

From blight to benefit: the potential of vacant lot greening to support ecosystem services

by

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A REPORT

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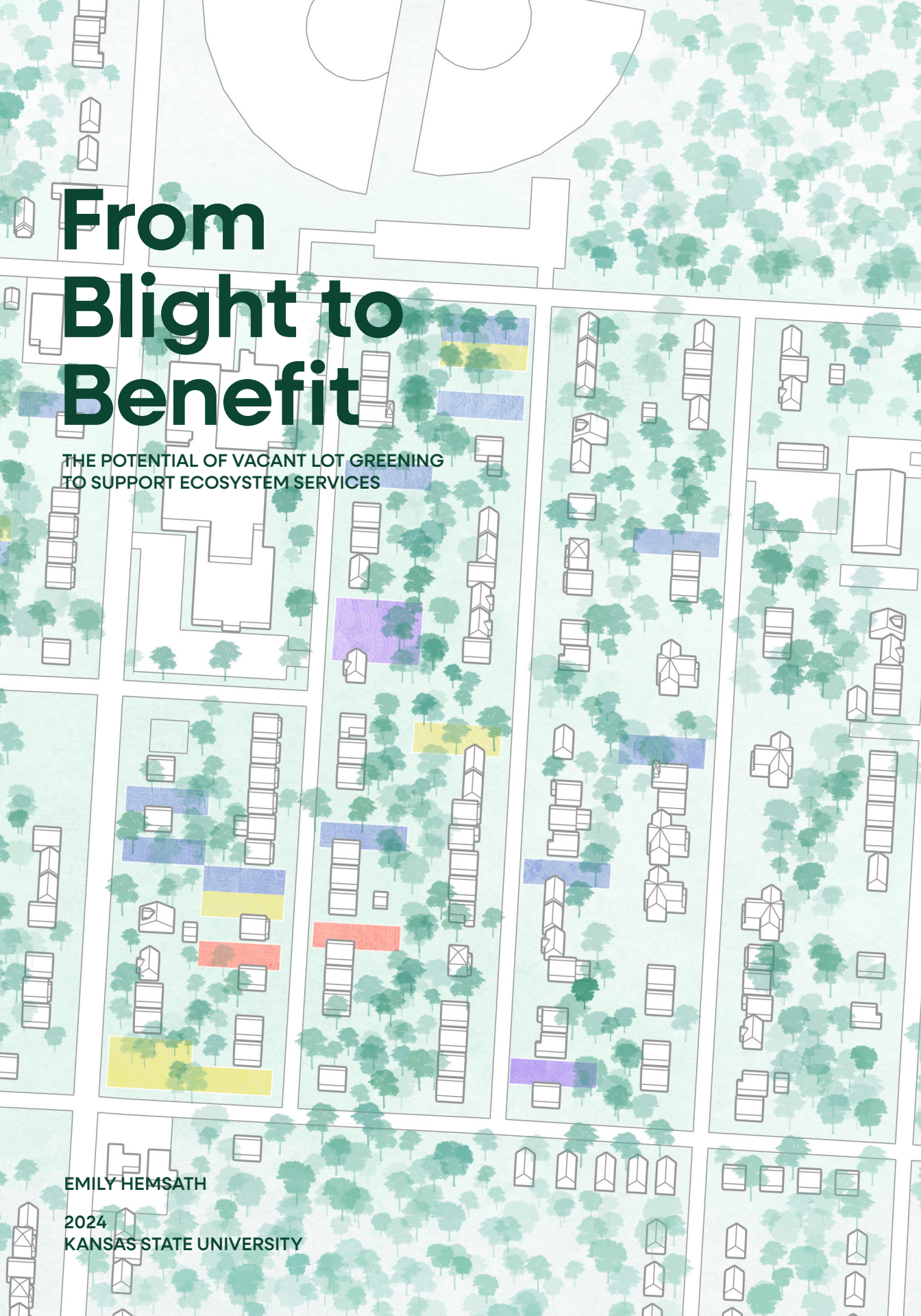
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Approved by:

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Dr. Sara Hadavi

Abstract

Overgrown vacant lots have become an issue in disinvested neighborhoods with declining populations across the US. However, studies have shown that spontaneous vegetation on vacant lots has the potential to support a high degree of biodiversity and provide significant ecosystem services in urban environments (Kim et al., 2015; McPhearson et al., 2013; Riley et al., 2018). While a city's ultimate goal for a site is often redevelopment into economically productive uses (Bowman & Pagano, 2004; Németh & Langhorst, 2014), vacant land should not be ignored while waiting for development and should be managed to promote social and ecological goals (Chen & Conroy, 2023; Kim et al., 2018; Rega-Brodsky et al., 2018). Many cities faced with a high number of vacant lots work with community members to green vacant lots (Sadler & Pruett, 2017). However, greening approaches for vacant lots typically seek to create a conventional residential lawn aesthetic, with mown turf and ornamental plantings, significantly reducing the site's biodiversity (Kim et al., 2015; Nassauer et al., 2021). This study aims to address the contradictions between vacant lots' negative impacts and ecosystem services and suggests converting vacant lots to greenspaces with high biodiversity. Focusing on nine of these high-vacancy neighborhoods of Kansas City, Missouri, as a case, this study aims to propose temporary design interventions for vacant lots that would enhance the ecosystem services provided to a community and contribute to an improved quality of life while waiting for redevelopment to occur. This study takes four key steps: a) Use ArcGIS to categorize the vacant lots into a typology based on their redevelopment potential; b) Use aerial imagery to estimate the ecosystem services currently provided by the vacant lots in one focus area, including carbon sequestration, microclimate regulation, stormwater management, and food production; c) Propose greening design interventions for the lots within the selected focus area based on spatial characteristics; and d) Calculate the ecosystem services provided by implementing the proposed design interventions across three alternative scenarios. The findings suggest that the proposed design interventions could improve the provision of the selected ecosystem services across a system of vacant lots. This project offers insights into the environmental value of temporary design interventions for vacant lots through an ecosystem services lens. Additionally, it contributes to the body of literature on landscape performance benefits by demonstrating a method to assess a design proposal's anticipated ecosystem services through aerial imagery, which can help designers advocate for its implementation.



From Blight to Benefit

THE POTENTIAL OF VACANT LOT GREENING
TO SUPPORT ECOSYSTEM SERVICES

EMILY HEMSATH

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KANSAS STATE UNIVERSITY

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SERVICES

Emily Hemsath | Master's Report Proposal

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Abstract

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Chapter 1

Introduction

Problem Statement

Vacant lots in disinvested urban areas can become overgrown with spontaneous vegetation and become illegal dumping sites often associated with criminal activity and a decreased sense of safety among surrounding residents (Nassauer & Raskin, 2014). However, studies have shown that vacant lots with spontaneous vegetation have the potential to support a high degree of biodiversity and provide essential ecosystem services to urban residents, including reducing stormwater runoff, reducing ambient temperature, and sequestering carbon (Burkholder, 2012; Kim et al., 2015; McPhearson et al., 2013; Riley et al., 2018). Many cities with a high volume of vacant properties are unable to manage these lots properly and have initiated programs to transfer management responsibilities to community members, either by selling properties as side yards (Accordino & Johnson, 2000; Hadavi et al., 2021) or partnering with non-profits and community groups for maintenance (Branas et al., 2012; Sadler & Pruett, 2017). These vacant lot greening projects are often considered temporary interventions with the ultimate goal of future redevelopment. Additionally, small, scattered interventions can only individually do so much to provide significant ecosystem services to the surrounding community. Urban vacancy is a large-scale problem that needs a large-scale approach. A system of lots with temporary design interventions could provide various ecosystem services and contribute to improved quality of life for nearby residents while future development is uncertain.

Research Questions

Focusing on high-vacancy neighborhoods of Kansas City, Missouri, as a case, this study aims to address two major questions:

- 1. To what extent can greening projects on urban vacant land increase the ecosystem services provided to nearby residents?*
- 2. How can aerial imagery be used to quantify ecosystem services and landscape performance benefits?*

This project considers vacant lots as an opportunity to re-integrate natural spaces into the city and improve urban ecosystem functioning. The project envisions a system of temporary design interventions for these parcels to provide environmental benefits, acknowledging that most will not be redeveloped into housing in the immediate timeframe and that some should be remediated and preserved as greenspace for the long term. This study proposes a typology to classify vacant lots and inform the selection of temporary vacant lot greening interventions. The study then assesses the potential increase in the provision of four selected ecosystem services on these lots using specific landscape performance metrics. The methods for comparing the current benefits provided by the selected vacant lots with the potential improvements if vacant lot greening projects were applied could be replicated by others in the landscape architecture profession. This project also demonstrates the value of conducting such assessments as a guide for optimizing the expected outcomes of such projects.

Study Overview

This project has addressed the research questions through three phases, as shown in Figure 1.1. In Phase I, based on a review of the literature, a vacant lot typology guided the selection of sites for temporary intervention. The vacant lots owned by the Land Bank of Kansas City, Missouri (KCMO) and Kansas City Missouri Homesteading Authority in the study area were classified into types based on their current site conditions, and the proportion of each lot type represented in the area was calculated. In Phase II, one focus area of fifty lots representative of the vacant lots typically found in the study area was selected for further ecosystem services assessment. Based on the literature and the potential impact on the quality of life of nearby residents in highly vacant neighborhoods, four ecosystem services were quantified: carbon sequestration, microclimate regulation, stormwater management, and food production. Land cover information determined from aerial imagery was used to estimate the ecosystem services these vacant lots currently provide. In Phase III, design prototypes for the suggested design interventions were developed and applied to each vacant lot owned by the Land Bank or Homesteading Authority to estimate proposed land cover changes under three scenarios. Then, a second ecosystem services assessment was conducted, using the proposed land cover changes to calculate the improved ecosystem services provision after two, five, and ten years. The project outcomes included prototype designs for temporary vacant lot design interventions and a set of metrics on the provided ecosystem services that can be used to advocate for the implementation of these projects.

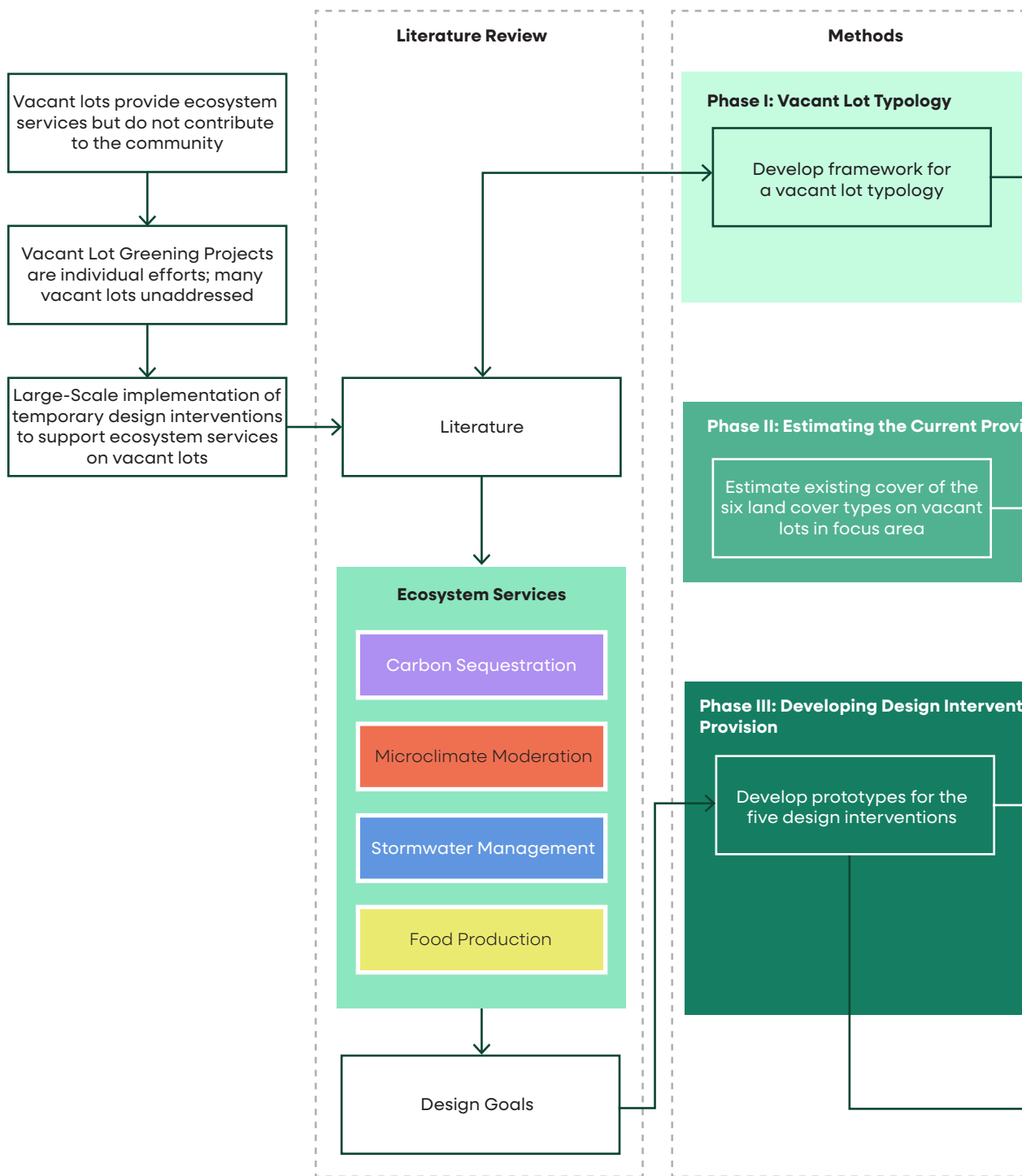
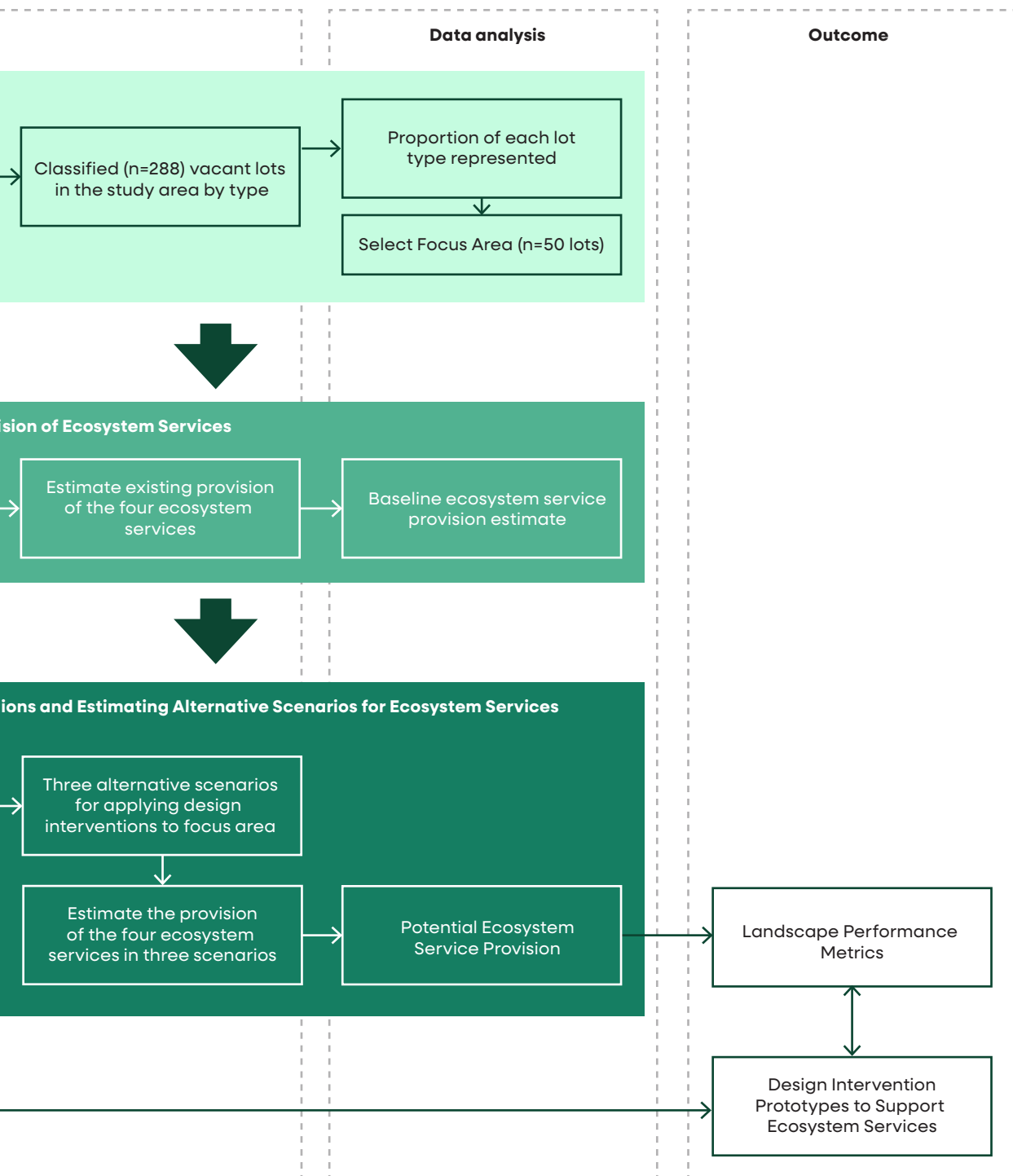


Figure 1.1 Study Process

The study process consists of three phases informed by the literature review. Each of the three phases includes the application of methods, followed by data analysis, which informs the next phase. The project outcomes include design prototypes for temporary vacant lot design interventions and landscape performance metrics to advocate for their implementation.





Chapter 2

Background

Ecosystem Services

Ecosystem services are naturally occurring processes that directly benefit human beings and are essential for maintaining life (Millennium Ecosystem Assessment, 2005). The growth of modern cities and increased demand for resources by humans have strained the world ecosystem's functioning and ability to provide these resources (Haase, Larondelle, et al., 2014; Millennium Ecosystem Assessment, 2005). The Millennium Ecosystem Assessment is the foremost study on ecosystem services, and it defines ecosystem services as the "benefits people obtain from ecosystems" necessary for human survival despite technological advancements (2005, p. v). The Millennium Ecosystem Assessment devised four categories of ecosystem services: (1) Provisioning services are the material goods the environment produces, like fresh water and food. (2) Cultural services are the benefits to human health and well-being that result from interacting with the environment. (3) Supporting services are indirect processes that enable the other categories of services to function, such as photosynthesis and soil production. (4) Regulating services regulate environmental conditions and ensure a livable climate, such as reducing air temperature and sequestering carbon (Millennium Ecosystem Assessment, 2005). This framework established by the Millennium Ecosystem Assessment is the standard for defining ecosystem services used today and is cited in most articles on ecosystem services assessments (e.g., Boehnke et al., 2022; Kremer et al., 2013).

Urban ecosystem services refer specifically to the ecosystem services produced within an urbanized, high-population-density ecosystem (Gómez-Baggethun & Barton, 2013). The demand for ecosystem services in dense urban areas outweighs the ability of greenspaces to provide those services, and cities rely on rural areas to provide ecosystem services. Additionally, in a complex global economy, the benefits of ecosystem services may be experienced far away from where that service was produced (e.g., food, water, and energy production; Brzoska & Spaġe, 2020; Burkhard et al., 2012). However, some ecosystem services must be provided locally, such as microclimate regulation and stormwater management, and are essential to the quality of life of those living directly nearby (Brzoska & Spaġe, 2020).

This study focuses on four ecosystem services based on their prominence in the literature and potential impact on quality of life for those living in high-vacancy neighborhoods: carbon sequestration, stormwater runoff retention, microclimate regulation, and food production (Brzoska & Spaġe, 2020; Haase, Larondelle, et al., 2014; Kain et al., 2016; McPhearson et al., 2013; Speak et al., 2015).

CARBON SEQUESTRATION & STORAGE

According to the Millennium Ecosystem Assessment, ecosystems impact the global climate by sequestering or emitting greenhouse gasses (2005). Above-ground carbon storage occurs almost exclusively in trees, which store carbon in their biomass during photosynthesis and release this carbon as they die and decay (Derkzen et al., 2015; Gómez-Baggethun & Barton, 2013; Nowak et al., 2013). Trees may also reduce carbon emissions by lowering temperatures and shading buildings in the summer and blocking cold winds in the winter, reducing their energy use for climate control (Kim et al., 2015; Nowak et al., 2013). Only a limited amount of carbon is stored in herbaceous vegetation and woody shrubs, and maintenance practices such as mowing and trimming may even emit CO₂ (Derkzen et al., 2015).

STORMWATER MANAGEMENT

Land cover changes can impact the speed and volume of stormwater runoff, especially in urban areas where the increase in impermeable surfaces increases runoff volume and contributes to flooding (Gómez-Baggethun & Barton, 2013; Millennium Ecosystem Assessment, 2005). Vegetation reduces runoff by intercepting and slowing rainwater, infiltrating it into the soil, or allowing it to evaporate off leaves and branches (Andersson-Sköld et al., 2018; Derkzen et al., 2015). Stormwater management by natural systems can impact residents by reducing flooding during storm events, which may damage property, and contribute to combined sewer overflow events, which make nearby receiving waterways unpleasant and dangerous to human health.

MICROCLIMATE REGULATION

The urban heat island effect is also caused by impermeable surfaces and buildings, which impact temperature, winds, and solar radiation (Burkhard et al., 2012; Derkzen et al., 2015; Millennium Ecosystem Assessment, 2005). Vegetation, particularly large trees, reduces temperatures through evapotranspiration and creates humid, shady microclimates (Andersson-Sköld et al., 2018; Gómez-Baggethun & Barton, 2013). Ambient microclimate regulation impacts human well-being by making outdoor spaces, including sidewalks, cooler and more pleasant. This is particularly important for people who must be outside during extreme heat events.

FOOD PRODUCTION

Food production as an ecosystem service encompasses all food products, including plants and animals (Millennium Ecosystem Assessment, 2005). However, this study focuses on food crops. While urban agriculture and farming only produce a fraction of the food cities require, global food crop demand is expected to increase significantly by 2050 (Gómez-Baggethun & Barton, 2013; Millennium Ecosystem Assessment, 2005). In a global economy, food consumed in a city may be produced thousands of miles away and shipped to the city (Brzoska & Spägle, 2020; Burkhard et al., 2012). Therefore, increasing the amount of locally produced food has significant implications on carbon emissions. Locally produced food through community gardens can also contribute to the health of nearby residents by increasing food security and providing social benefits.

Urban Vacancy

Vacant lots are abandoned properties not currently being used for any official purpose. They may contain derelict structures, bare soil, or overgrown ruderal plants (Bowman & Pagano, 2004; Kim et al., 2018; Németh & Langhorst, 2014). Vacant lots may be parcels that have never been developed or were previously developed and abandoned (Bowman & Pagano, 2004; Kim et al., 2018). These spaces tend to have a patchy pattern within neighborhoods and are dispersed between occupied households (Nassauer & Raskin, 2014), which Spirn et al. compared to “Swiss cheese” (1990). Post-industrial cities across Europe and North America have struggled with high-vacancy neighborhoods since the latter part of the twentieth

century (Burkholder, 2012). Vacancy is attributed to the shift from industrial to service economies and suburban migration, especially in the United States, where federal policies led to segregation and disinvestment in urban areas (Accordino & Johnson, 2000; Németh & Langhorst, 2014). These policies created highly vacant neighborhoods with disproportionately high populations of marginalized groups (Németh & Langhorst, 2014). Now, as downtown neighborhoods attract younger, educated people, high-vacancy neighborhoods sit between wealthy downtowns and the suburbs (Albro, 2019).

In high-vacancy areas, cities struggle to manage vacant properties. Cities may acquire tax-delinquent properties but then become responsible for maintaining them in an area with little demand for real estate and, therefore, little demand for purchasing city-owned lots (Accordino & Johnson, 2000; Kim, 2016; Nassauer & Raskin, 2014). As the number of vacant properties increases, cities must take care of more properties with a lower tax base (Accordino & Johnson, 2000). Cities typically do as little maintenance as mowing once or twice a year (Accordino & Johnson, 2000; Nassauer & Raskin, 2014).

As vacant properties receive little to no management, plants often freely colonize the lots until they become overgrown with unattended, ruderal, or spontaneous vegetation (Riley et al., 2018). Studies have investigated the regulating ecosystem services provided by vegetated vacant lots, including stormwater management, carbon sequestration, air purification, and microclimate regulation (Burkholder, 2012; Kim et al., 2015; McPhearson et al., 2013; Riley et al., 2018). Vacant lots with abundant vegetation may even provide more ecosystem services than lawns and other land uses while contributing no additional carbon dioxide or fertilizers through maintenance (Derkzen et al., 2015; Kim et al., 2015). Vacant lots can also be a diverse habitat for native flora and fauna, including native pollinators (Anderson & Minor, 2017; Riley et al., 2018). That said, vacant lots can harbor invasive and non-native species, which may provide ecosystem services but also negatively affect the ecosystem (Riley et al., 2018). Because of the ecosystem services they can provide, vacant lots may be considered a type of green infrastructure and a resource for improving the functioning of urban ecosystems, and the management of vacant lots should consider their potential (Anderson & Minor, 2017; Burkholder, 2012; Kim et al., 2015; McPhearson et al., 2013). However, it would be irresponsible to encourage overgrown vacant lots for their ecological value over neighbors' needs, concerns, and desires (Riley et al., 2018). Unmaintained and disorderly sites negatively impact the surrounding area by creating a sense of crime and disorder (Nassauer & Raskin, 2014; Sadler & Pruett, 2017). Additionally, unmaintained vacant properties pose a physical threat to human health through illegal dumping and derelict structures (Nassauer & Raskin, 2014).

