community, so everyone receives the care they need."
White Bird provides substance abuse and mental health care services, counseling, crisis service center, dental clinic, and many other services.

Cahoots

Cahoots, an extension of White Bird, is a mobile crisis intervention van in Eugene that responds to non-criminal situations including substance abuse, welfare checks, and dispute facilitation.

St Vincent De Paul: First Place Family

This day center provides resources for houseless or low-income families such as showers, laundry, preschool, meals, emergency night shelter, and much more.
"First Place Family Center is a refuge and place of support for children and their families who are low income, at risk of losing their housing or are already in transition between homes due to job loss, health issues and other critical problems."

ShelterCare

ShelterCare is a private, non-profit human-services agency run and directed by volunteers offering housing and support services for individuals or families who are homeless, or on the verge of homelessness, with a committed focus on individuals living with mental illness. with mental illness.

Eugene Mission

Eugene Mission's goal is to "provide holistic long-term solutions that lead to the long-term wellness of our guests." They provide rescue shelter and meals all while building relationships with guests and providing life skills and tools for the future.

Hosea Youth Services Project

"Helping the at-risk and homeless youth of Lane County, ages 16-24, create and sustain healthy lives away from the streets."

Community Supported Shelters

CSS's mission: "Fostering opportunities for community development and safe, functional shelter for those experiencing homelessness." They oversee multiple Safe Spot Communities throughout Eugene. Safe Spot Communities are legal designated places for people who are without a conventional form of housing. Each of these sites focuses on a different demographic, people with disabilities, a site for veterans, and another site for a mixed population. The number of sites continues to grow.

Warming Center

Warming Center is a homeless shelter hosted in First Christian Church. They provide a place to sleep and hot meals.

Geographically, as seen in Figure 4.4, Eugene's community resources are distributed throughout Eugene. These resources provide many tangible and social benefits to the community, especially for individuals experiencing homelessness. However, the physical infrastructure to navigate to these services is lacking and not accessible. There is potential to use Amazon Creek as a transitory corridor and wayfinding navigation tool to connect the community to the many social resources Eugene provides.

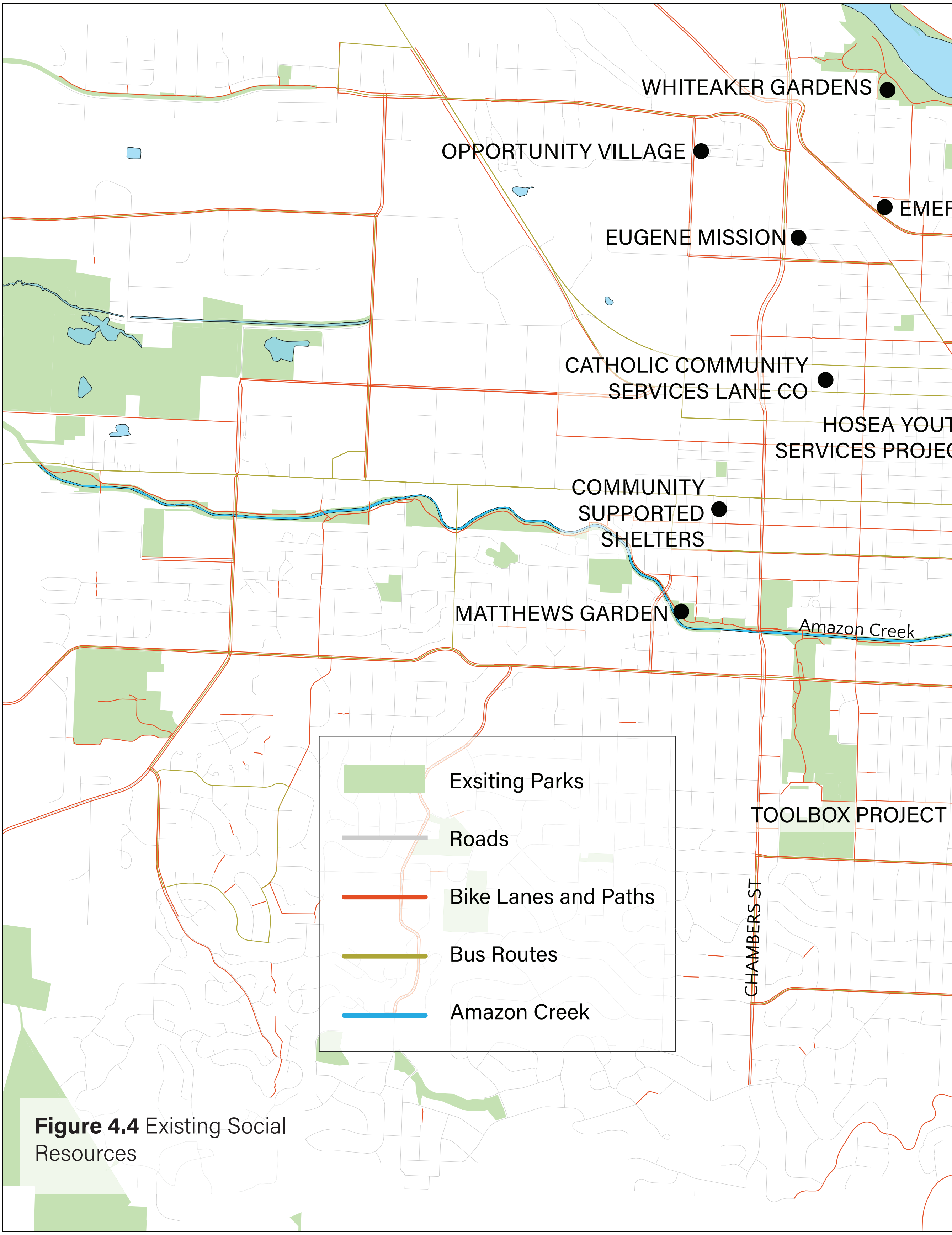
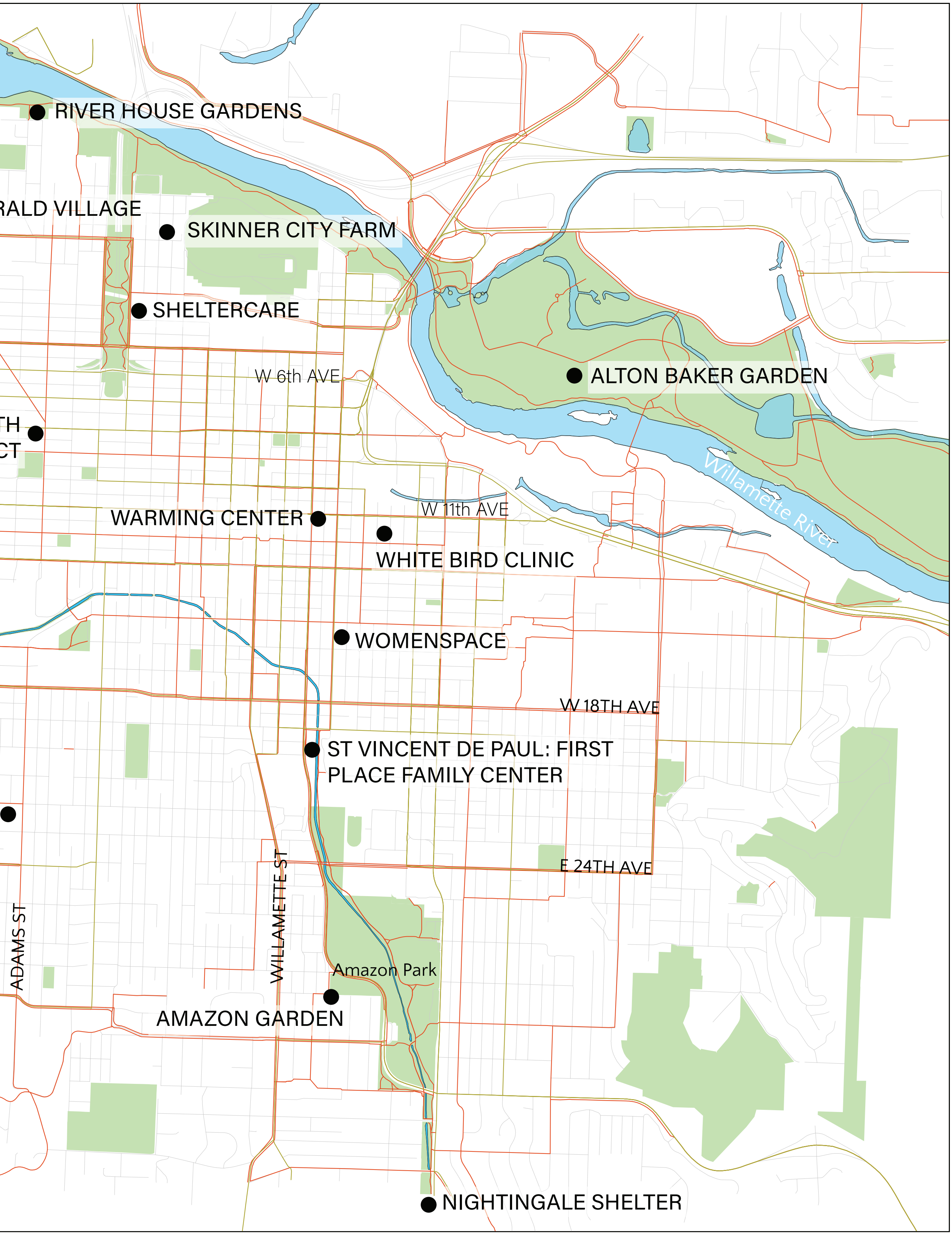


Figure 4.4 Existing Social Resources


RIVER HOUSE GARDENS
RALD VILLAGE
SKINNER CITY FARM
SHELTERCARE
W 6th AVE
ALTON BAKER GARDEN
TH
CT
Willamette River
W 11th AVE
WARMING CENTER
WHITE BIRD CLINIC
WOMENSPACE
W 18TH AVE
ST VINCENT DE PAUL: FIRST
PLACE FAMILY CENTER
E 24TH AVE
ADAMS ST
WILLAMETTE ST
Amazon Park
AMAZON GARDEN
NIGHTINGALE SHELTER

AMAZON CREEK

Existing Conditions

Amazon Creek, located in Eugene, Oregon, stretches almost 12 miles from the south hills to the West Eugene Wetlands and Fern Ridge Reservoir. The creek receives most of the city of Eugene's stormwater. 93% of the land that drains into the creek lies within the Urban Growth Boundary (UBG), as seen in Figure 4.6. The portion of Amazon Creek on which this project focuses spans from 33rd Ave north to 18th St where it turns west and continues to Oak Patch Rd. To mitigate flood risk for the urban core of Eugene, Amazon Creek was channelized in the 1950s from 33rd Ave to Fern Ridge Reservoir. The dense commercial and residential area from Amazon Parkway to Jefferson St was additionally channelized with a concrete-walled channel to further improve flood conveyance in the urban core. The existing conditions of the concrete channel can be seen in Figure 4.5.

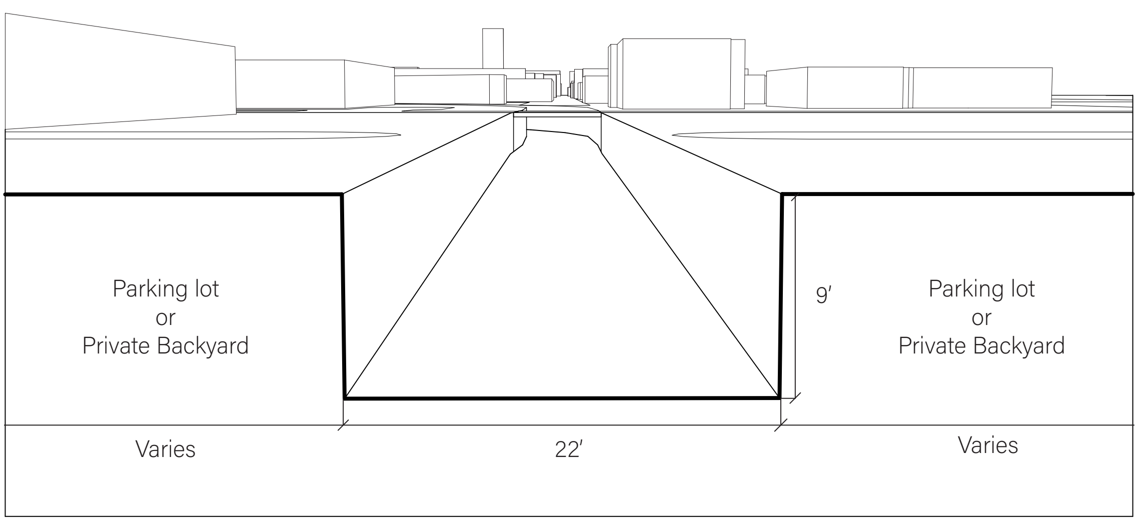
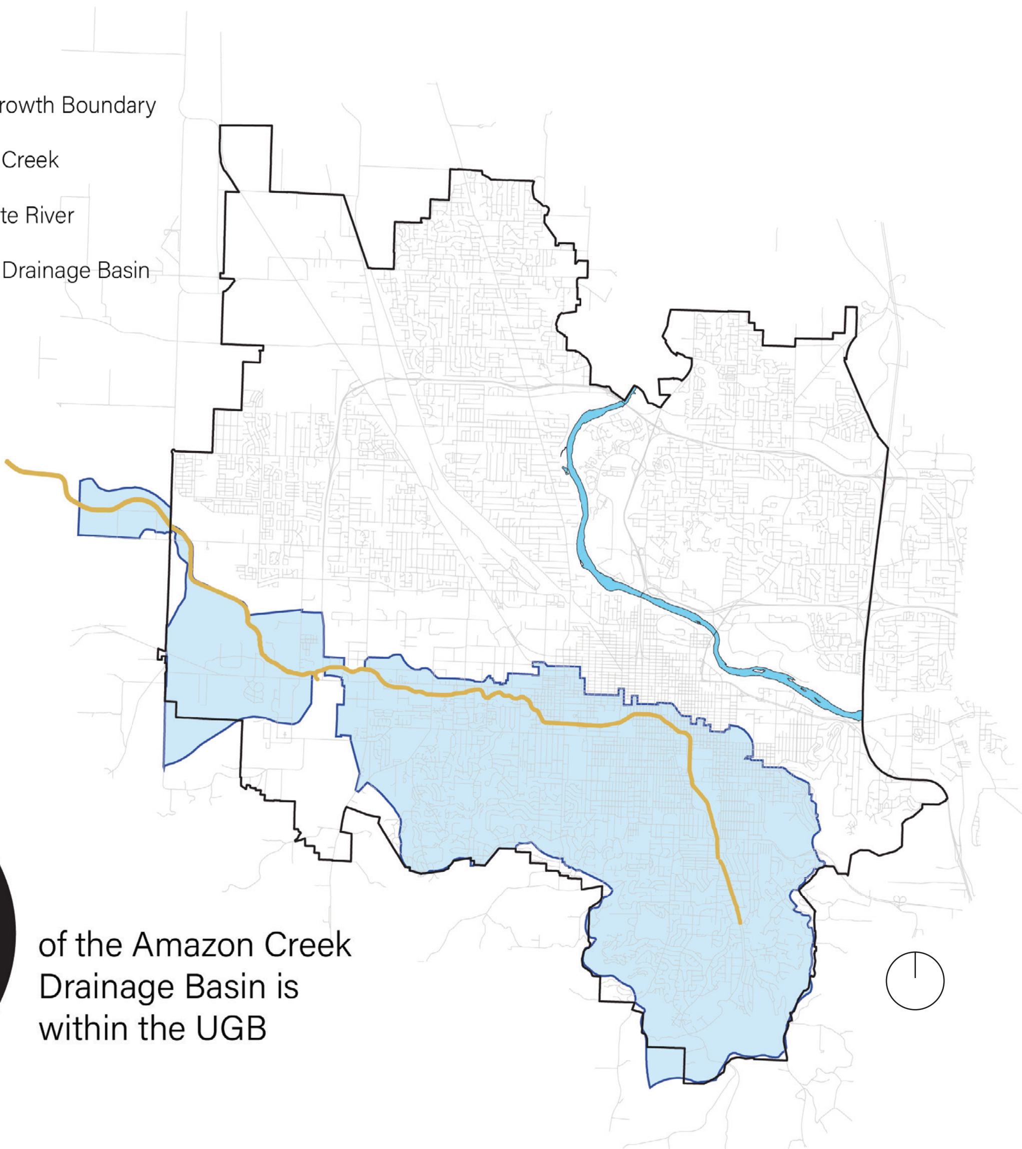
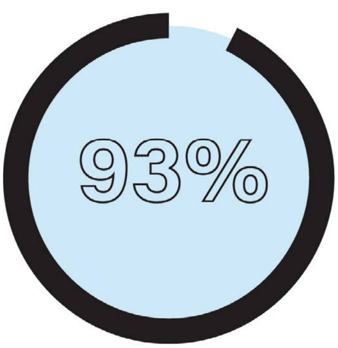


Figure 4.5 Existing conditions of channelized portion of Amazon Creek





of the Amazon Creek Drainage Basin is within the UGB

Figure 4.6 Amazon Drainage Basin

Vegetation

The channelizing of Amazon Creek has caused a significant decrease in quantity and quality of riparian plant communities. The headwaters in the south hills provide the only example of a successful, intact riparian forest with a native canopy and understory. This well-developed native community provides high resource value by shading the creek causing cooler water temperatures for aquatic organisms. From 30th Ave to 24th Ave Amazon Creek meanders through Amazon park with three large ash groves, native wet prairie areas, and a patch of the federally endangered species Bradshaw's lomatium (Lomatium bradshawii) just south of 19th Ave. Moving northwest along the creek we see the lack of vegetation and soil caused by the channelization leading to very low habitat value. The concrete channels and large amount of impervious surface surrounding the creek from 19th Ave to the Jefferson St doesn't allow for any natural riparian vegetation to grow. This causes a large gap in species habitat from Amazon Park to Oak Patch East, as seen in Figure 4.7. Implementing green infrastructure strategies along Amazon Creek through the urban core will provide potential habitat patches and corridors (Holts et. Al 2014).