Vacant Lot Greening Benefits and Challenges

Greening vacant lots can contribute to human health and well-being, a cultural ecosystem service (Millennium Ecosystem Assessment, 2005). Vacant lot greening projects have been associated with improved mental health among nearby residents

(Branas et al., 2012; South et al., 2018). Additionally, such projects may reduce crime incidents nearby (Branas et al., 2011; Hadavi et al., 2021).

The literature includes advice and examples of addressing vacant land, especially at low costs. Nassauer introduced the key term “Cues to Care,” design elements that immediately create a sense that a piece of land is being maintained and cared for (2014). These “Cues to Care” may include mowing frequently, fences and structures in good condition, neat plantings, and clear edges around plantings (Nassauer & Raskin, 2014). Other proposals address the need for “Cues to Care” and the lack of budget of most cities to maintain vacant properties by using the site as an educational opportunity and leaving most of the ruderal plants as-is. Minimal interventions, such as walking paths, mowing around the edges, and educational signage, demonstrate someone cares for the site (Burkholder, 2012; Kim, 2016).

Social and ecological goals for maintaining vacant lots are seen as conflicting objectives (Anderson & Minor, 2017). Environmentally focused and low-maintenance landscapes may be perceived by residents as lower value (Albro, 2019; Burkholder, 2012), and naturalistic spaces may be perceived as un-cared for and contribute to the sense of disorder in highly vacant neighborhoods (Nassauer & Raskin, 2014). US cities with the most respected vacant land reuse programs, like Chicago and Philadelphia, are focused on the social and economic benefits of their greening projects over ecological (Burkholder, 2012; Loder, 2020; Riley et al., 2018). However, by explicitly considering how “Cues to Care” are implemented, there can be a way to design for both ecosystem services and resident preferences (Nassauer & Raskin, 2014; Rega-Brodsky et al., 2018).

Vacant Lot Greening Policies

Some cities have initiated programs to transfer management responsibilities to community members, either by selling properties as side yards, such as the Large Lots program in Chicago (Hadavi et al., 2021; Loder, 2020), or partnering with non-profits and community groups for maintenance, such as programs initiated in Philadelphia, Flint, and Detroit (Branas et al., 2012; Sadler & Pruett, 2017). Examples of successful vacant lot greening programs include:

CHICAGO, IL

The Chicago Large Lots program sought to build community wealth and reduce the city’s maintenance burden for vacant lots by offering vacant parcels to residents on the same street for one dollar (Loder, 2020). This program was effective at building community wealth, enabling community members to invest in their neighborhoods, and may have contributed to reduced crime rates (Hadavi et al., 2021). However, improving biodiversity or ecosystem functioning was not part of the project goals, and many participants pursued designs that removed large trees and created highly manicured lawns (Loder, 2020).

PHILADELPHIA, PA

Philadelphia is addressing its vacant lots by working with the Philadelphia Horticultural Society, a non-profit organization, to implement simple “Cues to Care” on vacant lots (Loder, 2020). They have created hundreds of green spaces in neighborhoods with high percentages of vacant lots by implementing minimal, cost-effective interventions, such as low wooden fences, mowed turf, and new trees (Branas et al., 2012; Loder, 2020). The city budget funds the program, but the Philadelphia Horticultural Society selects lots and hires and trains community members to provide maintenance (Loder, 2020).

FLINT, MI

The vacant lot greening program in Flint incorporates aspects of both Philadelphia’s and Chicago’s programs. Like Philadelphia, Flint works with non-profit organizations to manage vacant lots owned by the city with funding from city revenue and grants. However, instead of working with one organization, the city provides stipends to many local community groups, churches, and other small non-profits towards the cost of managing twenty-five vacant lots each (Sadler & Pruett, 2017). This approach fosters stewardship of vacant lots among community members and brings neighbors together to address issues in their community in a way that Chicago’s program does not. In 2017, nearly half of the volunteers were youth, and many community groups used the stipends to provide seasonal jobs that connected local youth with improving their community (Sadler & Pruett, 2017).

DETROIT, MI

Detroit Future City is a non-profit organization pursuing multiple community development initiatives in Detroit, including vacant lot greening. They provide resources for community members who want to transform vacant lots, including guidebooks and contacts for other organizations supporting vacant lot greening projects (Detroit Future City, 2023). Unlike the previously mentioned programs, Detroit Future City’s vacant lot greening projects are completed by a network of organizations and non-profits, including but not led by the city (Wilson, 2018). One of their projects, Skinner Playfield, was initiated by local high school seniors as part of a capstone project. Engaging with and supporting leadership in the community, especially among youth, was central to this project’s goals. While the city owned the property, the project’s success relied on contributions of time and money from many local non-profits, businesses, and organizations (Wilson, 2018).

In all these programs, stewardship and involvement by community members are essential to the sites’ long-term maintenance. However, because cities typically have little funding to maintain vacant land and rely on citizen volunteers, only the neighborhoods with greater capacity and stronger civic associations can bring attention to their vacant lots and initiate programs to address them (Accordino & Johnson, 2000). Besides the high cost of implementing such programs, urban soils on vacant lots can be of low quality and risk contamination from illegal dumping and past uses (Albro, 2019; Burkholder, 2012; Haase, Haase, et al., 2014; Nassauer & Raskin, 2014). Vacant lot greening programs can take many forms, but their goal typically is to improve the visual quality of vacant lots (Sadler & Pruett, 2017). It can be

challenging for cities to acquire vacant properties from negligent owners to repurpose (Accordino & Johnson, 2000). And, as previously mentioned, once cities acquire a parcel, they often lack the resources for consistent management. In most cities, greening projects are grassroots efforts by citizens to address one parcel at a time (Albro, 2019). One opportunity for urban greening projects is involving community members in the construction and management process, either as volunteers or paid members of a greening workforce (Albro, 2019; Kim, 2016; Sadler & Pruett, 2017).

Developing a Greened Vacant Lot System

While vacant land is perceived as a liability and a sign of failure, it also creates an opportunity to re-integrate natural spaces into the city and improve urban ecological functioning (Burkholder, 2012; Kim et al., 2015). This time of low demand and readily available land is an opportunity for cities to establish greenspaces for the provision of ecosystem services, climate resilience, and improved quality of life (Albro, 2019; Kim et al., 2015; Nassauer & Raskin, 2014; Spirn et al., 1990). Vacant lots do not benefit communities on their own; these lots must be properly managed to realize their potential (Haase, Haase, et al., 2014). Because vacancy is a large-scale problem, some have proposed taking this opportunity to scale up urban greening projects beyond single lots to a sustainable system of vacant land (Albro, 2019; Burkholder, 2012; Sanches & Pellegrino, 2016). While the minor contributions of individual greened lots can add up (Spirn et al., 1990), a large-scale framework to unify project goals is needed to address high-vacancy areas (Zhang & Park, 2023). Additionally, a large-scale network could contribute to ecological connectivity by creating steppingstones and corridors for species (Anderson & Minor, 2017; Sanches & Pellegrino, 2016) and creating a network of sites at various successional stages that are essential for creating a variety of habitats (Rega-Brodsky et al., 2018). That said, Loder (2020) argues that a large-scale system may not be as successful as community-led small-scale projects because of the necessity of community support and stewardship. Therefore, implementing a large-scale system must incorporate community engagement to foster future stewardship (Lokman, 2017).

However, a large-scale approach may not be seen as necessary by community members and city officials who are optimistic that highly vacant neighborhoods will be full of houses again (Albro, 2019; Sadler & Pruett, 2017). It is not easy to acknowledge that urban growth will never be continuous, and it may be many years before the real estate market returns if it does (Burkholder, 2012). Even if open greenspace is not a city's ideal ultimate use of a property, until the time of future development, vacant land should not be ignored because it has a low economic value; instead, its ecological and social value should be considered (Chen & Conroy, 2023; Kim et al., 2018; Rega-Brodsky et al., 2018). When there is little incentive to invest in a permanent greenspace, temporary projects may be appropriate (Haase, Haase, et al., 2014; Németh & Langhorst, 2014). Temporary projects also allow for incremental change that can adapt to neighborhood needs, whether the population grows or continues to shrink (Németh & Langhorst, 2014).

Vacant Lot Typologies

Multiple authors have proposed typologies for classifying vacant land. Spirn et al. (1990) propose a vacant lot typology based on the size and adjacencies of lots, from singular lots or “missing teeth” to large blocks of adjacent parcels. They suggest intervention strategies based on a lot’s characteristics and the desires and capacity of individuals and municipalities to manage the site. Based on a review of successful vacant lot approaches, the suggested intervention strategies include community gardens, orchards, “meeting places,” play areas of differing scales, paths, meadows, and stormwater management (Spirn et al., 1990). This framework was adapted by Rega-Brodsky and colleagues (2018) and Zhang and Park (2023). Kim et al. (2018) proposed a typology and method for categorizing vacant lots to inform future management and development. Their typology was based on the site’s historical uses and current zoning. It considered the lot’s historical significance, potential for contamination, quality of vegetation, and development potential. They created a flowchart to facilitate the categorization of sites, and at the end of each pathway, suggested the development potential between unlimited development and ecological conservation (Kim et al., 2018).

Albro (2019) and Sanches & Pellegrino (2016) present additional evaluation criteria for vacant land that can inform development decisions. These include habitat value, connectivity to other greenspaces, stormwater management potential, accessibility, socioeconomic characteristics of the surrounding community, and signs of current informal use (Albro, 2019; Sanches & Pellegrino, 2016).

Ecosystem Services Assessment Methods

Evidence of social and environmental benefits is necessary to justify and advocate for greening projects on vacant land (Albro, 2019; Anderson & Minor, 2017). As previously mentioned, multiple studies have used various methods of ecosystem assessment to study ecosystem services provision on vacant lots (Kim et al., 2015; McPhearson et al., 2013), and others have measured specific ecosystem services on a project that has already been implemented, such as Albro (2019). However, no studies have looked at the potential ecosystem services provided by implementing urban greening projects on vacant lots.

Ecosystem services assessments may incorporate a wide variety of methods, including surveys, observations and field mapping, remote sensing, existing peer-reviewed models (such as the USDA’s i-Tree), and mapping proxy variables (Brzoska & Spaġe, 2020; Derkzen et al., 2015; Kremer, Hamstead, Haase, et al., 2016). Of these, mapping proxy variables, which typically uses GIS land cover class data to estimate the provision of ecosystem services (Burkhard et al., 2012; Kain et al., 2016), is the most common, likely due to its relative ease (Brzoska & Spaġe, 2020). While this method can help map large-scale systems, the data’s coarse grain makes it less appropriate for mapping small sites and highly variable urban conditions (Boehnke et al., 2022; Kain et al., 2016).

Therefore, multiple studies have investigated methods to quantify ecosystem services at a finer scale than land cover data can provide (Boehnke et al., 2022;

Brzoska & Spaġe, 2020; Kain et al., 2016). Many studies have had the explicit goal of developing these methods to be easily applied by practitioners, such as urban planners, to make quick assessments of their city's conditions (Andersson-Sköld et al., 2018; Boehnke et al., 2022; Kain et al., 2016).

Proxy assessment methods have been criticized for their potential oversimplification and the impact of the choice of indicator variables on the results (Eigenbrod et al., 2010; Zhao & Sander, 2018). However, studies using these methods are still widely used in the literature (Brzoska & Spaġe, 2020; Kremer, Hamstead, Haase, et al., 2016). Additionally, these concerns can be mitigated by calculating indicator variables based on local primary data studies (McPhearson et al., 2013) and by using the finest scale spatial data feasible for the study (Eigenbrod et al., 2010; Zhao & Sander, 2018). While using primary data collected on-site may be more accurate than remotely calculated proxy variables (Eigenbrod et al., 2010), on-site data collection is labor-intensive (Boehnke et al., 2022; Brzoska & Spaġe, 2020) and may not be feasible for professionals to apply without hiring additional staff.

The methods used in this study are based on literature to demonstrate a method of fine-scale ecosystem services assessment feasible application by professionals in the planning and landscape architecture disciplines. The methods seek to balance ease of implementation by professionals and generalizability with the need for accurate assessments.

Landscape Performance

Landscape performance is the “measure of the effectiveness with which landscape solutions fulfill their intended purpose and contribute to sustainability” (Canfield et al., 2018, p. 1); in other words, the concept within the landscape architecture profession of measuring how successfully designs are meeting their goals and contributing environmental, social, and economic benefits. Landscape performance, as commonly understood within the profession, was introduced by the Landscape Architecture Foundation (LAF) in 2010 through the Landscape Performance Series and its accompanying Case Study Investigation initiative and has since gained significance across the profession (Yang, 2020; Yang et al., 2016).

The goal of evaluating landscape performance is to provide quantitative evidence of the value of landscape architecture projects and their contribution to sustainability goals. Producing evidence of the performance of landscape-based solutions is valuable to informing future project decisions, as well as conveying the value of these solutions to those outside the profession, including clients, policymakers, and other stakeholders (Canfield et al., 2018; Ndubisi et al., 2015; Yang, 2020).

Methods for assessing landscape performance are informed by disciplines beyond landscape architecture (Canfield et al., 2018). Though the previously discussed ecosystem services assessment studies are not described as landscape performance assessments, as illustrated in Figure 2.1, ecosystem services and performance benefits in landscape architecture are closely connected (Yang et al., 2016), and these studies can inform assessments of designs. Additionally, while this study does not evaluate the post-implementation benefits of a project as the LAF Case Study Investigations do (Canfield et al., 2018; Yang, 2020), there is value in considering

potential performance benefits in the design phase of a project (Yang et al., 2016), and estimating potential benefits before implementation can contribute to the goals of landscape performance to provide informed metrics to advocate for landscape architecture projects.

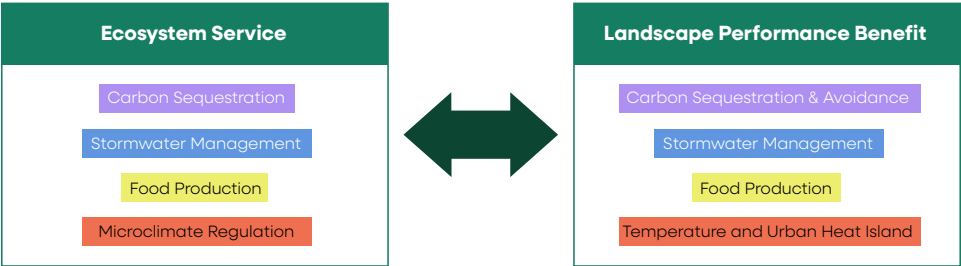


Figure 2.1 Ecosystem Services and Landscape Performance Benefits
Ecosystem services align with the landscape performance benefits identified by Canfield et al. (2018) and discussed within the landscape architecture profession.

While vacant lot greening and ecosystem services have been actively studied since the 1990s, only a handful of articles connected the two topics by looking at ecosystem services provided by spontaneous vegetation of currently vacant lots that receive little landscape management (Figure 2.2). Urban vacancy is a large-scale problem that needs a large-scale approach. A system of lots with design interventions to provide a variety of ecosystem services could contribute to improved quality of life for nearby residents while future development is uncertain. This project proposed and evaluated a set of temporary design interventions through the lens of landscape performance to generate meaningful metrics that can be used to advocate for implementing such urban greening projects.



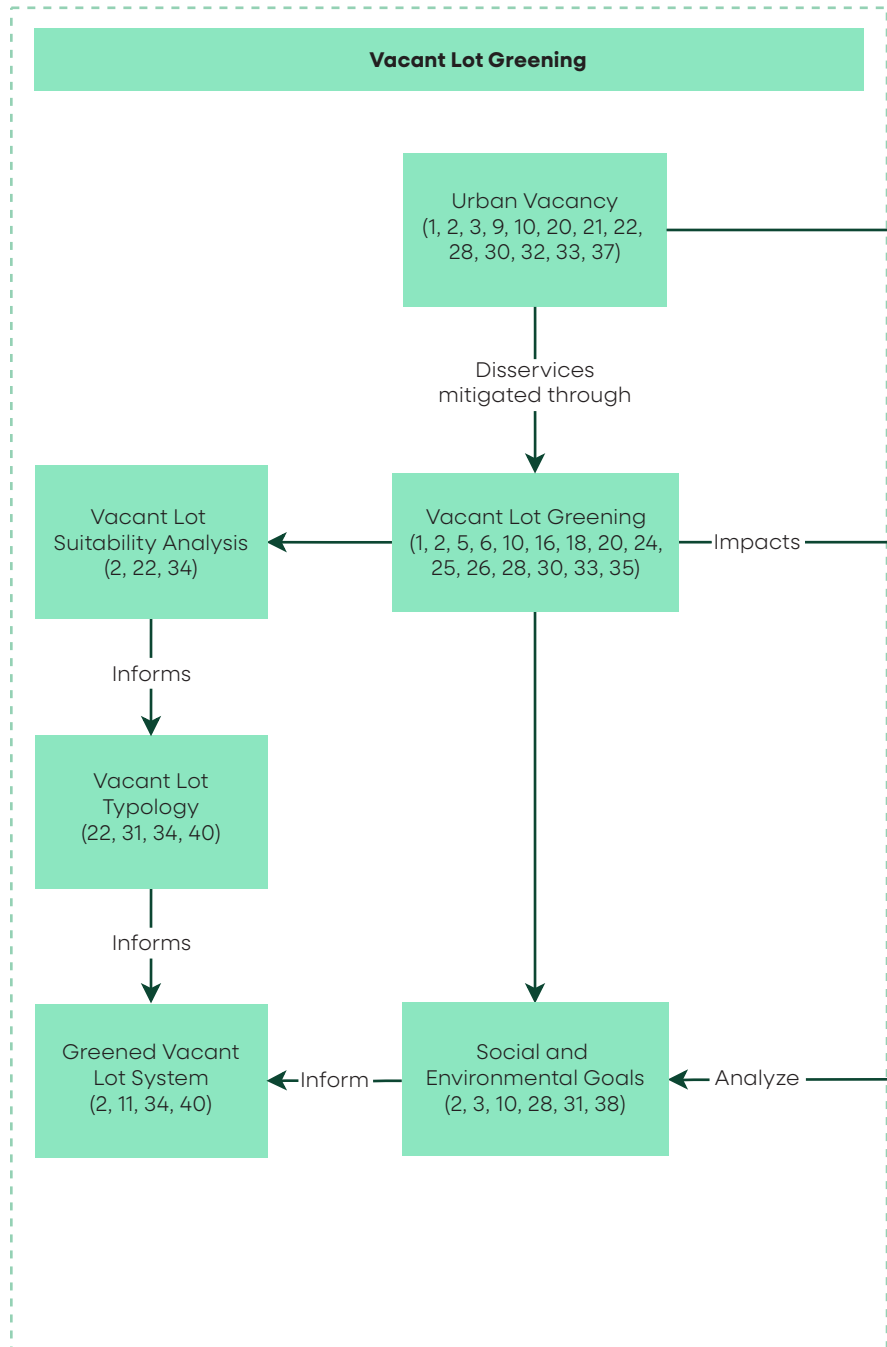
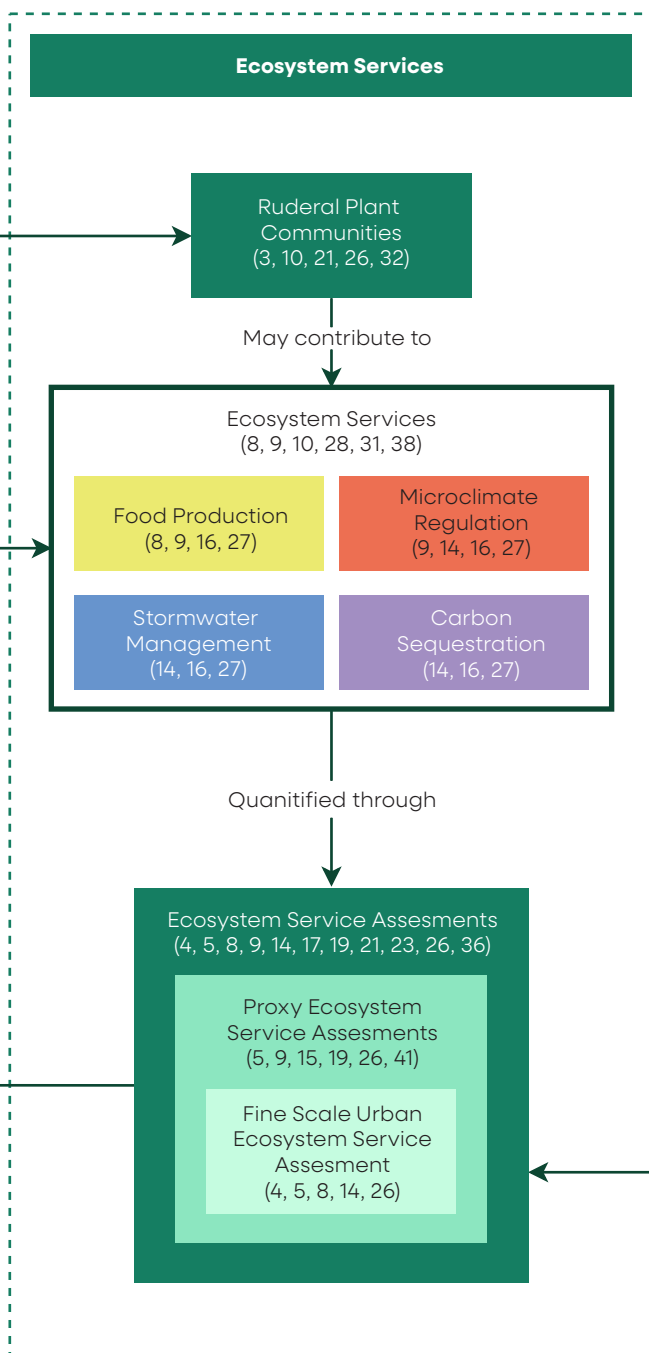


Figure 2.2 Literature Map

The literature review focused on vacant lot greening and ecosystem services and how these two topics connect to the concept of landscape performance.



1. Accordino & Johnson, 2000
2. Albro, 2019
3. Anderson & Minor, 2017
4. Andersson-Sköld et al., 2018
5. Boehnke et al., 2022
6. Branas et al., 2011
7. Branas et al., 2012
8. Brzoska & Spägle, 2020
9. Burkhard et al., 2012
10. Burkholder et al., 2012
11. Burkholder, 2012
12. Canfield et al., 2018
13. Chen & Conroy, 2023
14. Derksen et al., 2015
15. Eigenbrod et al., 2010
16. Gómez-Baggethun & Barton, 2013
17. Haase et al., 2014
18. Hadavi et al., 2021
19. Kain et al., 2016
20. Kim, 2016
21. Kim et al., 2015
22. Kim et al., 2018
23. Kremer et al., 2013
24. Loder, 2020
25. Lokman, 2017
26. McPhearson et al., 2013
27. Millennium Ecosystem Assessment, 2005
28. Nassauer & Raskin, 2014
29. Ndubisi et al., 2015
30. Németh & Langhorst, 2014
31. Rega-Brodsky et al., 2018
32. Riley et al., 2018
33. Sadler & Pruett, 2017
34. Sanches & Pellegrino, 2016
35. South et al., 2018
36. Speak et al., 2015
37. Spirn et al., 1990
38. Yang, 2020
39. Yang et al., 2016
40. Zhang & Park, 2023
41. Zhao & Sander, 2018



Chapter 3

Methods

This project studied four ecosystem services: carbon sequestration and storage, stormwater runoff control, food production, and microclimate regulation, based on their multifaceted significance demonstrated in the literature, including their potential impact on the quality of life of residents in highly vacant neighborhoods. Four project goals for the proposed temporary design interventions were established based on these ecosystem services (Figure 3.1):

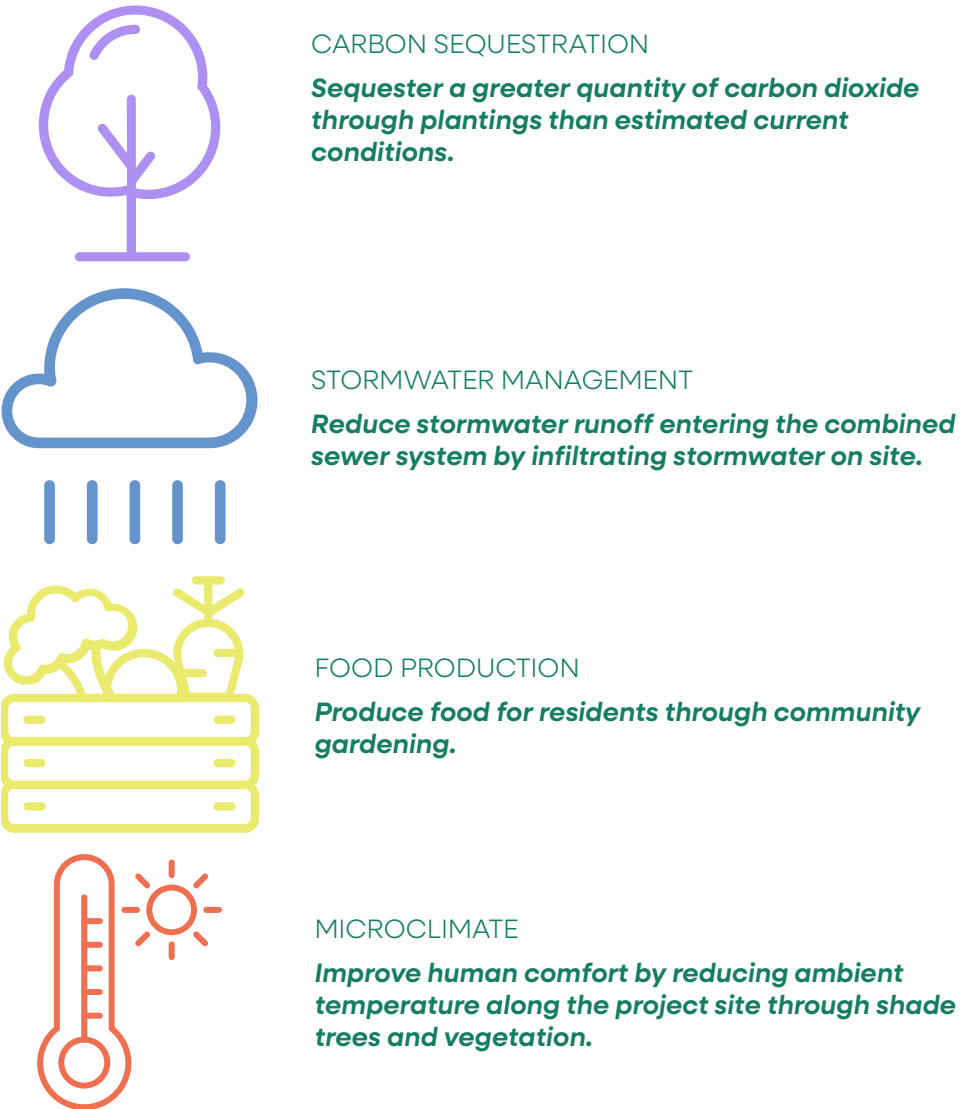


Figure 3.1 Design Goals
Four design goals related to the provision of the four ecosystem services selected for the study were developed.