Water Quality

Lack of mature vegetation throughout the urbanized creek and low water levels not only increase the water temperature but also causes lethal conditions for fish and other aquatic species. Approximately 1/3 of the Amazon drainage basin is impervious surfaces leading to high peak flows, increased erosion, and high sediment levels. Run-off from these impervious surfaces contains non-point pollution from urban development. The low water quality throughout Amazon Creek is violating the Department of Environmental Quality Standards. Overall, the high-water temperatures caused by lack of vegetation do not support any aquatic species. For water quality to improve, the temperature of the water needs

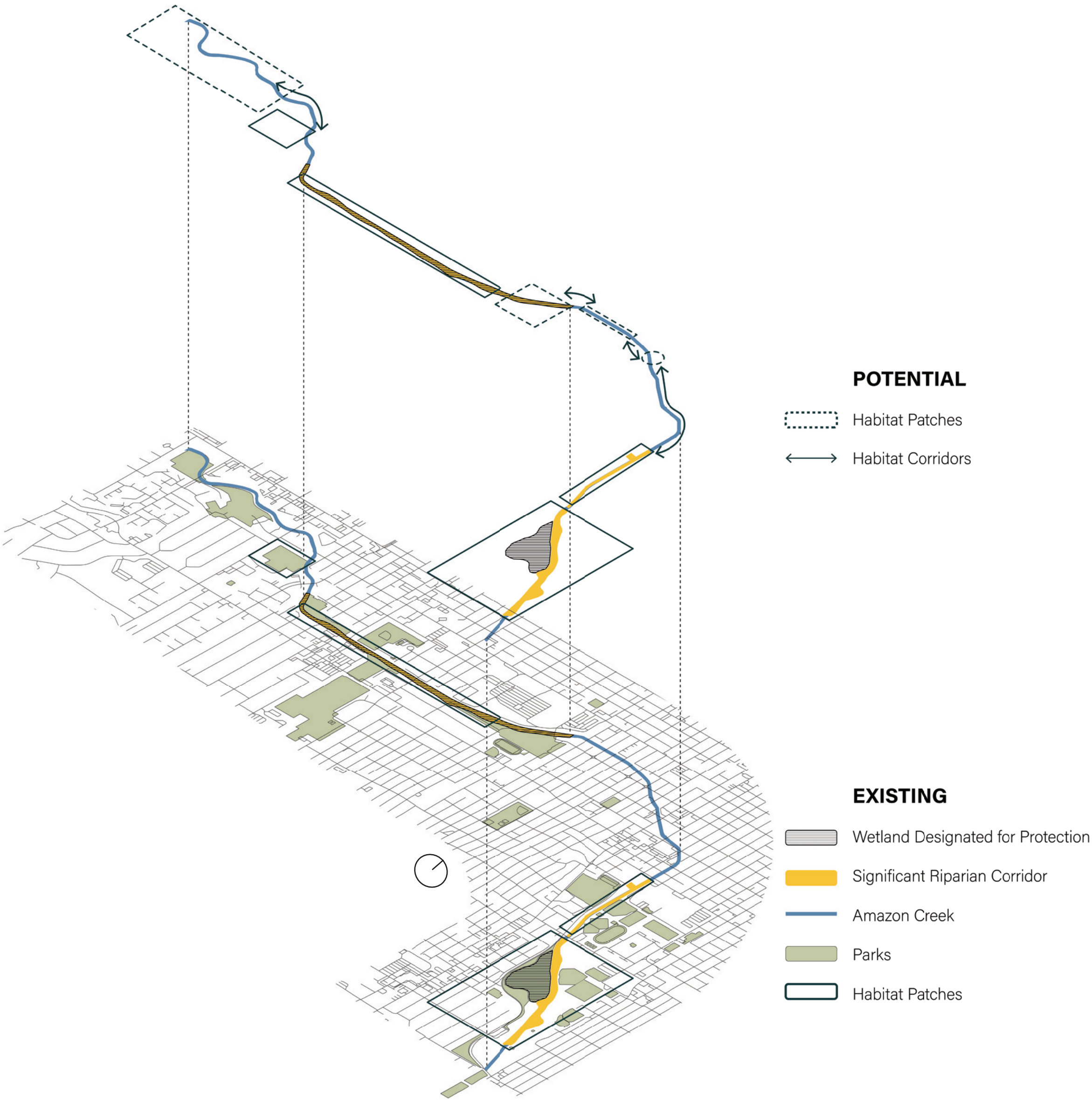


Figure 4.7 Existing and Potential Ecological Hotspots
Data Source: Goal 5 Water Resources Conservation Plan

to decrease through shading and less concrete with more absorptive edges. (Holts et. Al 2014)

Transitory Corridor

Currently, there exist two major non-vehicular paths along Amazon Creek, the Fern Ridge path beginning/ending at Jefferson Park and traveling out to the West Eugene Wetlands and the Amazon Trail beginning/ending abruptly at 19th Street, running through Amazon Park and connecting with Ridgeline Trail System. There is a gap waiting to connect these two heavily trafficked trails through the urban core along Amazon Creek from 19th St to Jefferson Park. These trails currently act as a heavily trafficked public pathway, specifically for members of the community experiencing homelessness. This was a key reason for Amazon Creek as the site selection. It currently acts as a corridor for some of Eugene's vulnerable populations, yet it has much more potential to serve people experiencing homelessness.

Spatial and Soical Narrative

Through the research of Elizabeth Stapleton on the social narrative of the Amazon Creek, she discusses the ways in which water has affected the spatial justice in urban Eugene (2020). As mentioned, in the 1950's Amazon Creek was channelized by the Army Corps of Engineers to alleviate flood in the urban core. However, even prior to this, it was seen as a forgotten landscape. Channelization efforts of dredging and straightening have been implemented for the last century, with the earliest in 1902. Due to this physical constriction, Amazon Creek has experienced little to no programmatic use. This relationship, or lack thereof, with Amazon Creek and Eugene community members degrades the human nature relationships in urban environments. This lack of care and attention contributes to the urban stream syndrome, which perceives urban environments as unnatural and unworthy of preservation (Stapleton 2020).

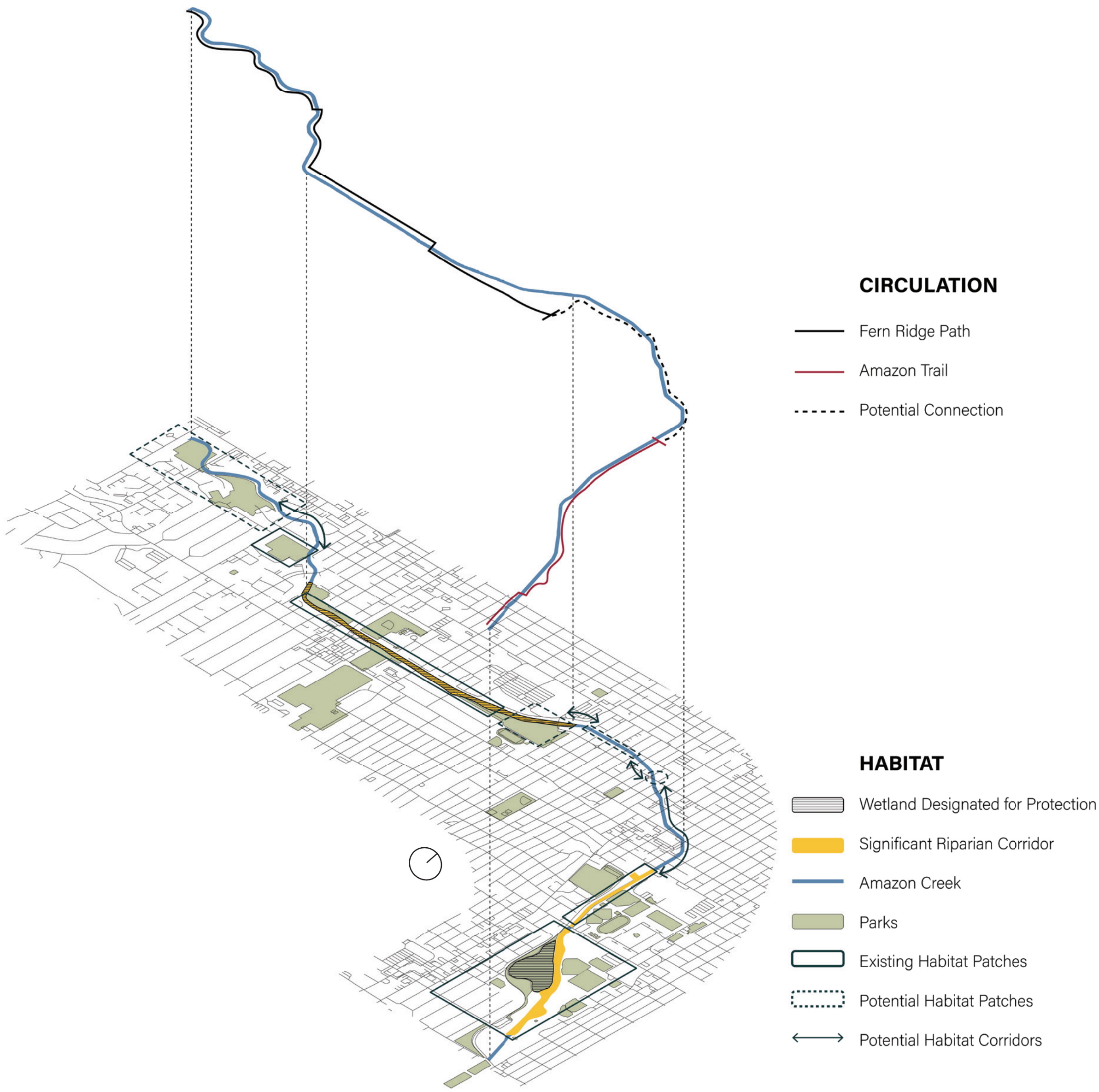


Figure 4.8 Fern Ridge Path and Amazon Trail along Amazon creek with the gap between the two shown in the dashed line.

There is an unfortunate link between restoration and development along parts of Amazon Creek, contributing to an unjust spatial narrative. Efforts of restoration or improvement are distributed unevenly across different regions of the creek, with a large contrast between the southern and western regions. These different regions of the creek are discussed very differently. The headwaters, in the southern region, are home to the most natural riparian habitat along Amazon Creek. As the creek runs north towards the urban core and turns west towards industrial west Eugene, it differs drastically from the natural meandering creek in the south. It is more polluted and primarily surrounded by heavy industrial and commercial uses. Additionally, west Eugene hosts more multi-family housing and a lower median household income than south Eugene, as seen in Figure 4.1. This drastically changes the perception of Amazon Creek based on location. The south is perceived as more natural and contributing to an open space network. In contrast, the west is viewed as unsafe, less desirable, and unnatural, focusing on the human users of the space rather than natural amenities (Stapleton 2020).

Design Scope

Following site analysis, I selected three sites along Amazon Creek that not only provide opportunity to apply the three design strategies, but also show a need for such interventions. The three sites, seen in Figure 4.9, include the land surrounding St Vincent De Paul: Family Day Center between 24th St and South Eugene High School, Jefferson Park and the land South of Lane County Events Center, and Oak Patch East and Berkeley City Park.

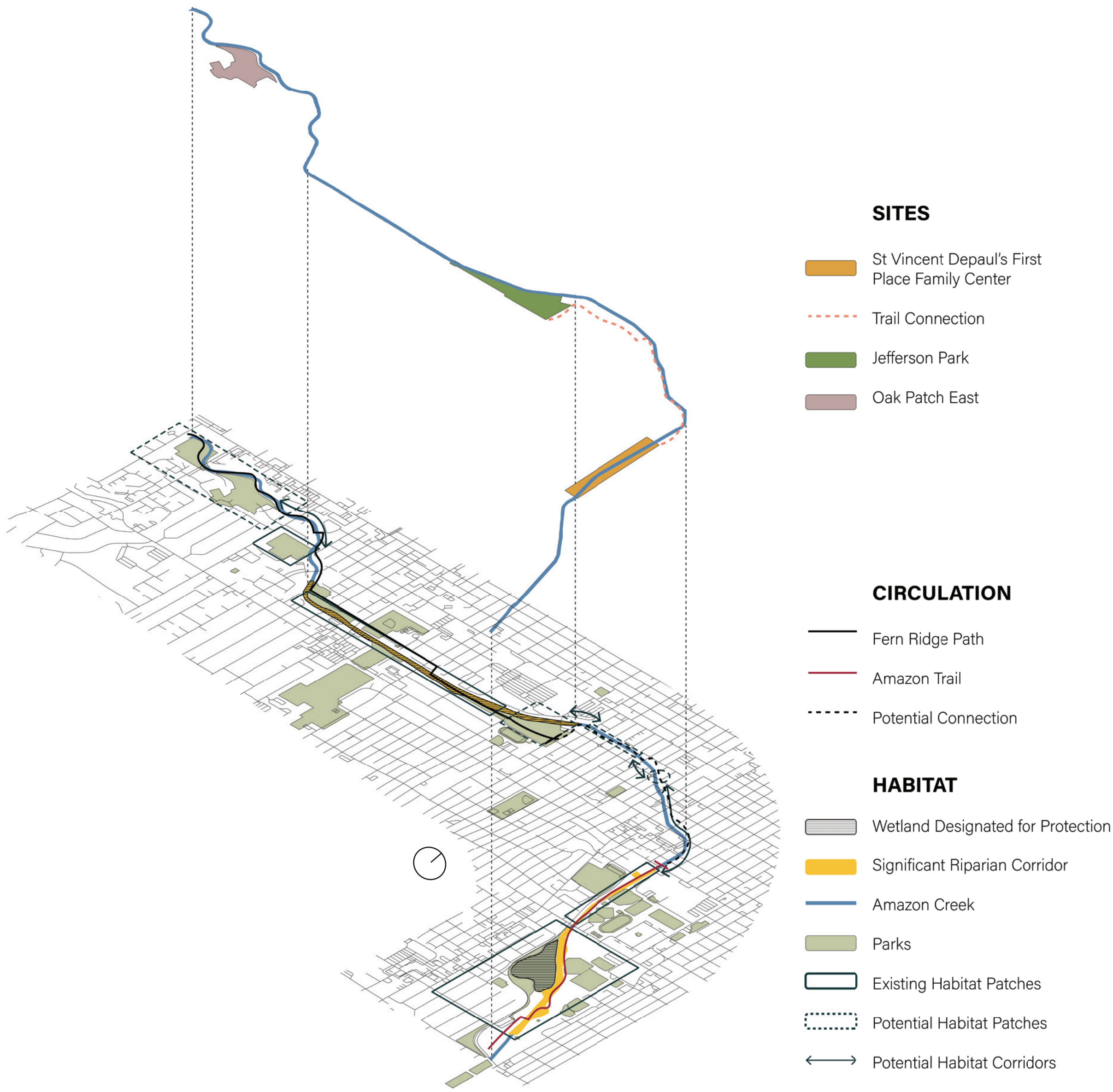


Figure 4.9 Design Scope, introducing three site selections and trail connection for design intervention

05 DESIGN

Social and Ecological Artery

Site 1: Learn

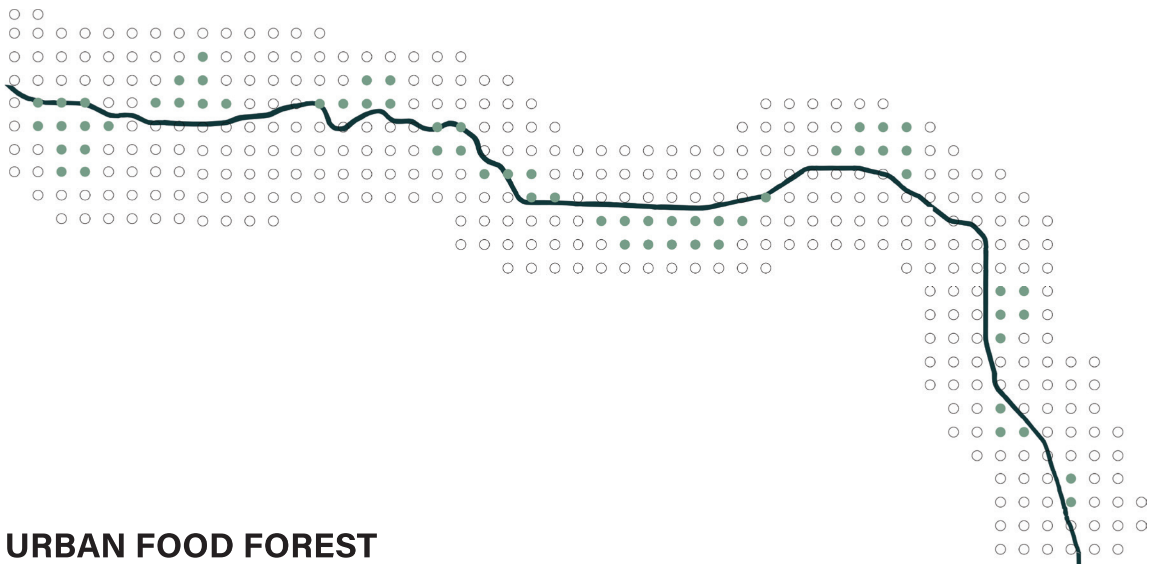
Site 2: Harvest

Site 3: Share

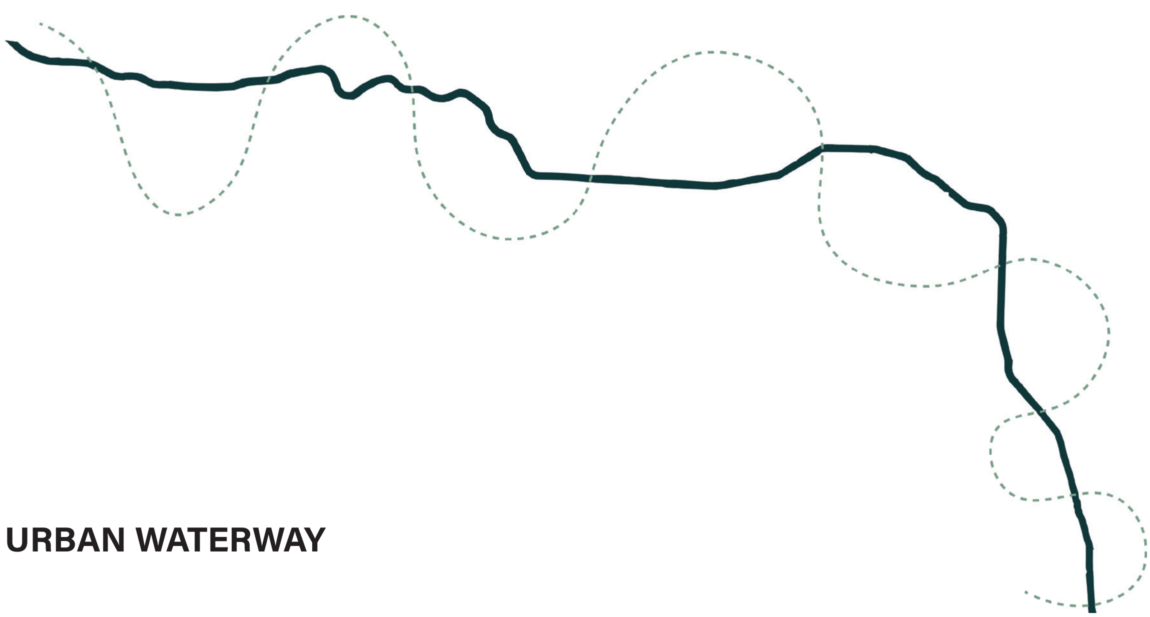
"Water infrastructure is more than just pipes, conduits, and tunnels - it is the often-invisible skeleton of a city."

-Sarah Dunn and Martin Felsen, 2007

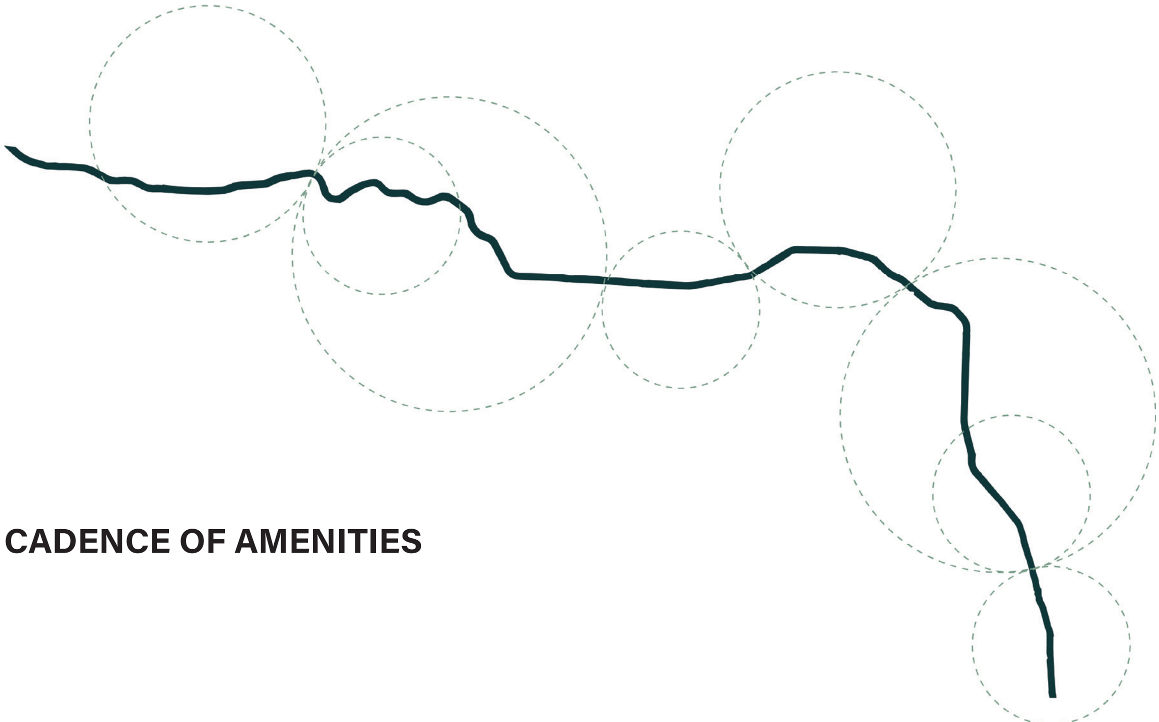
APPLYING DESIGN STRATEGIES



URBAN FOOD FOREST



URBAN WATERWAY



CADENCE OF AMENITIES

Figure 5.1 Applying Design Strategies to Amazon Creek

The design strategies were established to allow for transferability across sites and context. However, this does not come without its' restrictions and challenges. Landscape design strategies cannot be a universal, one-size fits all prescription. The site analysis discussed in Chapter 04, helped decipher how these design strategies can be applied to Amazon Creek. This chapter is organized as such: discussion of overall spatial design concept, urban design proposal of a social and ecological artery, a trail connection strategy, followed by site designs for each of the three sites.

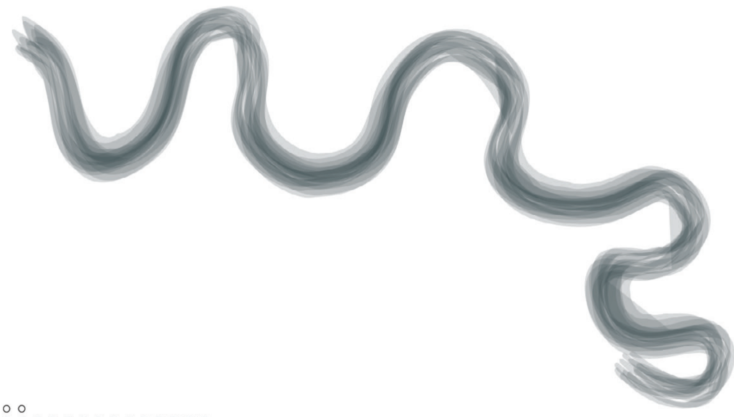
DESIGN CONCEPT

The design strategies discussed in Chapter 03 led design decisions over the social and ecological network for the trail connection as well as each of the three sites. These strategies further developed into a design concept to spatially organize all the elements of each site. Combining the current and proposed elements of the water, circulation and vegetation, the proposed concept explores the contrast between a natural meander of a creek and the traditional gridded nature of orchards or productive landscapes, as seen in Figure 5.2. These two spatial patterns come together to form the Meandering Foodscape. This spatial concept is applied to a design proposal for each site through their unique programmatic elements of learning, harvesting, and sharing. Each design proposal is discussed through SPUR and Gehl's facets to coexistence in public space which are spatial design and environment, operations and maintenance, program and activation, rights, rules, and accountability. The site's program and immediate context decipher how I address each of these facets through the design strategies of urban food forests, urban waterways, and a cadence of amenities.

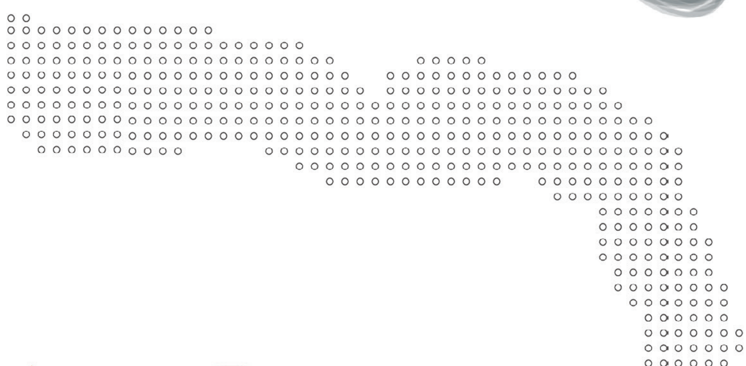
Social and Ecological Artery

I began the design process at an urban design scale looking at Amazon Creek as a potential social and ecological artery connecting Eugene. In addition, to connecting Amazon Trail and the Fern Ridge Path, there is a proposed improvement of bike and walk infrastructure along the dashed lines seen in Figure 5.3. This network connects to Eugene's existing social resources using Amazon Creek as the spine of these connections. This improvement of infrastructure for bikers and walkers, rather than cars, will help with wayfinding and a sense of place for those who travel through Eugene on foot or bike. It also connects neighborhoods of Eugene that currently sit divided.

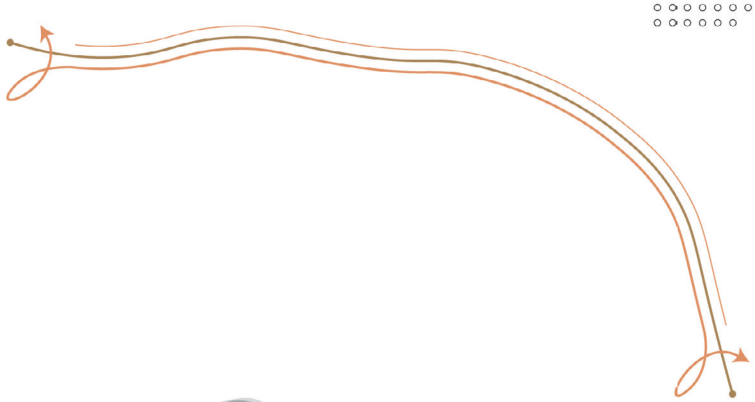
Figure 5.2 Design Concept



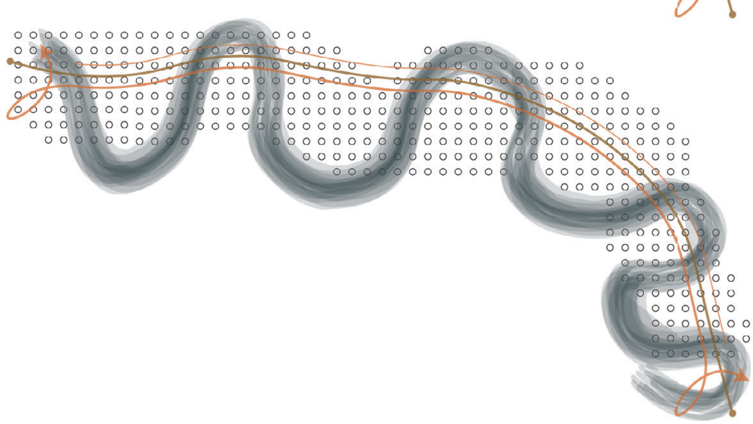
MEANDER



ORCHARD GRID



CIRCULATION



MEANDERING FOOODSCAPE

Figure 5.3
Urban design scale interventions

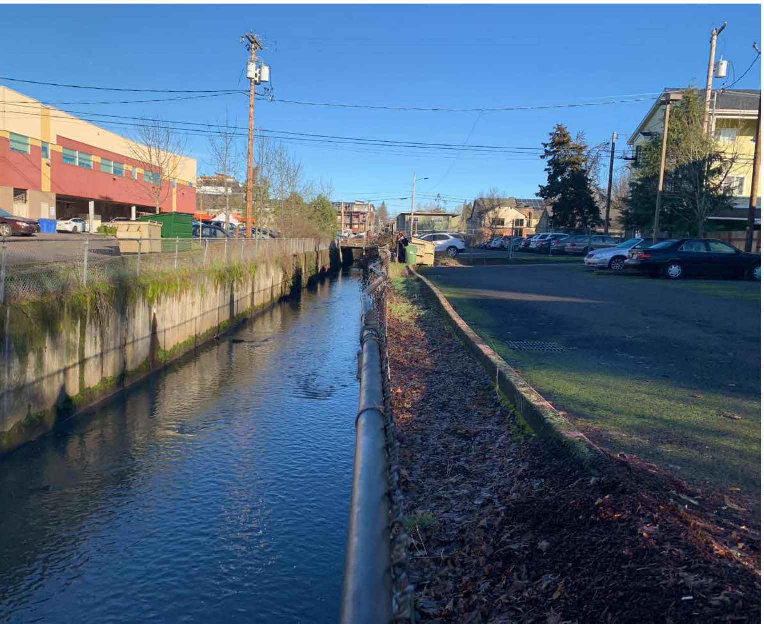

HARVEST
LEARN
TRAIL
CONNECTION
AMAZON CREEK

SOCIAL AND ECOLOGICAL ARTERY

Trail Connection

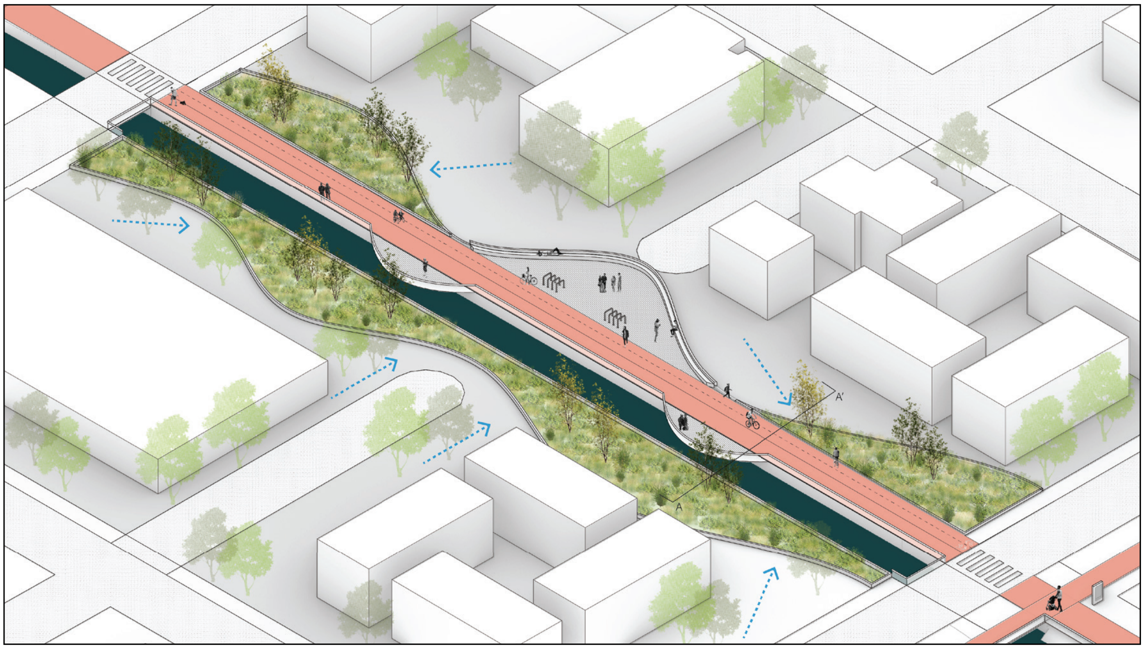
Both Fern Ridge Path and Amazon Trail begin/end abruptly, as discussed in Chapter 04. I first propose to connect the two with a walk/bike trail along Amazon Creek. Features of this trail connection will include separate bike and walk lanes, a cadence of amenities such as drinking fountains, wayfinding, bike repair, etc. The reason there is not an existing connection between Fern Ridge Path and Amazon Trail along Amazon Creek is that it runs through private commercial and residential properties. Also, it is not pleasant to be near. The alignment and format of the trail connection will depend on it's surrounding properties and buildings. If it is a mixed-use block, which is currently a parking lot, the trail will run alongside the creek, shaped by water filtration gardens and bioswales that filter rainwater and runoff before it enters the creek through the outflow pipes, as seen in Figures 5.10 and 5.11. There are a couple blocks between Lawrence and Jefferson St where the channelized creek runs between private backyards. For this stretch of the trail a slightly narrower, elevated path will run over the creek with dense vegetation on either side, maintaining privacy for the residents, as seen in Figures 5.12 and 5.13. This elevated trail will also help shade parts of the creek, cooling water temperatures in otherwise extremely exposed environments. Throughout the trail connection, there are several opportunities where there is left over space between the creek and a sidewalk, back yard, etc. that will transform to a bioswale adding more vegetation to the corridor, as well as filtering rainwater and run-off.

Figure 5.4-5.9 Trail Connection Existing Conditions (photos by author)




Fern
Ridge
Path

MIXED-USE ADJACENT



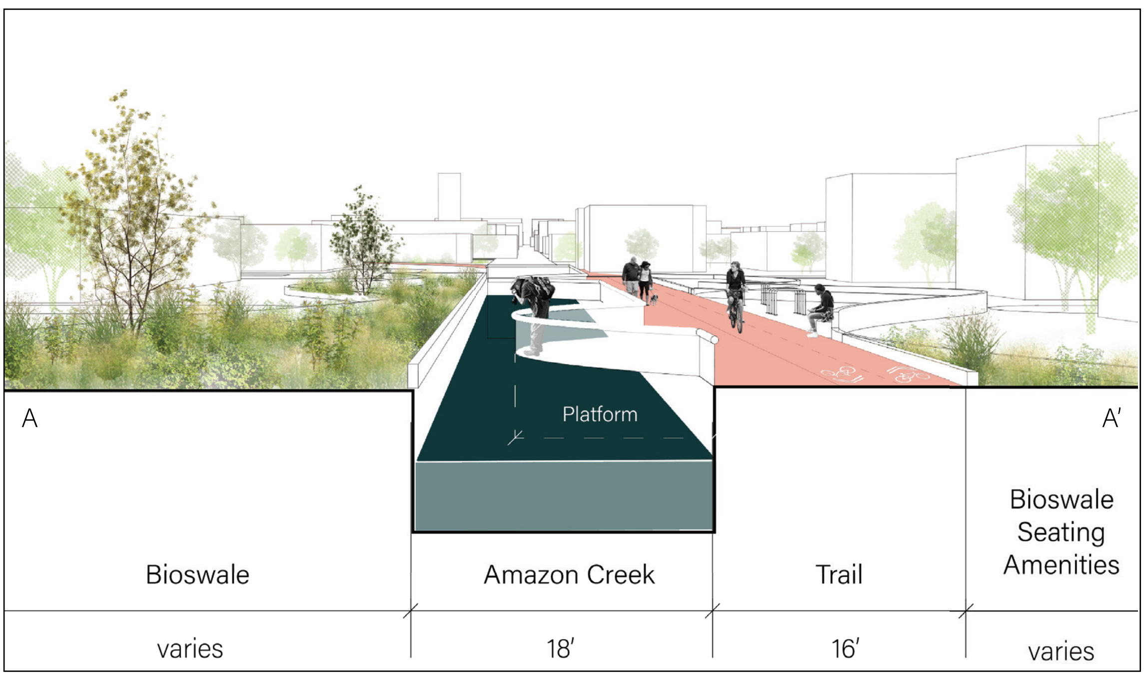
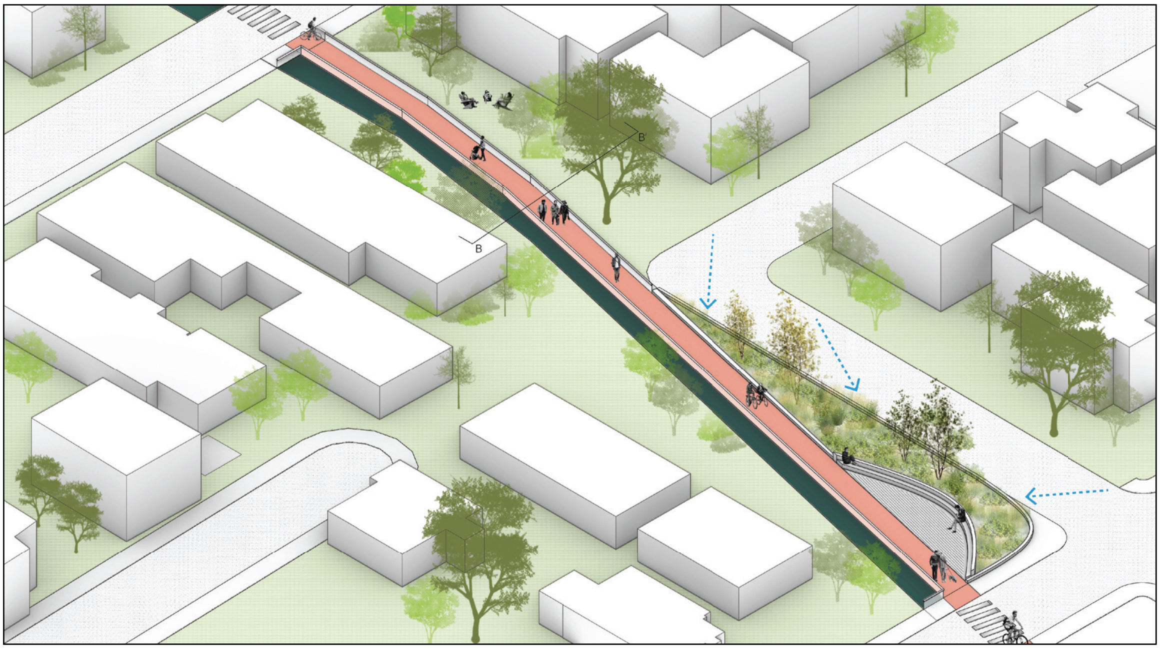


Figure 5.10 Axon of trail connection with Mixed-Use buildings adjacent
Figure 5.11 Section of trail connection with Mixed-Use buildings adjacent

SINGLE FAMILY HOMES ADJACENT



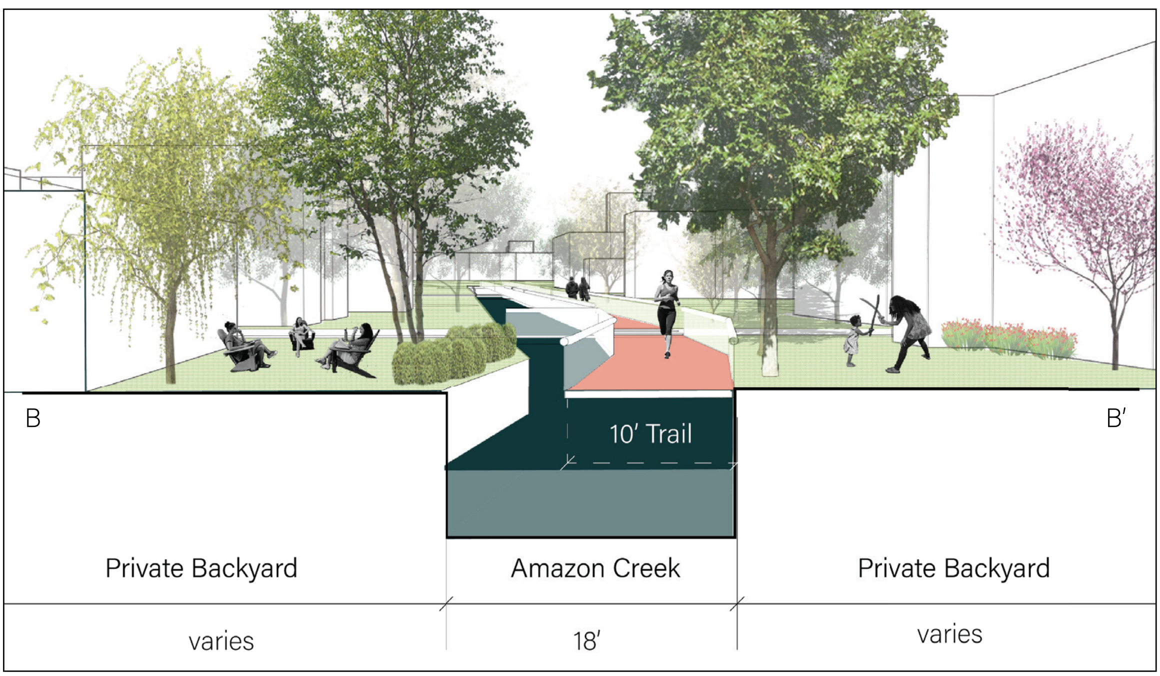


Figure 5.12 Axon of trail connection with single family homes adjacent
Figure 5.13 Section of trail connection with single family homes adjacent

Site 1: St. Vincent De Paul First Plance Family Center

Existing Conditions

The first of the three sites is between 24th and 19th St along the beginning of the channelized portion of the Amazon Creek, as seen in Figure 5.21. Immediate context of the site includes St. Vincent De Paul: First Place Family Center, a community facing day center providing services to un-housed and low-income families, see Chapter 4: Existing Social Resources for more information, and South Eugene High School, as seen in Figure 5.20. Currently, The St. Vincent family center is very exposed to Amazon Parkway and is very closed off from Amazon Creek. It is surrounded by land that has much more potential to serve the families and employees of the family center. The creek is almost hidden on the site in concrete channels and a chain link fence. There is one bridge crossing the creek that is the only connection to the water on the whole site. This portion of the creek also lacks any sort of riparian buffer, other than the federally endangered Bradshaw's lomatium just south of the family center, and the water is extremely exposed to urban conditions. All parcels on this site are currently zoned as public land and owned by Eugene 4J School District and the City of Eugene. More visual and spatial existing conditions can be seen in Figures 5.14-5.21.