The project focused on lots owned by the Land Bank of Kansas City, Missouri, and the Kansas City, Missouri, Homesteading Authority. First, a typology of vacant lots was developed to inform potential development and management decisions. A series of potential interventions were developed based on the typology. Then, an inventory of the vacant lots owned by the Land Bank and Homesteading Authority lots in the study was conducted to determine the proportion of lots of each typology present in the area. From this analysis, a focus area within one block group representative of the area was selected for ecosystem services assessment. The current provision of ecosystem services was estimated for these lots. Then, prototype design interventions were developed and applied to vacant lots in the selected focus area under three scenarios to compare the potential change in ecosystem services provided, and the overall increase in ecosystem services was calculated.

Study Area

The study area is a 3.6 square mile section of Kansas City, MO, comprised of nine high-vacancy neighborhoods (Figure 3.3). While Kansas City is projected to grow in population, these neighborhoods have experienced a declining population, which is projected to continue over the next decades (Figures 3.2 and 3.4; Lebofsky, 2023). Much of this area was historically redlined, and after years of disinvestment, 18.7% of the land area is vacant. 342 of the 1,700 vacant lots in the study area are owned by

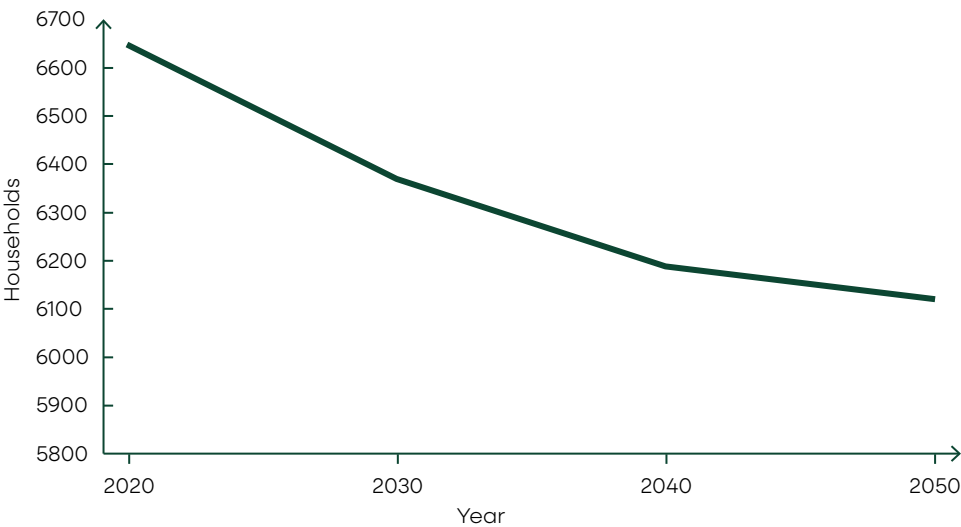


Figure 3.2 Projected Decline in the number of Households in the Study Area
The number of households in the study area is projected to decrease by around 500 households between 2020 and 2050.

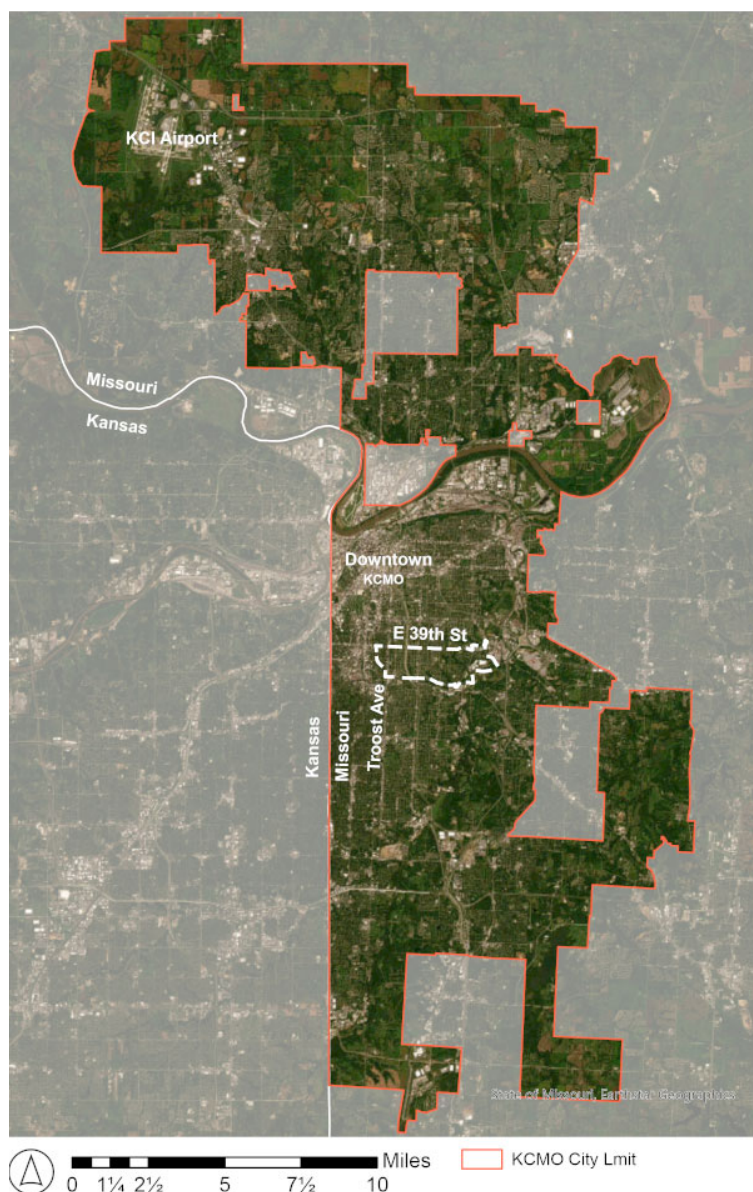
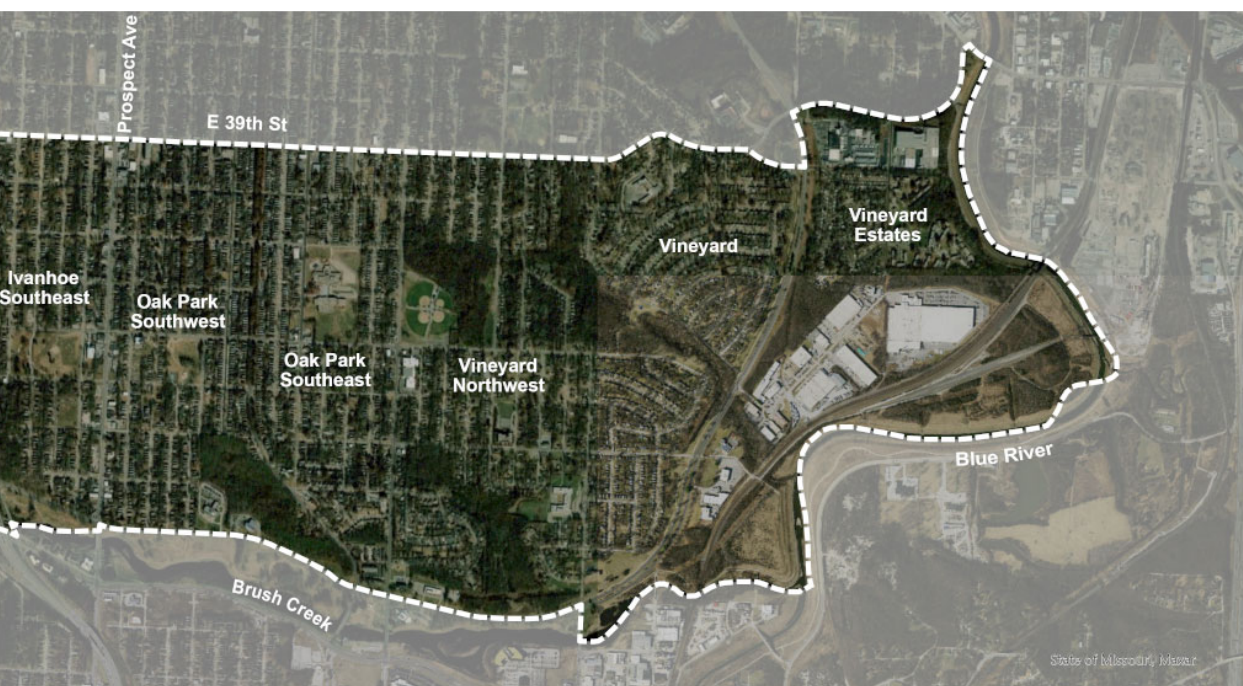


Figure 3.3 Study Area Context

The Study Area is located in Kansas City, Missouri, south of downtown. It includes nine residential neighborhoods experiencing high levels of vacancy: South Hyde Park, Manheim Park, Ivanhoe Southwest, Ivanhoe Southeast, Oak Park Southwest, Oak Park Southeast, Vineyard Northwest, Vineyard, and Vineyard Estates.



0 0.13 0.25 0.5 0.75 1 Miles

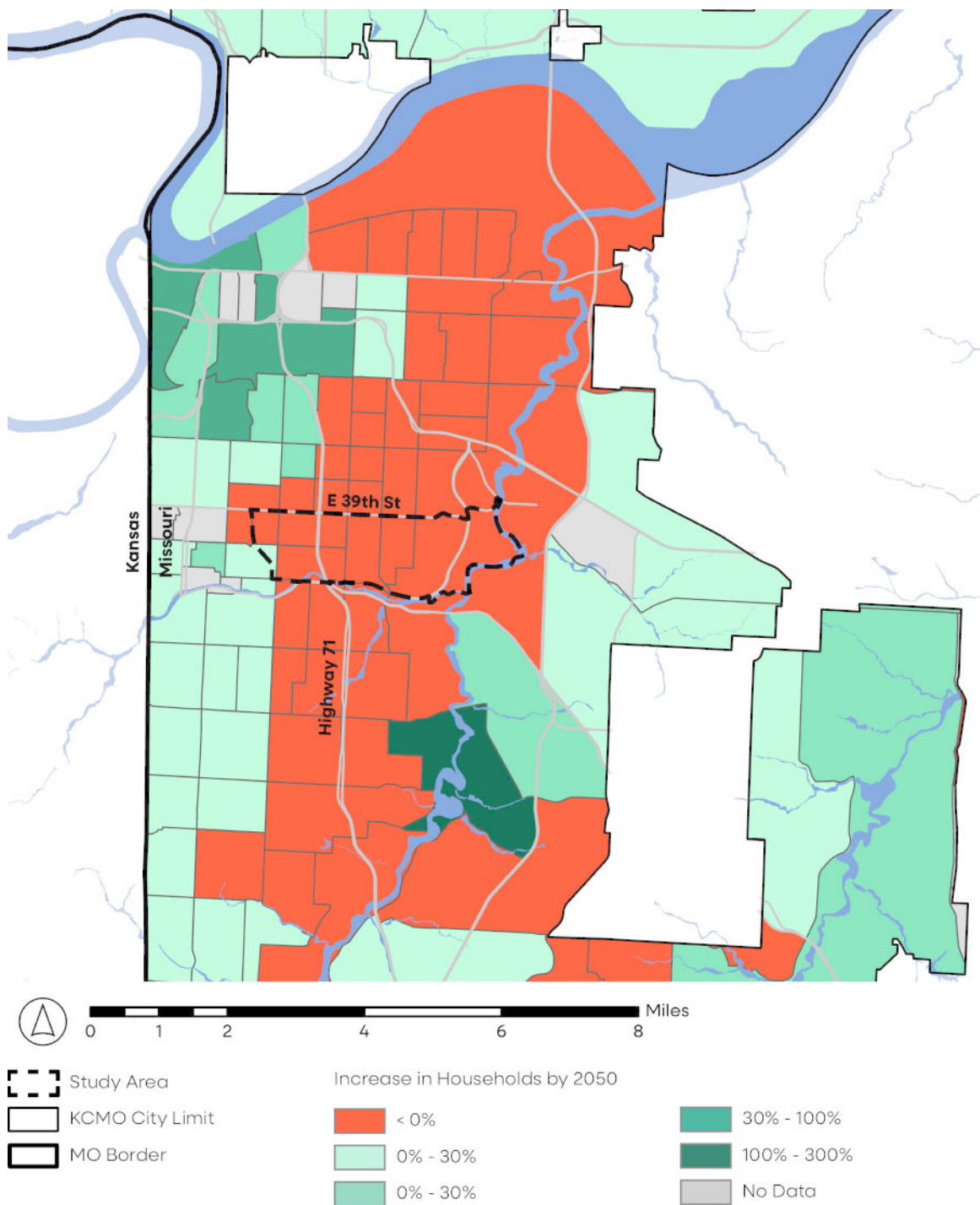


Figure 3.4 Percent Change in Number of Households in Kansas City

The number of households in the central part of Kansas City, including a majority of the census tracts in the study area, is projected to decrease between 2020 and 2050, while the census tracts near downtown are expected to increase the number of households.

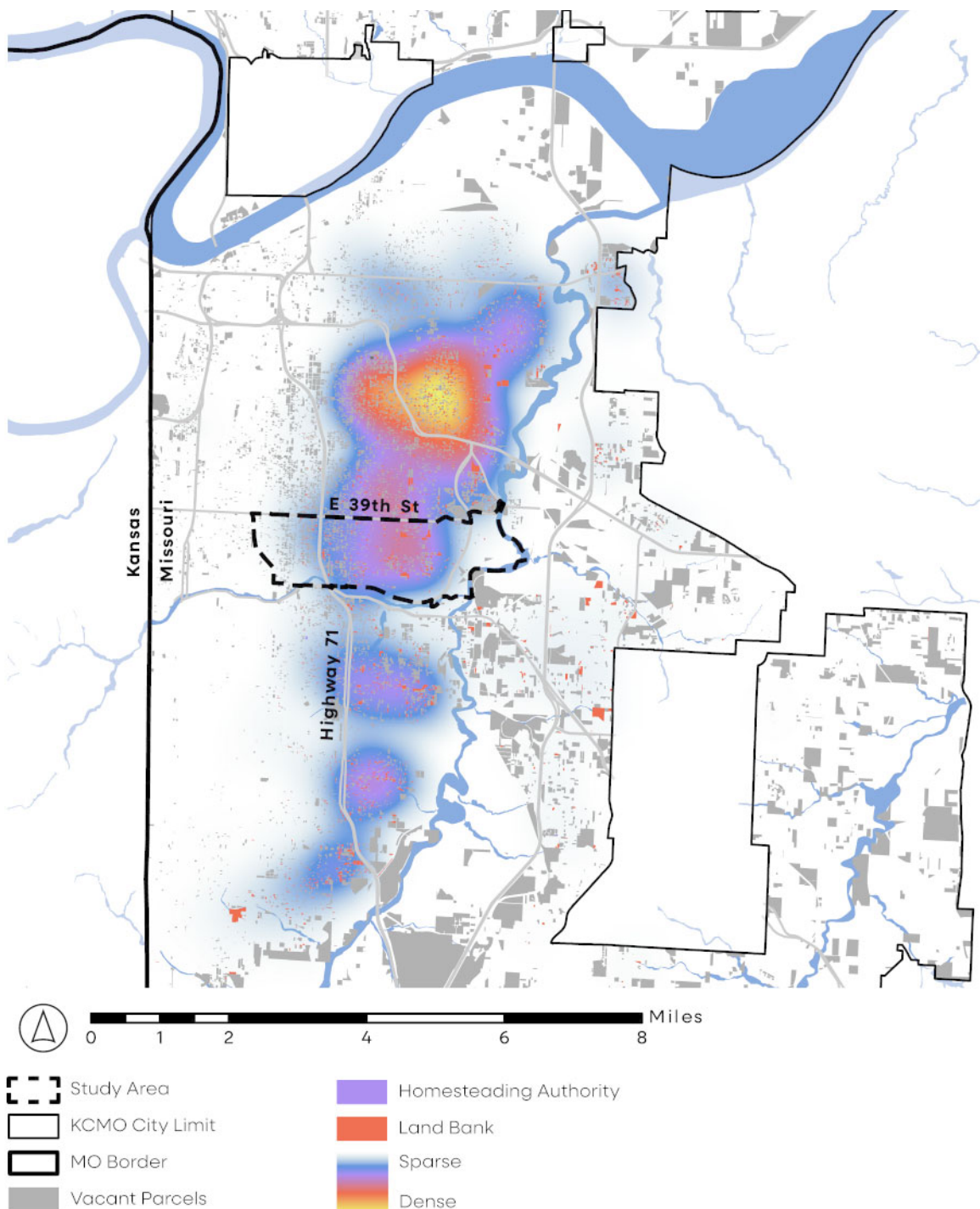


Figure 3.5 Vacant Lots Owned by the Land Bank and Homesteading Authority Across Kansas City
 This heatmap shows of the distribution of vacant lots owned by the Land Bank of Kansas City, Missouri, and the Kansas City, Missouri Homesteading Authority across Kansas City, Missouri, against the locations of all vacant parcels in the city.

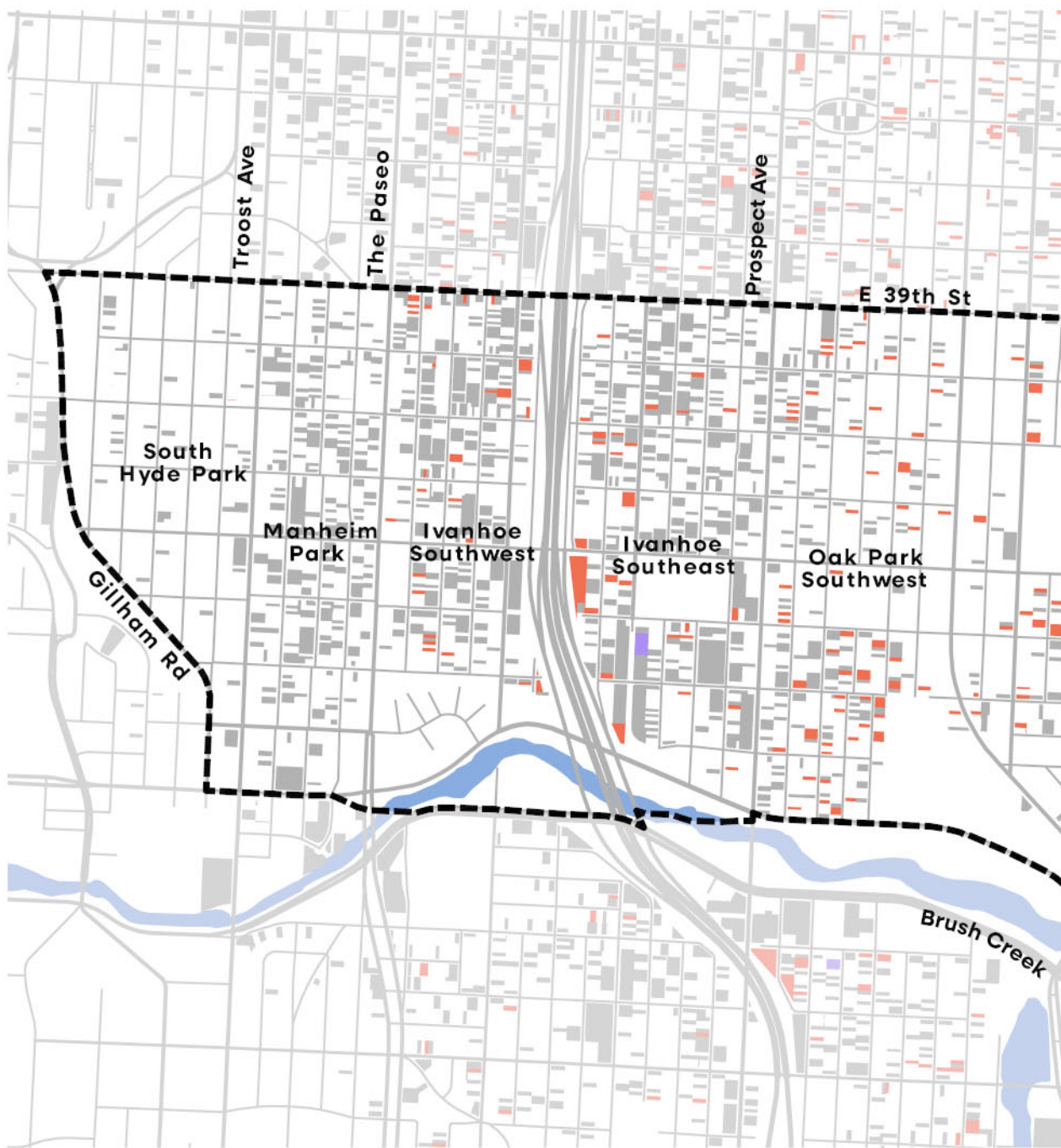
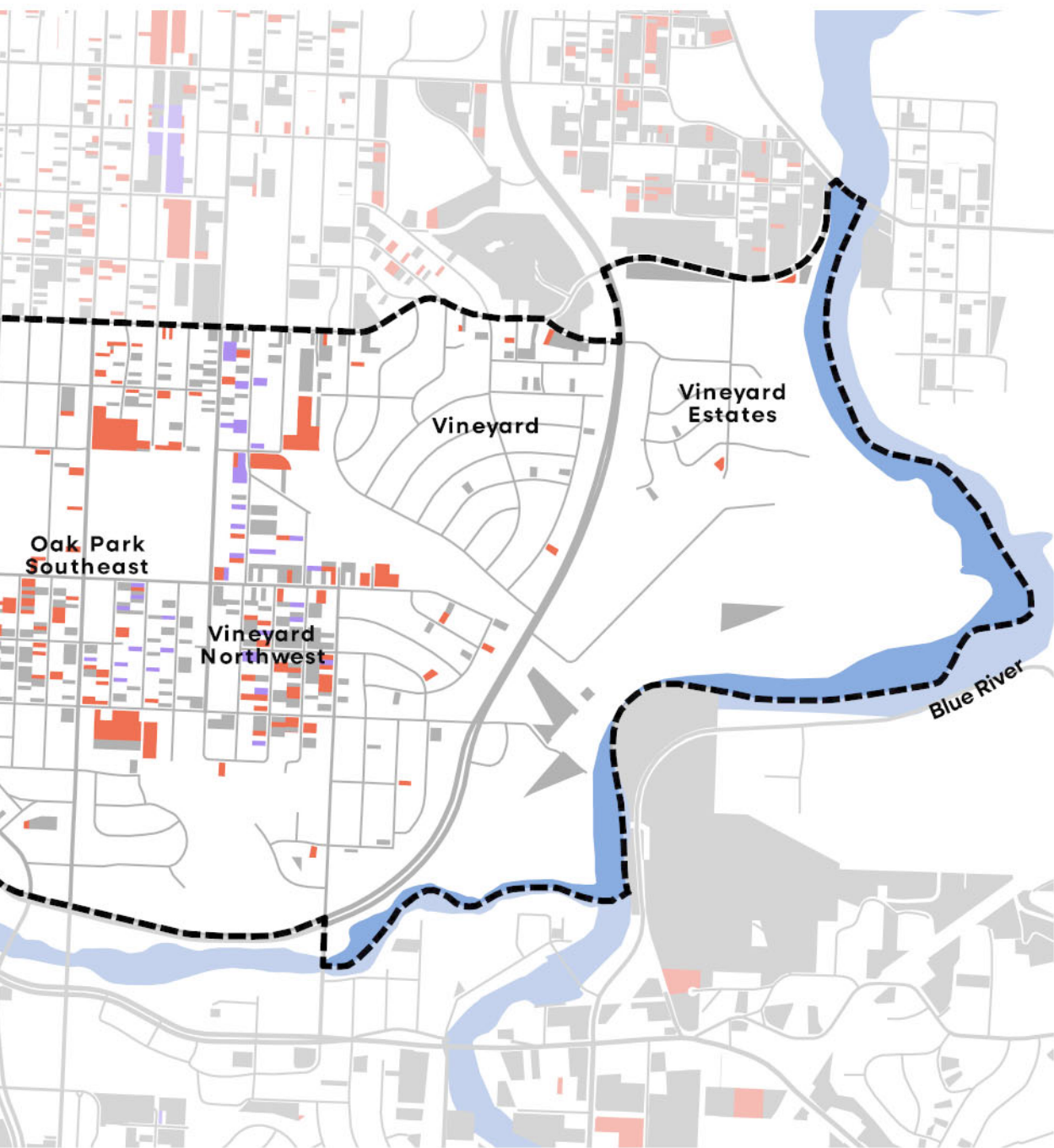


Figure 3.6 Vacant Lot Ownership in the Study Area
 The Land Bank of Kansas City, Missouri, and Kansas City Missouri Homesteading Authority own many lots across this study area, especially east of The Paseo.



0 0.13 0.25 0.5 0.75 1 Miles



Study Area



Vacant Parcels



KCMHA



Land Bank



Figure 3.7 Example of a Vacant Lot in the Study Area

While the Land Bank and Homesteading Authority provide occasional maintenance on the lots they own in the study area, illegal dumping is a recurring issue, as seen in this photo.



Figure 3.8 Example of a Vacant Lot in the Study Area

The existing vacant lots in the Study Area have a variety of different types of vegetation, including lawns, shrubs, and large trees.

the Land Bank of Kansas City, Missouri, and the Kansas City Missouri Homesteading Authority (Figure 3.6), which represents 11% of the properties owned by those entities across all of Kansas City and a combined total of 61.9 acres of land. The areas with the highest concentration of lots owned by the Land Bank and Homesteading Authority in Kansas City align with the census tracts that are expected to decline in population between 2020 and 2050, as seen by comparing Figures 3.4 and 3.5. While the study area does not exhibit the greatest concentration of vacant lots owned by the Land Bank and Homesteading Authority in Kansas City, the concentration of parcels owned by these entities in this region seems to be relatively representative of many neighborhoods in Kansas City. The condition of parcels owned by these entities is shown in the example photos in Figures 3.7 and 3.8.

The Land Bank of Kansas City, Missouri, and the Kansas City Missouri Homesteading Authority both acquire vacant properties intending to sell them to other parties who will put those properties to productive use (Figure 3.9). The Land Bank is a governmental entity that acquires vacant properties through multiple avenues, including foreclosures, manages, and eventually sells those properties to buyers who will renovate and use the property in a manner the Land Bank supports (Land Bank of Kansas City Missouri, 2013). The Homesteading Authority is a non-profit

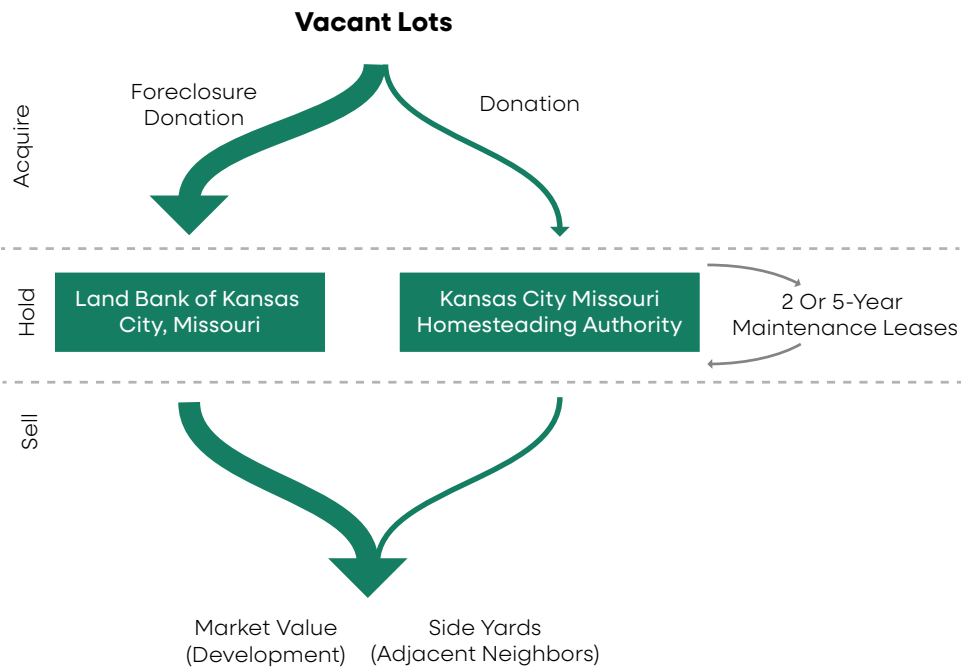


Figure 3.9 The Kansas City Missouri Land Bank and Homesteading Authority
The Land Bank of Kansas City, Missouri, and Kansas City Missouri Homesteading Authority are two entities in the city that both acquire vacant lots in the city and re-sell them so interested parties as side lots or for development.

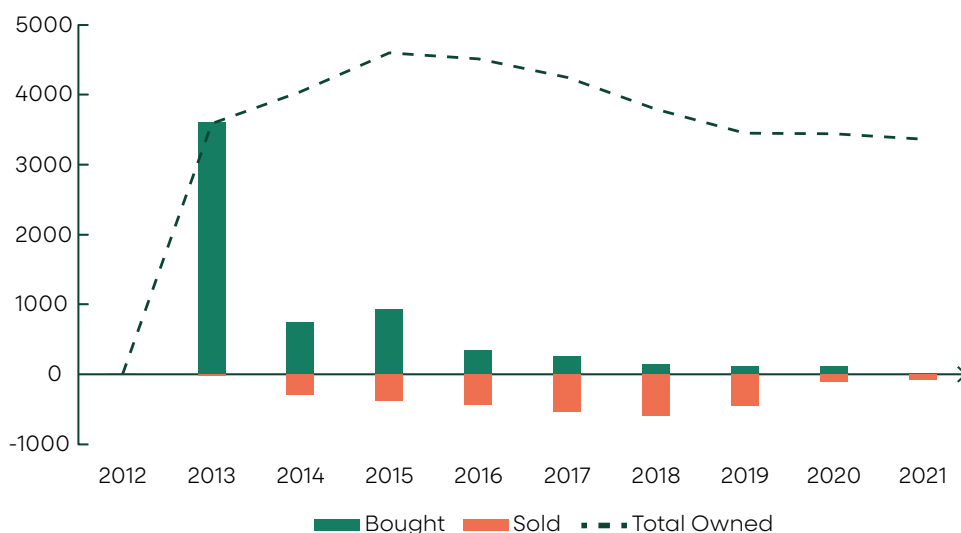


Figure 3.10 Vacant Lots Owned by the Landbank and Homesteading Authority Over Time
Collectively, the Land Bank and Homesteading Authority owned the greatest total lots in 2015 and sold the greatest number of lots in 2018. Very few lots were sold in 2020 and 2021, the most recent years for which data is available.

organization controlled by the city closely related to the Land Bank and has similar policies and procedures (Kansas City Missouri Homesteading Authority, 2013). The Land Bank owns around four times as many properties as the Homesteading Authority (Open Data KC, 2023). As of 2021, forty-one percent of the properties acquired by the Land Bank and Homesteading Authority have been sold (Open Data KC, 2023). However, the rate of properties bought and sold by the Land Bank and Homesteading Authority has slowed in recent years (Figure 3.10). Both entities sell their lots at market value, except for “side lots,” which can be acquired by an adjacent property owner for 20% of its market value (Kansas City Missouri Homesteading Authority, 2013; Land Bank of Kansas City Missouri, 2013).

According to both entities’ policies and procedures, as well as the Department of Housing and Community Development’s A Vision for Housing, selling Land Bank and Homesteading Authority properties for affordable housing is a priority (City of Kansas City Missouri Department of Housing & Community Development, 2021; Kansas City Missouri Homesteading Authority, 2013; Land Bank of Kansas City Missouri, 2013). Additionally, because non-side-yard lots are sold at their market value, the price could be prohibitive for community members desiring to turn them into community gardens or green spaces, even though both entities say they are willing to sell lots for those purposes. However, both entities will lease lots to community members for two to five years for community-led greening projects (Kansas City Missouri Homesteading Authority, 2013; Land Bank of Kansas City Missouri, 2013).

Phase I: Vacant Lot Typology

The first phase of the study was the development of a vacant lot typology and the application of that typology to n=304 vacant lots in the study area (Zhang & Park, 2023). A flowchart was created to organize lots into types (Kim et al., 2018). Lots that have considerable existing vegetation, are undevelopable or challenging to develop, or are in an area that naturally collects stormwater should be remediated into greenspace, while lots that have existing structures or large impervious areas and are very flat should be the first to expect redevelopment into housing. However, that development may not come for many years, and interim measures that would be easy to remove, such as seeding native prairie and a simple fence to show “Cues to Care,” should be implemented until then.

Taking into consideration typologies developed by Spirn et al. (1990) and Kim et al. (2018), a typology with two dimensions was developed to classify lots and guide suggested design interventions for analysis in Phase III. These two dimensions resulted in four types (Figure 3.11). One dimension focuses on the ecological value and development constraints after Kim et al. (2018). Sites are classified into two categories. The first, “Long Term Conservation,” means that the site potentially has high ecological value or development constraints such as slope or flood risk and should not be prioritized for future development. The second category, “Short Term Development,” means that because of the site’s physical conditions and low ecological value, it should be prioritized for permanent development. Therefore, a temporary intervention with a short turnaround and simple deconstruction is appropriate. These classifications are recommendations based on analysis of site

	Long-Term Conservation	Short-Term Development
Large Area Public Location	Long-Term High Activity Parklet Community Garden Orchard Woodland Restoration	Short-Term High Activity Community Garden Woodland Restoration
Small Area Private Location	Long-Term Low Activity Orchard Woodland Restoration	Short-Term Low Activity Meadow Restoration

Figure 3.11 Typology of Vacant Lots

The typology divides the lots into four types based on two dimensions of analysis—development potential and size—and suggests temporary design interventions for each type. The intersection of “Long-Term Conservation” and “large area, Public Location” offers the most flexibility in potential uses.

conditions and do not consider actual redevelopment plans in the neighborhood. The typology's second dimension considers a site's size and context. Sites are classified as "Large Area, Public Location," meaning that the site is of considerable size and in a highly visible location, which makes it appropriate for a high-activity intervention, or "Small Area, Private Location," meaning that the site is small and near occupied residential properties, so the intervention will be limited by site dimension and should not disrupt neighboring residents.

Flowcharts were created to facilitate the organization of sites into four categories (Figures 3.12 and 3.13), considering the following criteria.

EXISTING PERMANENT STRUCTURE

(From the Land Bank and Kansas City Missouri Homesteading Authority Data): The Land Bank and Homesteading Authority desire to sell houses in their possession that are in acceptable condition to support the need for low-income housing in Kansas City (City of Kansas City Missouri Department of Housing & Community Development, 2021). Therefore, any houses they classify in their database as able to be sold should be left for that purpose.

EXISTING TREE CANOPY

(Over 30% of lot vs. less than 30% of lot; Kim et al., 2018): Lots with existing vegetation should be remediated and preserved for their ecological value as naturalized greenspaces or parklets. Lots with large areas of impervious surfaces, compacted dirt, or gravel land cover have low ecological value, must have been developed in the recent past, and can be prioritized for redevelopment. Vegetation cover was evaluated through high-quality aerial imagery acquired from the U.S. Department of Agriculture National Agriculture Imagery Program (2022).

EXISTING TREES

(More than five vs fewer than five; Kim et al., 2018): Small residential lots may have considerable tree canopy provided by trees not located on the property. Therefore, this additional measure of vegetation cover considers how many trees are on the site. Existing trees were evaluated through aerial imagery and Google Street View imagery.

SLOPE

(Over 5% vs less than 5%): Flat slopes are easily accessible and create more opportunities for constructing amenities (hardscape areas for gathering, playgrounds, community garden beds, picnic tables, etc.). Steep slopes, by contrast, limit accessibility and construction feasibility but are suitable for stormwater management. If the land is too steep, it cannot be developed into buildings in the future and should be preserved for its ecological value. The median slope for the parcel was calculated in GIS from the U.S. Geological Survey digital elevation model (U.S. Geological Survey, 2023). Sites with a slope less than 5% were considered flat, while sites with a slope greater than 5% were considered steep (Kim et al., 2018).

ADJACENCIES

(Residential properties, street corners, commercial parcels, other vacant properties): Street and business adjacencies are high-visibility public areas best used for community spaces that accommodate groups or events. They may also be prioritized for future redevelopment. These lots are in more publicly visible and accessible locations, which makes them vulnerable to illegal dumping and vandalism by community outsiders (Spirn et al., 1990); therefore, these lots need clear “Cues to Care” (Nassauer & Raskin, 2014) and programming that keeps the site active. Lots adjacent to occupied housing should be designated for the surrounding families and should have more quiet programming for small groups or individuals. Natural areas or park adjacencies should focus on wildlife habitat. Additionally, lots adjacent to other vacant lots not currently owned by the Land Bank or Homesteading Authority have the potential to expand to those properties in the future. Adjacencies were identified through Google Maps and parcel data from the city of Kansas City.

SIZE

(Single lot vs. aggregated lots, size in ft²): Single lots can only accommodate small-scale programming, while multiple adjacent lots can be combined into one larger programmed area or redeveloped as one development. Potential aggregation was evaluated based on the Land Bank-owned parcel data. Additionally, any remanent parcels under 2,500 square feet were removed from consideration as they are too small for future development into housing.

COLLECTING STORMWATER RUNOFF

(Flow lines): Lots where stormwater runoff naturally collects should not be developed and should be used for stormwater management. The watershed location was evaluated based on elevation and slope data from the U.S. Geological Survey digital elevation model (U.S. Geological Survey, 2023) using ArcGIS.

CONTAMINATION POTENTIAL

(Yes vs. no): Lots with a high risk of past contamination require extra consideration if they will be used for food production. Plants for consumption should be planted in raised beds to limit contact with potential soil contaminants. Past contamination risk was evaluated based on past EPA RCRA reports or past illegal dumping reports.

After categorizing all lots in the study area by type, the total proportion of each type was calculated. This proportion of lots informed site selection in Phase II and informed generalizing the estimation of ecosystem services to all of Kansas City in Phases II and III.

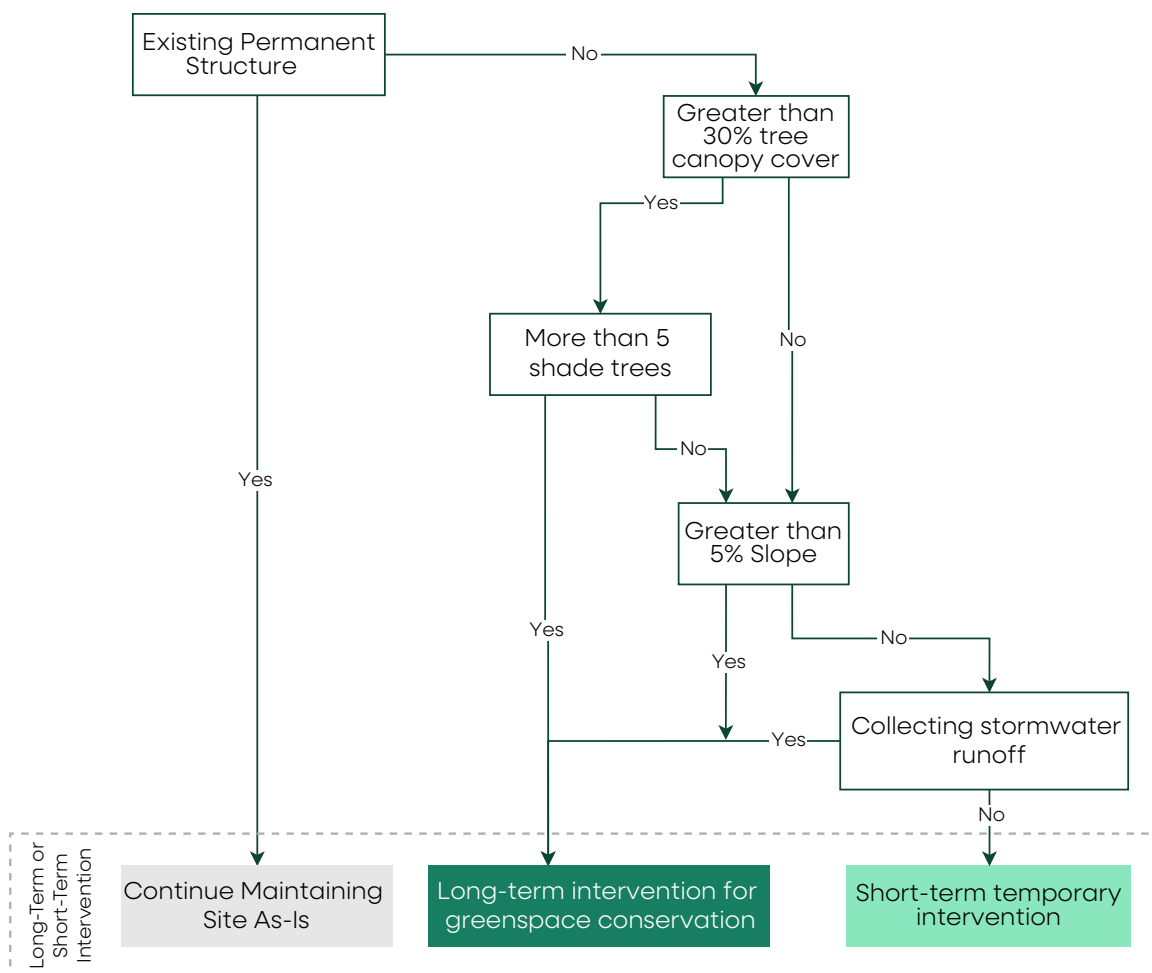


Figure 3.12 Long-Term or Short Term Flowchart

The existing conditions of each site were considered to determine the appropriate length of time to anticipate an intervention. If the site should be prioritized for permanent development in the future, it should be treated with a short-term, easy-to-remove design intervention. If the site has high ecological value or is difficult to develop, it should be treated with a long-term design intervention.

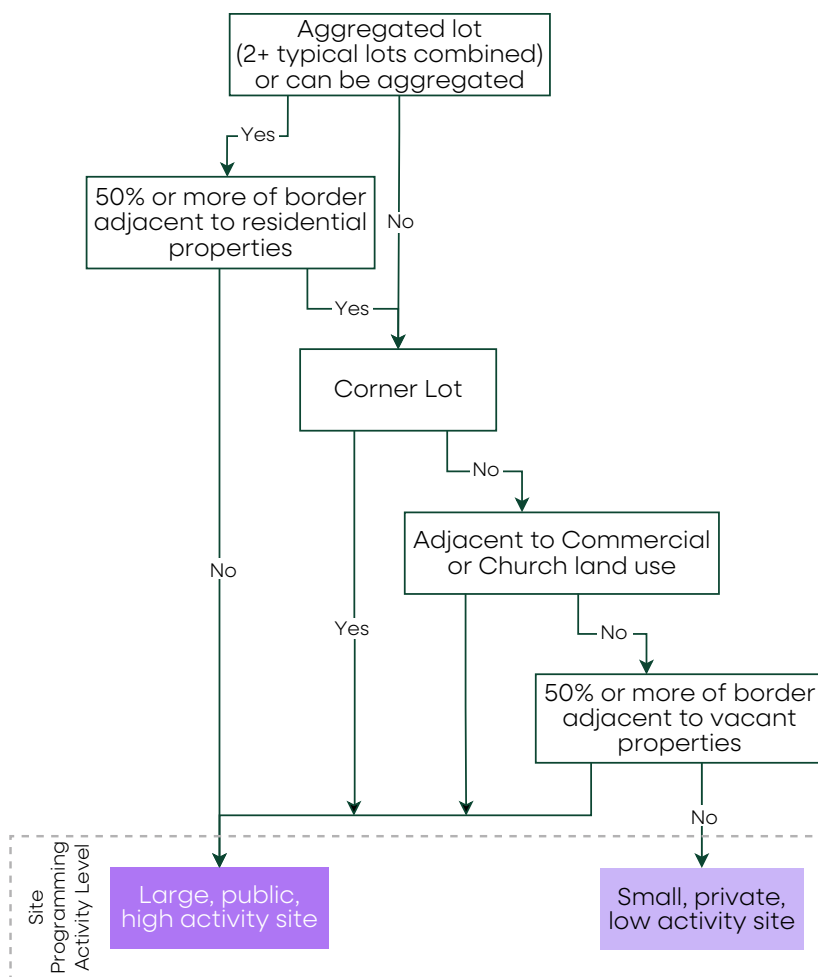


Figure 3.13 High Activity or Low Activity Flowchart

Site adjacencies and size were considered to determine the appropriate activity level for the proposed programming. If the site is a small “missing tooth” between residential houses, it should have quieter programming for small groups of people. Alternatively, if the site is in a prominent public location, it can and should accommodate frequent activity to ensure the site is monitored by many people (Spirn et al., 1990).

Phase II: Estimating the Current Provision of Ecosystem Services

One focus area (n=50 lots) was selected to study the application of the suggested design interventions and assess the changes in ecosystem services. Existing conditions were estimated for the sample sites using high-resolution aerial imagery obtained from the U.S. Geological Survey (2023). The land cover area of six different land cover types—tree canopy, shrub or meadow vegetation, impermeable surface, permeable surface, and bare earth—was estimated for each Land Bank and Homesteading Authority site in the focus area using ArcGIS. Ecosystem services assessment methods are based on McPhearson et al. (2013), Boehnke et al. (2022), Kain et al. (2016), and Andersson-Skold et al. (2018). Selected indicators for ecosystem services are listed in Table 3.1 and described below.

Table 3.1 Ecosystem Service Indicators
Seven metrics have been selected to estimate ecosystem services provision based on the literature.

ECOSYSTEM SERVICE	METRIC	INDICATOR CALCULATION	SOURCE(S)
Carbon Sequestration	Net Carbon sequestered per year by trees (lbs.)	=0.0438 lbs./ft ² /year x ft ² tree canopy cover	Nowak et al., 2013
	Net carbon stored in trees (lbs.)	= 1.1805 lbs./ ft ² x ft ² tree canopy cover	Nowak et al., 2013
Food Production	Food crops produced per year (lbs.)	= 0.5 lbs./ft ² community garden planted area	Rabin et al., 2012
		= 0.79 lbs./ft ² apple orchard	USDA National Agricultural Statistics Service, 2023
Stormwater Management	Stormwater Runoff per year (in.)	= Annual Runoff (EPA National Stormwater Calculator)	U.S. Environmental Protection Agency, 2019
	Maximum Rainfall Retained on site (in.)	= Maximum Rainfall Retained (EPA National Stormwater Calculator)	U.S. Environmental Protection Agency, 2019
Microclimate Regulation	Local Climate Regulation Value (unitless)	= Percent of each land cover type x score between 0-2 (see Table 3.2)	Burkhard et al., 2009; Elliot et al., 2020

CARBON SEQUESTRATION

Carbon sequestration was calculated by multiplying the area of tree canopy cover on the lot by the carbon sequestration rate calculated for Missouri by Nowak et al. (2013). This value was estimated based on field data collected across the US and is used by the US Forest Service's i-Tree Canopy Application (i-Tree, 2024a) to estimate carbon sequestration per unit of tree canopy cover.

FOOD PRODUCTION

Food production was calculated by multiplying the area of land to be used for food production by the food production rate estimated by Rabin et al. (2012) based on a review of multiple studies on crop yields of community and home gardens. Yield rates may be higher (Ackerman, 2012; Gittleman et al., 2012), but a more conservative estimate was used. For the orchard food production, an average estimate for apple production per acre of land between 2020 and 2023 across the United States was used after Ackerman (2012).

STORMWATER MANAGEMENT

Stormwater management was calculated using the EPA's National Stormwater Calculator (U.S. Environmental Protection Agency, 2019). This application uses information about the underlying soil, average rainfall, and the land cover types to estimate the amount of runoff the site generates annually. The annual runoff and maximum rainfall retained values were assessed for each lot. While the EPA National Stormwater Calculator is an accessible tool for those without specialized knowledge of hydrology, the application has limitations regarding estimating conditions on previously developed sites (Schifman et al., 2018). One of the major factors impacting the soil hydrology of a site is its hydraulic conductivity. The hydraulic conductivity of soil is greatly impacted by human development, including compaction, unknown materials such as buried building materials—especially on vacant residential parcels, and disturbed soil horizons, making hydraulic conductivity values difficult to determine without field-collected data (Shuster et al., 2021). The EPA National Stormwater Calculator uses data from the US Department of Agriculture Soil Survey Geographic Database to obtain hydraulic conductivity values. However, Schifman et al. (2018) found that the hydraulic conductivity values estimated by the Stormwater Calculator were, on average, 10.5 mm/h lower than measurements taken in urban sites, including vacant residential lots. The discrepancy between estimated and measured values was also inconsistent across the studied cities. As a result, the runoff estimates for vacant lots generated by the National Stormwater Calculator are potentially greater than the actual runoff.

MICROCLIMATE REGULATION

Microclimate regulation on each lot was assessed using a method adapted from Elliot et al. (2020) to calculate each lot's land cover's impact on its microclimate using the index developed by Burkhard et al. (2009), shown in Table 3.2. The percentage area of each land cover type within a lot was multiplied by the respective climate regulation value to determine an overall score for the lot. Lots with a lower score likely have a more uncomfortable microclimate due to hard surfaces. In comparison, lots with a higher score are likely to have a more comfortable microclimate due to tree canopy and vegetation. Elliot et al. (2020) found that climate regulation scores

Table 3.2 Land Cover Microclimate Index Values
 Land cover types and their climate regulation value, based on Burkhard et al. (2009) and Elliot et al. (2020).