Figures 5.14-5.19 Site 1 Existing Conditions Photos (photos by author)


St. Vincent dePaul

EXISTING CONDITIONS

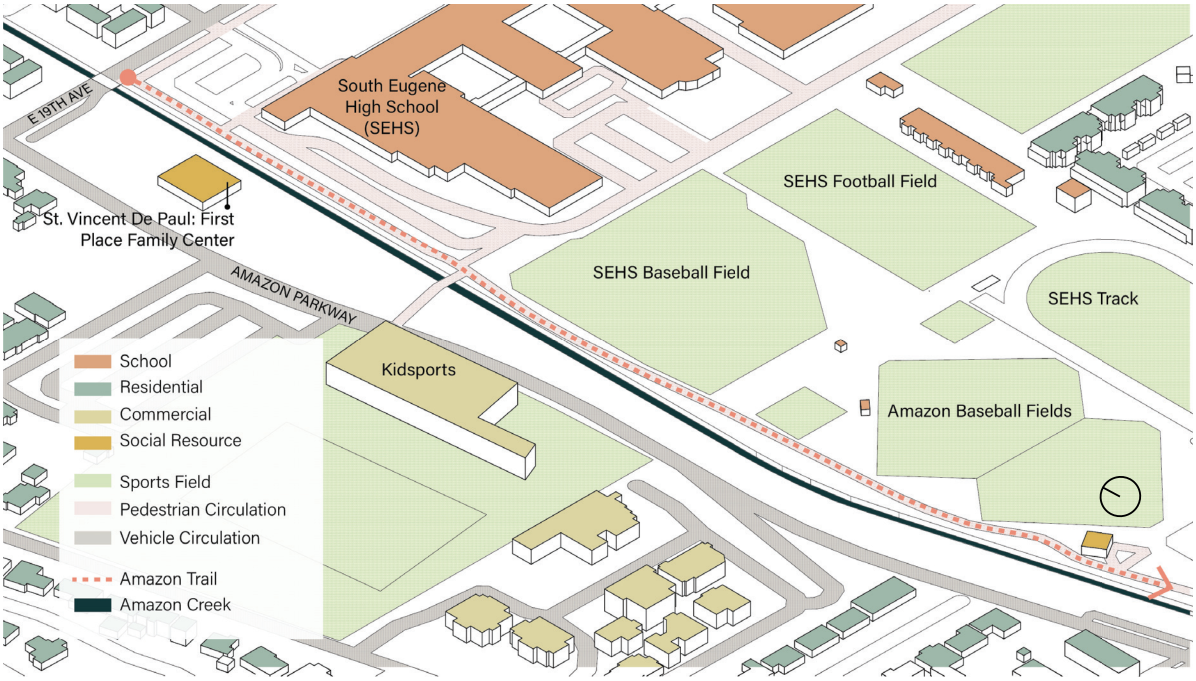


Figure 5.20 Site 1 Existing building and land use

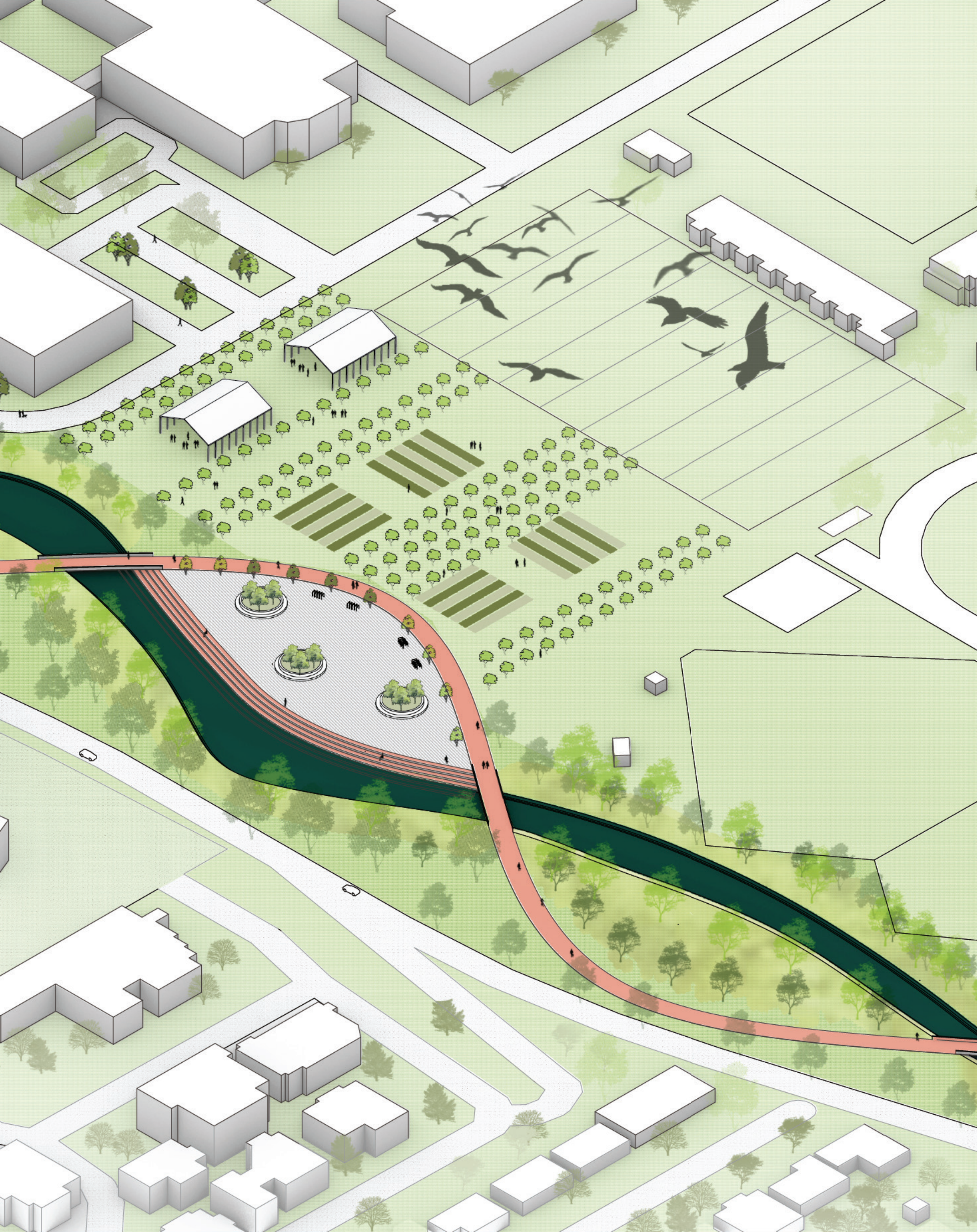
Figure 5.21 Site 1 Existing Conditions Air Photo

Spatial Design and Environment

The first design strategy I propose is to de-channelize this portion of the creek to develop a natural meander. Along with this natural meander, the Amazon Trail will mimic a meander in weaving pattern with the creek. Following the spatial concept of Meandering Foodscape, public orchards will be placed south of the day center and high school. Amazon Creek, especially in this section, suffers from lack of riparian buffer due to the concrete channel and urban conditions. The riparian buffer will be expanded to not only improve water quality and provide habitat, but also to provide a buffer from the traffic on Amazon Parkway, as seen in Figure 5.22 and 2.24. In addition to the riparian buffer expansion, the path of Bradshaw's lomatium will continue to be protected and expanded along the creek.

After speaking with an employee of St. Vincent De Paul, I gathered key design moves that would be helpful for employees and community members that access the day center. One of the biggest desires from these users is a more privatized parking lot. The parking lot currently sits right along Amazon Parkway and is extremely visible to vehicles driving by, people waiting at the bus stop, and even from the parking lot of the new YMCA Kids Sports Center across the street. A common stigma surrounding people experiencing homelessness living out of their car is messy-ness. Sometimes cars are filled with every belonging someone owns which can become crowded and not something you want on display. Proposing to screen the parking lot with vegetation is a simple way to create a sense of privacy to a lifestyle that is otherwise very public. Lastly, I propose an amenity hub with restrooms, bike repair station, seating, storage lockers, and shade on the corner of 19th and Amazon Parkway.

Figure 5.22



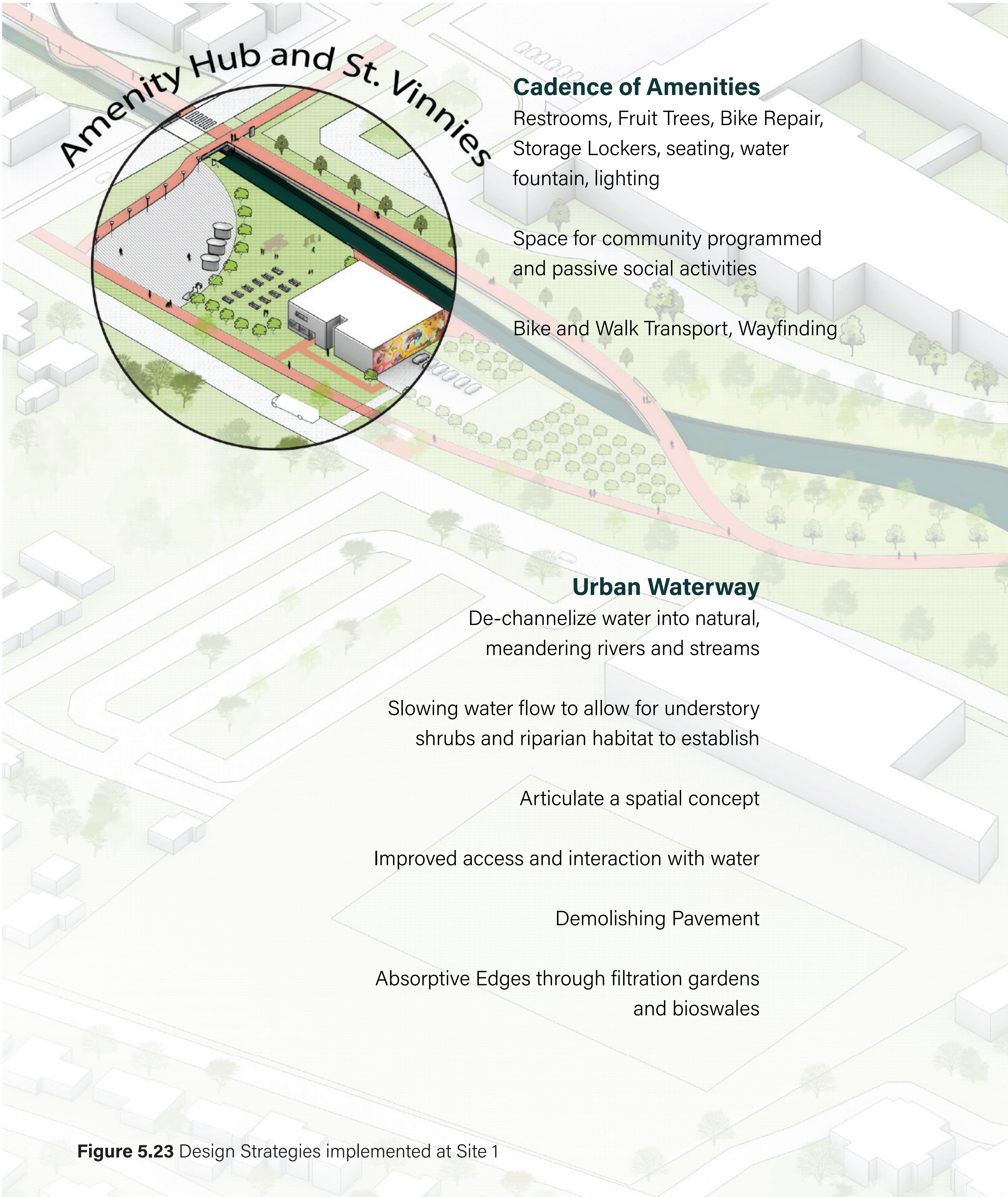


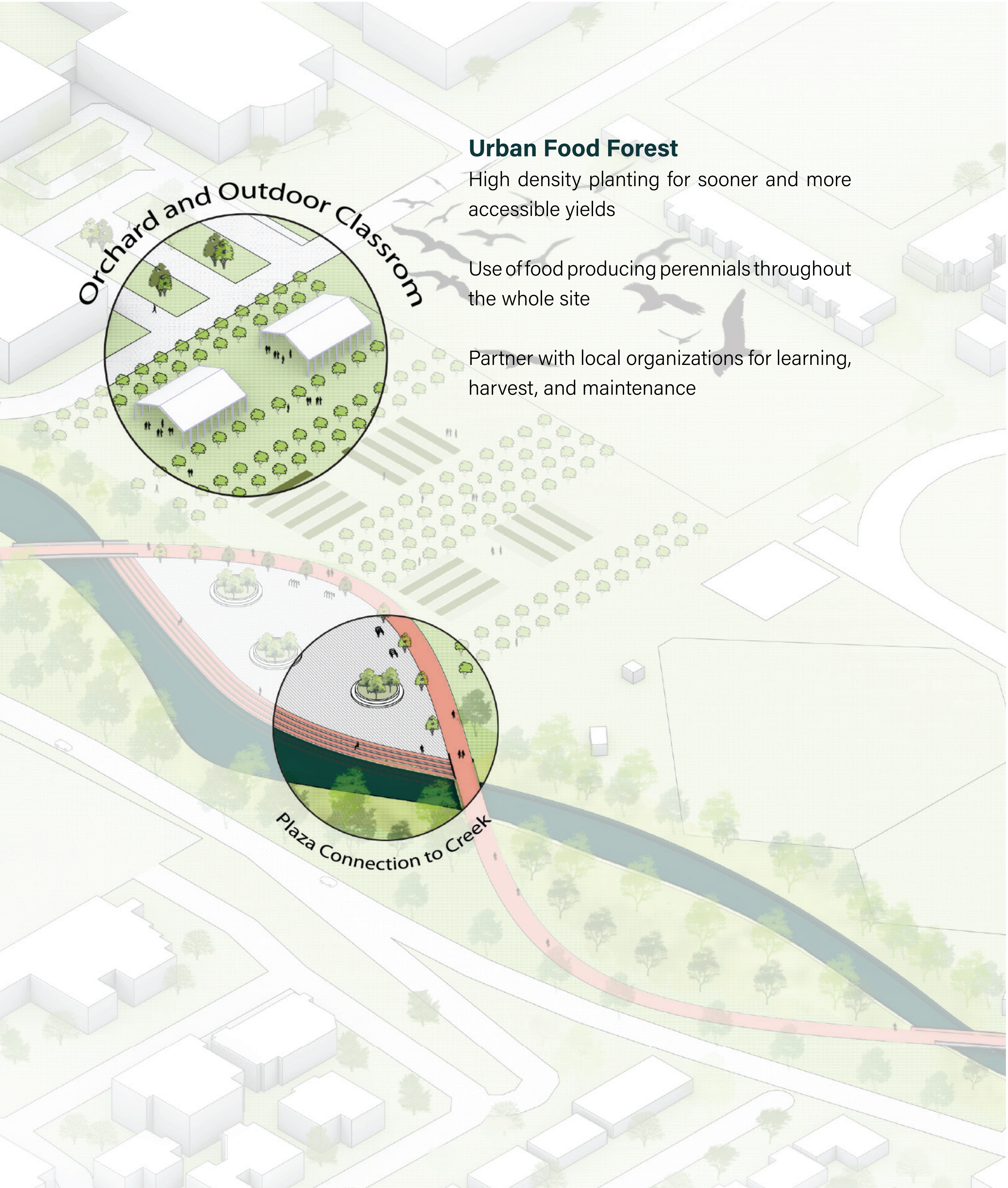
Figure 5.23 Design Strategies implemented at Site 1

Urban Food Forest

High density planting for sooner and more accessible yields

Use of food producing perennials throughout the whole site

Partner with local organizations for learning, harvest, and maintenance



MEANDERING FOODSCAPE | Learn

Operations and Maintenance

The proposed programmatic concept of this site is Learn, therefore operations and maintenance of the orchards will be accomplished through learning opportunities. While both orchards will be open to public harvest, the day center and South Eugene High School will lead and oversee maintenance and harvesting operations through learning opportunities with their users, families and students, as well as the community.

Program and Activation

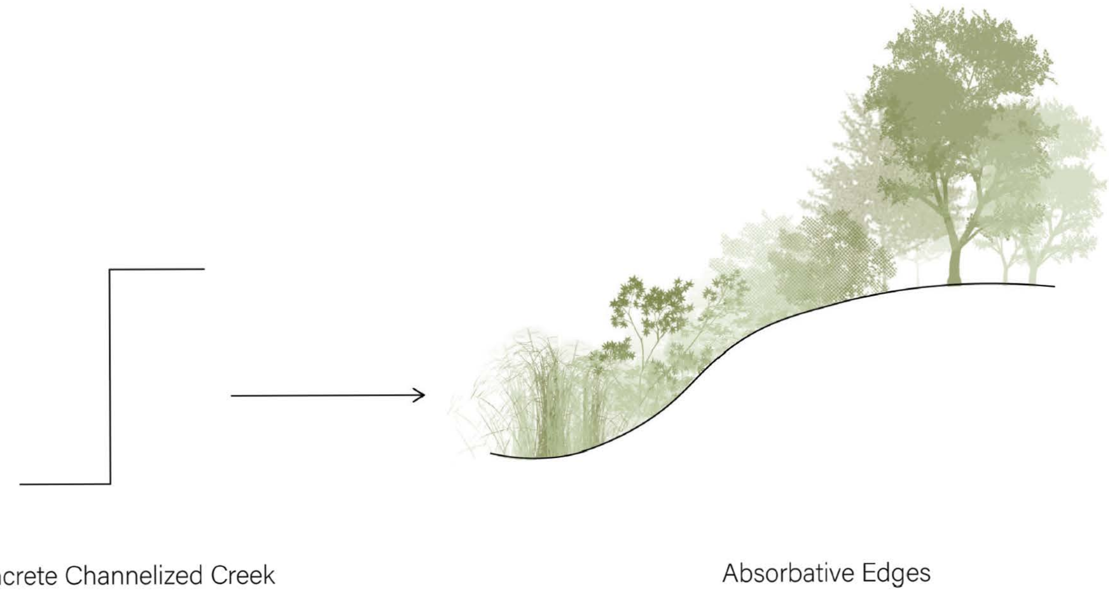
South Eugene High School and St. Vincent's Family Center inspired the programmatic concept of Learn. The Day Center serves families, which means it hosts a lot of programming for children. There is currently a play set located in a very small fenced in portion along the creek. They desire a larger open area for kids to run around that is still fenced or screened in, to prevent children from wandering far near the busy intersection of 19th St and Amazon Parkway.