LAND COVER TYPE	ASSOCIATED CORINE LAND COVER CLASS	LOCAL CLIMATE REGULATION VALUE
Tree Canopy	Broad Leaved Forest Mixed Forest	1
Shrub or Meadow	Green Urban Areas Non-irrigated arable land Complex cultivation patterns	2
Impermeable Surface	Continuous Urban Fabric	0
Permeable Surface	Continuous Urban Fabric	0
Bare Soil	Continuous Urban Fabric	0

based on Burkhard et al.’s (2009) methods aligned with actual measurements of urban heat island severity and is, therefore, an effective way to estimate the impact of land cover on local temperatures.

The provision of each ecosystem service metric for all n=50 lots in the focus area was calculated using the area of each of the six land cover types found in ArcGIS and formulas in Microsoft Excel. The average provision of each service was estimated for all studied lots. Additionally, the total carbon sequestered and stored by trees on the vacant lots was calculated. The stormwater management metrics and micro-climate regulation index scores are specific to each lot and cannot be calculated as a combined total for multiple lots.

Phase III: Developing Design Intervention Prototypes and Estimating Alternative Scenarios for Ecosystem Services Provision

Design prototypes were developed for each vacant lot design intervention. Potential temporary to semi-permanent design interventions were proposed for vacant lots in the focus area based on each lot's classification into one of the four types from Phase I (Long-Term High Activity, Long-Term Low Activity, Short-Term High Activity, or Short-Term Low Activity) and the site's existing conditions. Then, the potential changes in ecosystem service provision across three alternative scenarios were evaluated. The proportion of the six land cover types proposed in each prototype design was applied to the selected vacant lots to estimate the potential change in ecosystem services provided due to changes in land cover between the existing conditions and the proposed design intervention.

DESIGN INTERVENTION PROTOTYPES

The potential design interventions suggested include community gardens, urban orchards, parklets, or meadow or woodland restorations. Each potential intervention supports one or more of the ecosystem services of interest (carbon sequestration, stormwater management, food production, or microclimate regulation) based on the use of trees or herbaceous vegetation (Figure 3.14). While lots classified for “long-term” conservation could include the long-term investment of planting trees, “short-term” lots should focus on herbaceous vegetation. The proposed interventions adapted from Spirn et al.'s (1990) design ideas for vacant land but specifically select uses that could contribute to the desired ecosystem services. These five types of design interventions additionally create community spaces that improve the quality of the environment and contribute to the social dimensions of sustainability, adding an additional layer to the project goal of improving the quality of life for residents in highly vacant communities.

The following criteria were considered in suggesting interventions for each lot type and were incorporated into the flowchart in Figure 3.15.

COMMUNITY GARDENS

Community gardens could function on a site of any size, but because they need abundant sun and high activity levels (Spirn et al., 1990), large lots with few trees are best suited for this intervention. Community gardens would be quick to implement and mostly rely on herbaceous annual plants that could be easily removed (as opposed to shade trees). Additional considerations include contamination potential (Nassauer & Raskin, 2014), which can be mitigated using raised garden beds. Raised beds can also be used, potentially in combination with rain gardens, on sites with existing impervious cover to reduce stormwater runoff. Additionally, community gardens need access to water utilities for irrigation (Spirn et al., 1990).

URBAN ORCHARDS

Urban orchards provide food and other ecosystem services through trees that produce edible fruit. As previously mentioned, soil contamination is a concern when growing food (Nassauer & Raskin, 2014), and unlike community gardens, the issues

cannot be mitigated through raised garden beds. Also, like community gardens, urban orchards need access to water utilities for irrigation, at least during plant establishment (Spirn et al., 1990). Lastly, sites with a mature tree canopy should be avoided as existing tree canopy would provide shade, limiting sapling growth (Spirn et al., 1990), and removing mature trees would emit carbon.

PARKLETS

Parklets can contribute social and environmental benefits through plantings, semi-permanent play spaces, and other furnishings that could be moved to another location in the chance of future development. Parklets can respond to the size of their site by incorporating multiple types of programming and activities, such as playgrounds and larger playfields (Spirn et al., 1990). The potential stormwater impacts of hardscape areas in parklets can be mitigated through rain gardens and permeable paving. While creating natural playscapes may seem like an excellent use of readily available materials, using elements such as fallen logs, tires, and other objects reminiscent of trash dumped in vacant lots can come off as tactless and lead to adverse reactions from residents of highly vacant neighborhoods (Albro, 2019).

MEADOW RESTORATIONS

Meadow restorations involve removing invasive species and seeding native grasses and flowers. Simple interventions to indicate “Cues to Care,” such as clear edges and well-maintained fences, as well as benches and pathways that encourage the use

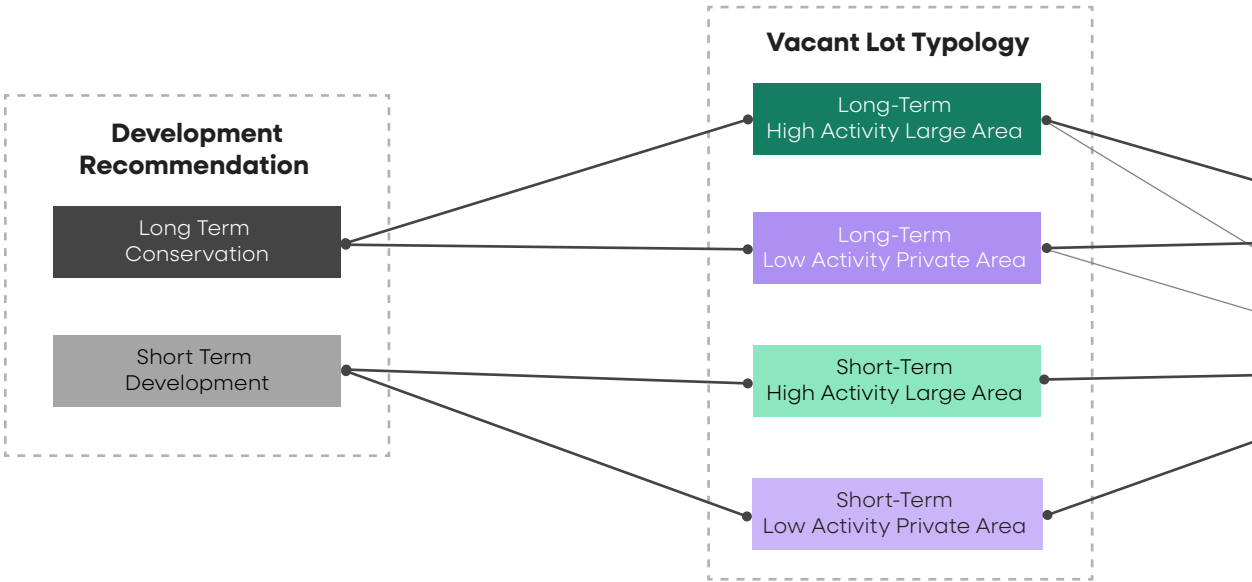


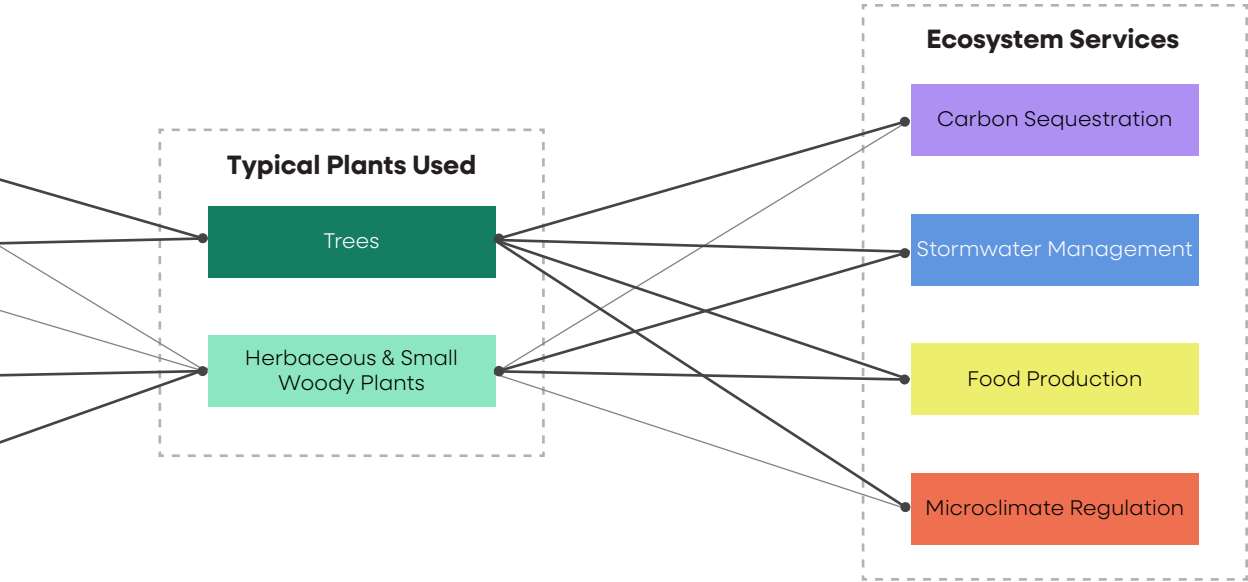
Figure 3.14 Vegetation and Ecosystem Services
Each site’s development potential and subsequent type classification informs the appropriate plants used, which impacts the degree to which each ecosystem service is provided.

of the site, can reduce perceptions of disorder, and deter illegal activity (Nassauer & Raskin, 2014; Spirn et al., 1990). Meadows also have the potential to incorporate phytoremediation through plant selection (Lokman, 2017) and are suitable for areas with steep slopes in order to reduce runoff speed and limit downstream flooding during rain events.

WOODLAND RESTORATIONS

Woodland restorations are similar to meadow restorations but use existing mature trees, which is more sustainable than trying to establish new saplings (Spirn et al., 1990). Like meadow restorations, “Cues to Care” are essential for their success, as well as ensuring clear visibility into the site (Nassauer & Raskin, 2014).

The prototype design proposals were informed by the design goals introduced at the beginning of Chapter Three, “Methods.” Figure 3.16 summarizes the connection between the four vacant lot types and the design interventions that would change the proportion of the land cover types on each lot and would impact the ecosystem services calculated. Each intervention would provide ecosystem services to varying degrees; therefore, a proper mix of interventions based on site conditions is necessary to provide a robust variety of ecosystem services. The lot prototype designs were informed by Spirn et al. (1990), Albro (2019), and Detroit Future City’s (2023) designs and recommendations for vacant lot greening and are explained in greater detail in Chapter Four, “Findings.”



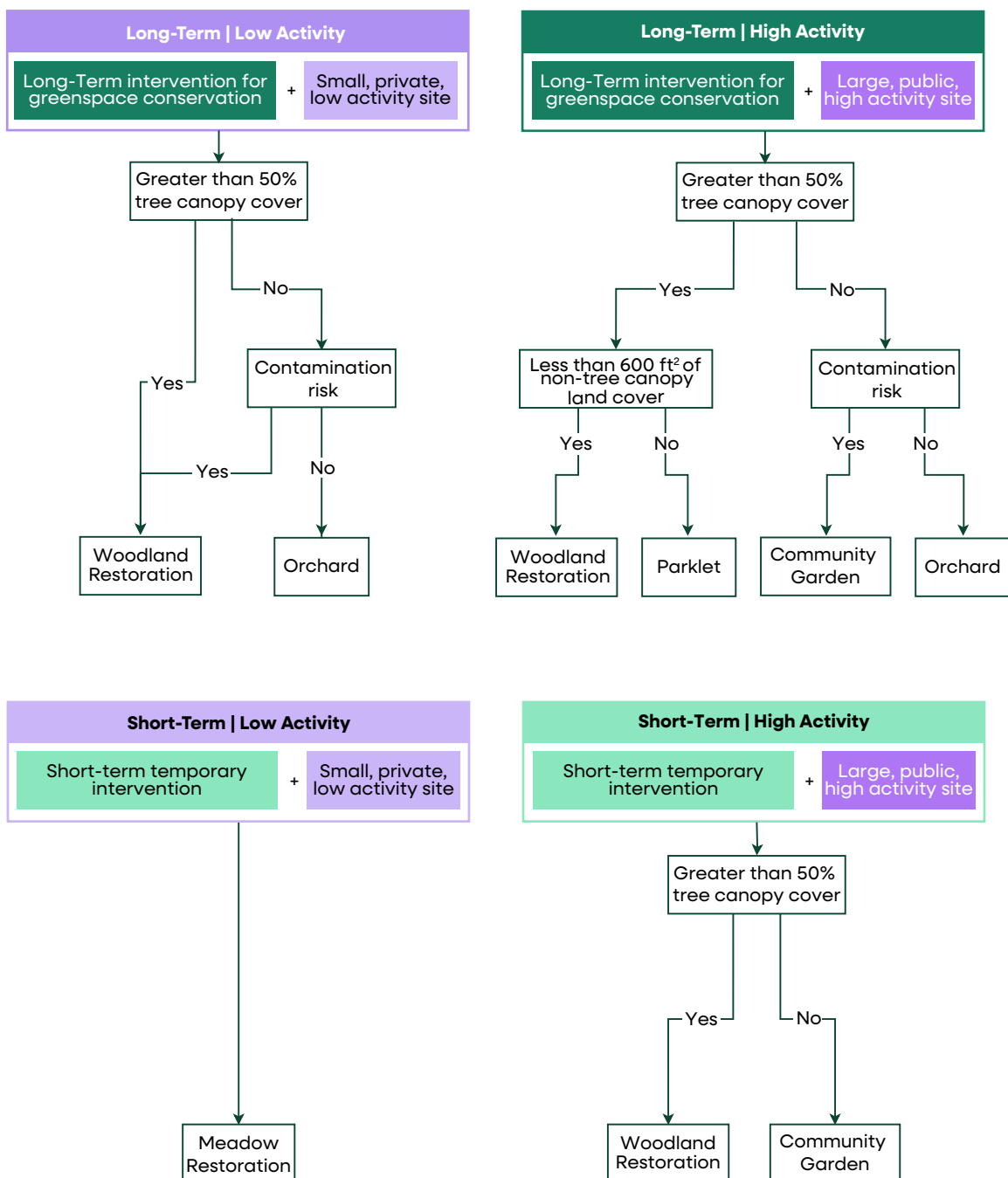


Figure 3.15 Design Intervention Selection Flowchart
 Temporary greening strategies were recommended based on the four potential typologies and additional criteria.

ALTERNATIVE SCENARIOS

The alternative scenarios were developed to examine the potential impacts of development, funding, and community involvement on the implementation of the proposed design interventions and the consequent impact on the ecosystem services provided by the collective system of lots. The first scenario assumed a design intervention was applied to every vacant lot without any limitations on socioeconomic factors such as funding or labor to determine the maximum change in the provided ecosystem services from implementing these design interventions. The second scenario assumed every vacant lot was developed into single-family housing, typical of the area. A land cover analysis using the US Forest Service's i-Tree Canopy Application (i-Tree, 2024a) was conducted of the lots in the study area for which a building permit for single-family new construction was issued between 2013 and 2021 to determine the average percent of each land cover type for a newly constructed single-family lot over ten years. 2021 was the most recent year for which data was available. The third scenario investigated the socioeconomic factors that would limit the successful implementation of the recommended interventions. This scenario considers the estimated costs of implementing the recommended design interventions and potential community participation. A subset of the greened lots proposed in Scenario I that could be reasonably constructed and maintained were considered implemented, while the remaining lots were considered to be left in their current conditions for this assessment.

The process for estimating the provision of the four selected ecosystem services outlined in Phase II was repeated for each scenario. For Scenario I and III, the assessment was conducted for three different points in time: two years after implementation, five years after implementation, and ten years after implementation. The ten-year timeframe was selected because it represents a reasonable amount of time for a semi-permanent intervention to be in place and aligns with a timeframe typically considered by city plans. For each timeframe, the estimated change in services provided due to the growth of proposed trees was calculated. For newly planted trees, the carbon storage calculations were reduced to more accurately represent the carbon stored by one unit of young tree canopy cover, as detailed in Appendix B.2.

After assessing each scenario, the benefits for carbon sequestration and food production were extrapolated to the entire system of lots owned by the Land Bank and Homesteading Authority. The percentage of each design intervention proposed in the focus area and the ecosystem services they provide found in Phase II and III was scaled up to the total number of lots owned by those entities. As previously noted, the benefits of stormwater management and microclimate regulation are specific to each lot and cannot be aggregated across multiple lots.

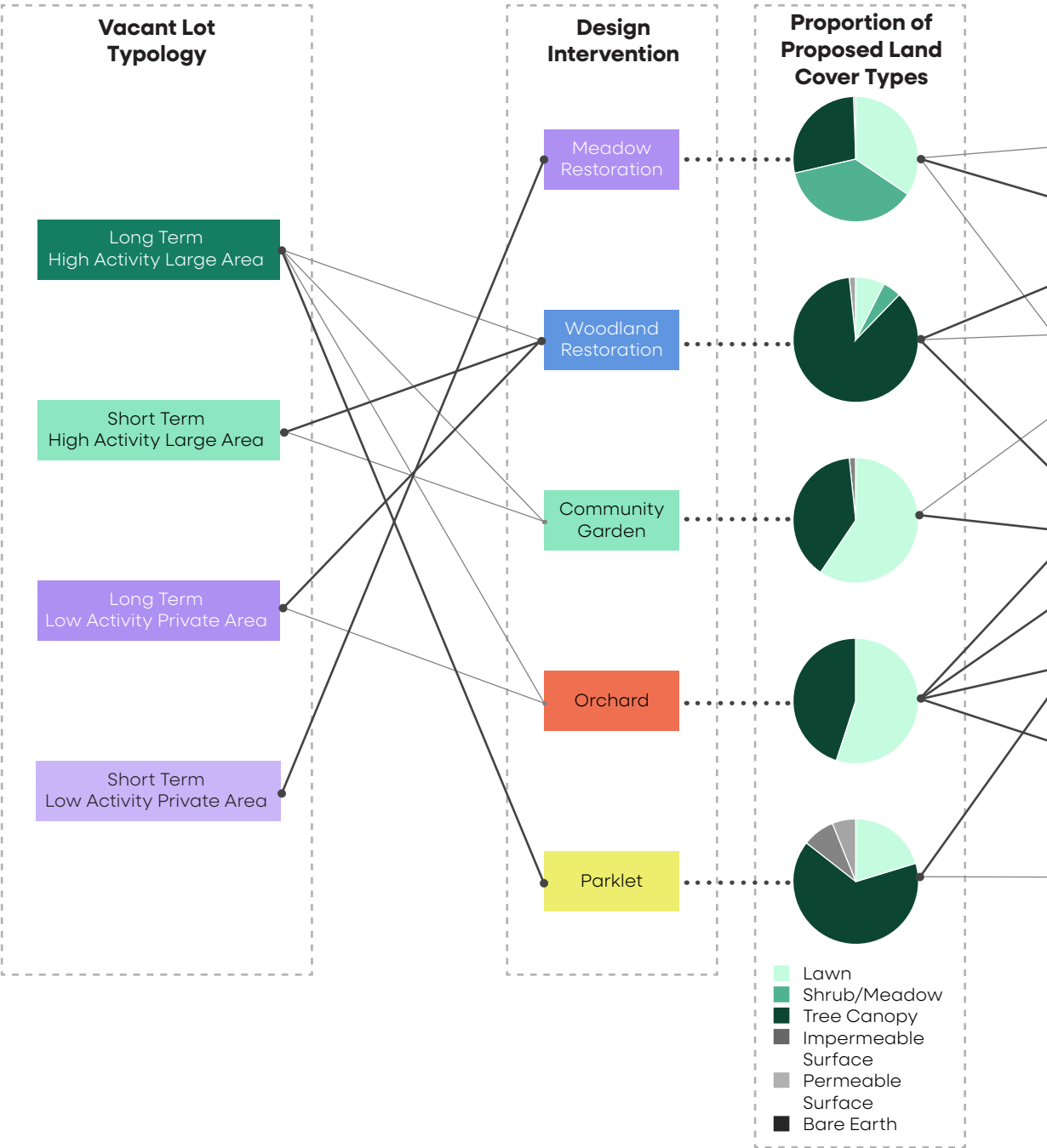
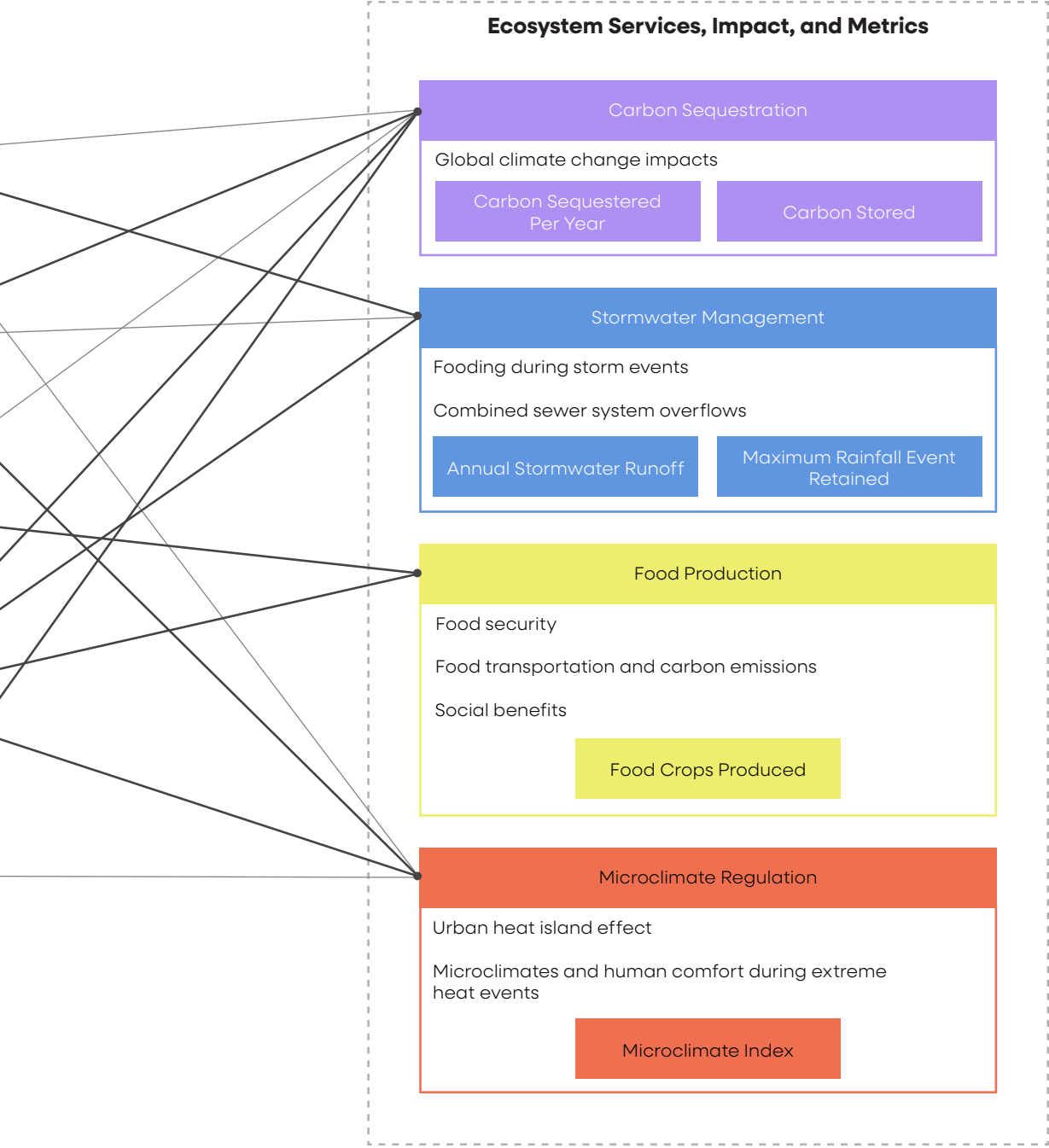


Figure 3.16 Typology, Design Intervention, and Ecosystem Services
 A combined diagram showing how the four vacant lot types are related to the five design interventions. The proportion of each land cover type due to the plantings and other elements in each intervention impacts the degree to which each ecosystem provides benefits to the community and is measured by the selected metrics.





Chapter 4

Findings

Phase I: Vacant Lot Typology

Phase I of the study established a typology of vacant lots and applied the typology to a selected study area in Kansas City, MO. Within this study area, 288 lots were assigned one of the four potential types: “Long-Term High Activity,” “Long-Term Low Activity,” “Short-Term High Activity,” and “Short-Term Low Activity.” Sixteen lots were removed from consideration for being under 2,500 square feet or having an existing permanent structure, as outlined in the methods. For details on the classification of each lot, see Appendix D. Based on this analysis, thirty-nine percent of lots classified as “Short-Term” should be the first prioritized for redevelopment, while the sixty-one percent classified for “Long-Term” interventions should be preserved as greenspace for the long term. Additionally, a slightly higher number of lots, fifty-two percent, are suitable for “Low Activity” design interventions, meaning they are located on small lots intermixed with occupied housing and should receive design interventions that are lower in activity compared to the forty-eight percent of lots classified as having the potential for “High Activity” interventions, as shown in Figure 4.1. Table 4.1 gives an estimate of the number of lots of each of the four types estimated to be owned by the Land Bank and Homesteading Authority in Kansas City. The lot type percentages calculated for the study area were applied to the entire 2,638 lots owned by those entities. Figures 4.2-4.5 show example photos of each lot type. Additionally, the distribution of each lot type was not even across all the block groups in the study area, as shown in Figure 4.6.

From the analysis of the lot typology across the study area, one focus area was selected. This focus area was chosen for having a proportion of the four lot types similar to the entire study area. Table 4.1 compares the percentage of lot types between the study area and this focus area. The selected focus area, highlighted in Figure 4.7, contains fifty-one lots owned by the Land Bank and Homesteading Authority, which combined cover 6.7 acres of the 79-acre area. The focus area is in the Oak Park Southeast neighborhood and is shown in greater detail in Figure 4.8. One lot in this area is listed as owned by the Land Bank or Homesteading Authority in the latest available data, but based on in-person site analysis, it has been sold to a private owner and was removed from further analysis.

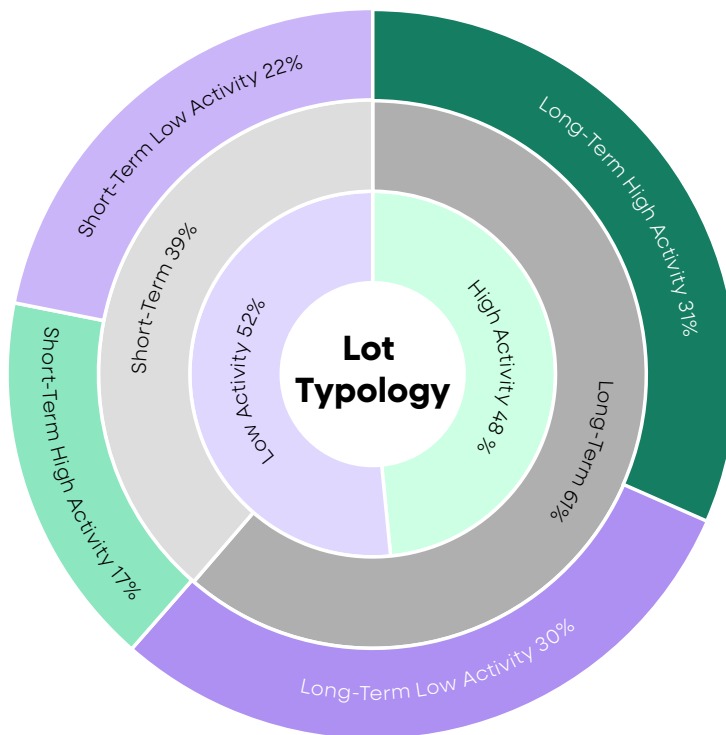


Figure 4.1 Proportion of Each Lot Type in the Study Area

Percentage of each of the four lot types in the study area, as well as the percentage of “Long-Term” and “Short-Term” lots, and “High-Activity” and “Low Activity” lots.

Table 4.1 Lot Types

Summary of lots classified into the four types in the focus and study areas, and an estimate for the number of each lot type across the entire city.

LOT TYPE	FOCUS AREA	STUDY AREA	CITY (ESTIMATE)
<i>Long-Term High Activity</i>	15 (30%)	91 (31%)	834 (31%)
<i>Long-Term Low Activity</i>	15 (30%)	86 (30%)	788 (30%)
<i>Short Term High Activity</i>	8 (16%)	48 (17%)	440 (17%)
<i>Short Term Low Activity</i>	12 (24%)	63 (22%)	577 (22%)
<i>Total</i>	50	288	2,638



Figure 4.2 Long-Term High Activity Lot Example
An example “Long-Term High Activity” type lot with a large existing tree canopy, aggregated lot size, and location on a street corner. Image: Google ©2023

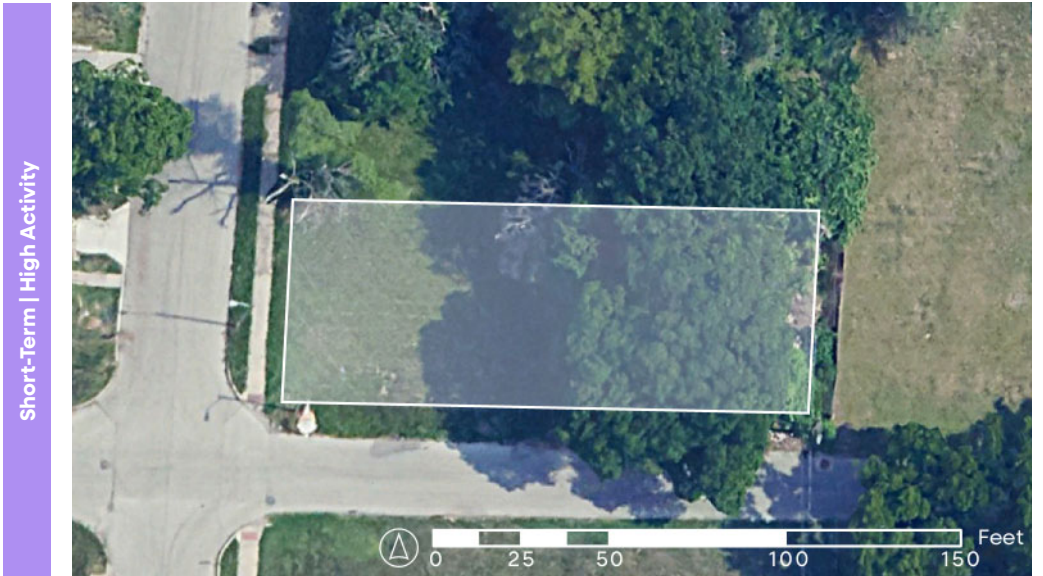


Figure 4.3 Short-Term High Activity Lot Example
An example of a “Short-Term High Activity” type lot with few existing trees and location on a street corner. Image: Google ©2023



Figure 4.4 Long-Term Low Activity Lot Example
An example of a “Long-Term Low Activity” type lot with high tree canopy coverage tucked between two occupied homes. Image: Google ©2023



Figure 4.5 Short-Term Low Activity Lot Example
An example of a “Short-Term Low Activity” type lot with little vegetation other than lawn tucked between two occupied homes. Image: Google ©2023

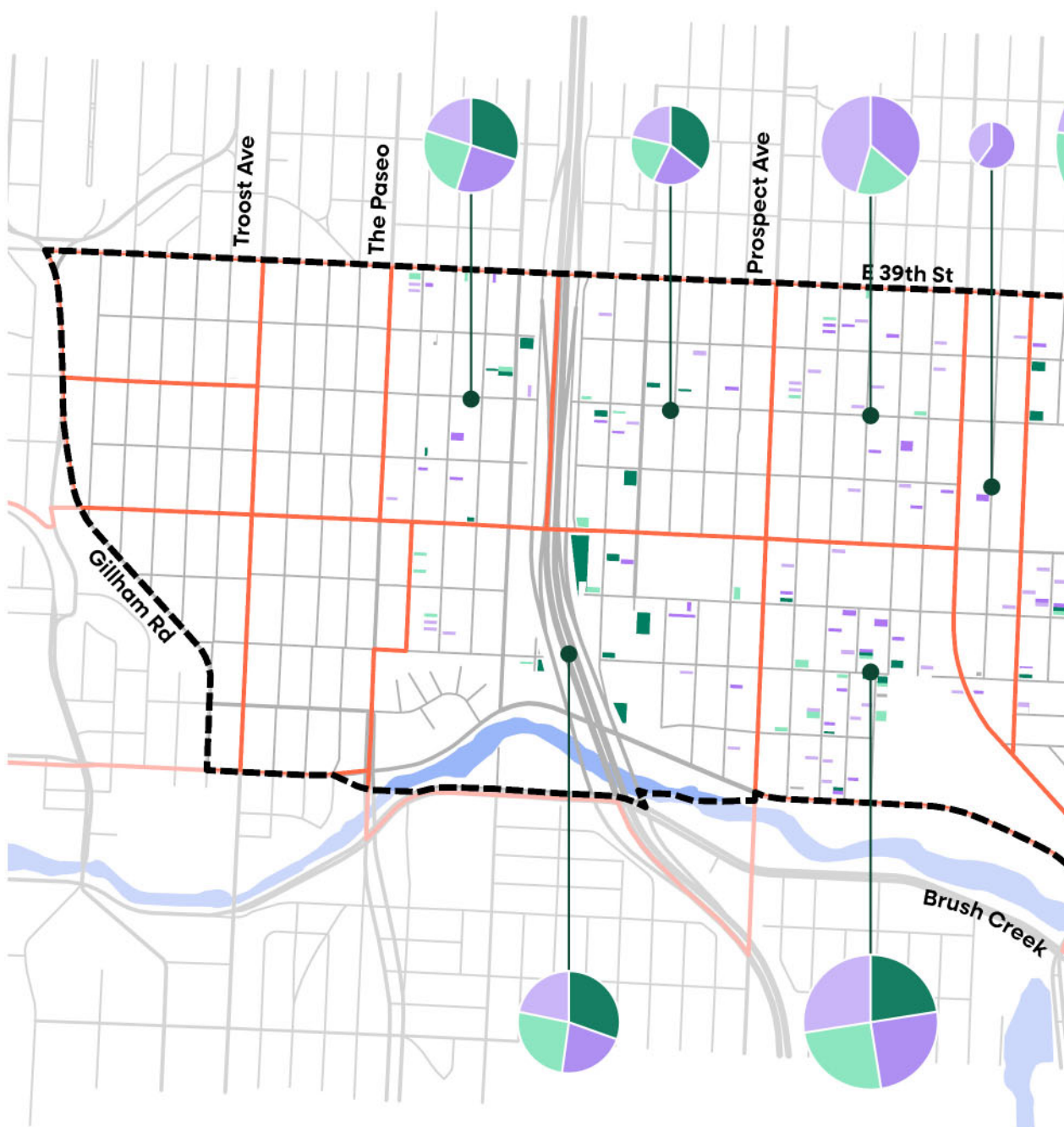
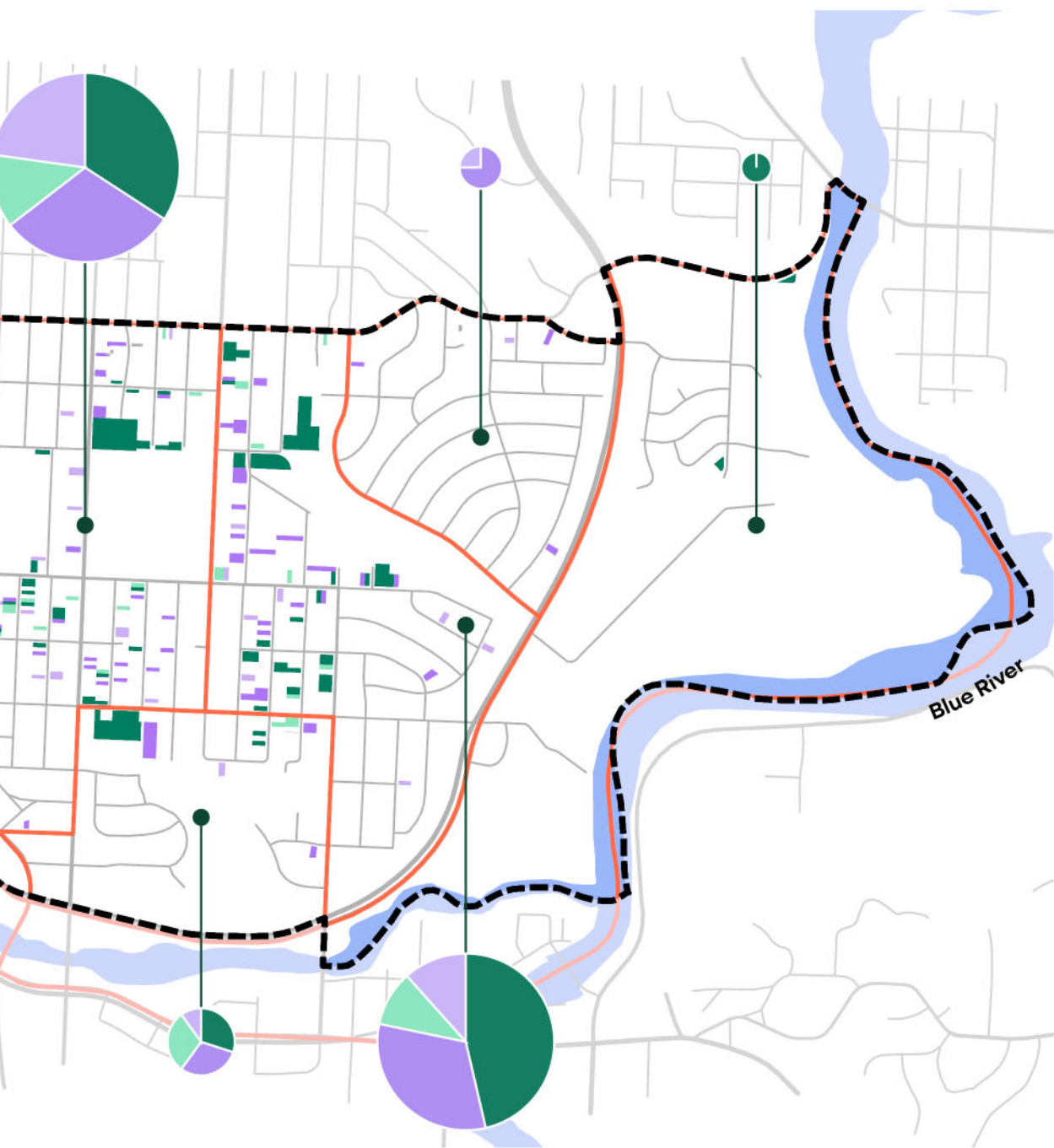


Figure 4.6 Lot Types Across the Study Area
The distribution of lot types across the study area and the proportion of lot types in each block group.



0 0.13 0.25 0.5 0.75 1 Miles



Study Area



StudyAreaBG

Type



long term high activity



long term low activity



short term high activity



short term low activity



<all other values>

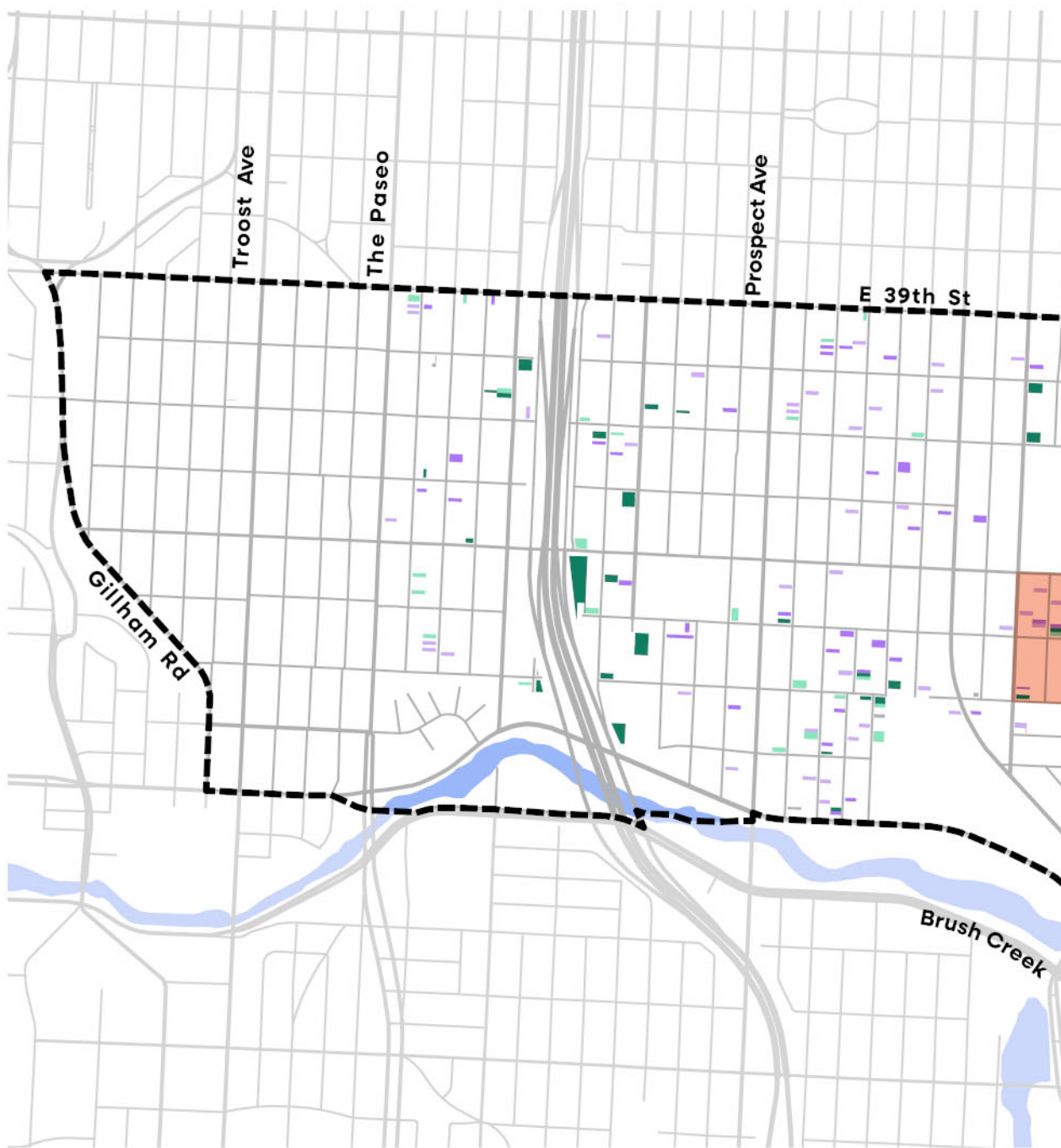
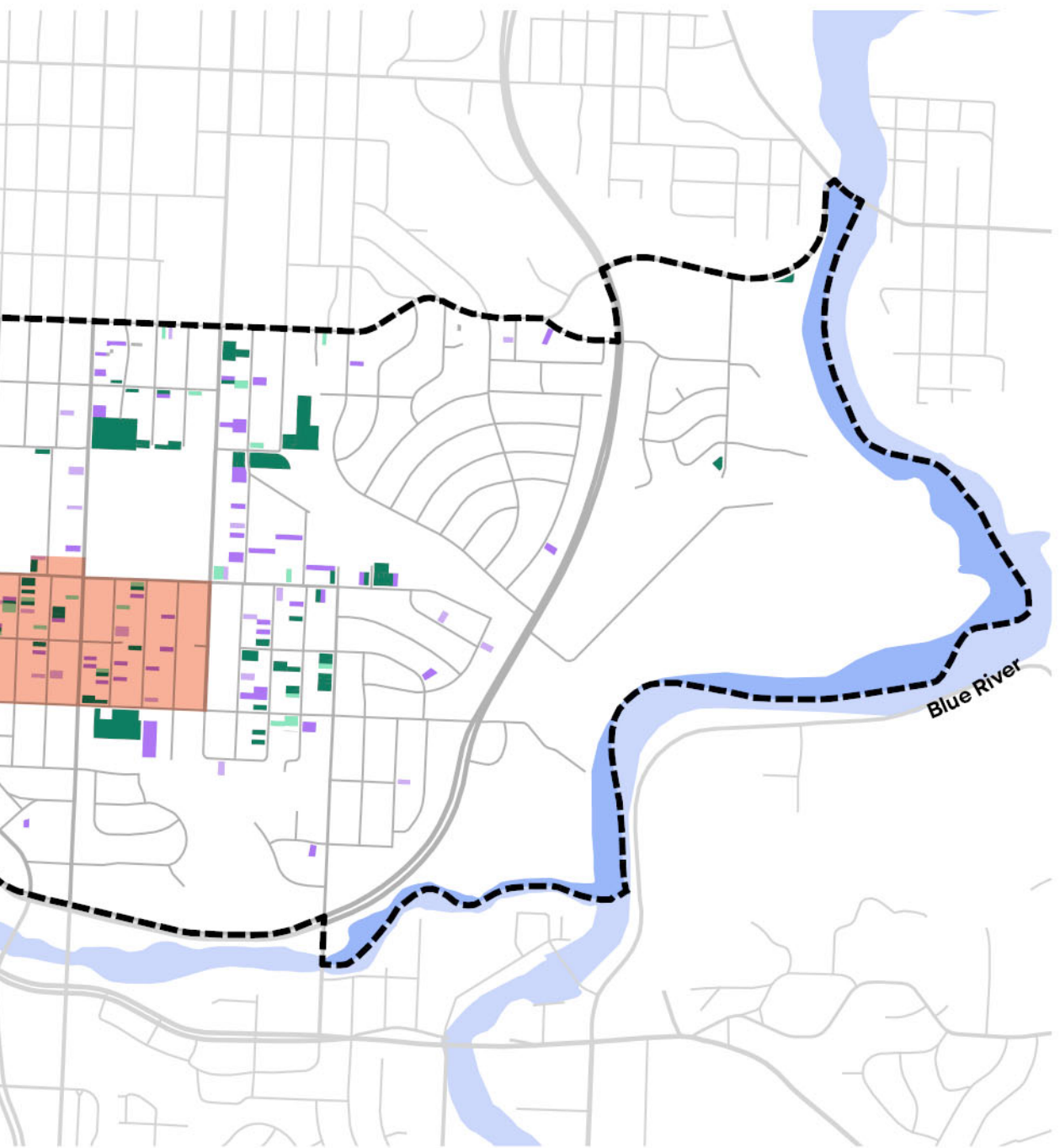


Figure 4.7 Focus Area Location

The focus area includes fifty vacant lots in a 0.12 mi² (79 acre) area.



0 0.13 0.25 0.5 0.75 1 Miles

Long-Term High Activity
Long-Term Low Activity

Short-Term High Activity
Short-Term Low Activity

Study Area
Focus Area

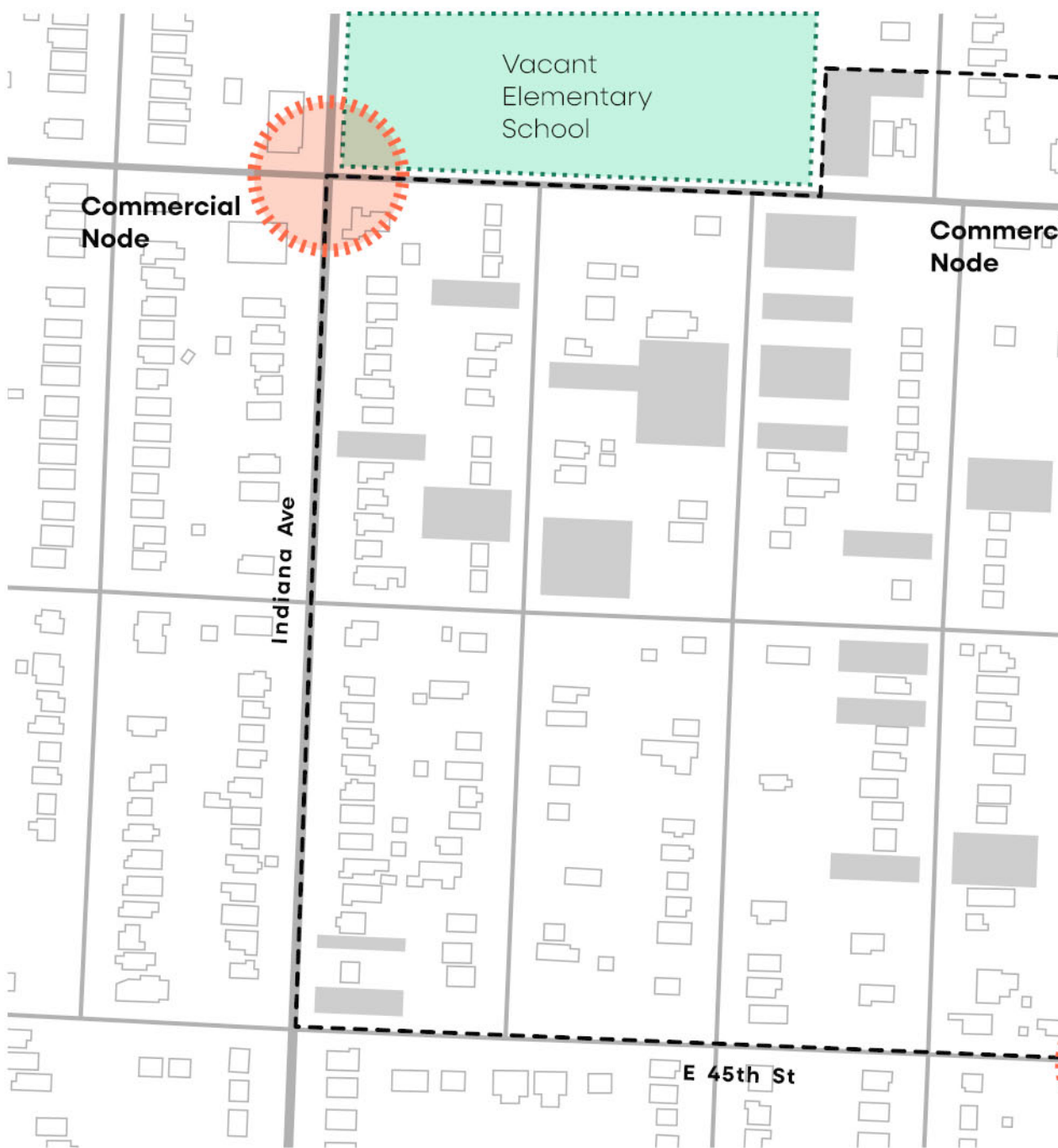
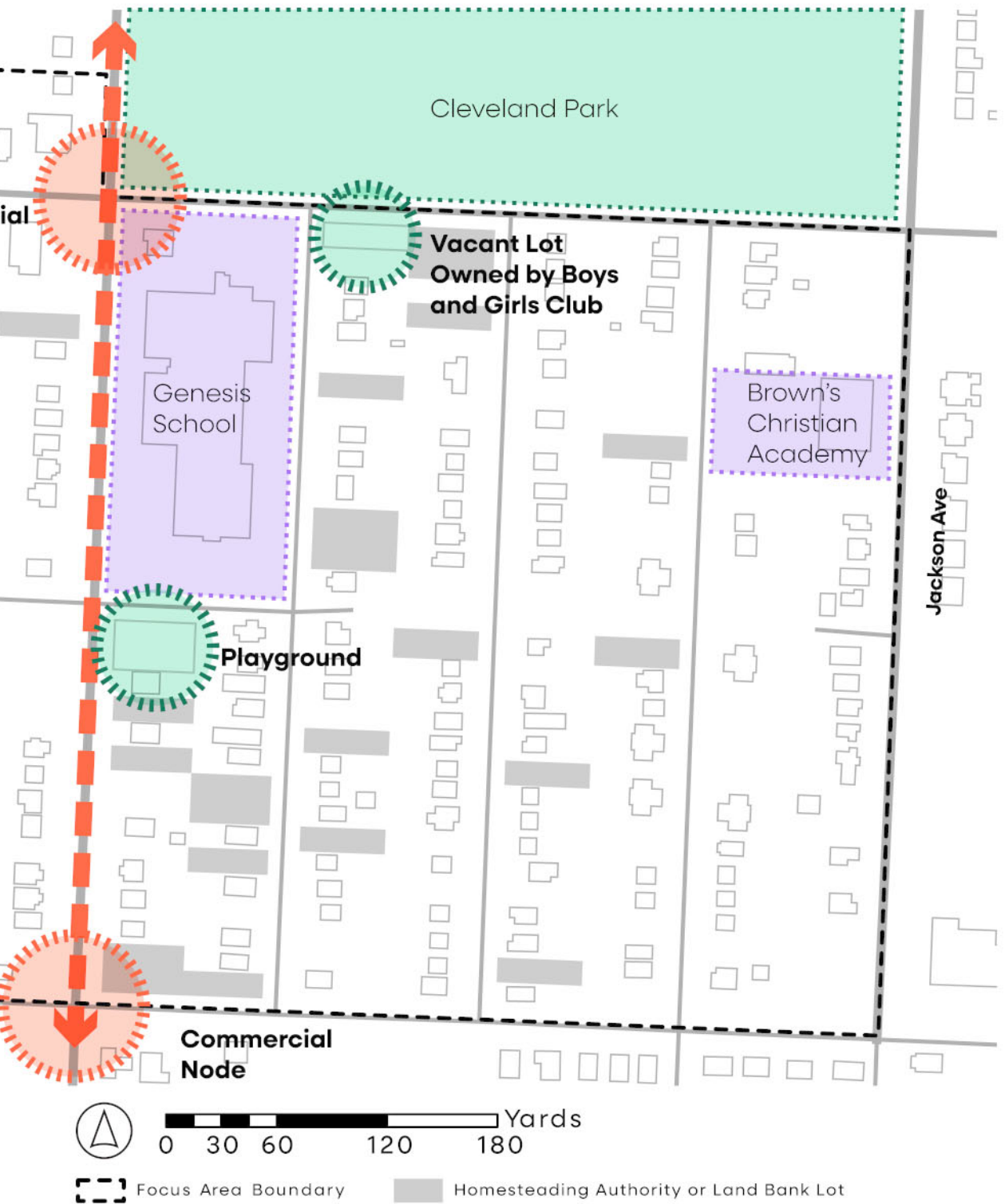