RIPARIAN SPECIES

Salix spp. | Willow
Rhamnus purshiana | Cascara Buckthorn
Crataegus douglasii | Douglas Hawthorn
Sambucus caerulea | Blue Elderberry
Spirea douglasii | Douglas Spirea
Philadelphus lewisii | Mock Orange
Physocarpus capitatus | Pacific Ninebark
Cornus sericea | Red-Twig Dogwood
Alnus rhombifolia | White Alder
Populus trichocarpa | Black Cottonwood
Fraxinus latifolia | Oregon Ash

Figure 5.24 Diagram of Riparian Buffer before and after

Figure 5.25 Design interventions for Amazon Trail


Concrete Channelized Creek
Absorbative Edges

MEANDERING FOODSCAPE | Learn

Moving the enclosed play area to the north side of the building will provide more space for the children as well as open an opportunity for an improved connection to the creek. The play area will be enclosed through a combination of vegetation and fencing and host a play set, open space, and some community garden plots for families that access the day center. Opening the space behind the building will allow for a unique connection between the happenings inside the day center with the natural creek, as seen in Figure 5.26. South Eugene High School will have orchards, vegetable gardens, and an outdoor classroom to host urban farm programming through classes and organizations. This will not only activate the space but also will contribute to maintenance and harvesting of the productive land. Teaching students about urban farming practices broadens their horizons to where food can come from and possibly contribute to more sustainable and local future food consumption practices. Throughout the rest of the site, the program will include recreation along Amazon Trail and connections to the water. The new trail will continue the aesthetic nature of Amazon Trail to the south, allowing for simultaneous transit, recreation, and exploration.

Rights, Rules, and Accountability

All public space needs realistic standards to be met to ensure successful activation and use of the space. The school orchards will be open from dawn until dusk. The day center play area will be open during their operating hours and the amenity hub open 24/7.

Figure 5.26 Design interventions for the Family Center and Amazon Trail along Amazon Creek

ST VINNIE'S PLAZA
AMAZON TRAIL
AMAZON CREEK

Site 2: Lane Events Center and Jefferson Park

Existing Conditions

The second site is located at Jefferson City Park. This site was chosen for multiple reasons: it is where the Fern Ridge Path abruptly begins/ends at 15th and 16th Ave, as seen in Figure 3.33. Just north of the site is Lane Events Center, a public facing space that has served the community through COVID and the recent 2020 wildfire season. Also, to the north of Jefferson Park and the creek are warehouse buildings hosting ski swaps and other commercial uses. Lastly, what is currently Jefferson Park, the piece of land south of the creek is significantly under-utilized, as seen in Figure 5.34. The main use of that space is during fair season for excess parking or displays of logging equipment during another annual event. Surrounding the site to the south is single-family residential homes and O'Hara Catholic School. While there is a small riparian community along the creek, it is very narrow and doesn't allow for interaction of the water. There are a couple bridges across the creek and only connect with private entrances to the warehouses. The two parcels that make up this site are both zoned public land and owned by Lane County and the City of Eugene. This space has much more potential to serve its local ecologies and community. More visual and spatial existing conditions can be seen in Figures 5.27- 5.34.

Figures 5.27-5.32 Site 2 Existing Conditions (photos by author)


Fern
Ridge
Path

EXISTING CONDITIONS

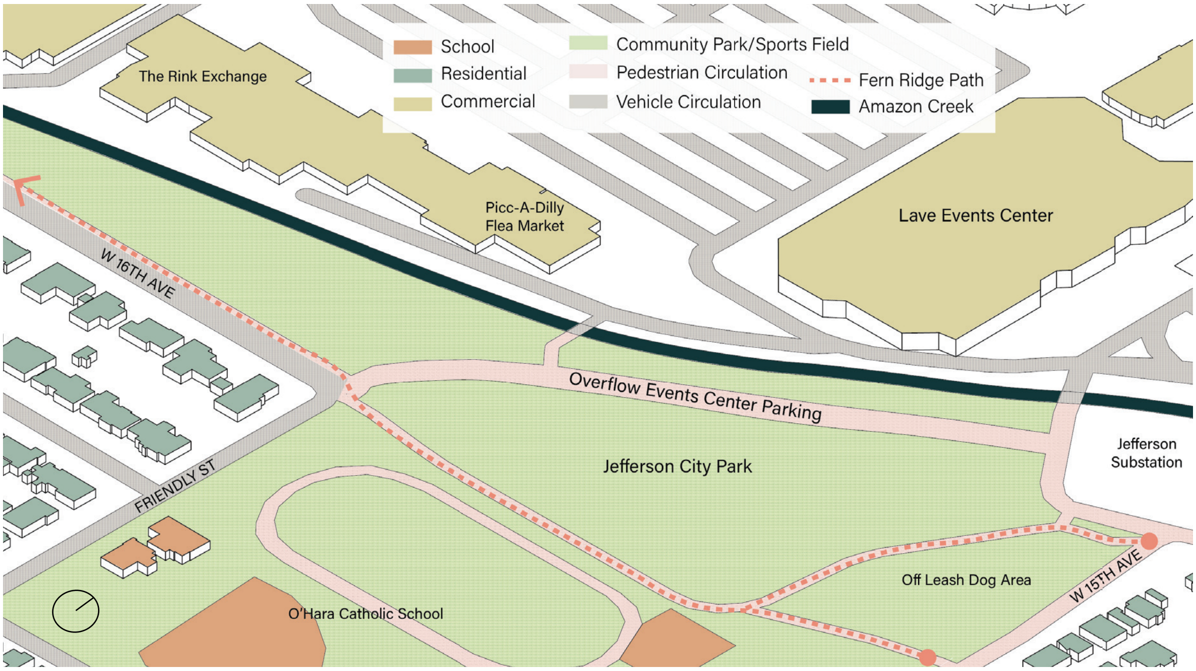


Figure 5.33 Site 2 Existing Conditions building and land use

Figure 5.34 Site 2 Existing Conditions Air Photo

Spatial Design and Environment

Through the continuous concept of Meandering Foodscape, the production of food will be celebrated through public space and harvesting as a communal activity. As seen in Figure 5.35, a natural meander is restored to the creek to create a new and unique definition of space. I propose an improved riparian buffer and program of Harvest. Much of the will be an urban food forest and public orchard. Complimenting these will be public crops and a community garden that serves the immediate neighborhood through individual plots. Near the community garden, I propose a pavilion to allow for community gathering and events. Along the new meanders there will be access points down to the water to improve our interactions and perception of Amazon Creek. With some points very accessible to the creek, others will be inhabited by green infrastructure strategies such as bioswales to clean run-off before entering the creek. These processes will still play into an improved perception of the local creek ecology. Lastly, this site will have an amenity hub at the end of 16th Ave with restrooms, bike repair station, water fountain, seating, and shelter from the rain.

Operations and Maintenance

Productive lands require a lot of hard work and maintenance to allow continued successful harvests and yields. This site will be overseen by a live-in caretaker. While the entire food forest will be public, the caretaker will oversee maintenance and coordinate with community organizations that will provide programming and volunteer hours through harvesting and maintenance. The caretaker will live in a home on the east end of the site between 15th and 16th St, as seen in Figure 5.36.

MEANDERING FOODSCAPE | Harvest

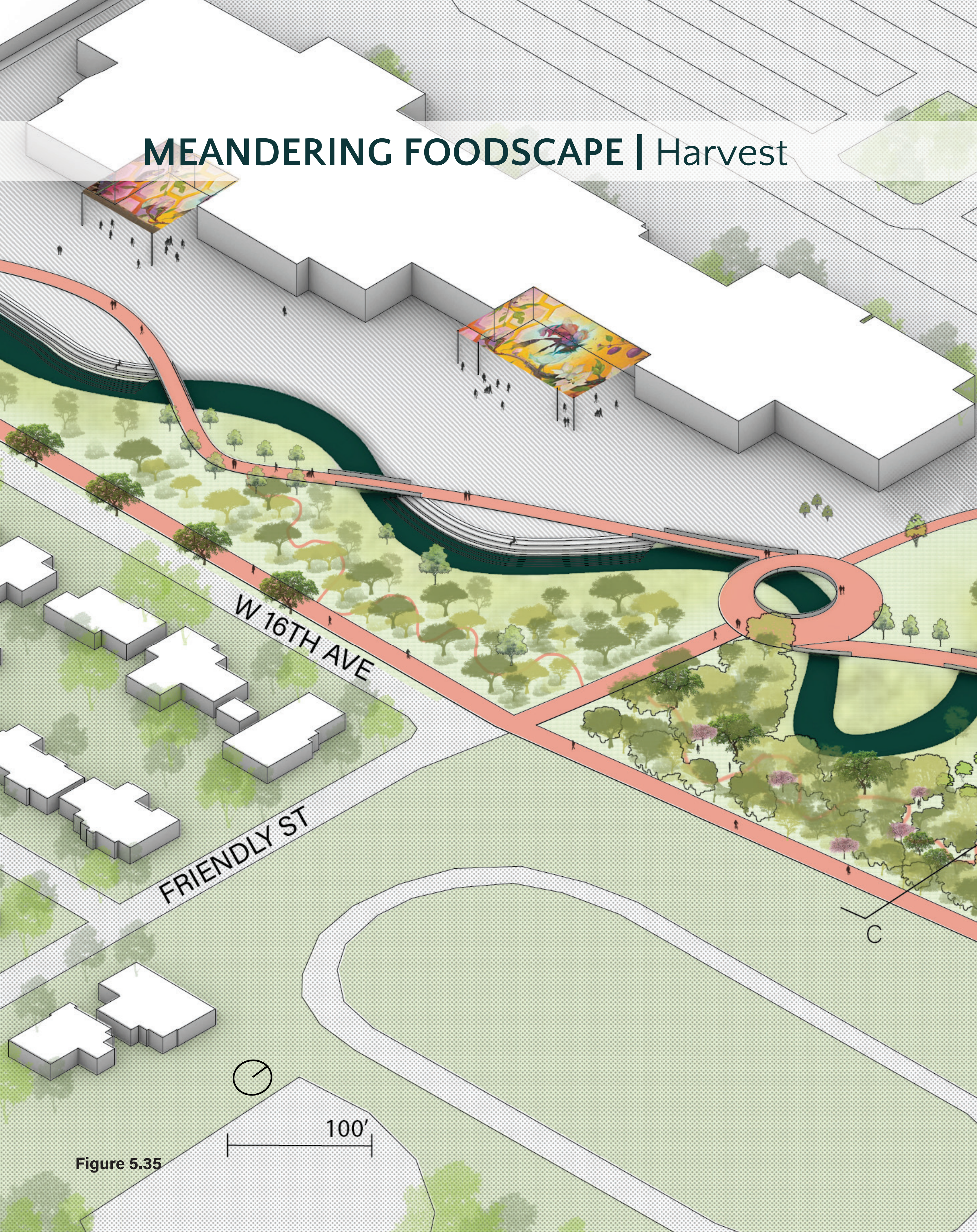
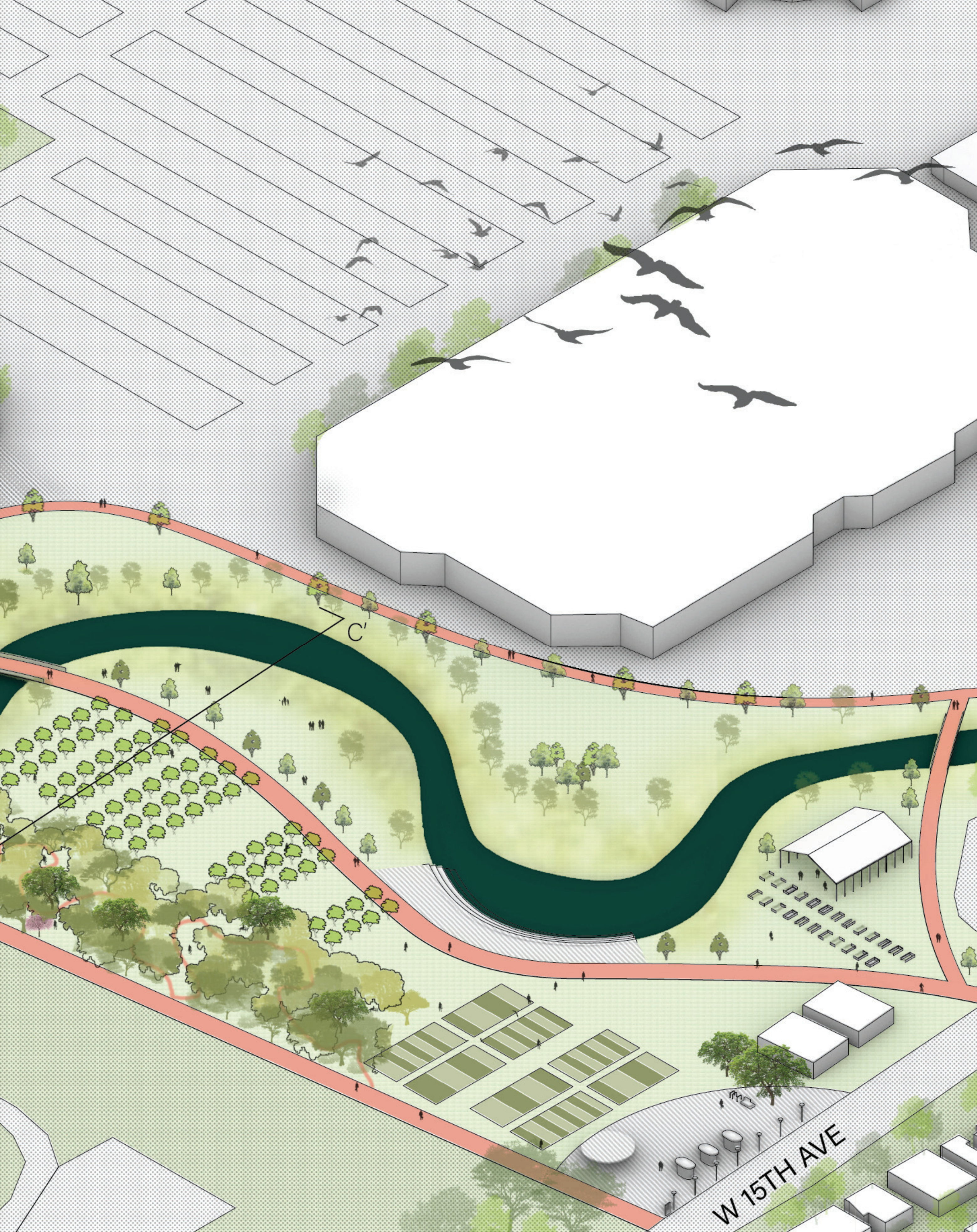


Figure 5.35


C'
W 15TH AVE

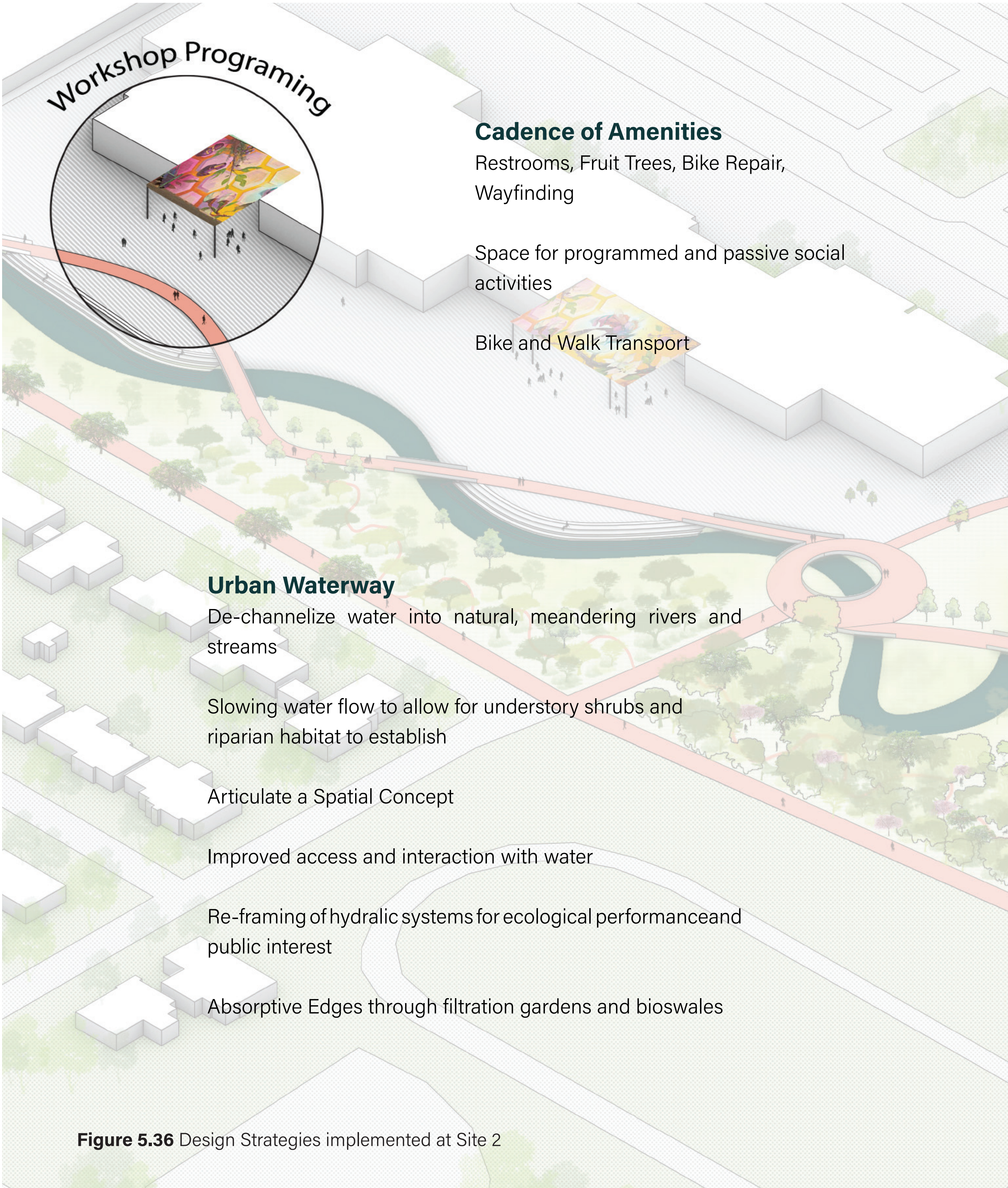


Figure 5.36 Design Strategies implemented at Site 2

Urban Food Forest

High density planting for sooner and more accessible yields

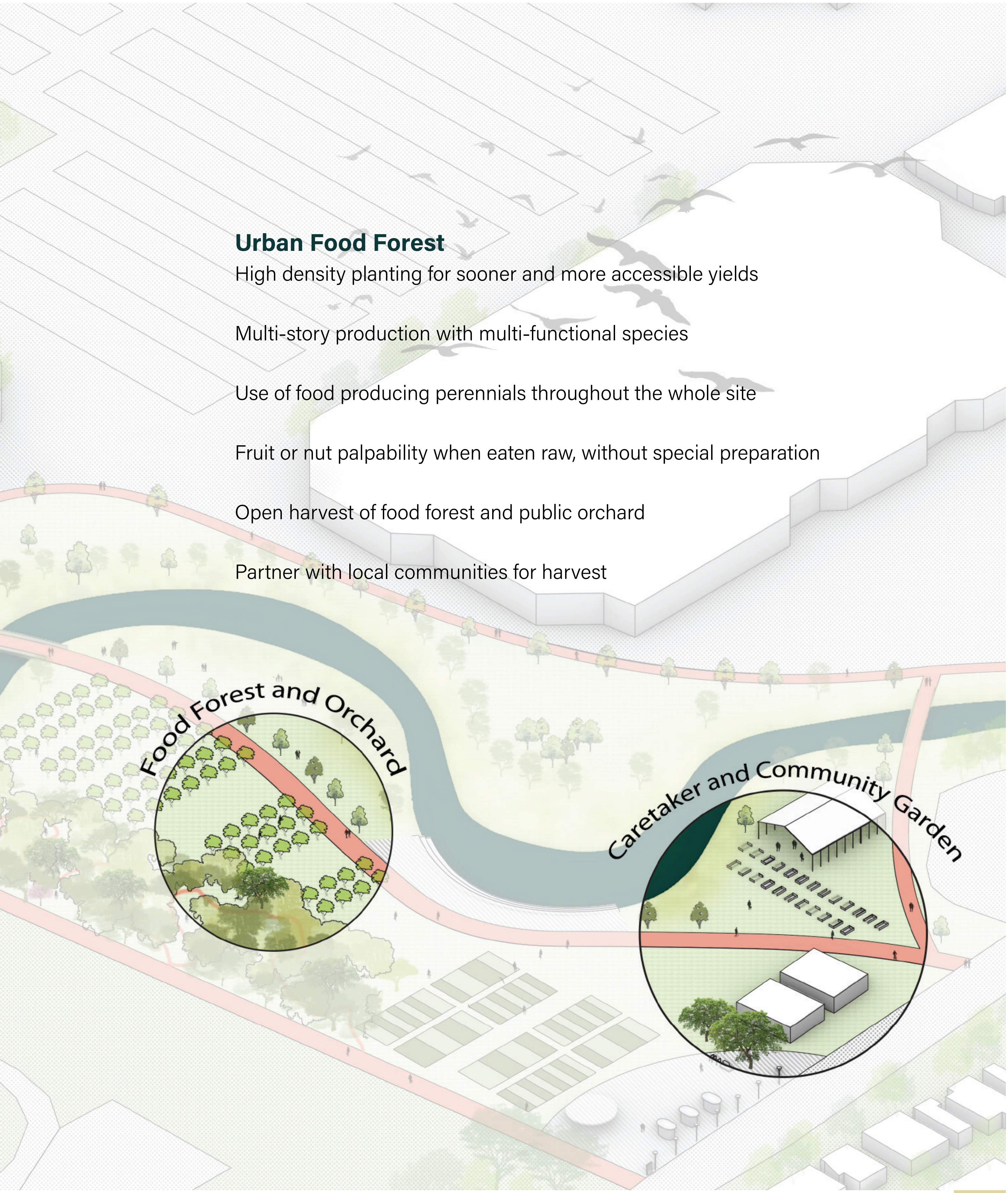
Multi-story production with multi-functional species