Figure 4.8 Focus Area Map

The focus area includes three commercial “nodes” and two schools. While there are large greenspaces to the north, these are closed and inaccessible to residents. There is a public playground in the center of the focus area and one vacant lot that has been converted into a greenspace by the Boys and Girls Club.



Phase II: Estimating the Current Provision of Ecosystem Services

Each vacant lot owned by the Land Bank and Homesteading Authority in the focus area selected in Phase I was assessed for their existing ecosystem services based on the methods outlined in Chapter Three, “Methods.”

LAND COVER

First, the percentage of each previously defined land cover type (lawn, tree canopy, shrub or meadow, impermeable surface, and bare earth) present on each lot was assessed using ArcGIS. For details on the lot cover of each studied lot, see Appendix E.1.1. The comprehensive percentages of each land cover type across all the studied lots are shown in Figure 4.9. The tree canopy represents sixty-three percent of the land cover across the selected sites, the largest land cover type, while less than one percent of the area is covered by impermeable surfaces or bare earth. Lots classified for “Long Term” interventions had a greater percent tree canopy cover than lots classified for “Short Term” interventions. This result aligns with the flowcharts developed to guide the selection of lot types, which prioritized sites with less tree canopy for future development over those with greater tree canopy.

63%
Tree Canopy

0.5%
Impermeable Surface

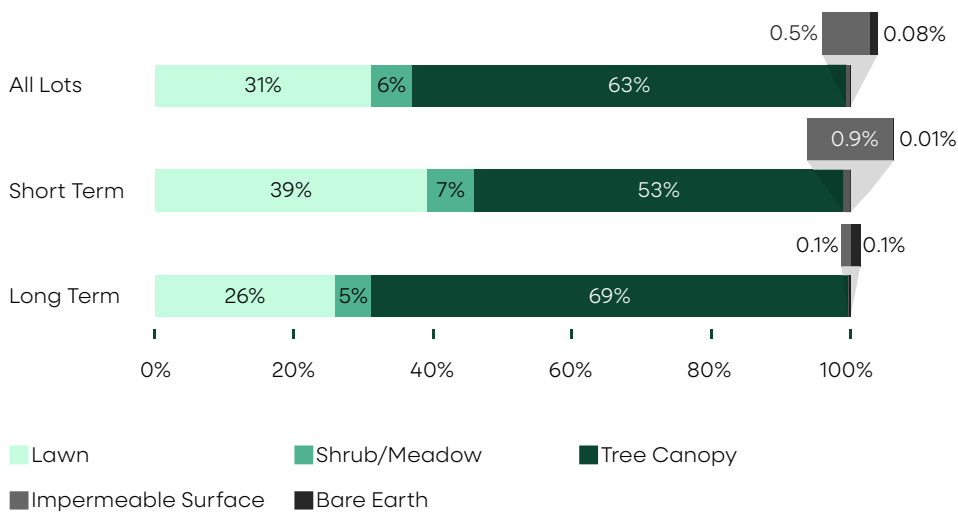


Figure 4.9 Land Cover Comparison—Existing Conditions

The percentage of each landcover type across all studied lots in the focus area, broken down by lots classified for “Short-Term” and “Long-Term” greening strategies.

CARBON SEQUESTRATION

From the analysis of the land cover types present on each site, the existing provision of each ecosystem service was assessed through the indicators described in Chapter Three, “Methods.” First, the net carbon sequestered and stored was evaluated based on the tree canopy area. For details on the carbon sequestered and stored by each lot, see Appendix E.2.1. In total, trees on the studied lots are estimated to sequester a net amount of 8,024 lbs. of carbon per year and currently store a net amount of 216,274 lbs. of carbon. Lots classified for “Long-Term” interventions currently sequester and store, on average, twenty-five percent more carbon than lots classified for “Short-Term” interventions, supporting the justification of preserving “Long-Term” lots from immediate development. In Figures 4.10 and 4.11, the outlier data points in the “Long-Term” intervention category are lots with little tree canopy but not recommended for short-term development because they likely collect a significant amount of stormwater from off-site or have a high percent slope.

8,024 lbs
Net carbon sequestered per year

216,274 lbs
Net carbon stored

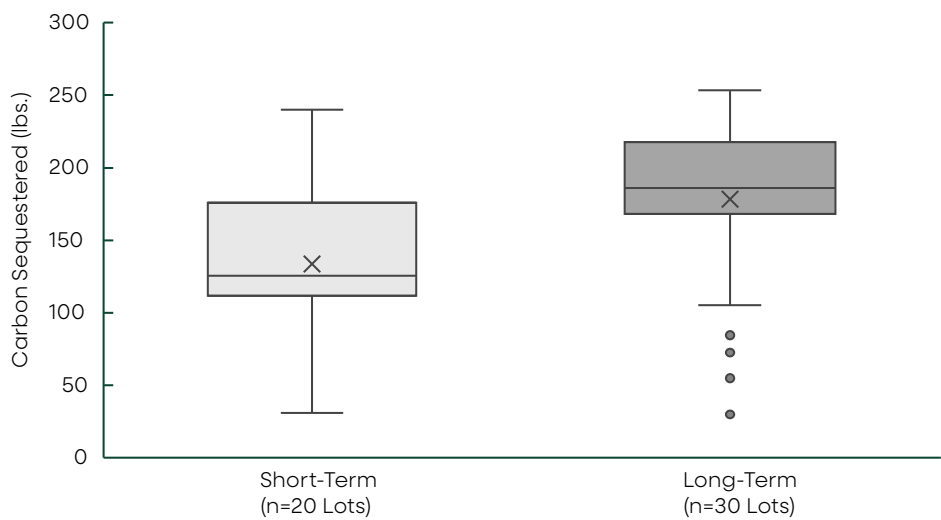


Figure 4.10 Net Carbon Sequestered Per Year—Existing Conditions
 A comparison of the net carbon estimated to be sequestered by each “Short-Term” and “Long-Term” lot.

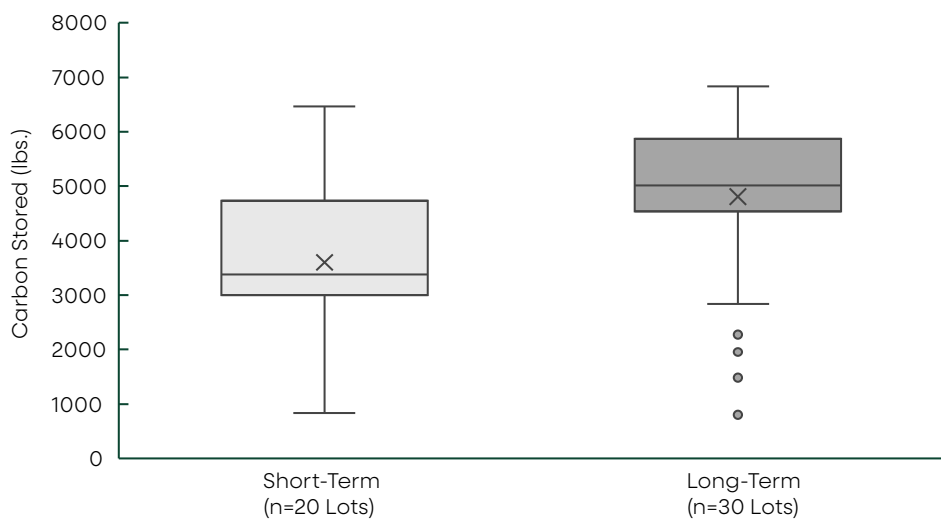


Figure 4.11 Net Carbon Stored—Existing Conditions
 A comparison of the net carbon estimated to be stored by each “Short-Term” and “Long-Term” lot.

STORMWATER MANAGEMENT

Next, stormwater conditions were analyzed using the EPA National Stormwater Calculator (U.S. Environmental Protection Agency, 2019) and the percent of each land cover type present on the site as outlined in Chapter Three, “Methods.” For details on the stormwater conditions of each studied lot, see Appendix E.3.1. As shown in Figures 4.12 and 4.13, the range of values for the average annual runoff and maximum rainfall event retained was small. The outlier data points were some sites in the southeast corner of the study area classified as a different soil type than the other lots, which had a “very high” runoff potential.

The average annual runoff per lot across all the focus area is estimated to be 4.32 inches, 11.4% of the annual rainfall of 38 inches. The average maximum rainfall event retained per lot across all the focus area is estimated to be 3.45 inches. Lots classified for “Long-Term” interventions are estimated to have 6.8% lower annual runoff than lots classified for “Short-Term” interventions on average, but only 0.3 of an inch difference. However, “Long-Term” lots also are estimated to retain a 0.5% smaller maximum rainfall than “Short-Term” lots on average. Overall, the differences in the amount of stormwater runoff generated and the maximum size of rainfall retained between lots classified as “Long-Term” and “Short-Term” are slight.

4.32 in

Average annual runoff, 11.4% of annual rainfall

3.45 in

Average maximum rainfall event retained

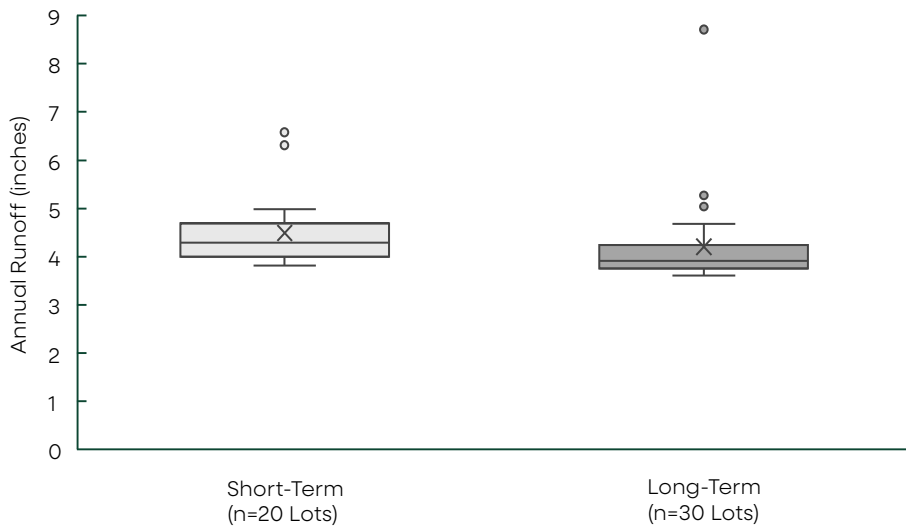


Figure 4.12 Average Annual Runoff—Existing Conditions

A comparison of the average yearly annual runoff between “Short-Term” and “Long-Term” lots.

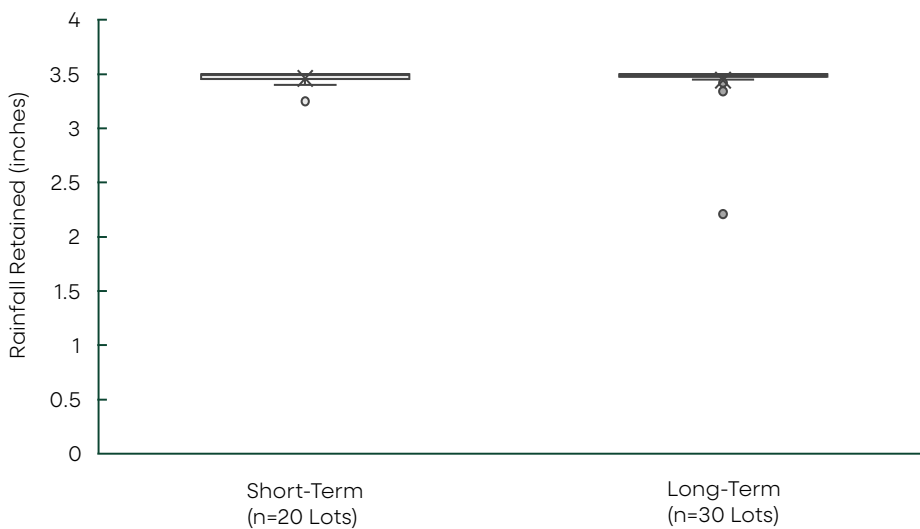


Figure 4.13 Maximum Rainfall Event Retained—Existing Conditions

A comparison of the maximum rainfall event retained between “Short-Term” and “Long-Term” lots.

MICROCLIMATE

Microclimate conditions were assessed using a microclimate index based on the percentage of the tree canopy, vegetation, and other land cover and given a value between 0 and 500, as established in Chapter Three, “Methods.” Lots that have a higher microclimate index score would have a higher comfort level. For details on the microclimate index scores of each lot, see Appendix E.5.1. As with the carbon sequestration estimates, the outliers in the “long-Term” category in Figure 4.14 were sites with low tree canopy cover but may be collecting stormwater runoff from off-site or having a steep slope. As shown in Figure 4.15, the average index rating per lot across all studied lots is estimated to be 388.67, 78% of the maximum value of 500. Lots classified for “Long-Term” design interventions have a higher average index score than lots classified for “Short-Term” design interventions by an average of 57 points and a more comfortable microclimate.

388.67

*Average microclimate index score
78% of a maximum 500 points*

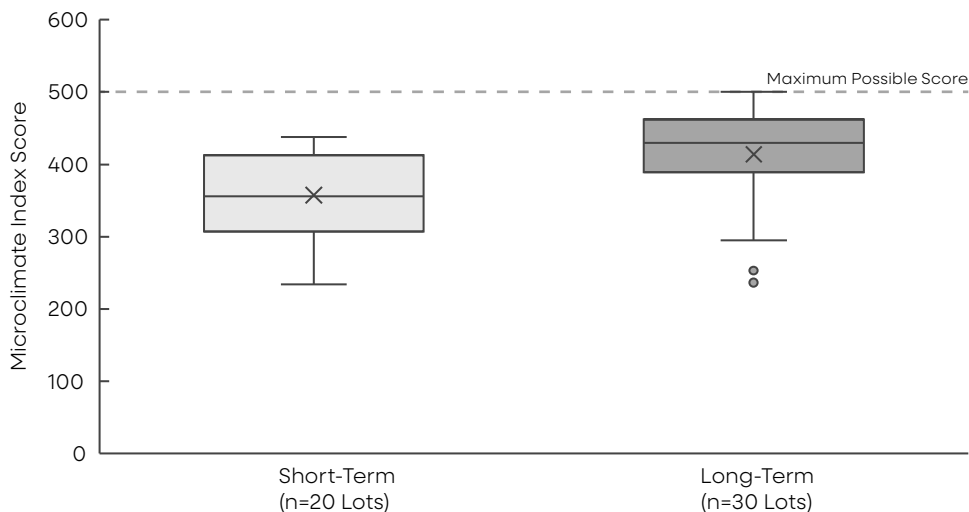


Figure 4.14 Microclimate Regulation Index—Existing Conditions
A comparison of the microclimate index scores of each “Short-Term” and “Long-Term” lot.

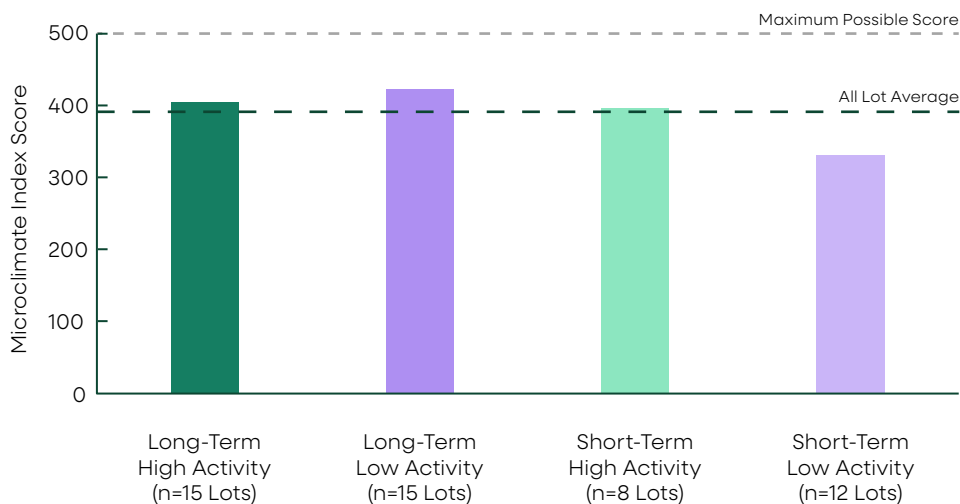


Figure 4.15 Average Microclimate Regulation Index Values
The average microclimate score per lot broken down by type compared to the average microclimate score per lot across all studied lots.

Lots were classified as “Long-Term” in the vacant lot typology for preservation of their qualities that would contribute to providing ecosystem services, specifically their mature tree canopy, and characteristics that would make them less suitable for development, like steep slopes and potential to collect stormwater. “Short-Term” lots have fewer trees and are more suitable for development. This analysis shows that, on average, “Long-Term” lots sequester more carbon and have slightly cooler microclimate than “Short-Term” lots. “Long-Term” lots also generate slightly lower annual stormwater runoff but do not retain as large of rainfall events as “Short-Term” lots, but the differences in stormwater management between the two categories of lots are small. Additionally, this assessment provides baseline values for comparison to later scenarios.

Phase III: Developing Design Intervention Prototypes and Estimating Alternative Scenarios for Ecosystem Services Provision

DESIGN INTERVENTION PROTOTYPES

Prototype designs for the design interventions were developed based on the criteria outlined in the methods. The designs presented on the following pages are prototypes that could be adapted to other cities with similar climatic conditions. While each is intended for one lot of approximately 0.12 acres in size, multiple interventions could be used across adjacent lots. The designs synthesize previous research and best practices for vacant lot designs by Albro (2019), Detroit Future City (2023), Nassauer & Raskin (2014), and Spirn et al. (1990) and are shown in Figures 4.16 to 4.20.

A standard feature of all five lot designs includes a clean five-foot wide mowed turfgrass border around all edges, and a ten-foot border along the right of way like the lot designs by Detroit Future City (2023). Additionally, a split rail fence—like those used in the Philadelphia Horticultural Society’s vacant lot program—along edges bordering streets demonstrates ownership of the property and deters illegal dumping (Branas et al., 2012; Loder, 2020).

As supporting the provision of ecosystem services was a primary goal for the designs, each prototype assumes that the mature tree canopy, often located near the back of the site, is maintained. The flowchart in Figure 3.15 was used to assign a design intervention to each lot in the focus area. Then, the average existing tree canopy cover was calculated for each design intervention and used to finalize the prototype designs. Design plans for each of the five prototypes are shown in Appendix C.1.

To apply these lot prototypes and assess ecosystem services, the total area of the design not under existing tree canopy assigned to the pavement, lawn, and meadow or shrub land cover types was calculated for each prototype. Then, those percentages were applied to each vacant lot in the focus area.

Table 4.2 shows recommended tree species selections for the prototype designs in the Kansas City region. Recommended trees were selected from the Kansas City Missouri Parks and Recreation Department Forestry Operation’s (2018) list of

approved street trees and refined to only hardy native species. It was assumed that the five tree species in each category were used evenly across the design interventions where new trees were proposed in Scenarios I and III, as further detailed in Appendix B.

Table 4.2 Recommended Tree Species
Recommended tree species selected for the design intervention prototypes. Overstory shade trees are used in the parklet lot design, while understory trees are used in the woodland and parklet designs.