Use of food producing perennials throughout the whole site

Fruit or nut palpability when eaten raw, without special preparation

Open harvest of food forest and public orchard

Partner with local communities for harvest



MEANDERING FOODSCAPE | Harvest

Program and Activation

With the proposed theme of Harvest, programming and activation of the space will center around harvesting on the productive land as a community. This will happen through workshops hosted by local organizations that will contribute to maintaining the land as well as teaching the community how to harvest these specific productive plants. This proposal includes open harvest on the food forest, orchard, and vegetable crops. The buildings on the north side of the river are currently used for flea markets and ski swaps. These buildings will transition to also host rotating workshops such as pruning, and cooking classes based on the lands produce and season.

Rights, Rules, and Accountability

While the main goal of this work is to celebrate public harvest, that comes with the need to protect the space from undesirable events or intrusions. The areas of vegetable crops and community garden will be fenced in and closed from dusk to dawn. These plants and design of the spaces will be most susceptible to animal or pest intrusion. The food forest and public orchard will re-main open with the hope that the amenity hub near by will provide the resources for any human users looking for a restroom or an overheard shelter from rain. Through signage, ongoing community workshops, and conversation, acceptable behaviors will be learned for harvesting and co-existing on public land.

The proposed urban food forest plant list seen in Figure 5.49 was created based on Clarks and Nicholas' Climate-Food-Species matrix, seen in the Appendix, and Oregon native food producing species. It is divided into categories based on

Figure 5.37 Urban Food Forest and Public Orchard


←HARVEST HERE
FREE FOOD

URBAN FOOD FOREST

CANOPY
Malus domestica | Apple
Pyrus communis | European Pear
Morus alba | White Mulberry
Morus nigra | Black mulberry
Diospyros virginiana | Common Persimmon

SHRUB
Vaccinium angustifolium | Lowbush Blueberry
Vaccinium corynbosum | Highbusy Blueberry
Vaccinium membranaceum | Black Huckleberry
Vaccinium ovatum | Evergreen Huckleberry
Amelianchier alnifolia | Serviceberry
Rubus spectabilis | Salmonberry
Rubus parviflora | Thimbleberry

PUBLIC ORCHARD

LOWER CANOPY/ORCHARD
Malus domestica 'Gala' | Semi-Dwarf Apple
Prunus cerasus | Sour Cherry
Pyrus pyrifolia | Asian Pear
Lycium barbarum | Goji Berry
Prunus armeniaca | Apricot
Ficus carica | Fig
Prunus cerasifera | Cherry Plum

C

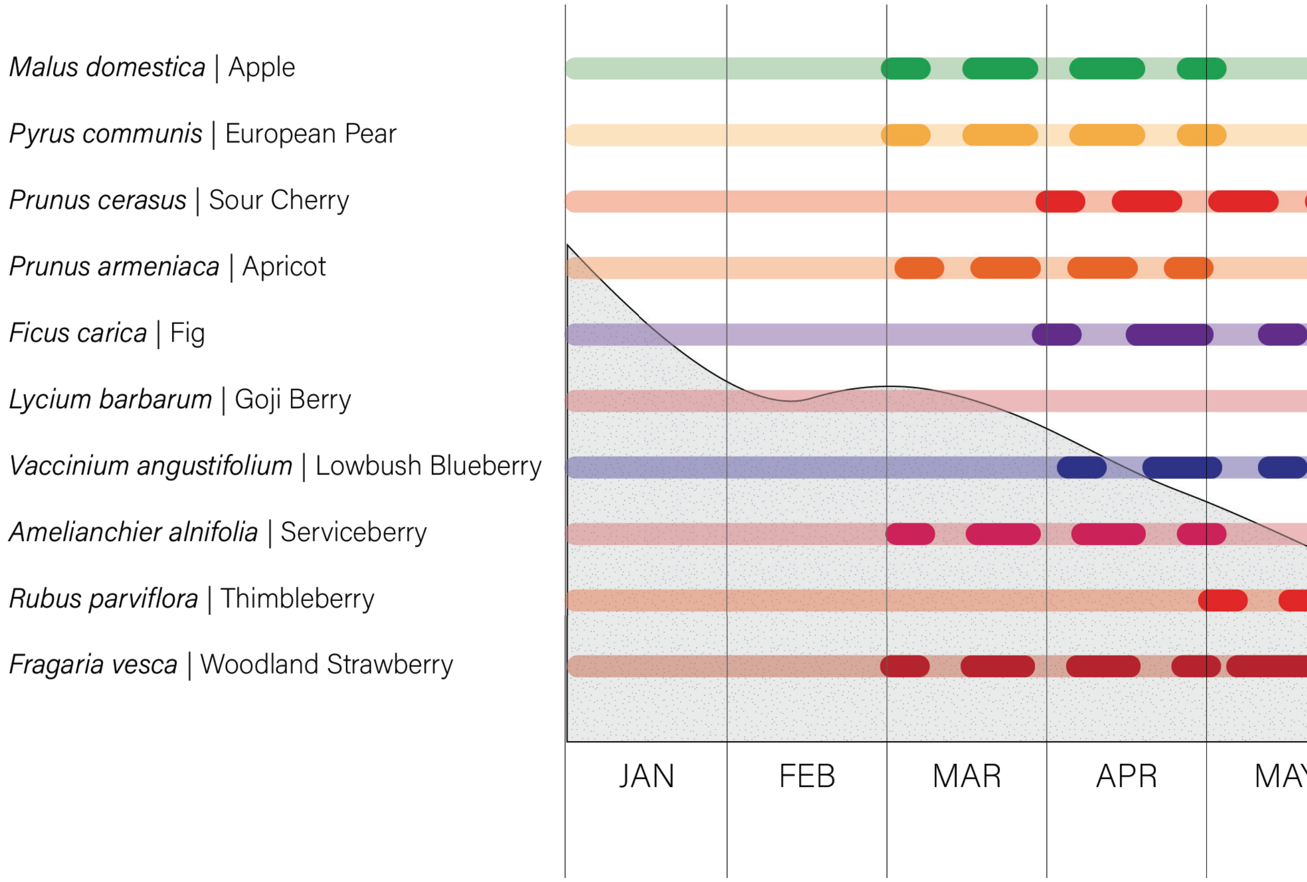
FERN RIDGE PATH

GROUND COVER
Fragaria vesca | Alpine Strawberry
Fragaria chiloensis | Beach Strawberry
Fragaria vesca | Woodland Strawberry

Beacon Food Forest's planting categories. This list is a starting point for Oregon based projects. Transferability of these design strategies will require re-working of the plant list based on local natives. Seasonality is an important consideration when selecting plants for public landscapes to ensure harvesting time can vary slightly for longer seasons of production and enough manual labor is available to successfully collect all the yields. Various bloom and fruiting time for this plant palette can be seen in Figure 5.39.

Figure 5.38 Site 2 Section and Plant Palette

SEASONALITY



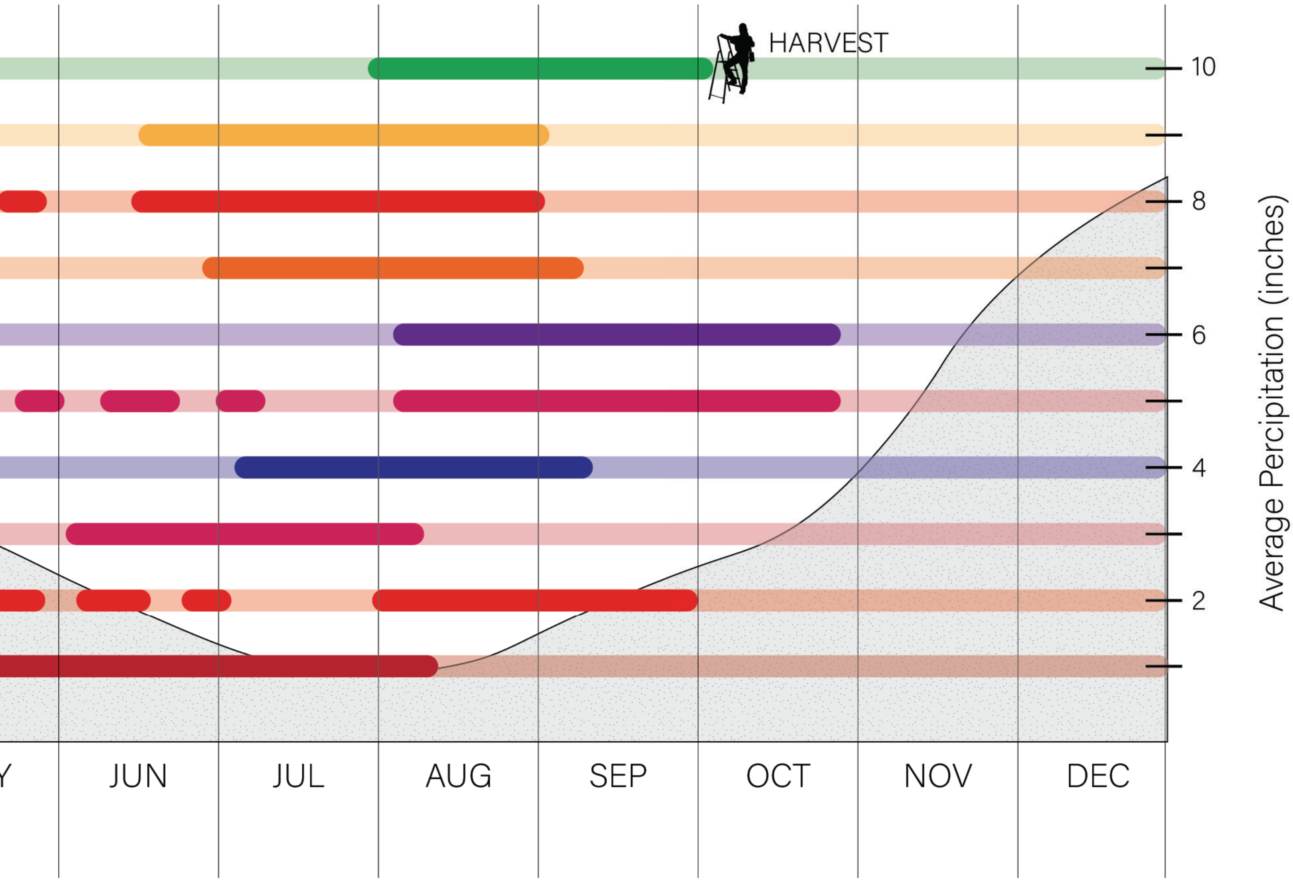


Figure 5.39 Seasonality of Plant Palette

Site 3: Oak Patch East and Berkely City Park

Existing Conditions

The third and final site is the most distant and disconnected from existing social resources in the urban core and fresh food options. Additionally, according to Figure 4.1 in the Chapter 04, this area has some of the lowest median household income in Eugene. The land surrounding the Amazon Creek at this site is significantly more impervious than other parts of Eugene. There is a need for more filtration of urban stormwater runoff entering the creek. On this impervious land to the north is W 11th St, a high traffic bus and vehicular route travelling into or out of Eugene with a lot of big-box commercial stores or industrial businesses. Multi and single-family residential neighborhoods surround the site to the south. Berkeley City Park is also a part of this site. The park has a playground and basketball courts, that are frequently used by surrounding neighborhoods. The rest of the site sits as open, underutilized lawn space with little to no interaction with the creek. Fern ridge Path travels through the site along Amazon Creek, connecting downtown with west Eugene neighborhoods. Like the second site, there is a small riparian community. This site provides unique opportunities to fill in those ecological and social gaps. The three parcels that make up this site are either zoned low-density residential, medium-density residential, or public land. The public land parcel is owned by the City of Eugene, while the residentially zoned parcels are owned by EDCO Properties. More visual and spatial existing conditions can be seen in Figures 5.40- 5.47.

Figures 5.40-5.45 Site 3 Existing Conditions (photos by author)


ROSE
HERBS
OAK PATCH EAST
PARK
WATCH




EXISTING CONDITIONS

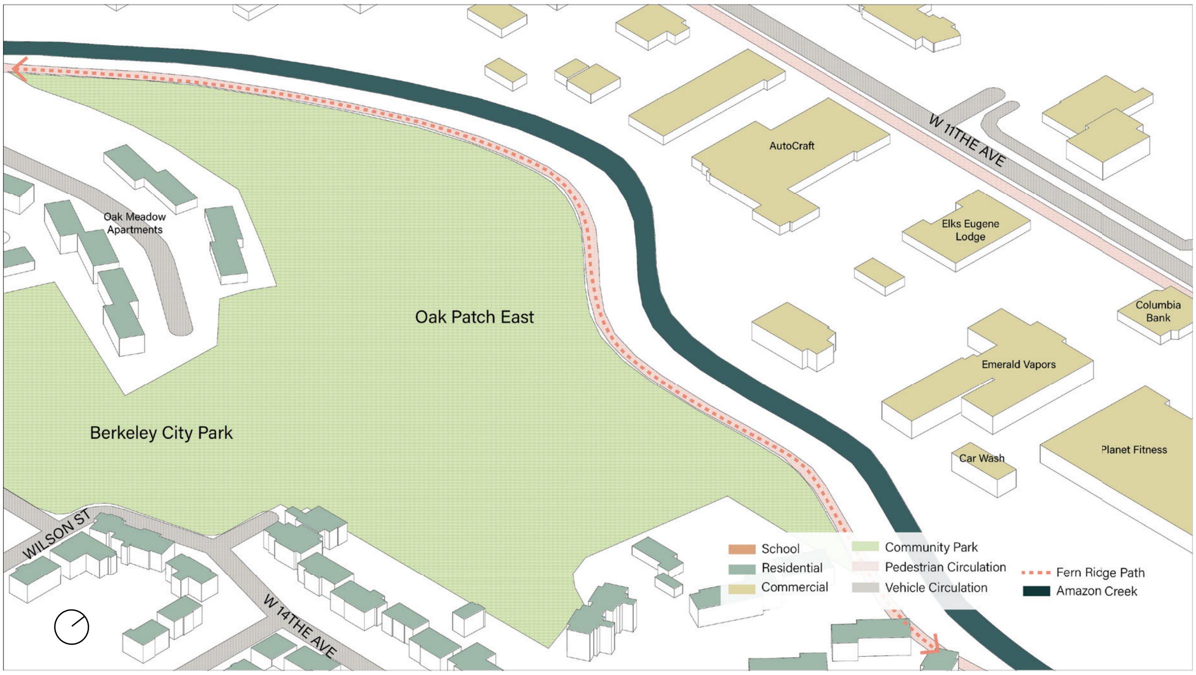


Figure 5.46 Site 3 Existing Conditions building and land use

Figure 5.47 Site 3 Existing Conditions Air Photo

Spatial Design and Environment

After learning and harvesting, the third site in the Meandering Foodscape network will be centered around sharing. This space will offer not only more opportunity for productive land, but also will lay the foundation for a distribution system, moving the fresh food produced on all these sites to the residents and people experiencing homelessness in the community. Continuing the naturalistic meander of the creek from site 2, the Fern Ridge Path will continue along an improved riparian buffer and green infrastructure implementation of bioswales. Due to the abundant impervious surfaces on the north side of the creek, I propose less human occupied spaces and more filtration gardens and bioswales, while still connecting to W 11th St, a highly trafficked bus route.

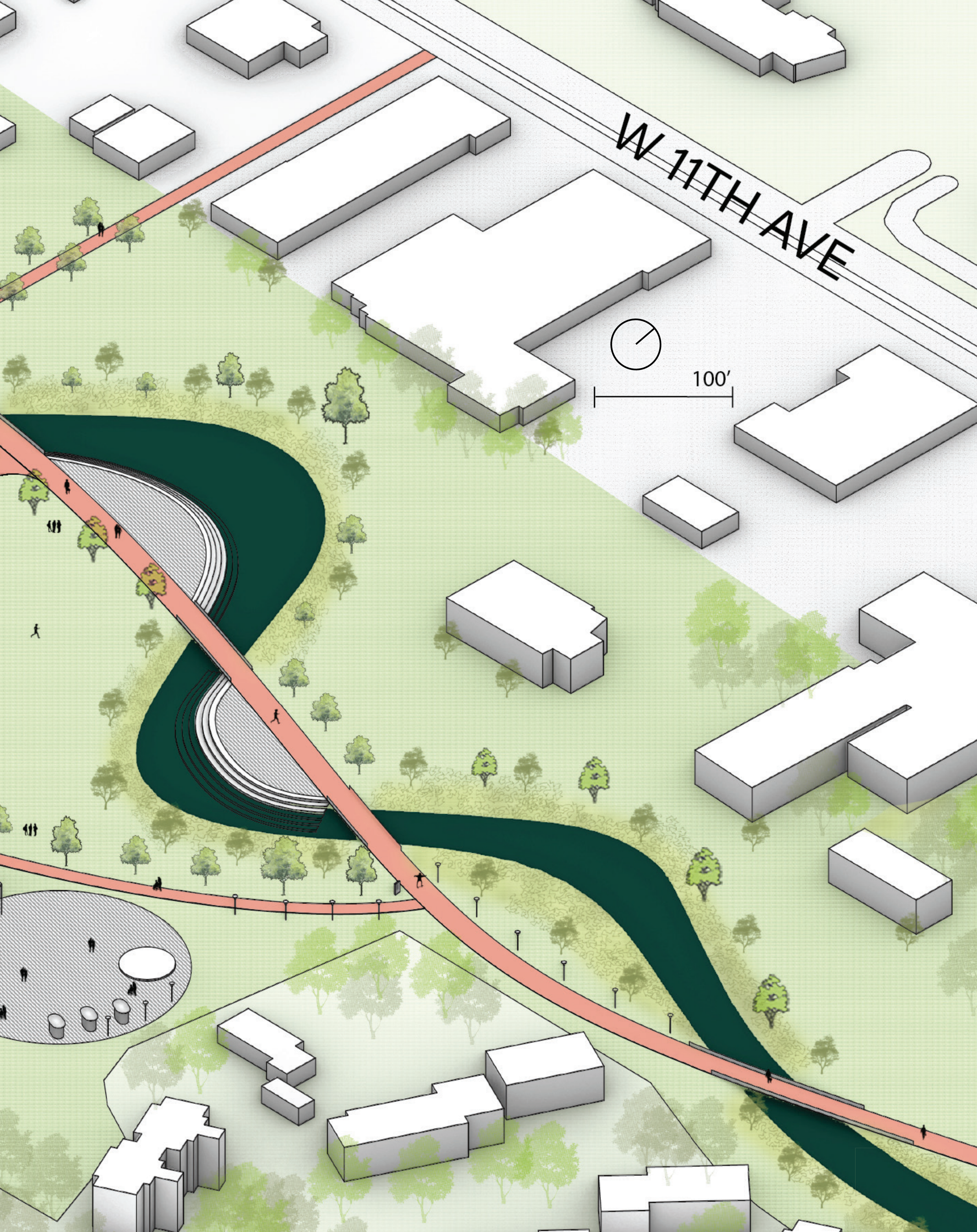
Just south of the creek there will be two large overhead structures to host organized or pop-up markets selling and distributing the produce harvested from any of the three sites. When markets are not taking place, the structures will be used as a gathering space. Adjacent to the open structures will be public orchard, community garden plots, and a community park that will allow for spill over from market events and retaining open green space for the neighborhood from the park that exists there currently. Additionally, there will be a proposed outdoor kitchen near the amenity hub to allow for outdoor cooking and preparing of harvested food.

Operations and Maintenance

Out of all three sites, this third site will require the least amount of productive land and will require the least amount of maintenance in terms of harvesting. The outdoor kitchen will be regularly cleaned and maintained by the parks department.

MEANDERING FOODSCAPE | Share

Figure 5.48



W 11TH AVE
100′

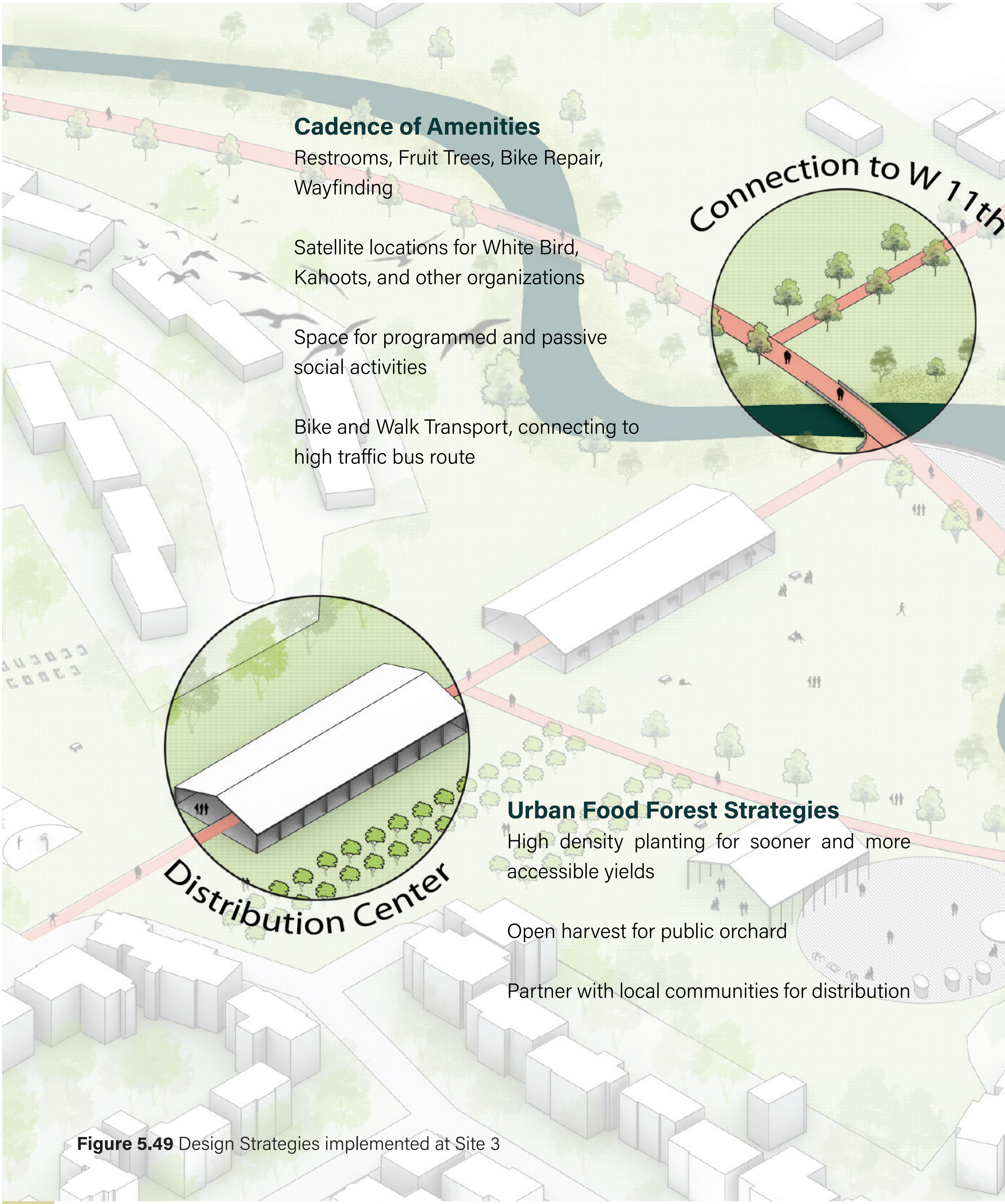


Figure 5.49 Design Strategies implemented at Site 3

Re-Imagining the Urban Riparian Network

De-channelize water into natural, meandering rivers and streams

Slowing water flow to allow for understory shrubs and riparian habitat to establish

Articulate a spatial concept

Improved access and interaction with water

Re-framing of hydralic systems for ecological performanceand public interest

Absorptive Edges through filtration gardens and bioswales

MEANDERING FOODSCAPE | Share

Program and Activation

Regular markets will activate the space hosted by community members and organizations distributing excess yields from sites 1 and 2. In addition to distributing foods, local organizations, such as White Bird or Hosea Youth services, are able to rent out the structures or kitchen to host events or distribute their services to west Eugene community members or people experiencing homelessness. This site allows for the most open-ended program through covered and green open space for the community to share and distribute resources when organized or to celebrate the unscripted interactions between members of the community.

Rights, Rules, and Accountability

Like the previous two sites, signage, continued use and conversation will guide appropriate harvesting for the productive lands. The kitchen and community garden plots will be closed at night while the overhead structures will remain open. These structures will most likely host people experiencing homelessness at night and provide programming and resources for them and nearby residents in the day. These shared spaces that allow for multiple uses allow us to celebrate our differences as a community.

Figure 5.50 Market Space and Community Park

06 REFLECTION

"We do not learn from experience ... we learn from reflecting on experience."

-John Dewey

REFLECTION

With this project, I aimed to develop a toolbox of design strategies to apply to public space design that cohesively improve the ecological and social function of communities. This was done through gathering existing knowledge in urban ecology and public space design and pulling key themes from these concepts to turn into design strategies. The three design strategies I developed are urban food forests as novel ecosystems, re-imagining the urban waterway, and developing a cadence of amenities. Applying these strategies to sites in Eugene, Oregon allowed me to speculate on strengths and weaknesses, or areas for further study, of these design strategies.

Strengths

It is clear that public space design can complement already existing social resources serving vulnerable populations in the community. People experiencing houselessness rely heavily on public space. In Eugene, there are established organizations serving these communities throughout the city. My design strategy took Amazon Creek, an existing feature currently physically and socially dividing the city and transformed it into a form of connection. I found the combined social and ecological network has strong potential to connect vulnerable communities to social resources, while improving ecosystem services for local ecologies. The strengths of this project include meeting people where they are, creating and supplementing habitat corridors, and improving the ecological and social health of Amazon Creek.

Meeting people where they are

The banks of Amazon Creek host a lot of people in Eugene experiencing homelessness. The underutilized public space along the creek has potential to serve the community in much more fruitful ways. Having food forests near where people where people camp provides accessible and nutritional resources for people experiencing homelessness. It also provides opportunities to learn new skills such as harvesting and pruning, as well as partake in a community effort on public land with fellow members of the community. For example, observed near Site 2 on one site visit at one particular time there was about a dozen people experiencing homelessness that could benefit from an open harvest food forest.

Habitat Corridors

Amazon Creek currently provides little to no benefit for non-human species navigating through the urban environment. With concrete encasing the waters through the urban core, no riparian vegetation is allowed to grow to provide habitat patches or corridors for migrating birds or other species. Connecting the existing trails along Amazon Creek with green infrastructure interventions provides potential for these corridors.

Amazon Creek

The designs I propose demonstrate the overlapping benefits these three design strategies can have on both the social and ecological health of Amazon Creek. Currently the creek's temperatures are too high to support any biotic life. Shading strategies such as building a path over the creek and increasing bioswales surrounding the creek provide constructed and natural shading, allowing more plant and animal life to flourish. Additionally, the proposed strategy of de-channelizing the creek to a more meandering form, slows water speeds that benefit riparian plant species. I predict with interventions such as these, it will improve the perception of Amazon Creek to be a healthier natural amenity to the city. Following the proposal of these design strategies along Amazon Creek, I re-visited Ahern's ABC functions of a stream to move Amazon Creek on the continuum based on the

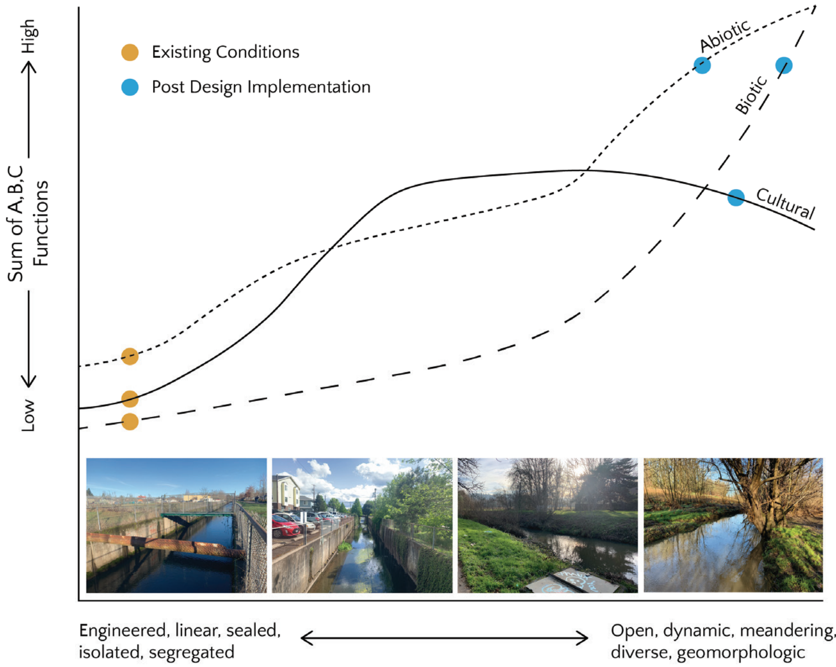


Figure 6.1 ABC Functions of Streams Adapted from Ahern's continuum of hydrological/stream types and associated abiotic, biotic and cultural functions applied showing Amazon Creek pre and post design

proposed design. As seen in Figure 6.1, re-imagining Amazon Creek using these design strategies has the potential to drastically improve the abiotic, biotic, and cultural function of the creek.

Weaknesses | Areas for Further Study

If I had more time, I would develop post-implementation management strategies for the maintenance of these spaces. Productive public space is not a new idea, yet it has not been applied for close to a century in this country. Without continuous knowledge the concept of ongoing maintenance of productive landscapes would be new to most municipalities. Efforts like urban food forests require not only ample support to implement, but also continued maintenance and operations to keep it, literally and figuratively, alive. Next steps in the project might include gaining a better understanding of specific plant combinations' maintenance needs to establish a social infrastructure of maintenance. This project could also further benefit from future research on establishing a plan for pest and rodent control while still celebrating open and public harvest. In addition to maintenance and pest control, areas of further study should include broadening the perceptions of public space beyond recreational and growing upon these design strategies to develop a larger toolkit.

Public Space Perception

Design strategies discussed in this research require substantial social and political support. Public space is a unique part of any city with opposing forces of open-ended program and many restrictions. "Too much control obviously diminishes the public realm, but a certain amount of control is necessary." (Allen 2004, p. 13) In order for public orchards and urban food forests to flourish, there is a need for shared understanding of appropriate behaviors and practices, which takes time to establish. Spaces like these require shared accountability from the public, which takes time to be learned.

Kit of parts

Another opportunity for further study is developing a larger toolkit for converting current open space to more productive space. The transferability of these strategies needs further development if they are to be used on sites of differing density and ecological context. These strategies could also be used as with a kit of parts approach. For example, not all public spaces need to be near an urban waterway to implement components of the urban food forest strategies and vice versa. But rather a larger toolkit can allow planners, landscape architects, and city officials to mix and match public space design strategies to better serve their specific ecologies and social communities.

Lastly, as this project discusses vulnerable populations such as people experiencing homelessness, it does not solve the issue of homelessness. What people experiencing homelessness really need are houses. This project aims to address the role of landscape architects as public space designers, and how we can better sculpt our cities to accommodate and provide resources for these vulnerable communities.

APPENDIX

Urban ecology principles developed since the field's 1970s origin (Forman 2016, p. 1657-1660)

Bolded are principles used to guide further research

Habitats

1. More buildings and tall structures create both more habitats and hazards for organisms.

2. Hospitals, veterinaries, zoos, structures with food, and human wastewater greatly enrich microbial diversity and ecology.

3. Both rectilinear networks of different form and the arrangement of buildings strongly affect species distributions and movements.

4. A concentration of numerous tiny and diverse human-made objects creates high microhabitat diversity.

5. Trees and shrubs, typically in straight lines along streets and roads, with associated animals are increasingly stressed by more traffic and diverse related pollutants.

6. House plots (lots), street blocks, neighborhoods, cities, and urban regions support relatively different vegetation and associated animals at each spatial scale.

Biodiversity

7. Planted native and nonnative species, along with diverse spontaneous colonizers, coexist, interact, and together provide the benefits offered by limited urban plant cover.

8. Few specialist species and mostly environmental generalists predominate in cities, with some pre-adapted and some in situ city-adapted species present.

9. Despite widespread species-scarce sites, overall biodiversity is high, mainly due to high habitat diversity, native species inputs, plantings, and abundant nonnative species.

10. Plant and animal biodiversity is typically high in neglected sites, and (excluding zoos and botanical gardens) decreases with more design, planning, management, and/or maintenance.

11. Numerous low-population-size species, especially plantings and recent nonnative arrivals, coexist with, some common species, and few highly abundant species.

12. Species populations commonly exhibit high mortality, so unplanted rich native biodiversity largely depends on "species rain" inputs, especially from surrounding semi-natural areas.

13. Almost all rare native species seem doomed to local extinction due to concentrated human impacts, whereas rare nonnative species may disappear, persist, or spread.

Plants and vegetation

14. Shrubs are commonly limited in abundance, especially near walkways and public spaces, due to human security concern.

15. Despite considerable tree mortality, dead trees, branches and logs, along with their associated fauna, are normally scarce due to human removal.

16. Abundant flowers with pollinators commonly persist much of the year, due to urban heat and/or gardens and plantings with sequential flowering.

17. Seed dispersal is greatly facilitated by people and vehicle movement, plus stormwater runoff and accelerated airflow associated with built structures.

18. Green roofs (vegetation covered) and green walls help reduce urban heat buildup, stormwater runoff, and air pollution locally within an urban area.

19. Most vegetation patchiness and succession results from human activity, i.e., site clearance/alteration/construction and/or ongoing management/maintenance/repair.

20. Ecological succession from plant colonization to mature tree vegetation, or even complete young-tree cover, is rare due to site disturbance or land-use change

21. While species composition and abundance constantly change, pulses of new species (e.g., after 1500 in Europe) provide novel species assemblages, which in turn change rapidly.

22. Plant populations typically exhibit high resistance, high resilience, or temporary existence in urban areas with widely fluctuating environmental conditions.

Animals/wildlife

23. Most wildlife species strongly respond to the species and arrangement of trees and shrubs, especially in areas with high impervious-surface cover.

24. Animals tolerate and communicate in endless urban noise—some loud, most low frequency.

25. Many terrestrial wildlife species are nocturnal, avoiding daytime people and traffic, and respond to diverse changing urban lights.

26. Pipes and streets facilitate widespread pest movement between and into buildings. 27. Pets respond strongly to human behavior and feeding, while only slightly affecting surrounding animals and plants.

28. Genetic adaptation and differentiation includes urban-rural population divergence, while selective forces include pollution, human-provided food, and low-frequency noise.

29. Wildlife distributions and routes are commonly rectilinear, mainly reflecting road, street, walkway, rail, and pipe infrastructure networks.

30. Streets and roads are barriers against, and conduits for, animal movement, in both cases with more traffic strongly decreasing movement rate.

31. Food webs are typically simplified, and their predator links reduced, with increasingly intensive urbanization.

Soil and organisms

32. Porous low-organic-matter soils, characteristic of fill sites, predominate near roads, streets, and buildings.

33. Low organic matter in widespread fill, plus soil compaction by former construction or present human activity, strongly limits the growth of woody plants.

34. Soil types are often only 1 to 100 m wide, commonly reflecting an area's history of construction and fill.

35. Vertical soil layers from place to place are highly variable in number, depth, and types/amounts of embedded anthropogenic objects.

36. Abundant diverse pipes, tunnels, foundations, and artifacts, plus their chemicals, strongly affect the growth and distribution of roots, soil microbes, and soil animals.

37. Diverse dense overlapping pipe-systems with leaks and overflows add chemicals and water to the soil, while maintenance and repairs keep the area in flux.

38. Widespread high soil pH from water running across concrete or mortar surfaces differentially affects mineral nutrient availability, growth of organisms, and species present.

39. Concentrated heavy metals, hydrocarbons, pesticides, and other organic compounds in soil, especially from nearby industry and transportation, decimate soil animals and microbes.

40. Aerobic decomposition typically improves contaminated soil, whereas water flowing through such soil commonly spreads toxins into groundwater and surface waterbodies.

Chemical and Organisms

41. Around built structures chemical flows are mainly rectilinear, but locally convoluted, enhancing or inhibiting organisms along the routes.
42. Chemical "flow throughs" rather than cycles predominate, with little recycling.
43. Photosynthetic CO_2 absorption and organic matter production are low due to limited vegetation cover, plus heat-and-pollution stressed plants.
44. Nitrogen and phosphorus from diverse sources blanket the urban area, producing highly eutrophicated terrestrial and aquatic ecosystems often dominated by one or a few species.
45. Cities are cauldrons of countless concentrated human-created chemicals, overwhelmingly with unknown effects on species and their biology.

Air and Organisms

46. Heat flow, especially related to impervious surfaces, rather than organic food-chain energy flow, dominates most urban ecosystems.
47. Extensive impervious-surface areas have limited plant transpiration along with considerable evaporation (after rains), with the net result being rather little air cooling.
48. Air turbulence and vortices, related to the arrangement of built structures, effectively remove particles from surfaces and create pollutant and propagule-dispersal patterns.
49. Diverse air pollutants, especially from nearby motor-vehicles and industries, bathe and often inhibit the growth and survival of plants and animals.
50. Strategically located tree plantings, e.g., in parks, help reduce most air pollutants, locally improving air quality.
51. Trees cool air by shading wall, sidewalk and street, by transpiring water, and by accelerating airflow between tree crown and wall.
52. Abundant well-adapted urban-tolerant nonnative woody plants help cool and clean urban air.
53. In summer, heat volatilizes certain organic substances from the surfaces of roads and car parks, with the heat and resultant air pollutants inhibiting some nearby plants.
54. Concentrated fossil-fuel combustion makes the urban area a primary CO_2 emitter, with global-warming effects on organisms in rural and remote areas.

Water and organisms

55. The water table commonly supporting surface waterbodies is normally lower and more variable than in surrounding areas, and groundwater is polluted/contaminated.
56. Wetlands are scarce, often due to former farmer activity, and typically contain locally uncommon species tolerant of human disturbance.
57. Stormwater runoff largely from impervious surfaces and low-friction pipes dominates water flows, and hardly any water cycling/recycling occurs within an urban area.
58. Stormwater runoff, which cleans urban surfaces and is piped or ditched to stream, pond, or wetland, causes pulses or fluctuations in water levels and pollutant concentrations.

58. Stormwater runoff, which cleans urban surfaces and is piped or ditched to stream, pond, or wetland, causes pulses or fluctuations in water levels and pollutant concentrations.

59. Most local waterbodies have intensive human use and disturbance, considerable hard edge, and a quite limited littoral area of vegetation zones with rich aquatic fauna.

60. Many streams, ponds, and wetlands have lowered water levels in a wastewater sewage-system area, and are polluted in a septic-system area containing some defective systems.

61. Human wastewater with limited or no treatment, or combined-sewer-overflows, is channeled downslope/downriver, often creating local anaerobic water conditions.

62. Chemicals and microbes in human wastewater commonly seep into the soil, but constantly or periodically pour into and pollute local aquatic ecosystems.

63. Streams are commonly truncated, channelized, rock/concrete-lined, flashy, in low-flow condition, and/or lost into pipes, all of which limit fish and other aquatic species.

64. Urban streams and rivers, or estuary and sea, normally clean an urban area by carrying away numerous types of solid waste and chemical pollution.

65. Water quality is strongly determined by diverse human effects along and near stream corridors.

66. Water quantity (or hydrologic flow) and flooding of streams and rivers commonly increase with the proportion of developed land in upstream or headwater areas.

Greenspaces

67. Dissimilar large greenspaces in a city contain most of the interior and uncommon native species, and are major sources for species dispersal within the city.

68. The distribution of greenspaces, even tiny, within a built area has a strong effect on urban heat, water flows, and species movement.

69. Diverse types of urban agriculture provide a distinctive flora, abundant herbivore populations, and nutrient-rich soil and water.

70. Vacant plots (lots) are typically susceptible to infill construction, which reduces the benefits of vegetation and of "stepping stones" for species movement.

71. Lawns, with intensive human use, mowing, watering, and chemical maintenance, are widespread patches of water absorption, low-structure plant cover, and low species richness.

72. Vegetated corridors, from house-plot shrub lines to wide greenways, are often connected in networks and facilitate species movement.

73. Species movement along green corridors is commonly limited by internal heterogeneity, low-quality sections, gaps/breaks, and the sequence of adjoining land uses.

74. Sequences of green (vegetated) "stepping stones" surrounded by development are effective routes for some wildlife movement, especially generalist species.

Residential, commercial, industrial areas

75. Residential high rises, low rises, single units, courtyard/patio houses, and informal squatter housing in a city serve as differing sources, sinks, and repellents for species movement.

76. A block of highly diverse and ever-changing house plots is ecologically tied together by some repetitive plantings/land uses, plus green street side and back-boundary corridors.

77. Within a house plot, concentrating diverse land uses, maintenance regimes, and tiny structures commonly increases species richness well above that in a nearby natural area.

78. Biodiversity is likely higher in informal settlements than in similar-density areas, due to concentrated microhabitats and little maintenance sites with native and nonnative species.

79. Numerous nonnative species are transported by ship, aircraft, train, and truck to warehouses/storage sites, and then escape or are trucked to commercial and residential areas. 80. Commercial and shopping areas, with concentrated goods, people, food, garbage, and other organic materials, sustain surrounding scavenger and pest populations.

81. Many industrial sites contain uncommon species associated with raw materials, byproducts, or pollutants, yet have low species richness.

82. Many pest insects genetically adapt to heavy pesticide use around kitchens, houses, restaurants, and food markets, as well as standing water.

City and ring-around-the-city

83. Urban pollutants, commercial goods, vehicles, and people flow outward from a city, ecologically transforming surrounding areas.

84. Commuters, suburban nonnative species, and diverse farm and industrial effects from surrounding areas flow inward to the city, ecologically modifying urban areas.

85. Urban areas normally expand by combined bulges, satellite-city growth, strip development, and sprawl, with the first two urbanization processes being least environmentally damaging.

86. Suburbs are filters of flows/movements between rural and city areas, and also key sources of flows affecting both areas.

87. The patterns (curve shapes) along urban-to-rural gradients especially depend on the specific radii selected, locations of first and last points, and the ecological variables measured.

88. Urban-region natural resources close to a city, including freshwater supply, food market-gardening, clean air, recreation areas, and tourist spots, strongly enhance the city's ecology.

89. Outside the city, a water-supply reservoir with protected surrounding land is a "hotspot" of fish, wildlife, and biodiversity, due to its large area and concentration of diverse habitats.

90. Major natural and human-caused disturbances are often ecological and human disasters, due to intensive development plus limited resistance and resilience of a large dense population.

Table 4 Climate–Food–Species Matrix of seventy perennial woody species potentially appropriate for urban food forestry applications, according to our analysis. The thirty species shown in bold are highly suitable for urban food forestry, based on both their drought and cold tolerance, and high edibility ranking according to four criteria. Italicized species are part of genera included in the Climate–Species Matrix of Roloff et al. (2009). Species marked with stars are actinorhizal (nitrogen-fixing). "Type of plant" includes large trees (>10 m), short trees (6–10 m), large bushes (3–6 m), short bushes (0.25–3 m), and groundcovers (<0.25 m)

Latin name	Type of plant	Common name	Commercially cultivated for human food?	Widely recognized and marketed?	Palatable when eaten raw?	Can be eaten without special preparation?	Edibility rating	Approximate cold hardiness (°C)	Drought tolerant?
Vaccinium angustifolium	Short bush	Lowbush blueberry	Yes	Yes	Yes	Yes	5	−40	Yes
Vaccinium corymbosum	Tall bush	Highbush blueberry	Yes	Yes	Yes	Yes	5	−40	Yes
Malus domestica	Tall tree	Apple	Yes	Yes	Yes	Yes	5	−40	Yes
Prunus cerasus	Short tree	Sour cherry	Yes	Yes	Yes	Yes	5	−40	Yes
Vitis labrusca	Vine	Fox Grape	Yes	Yes	Yes	Yes	5	−35	Yes
Pyrus communis	Large tree	European pear	Yes	Yes	Yes	Yes	5	−30	Yes
Fragaria vesca	Groundcover	Alpine strawberry	Yes	Yes	Yes	Yes	5	−30	Yes
Vaccinium membranaceum	Short bush	Black huckleberry	Yes	Yes	Yes	Yes	5	−30	Yes
Rubus fruticosus	Short bush	Blackberry	Yes	Yes	Yes	Yes	5	−25	Yes
Pyrus pyrifolia	Short tree	Asian pear	Yes	Yes	Yes	Yes	5	−25	Yes
Lycium barbarum	Short tree	Goji berry	Yes	Yes	Yes	Yes	5	−25	Yes
Prunus armeniaca	Short tree	Apricot	Yes	Yes	Yes	Yes	5	−20	Yes
Hippophae rhamnoides*	Large bush	Sea buckthorn, seaberry	Yes	No	Yes	Yes	4	−40	Yes
Amelanchier alnifolia	Short tree	Saskatoon, serviceberry	Yes	No	Yes	Yes	4	−40	Yes
Lonicera caerulea var. edulis	Short bush	Haskap, honeyberry	Yes	No	Yes	Yes	4	−40	Yes
Pinus koraiensis	Large tree	Korean pine nut	Yes	Yes	Yes	No	4	−35	Yes
Corylus avellana	Short tree	Common hazel	Yes	Yes	Yes	No	4	−30	Yes
Castanea mollissima	Tall tree	Chinese chestnut	Yes	Yes	Yes	No	4	−25	Yes
Lycium chinense	Short tree	Chinese boxthorn	Yes	No	Yes	Yes	4	−25	Yes

Clarks and Nicholas' Climate-Food-Species Matrix, used in the development of the urban food forset plant palette (Clarks and Nicholas 2013).

Table 4 continued

Latin name	Type of plant	Common name	Commercially cultivated for human food?	Widely recognized and marketed?	Palatable when eaten raw?	Can be eaten without special preparation?	Edibility rating	Approximate cold hardiness (°C)	Drought tolerant?
Prunus cerasifera	***Short tree***	***Cherry plum***	***No***	***Yes***	***Yes***	***Yes***	**4**	**−25**	***Yes***
Diospyros virginiana	***Large tree***	***American persimmon***	***Yes***	***Yes***	***Yes***	***No***	**4**	**−25**	***Yes***
Ziziphus zizyphus	**Tall tree**	**Jujube**	**Yes**	**No**	**Yes**	**Yes**	**4**	**−20**	**Yes**
Corylus americana	**Short tree**	**American filbert**	**Yes**	**Yes**	**Yes**	**No**	**4**	**−20**	**Yes**
Passiflora incarnata	**Vine**	**Maypop**	**Yes**	**Yes**	**Yes**	**No**	**4**	**−20**	**Yes**
Prunus tomentosa	**Short tree**	**Nanking cherry**	**No**	**No**	**Yes**	**Yes**	**3**	**−40**	**Yes**
Elaeagnus multiflora*	**Tall bush**	**Goumi**	**No**	**No**	**Yes**	**Yes**	**3**	**−35**	**Yes**
Cornus mas	***Short tree***	***Cornelian cherry***	***No***	***No***	***Yes***	***Yes***	**3**	**−25**	***Yes***
Morus alba	***Large tree***	***White mulberry***	***No***	***No***	***Yes***	***Yes***	**3**	**−20**	***Yes***
Castanea sativa	***Large tree***	***Sweet chestnut***	***Yes***	***Yes***	***No***	***No***	**3**	**−20**	***Yes***
Morus nigra	***Large tree***	***Black mulberry***	***No***	***No***	***Yes***	***Yes***	**3**	**−20**	***Yes***
Rubus idaeus	Short bush	Raspberry	Yes	Yes	Yes	Yes	5	−40	No
Ribes glandulosum	Short bush	White currant	Yes	Yes	Yes	Yes	5	−40	No
Rubus spectabilis	Short bush	Salmonberry	Yes	Yes	Yes	Yes	5	−35	No
Fragaria × ananassa	Groundcover	Strawberry	Yes	Yes	Yes	Yes	5	−30	No
Sambucus nigra	Tall bush	Elderberry	Yes	Yes	Yes	Yes	5	−25	No
Ribes nigrum	Short bush	Black currant	Yes	Yes	Yes	Yes	5	−20	No
Prunus persica	Short tree	Peach and nectarine	Yes	Yes	Yes	Yes	5	−20	No
Ribes uva-crispa	Short bush	Gooseberry	Yes	Yes	Yes	Yes	5	−20	No
Diospyros kaki	Short tree	Asian persimmon	Yes	Yes	Yes	Yes	5	−18	No
Ficus carica	Short tree	Fig	Yes	Yes	Yes	Yes	5	−15	Yes
Rubus chamaemorus	Groundcover	Cloudberry	Yes	No	Yes	Yes	4	−40	No
Vaccinium vitis-idaea	Groundcover	Lingonberry	Yes	Yes	No	Yes	4	−35	No

REFERENCES

Adams, T. 2019. "'They are absolutely being priced OUT': Rents, home prices OUTPACE income growth in Eugene." Retrieved February, 2021, from https://kval.com/news/local/they-are-absolutely-being-priced-out-rents-home-prices-outpace-income-growth-in-eugene

Ahern, J. 2007. Green Infrastructure for cities. The spatial dimension. In Cities of the future. Towards integrated sustainable water and landscape management, ed. V. Novotny, 267–283. London: IWA Publications.

Ahern, Jack. 2016. "Novel urban ecosystems: Concepts, definitions and a strategy to support urban sustainability and resilience." Landscape Architecture Frontiers, 4(1), 10+. Retrieved from https://linkgalecom.libproxy.uoregon.edu/apps/doc/A459715410/AONE?u=euge94201&sid=AONE&xid=7710925d

Ahern, Jack, Sarel Cilliers, and Jari Niemelä. 2014. "The Concept of Ecosystem Services in Adaptive Urban Planning and Design: A Framework for Supporting Innovation." Landscape and Urban Planning 125 (May): 254–59. https://doi.org/10.1016/j.landurbplan.2014.01.020.

Armborst, Tobias, Daniel D'Oca, Georgeen Theodore, and Riley Gold. 2017. The Arsenal of Exclusion & Inclusion. New York ; Barcelona: Actar Publishers.

Beardsley, John. 2007. "Conflict and Erosion: The Contemporary Public Life of Large Parks." Large Parks, Czerniak, J., Hargreaves, G., & Harvard University (Eds.). (2007). Princeton Architectural Press ; in association with the Harvard University Graduate School of Design.

Berrizbeita, Anita. 2007. "Re-placing Process." Large Parks, Czerniak, J., Hargreaves, G., & Harvard University (Eds.). (2007). Princeton Architectural Press ; in association with the Harvard University Graduate School of Design.

Clark, Kyle H., and Kimberly A. Nicholas. 2013. "Introducing Urban Food Forestry: A Multifunctional Approach to Increase Food Security and Provide Ecosystem Services." Landscape Ecology 28 (9): 1649–69. https://doi.org/10.1007/s10980-013-9903-z.

Czerniak, Julia, George Hargreaves, and Harvard University, eds. 2007. Large Parks. New York : Cambridge, Mass: Princeton Architectural Press ; in association with the Harvard University Graduate School of Design.

Dunn, Sarah, Martin Felsen, Stan Allen, John McMorrough, Ellen Grimes, and UrbanLab (Firme). 2017. Bowling: Water, Architecture, Urbanism.

Dunne, Anthony, and Fiona Raby. 2013. Speculative Everything: Design, Fiction, and Social Dreaming. Cambridge, Massachusetts ; London: The MIT Press.

Erlhoff, Michael, Philipp Heidkamp, Iris Utikal, and Köln International School of Design, eds. 2008. Designing public: Perspektiven für die Öffentlichkeit = perspectives for the public. Basel ; Boston: Birkhauser Verlag AG.

"Eugene, OR Census Place." 2020. Retrieved February, 2021, from https://datausa.io/profile/geo/eugene-or/#about

"Eugene, OR Rental Market Trends." 2021. Retrieved February, 2021, from https://www.rentcafe.com/average-rent-market-trends/us/or/eugene/

Forman, Richard T. T. 2015. Urban Ecology Science of Cities. Cambridge: Cambridge Univ. Press. https://doi.org/10.1017/CBO9781139030472.

Forman, Richard T. T. 2016. "Urban Ecology Principles: Are Urban Ecology and Natural Area Ecology Really Different?" Landscape Ecology 31 (8): 1653–62. https://doi.org/10.1007/s10980-016-0424-4.

Gastil, Raymond W. 2004. Open: New Designs for Public Space. New York: Princeton Architectural.

Gilmartin, Wendy. 2016. "THE HOMELESS WANT MORE THAN HOUSING." Retrieved from https://landscapearchitecturemagazine.org/2016/10/17/the-homeless-want-more-than-housing/

Hou, Jeffrey. 2017. "Urban Community Gardens as Multimodal Social Spaces." In Greening Cities, edited by Puay Yok Tan and Chi Yung Jim, 113–30. Advances in 21st Century Human Settlements. Singapore: Springer Singapore. https://doi.org/10.1007/978-981-10-4113-6_6.

Holts, Lauri, Trevor Taylor, Ryan Turner, Rachel Burr, and Eric Wold. 2014. Rep. Open Waterway Maintenance Plans. Eugene, Oregon: City of Eugene Public Works Department, Parks and Open Space Division 2014.

Huttenhoff, Michelle. 2021. "Coexistence in Public Space: Engagement tools for creating shared spaces in places with homelessness." SPUR, Gehl. John S. and James L. Knight Foundation.

Kingwell, Mark, ed. 2009. Rites of Way: The Politics and Poetics of Public Space. Canadian Commentaries. Waterloo, Ont: Wilfrid Laurier Univ. Press.

Kingery-Page, Katie and Brown, Skyler. 2019, March 7. "Designing for Public Space Inclusive of Unhoused People." Retrieved from https://thefield.asla.org/2019/03/07/designing-for-public-space-inclusive-of-unhoused-people/

Klinenberg, Eric. 2018. Palaces for the People: How Social Infrastructure Can Help Fight Inequality, Polarization, and the Decline of Civic Life. First Edition. New York: Crown.

Lindner, Christoph, and Miriam Meissner, eds. 2019. The Routledge Companion to Urban Imaginaries. London: New York : Routledge, Taylor and Francis Group.

Lister, Nina-Marie. 2007. "Sustainable Large Parks: Ecological Design or Designer Ecology?" Large Parks, Czerniak, J., Hargreaves, G., & Harvard University (Eds.). (2007). Princeton Architectural Press ; in association with the Harvard University Graduate School of Design.

Nordahl, Darrin. 2009. Public Produce: The New Urban Agriculture. Washington: Island Press.

Orff, Kate. 2016. Toward an Urban Ecology. New York, New York: The Monacelli Press.

Penderock, Carla, Will Rak, Donald Comstock, David Perasso, Laureena Marston,

Kimberly Leeper, Joanne Walby, and Elise Evans. 2019. Rep. 2019 Annual Report. Seattle, Washington: Beacon Food Forest, 2019.

Sasaki Associates, Inc. "Innovations in Addressing Homelessness." Sasaki, 23 Mar. 2017, https://www.sasaki.com/voices/innovations-in-addressing-homelessness/

Stapleton, Elizabeth. 2020. "The Making and Making Do of Amazon Creek." Making-Do Conference. presented at the Making-Do Conference, November 2020.

Turner, Gabe, Aliza Vigderman, and Corey Birnstengel. 2019. "32 Cities With Biggest Homelessness Problems." Security.org, October 4, 2019. https://www.security.org/resources/homeless-statistics/.

Williams, Stockton, Lisa Sturtevant, Paul Angelone, Rosemarie Hepner, Grace Hill, and Cali Slepin. 2018. "Homelessness Los Angeles, California Recommendations for Local Action." Urban Land Institute: A ULI Advisory Services Panel Report.

Yao, Xueyan, and Meng Xu. 2017. "Research on Innovative Approaches and Guidance for Urban Public Space Design." Landscape Architecture Frontiers 5 (3): 18. https://doi.org/10.15302/J-LAF-20170303.

Yu, K. (2014). Slow down: Minghu Wetland Park in Liupanshui, Guizhou. Landscape Architecture Frontiers, 2(2), 130+. Retrieved from https://link-gale-com.libproxy.uoregon.edu/apps/doc/A454485920/AONE?u=euge94201&sid=AONE&xid=ffae9962

"[...] parks provide the necessary room for contest and struggle that allow people an opportunity to produce their own meanings and uses for public space. Whatever their flaws, parks remain among the most reliable places we have for the unscripted interactions that oil the creaky machinery of democratic social life."

-John Beardsley, 2007