TYPE	SPECIES
Overstory Trees	Swamp white oak (<i>Quercus bicolor</i>)
	Kentucky coffeetree (<i>Gymnocladus dioicus</i>)
	Bald cypress (<i>Taxodium distichum</i>)
	Northern red oak (<i>Quercus rubra</i>)
	Chinkapin oak (<i>Quercus muehlenbergii</i>)
Understory Trees	American hophornbeam (<i>Ostrya virginiana</i>)
	American hornbeam (<i>Carpinus caroliniana</i>)
	Serviceberry (<i>Amelanchier spp.</i>)
	Flowering dogwood (<i>Cornus florida</i>)
	Eastern redbud (<i>Cercis canadensis</i>)

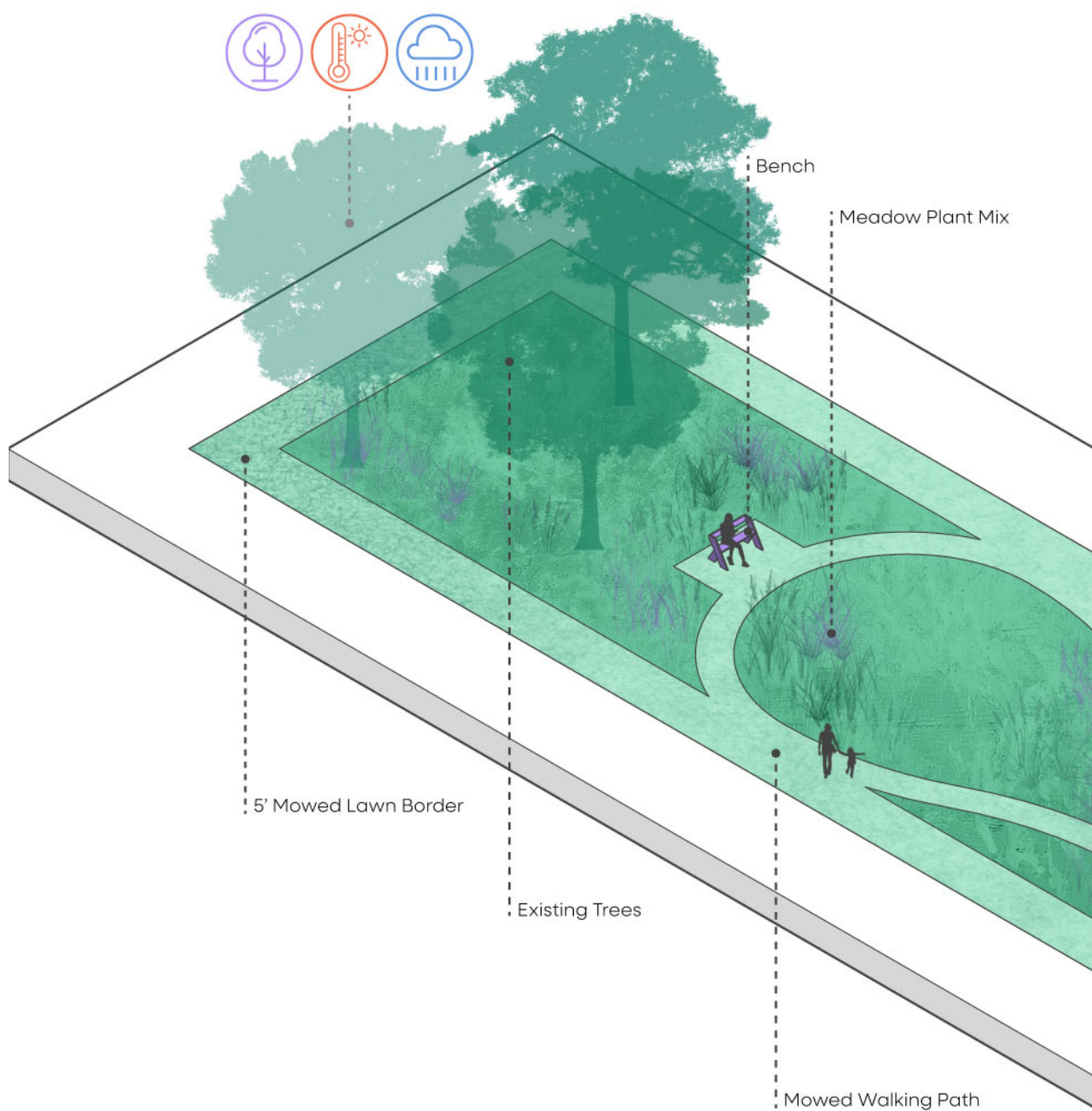
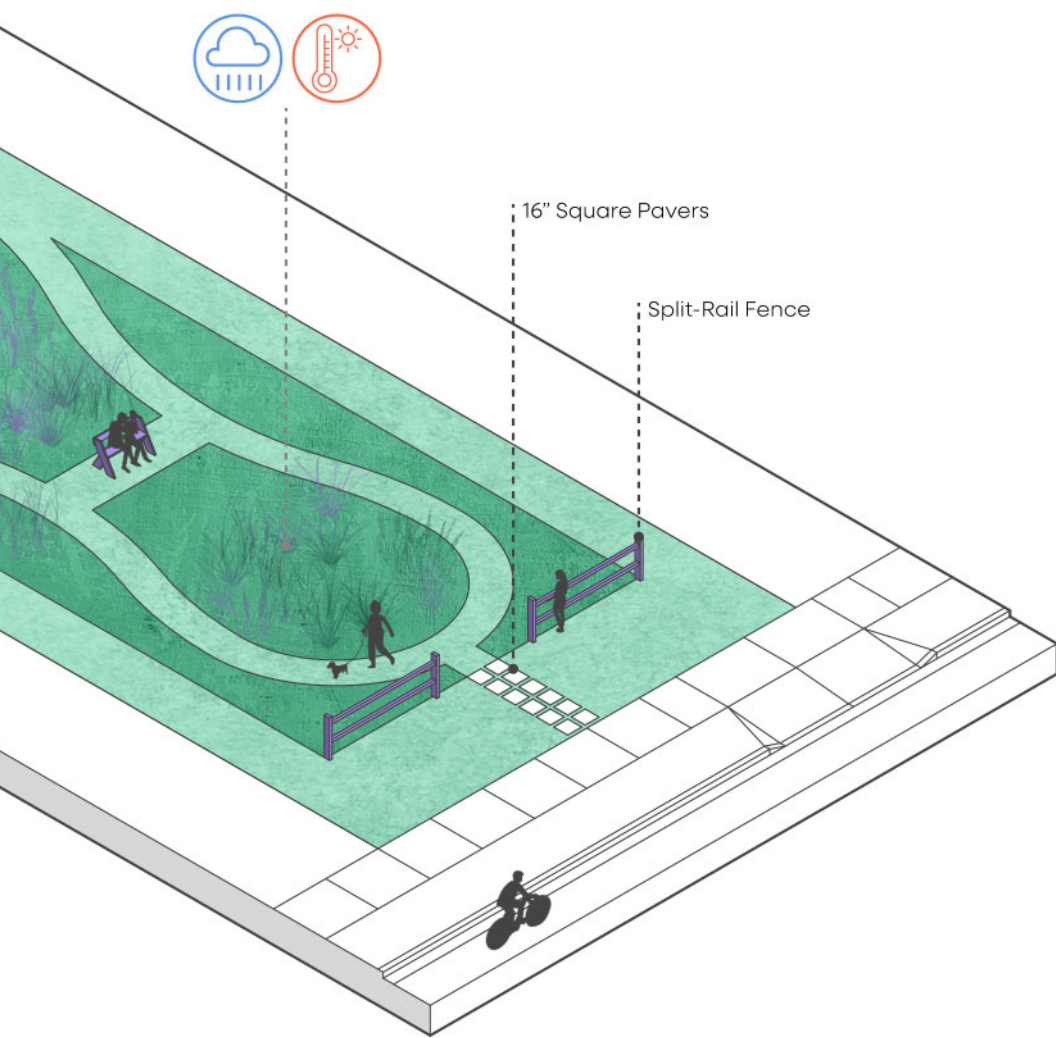


Figure 4.16 Meadow Restoration
An overview of the meadow restoration design prototype

MEADOW RESTORATION

This prototype (Figure 4.16) includes the typical split rail fence and clear-mowed edges. Areas of the site not under the existing tree canopy would be seeded with a native meadow seed mix. As Spirn et al. (1990) recommended, a walking path mown through the site and a couple of benches could make the site a usable amenity for residents. Areas under the existing tree canopy would be maintained as described in the woodland restoration prototype.



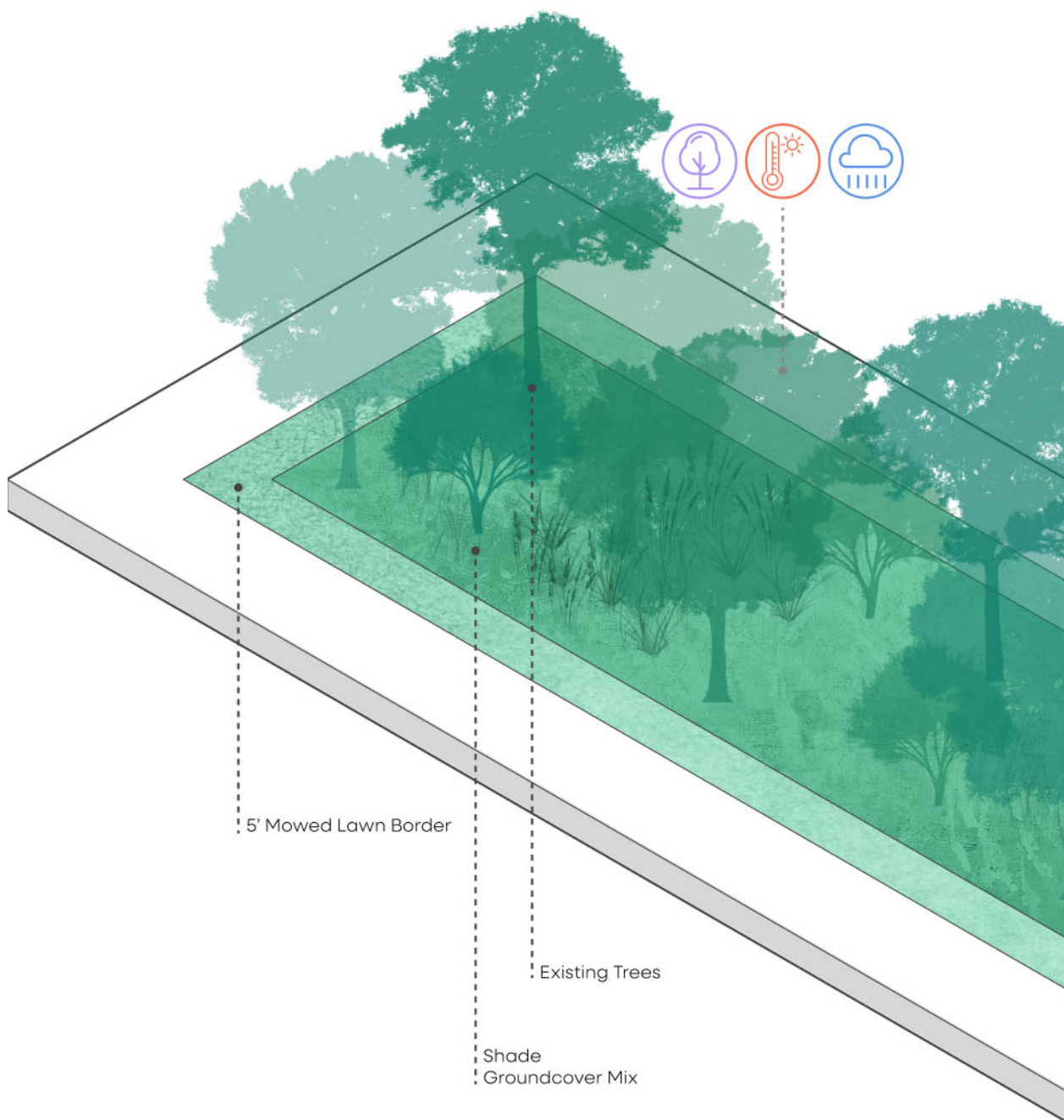
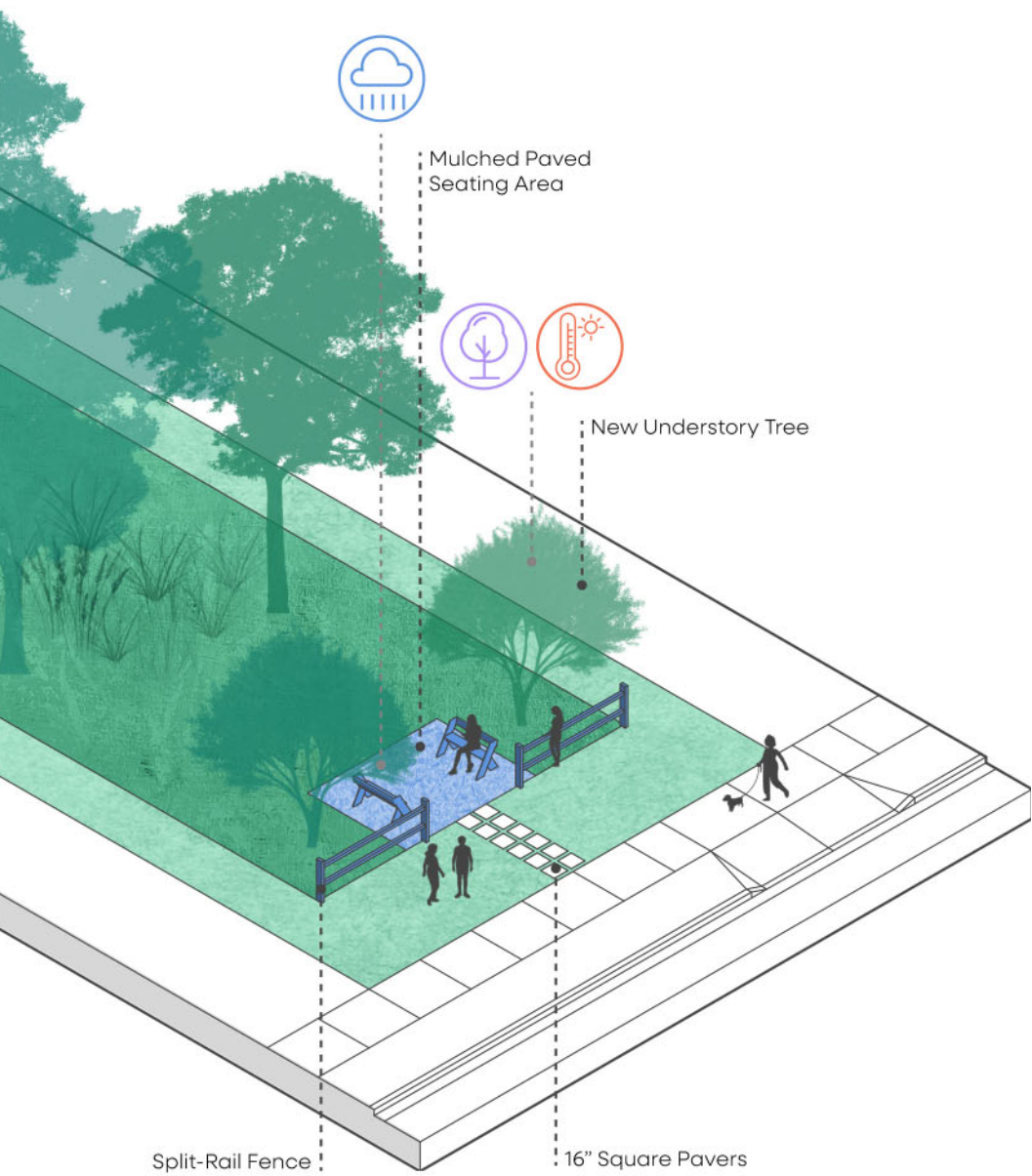


Figure 4.17 Woodland Restoration
An overview of the woodland restoration design prototype

WOODLAND RESTORATION

This prototype (Figure 4.17) is intended to preserve sites with a large area of existing mature tree canopy. On these sites, visibility and a sense of care can be enhanced by clearing out understory plants and pruning existing trees above six feet, as recommended by Spirn et al. (1990) and Detroit Future City’s (2023) “Forest Patcher” lot design. Shade-tolerant ground cover plants could be seeded to fill in areas of bare soil as needed. Additional understory trees could be planted if space permits to increase the tree canopy cover.



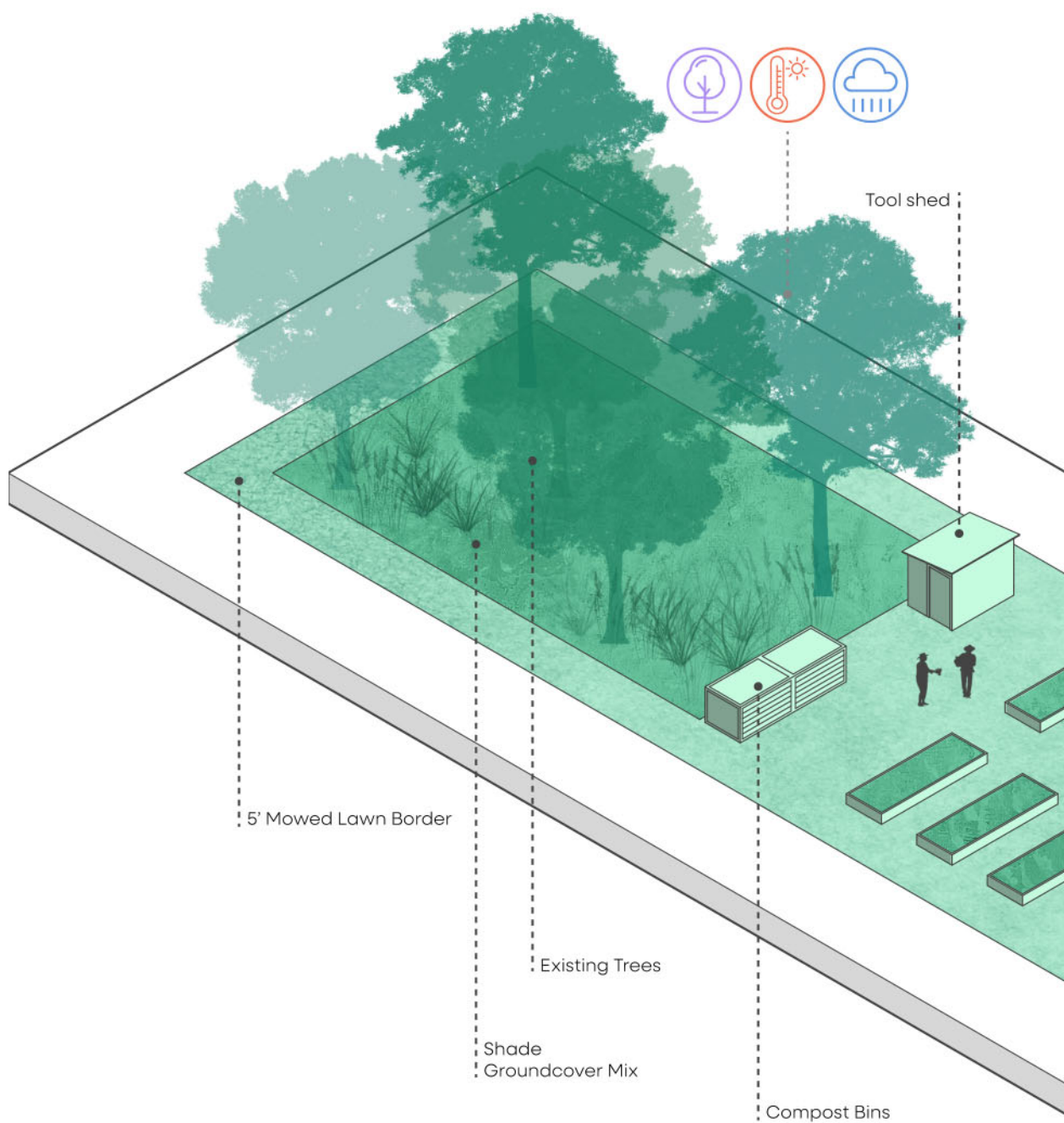
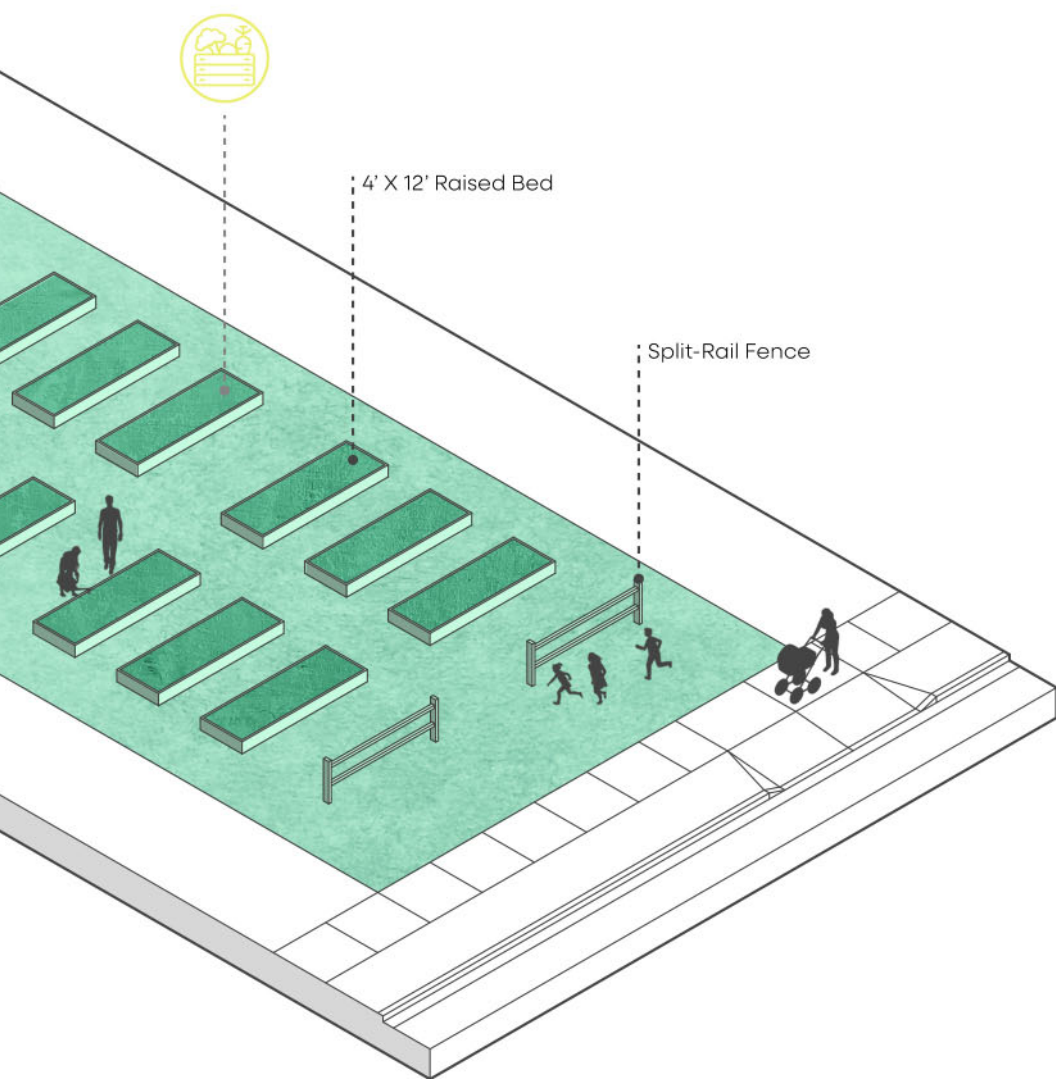


Figure 4.18 Community Garden
An overview of the community garden design prototype

COMMUNITY GARDEN

This prototype (Figure 4.18) follows regulations on urban agriculture and community gardens in Kansas City, Missouri, including setbacks and the requirement for a lockable structure, like a shed, to store any chemicals (Land Bank of Kansas City Missouri, 2022). Additionally, the site includes a dozen four-by-twelve-foot raised beds, the standard size for Kansas City Community Garden sites (Kansas City Community Gardens, 2020), and a compost area. The need for a water source on the site is not shown on the plan. As with the other prototypes, the existing tree canopy should be maintained.



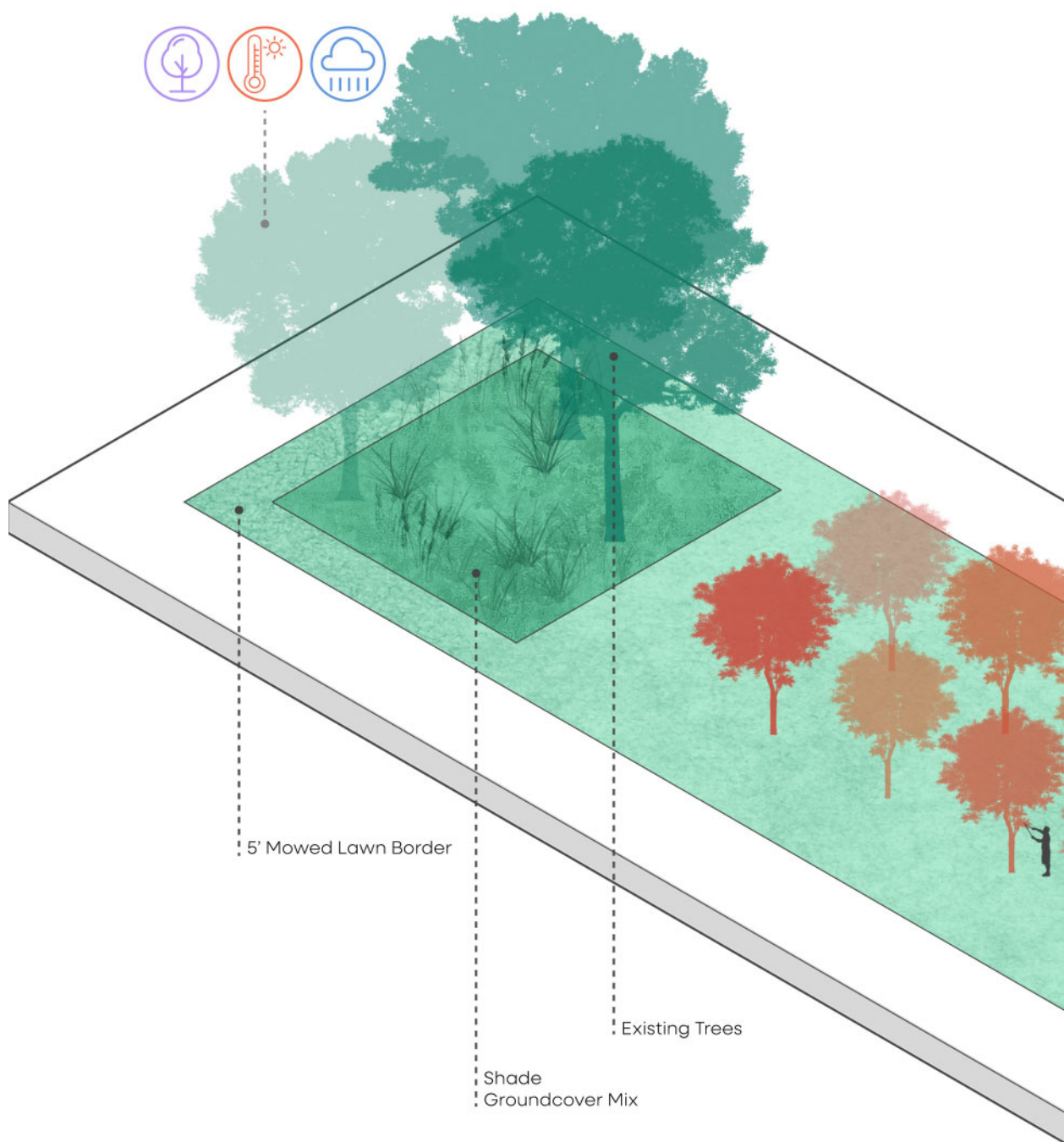
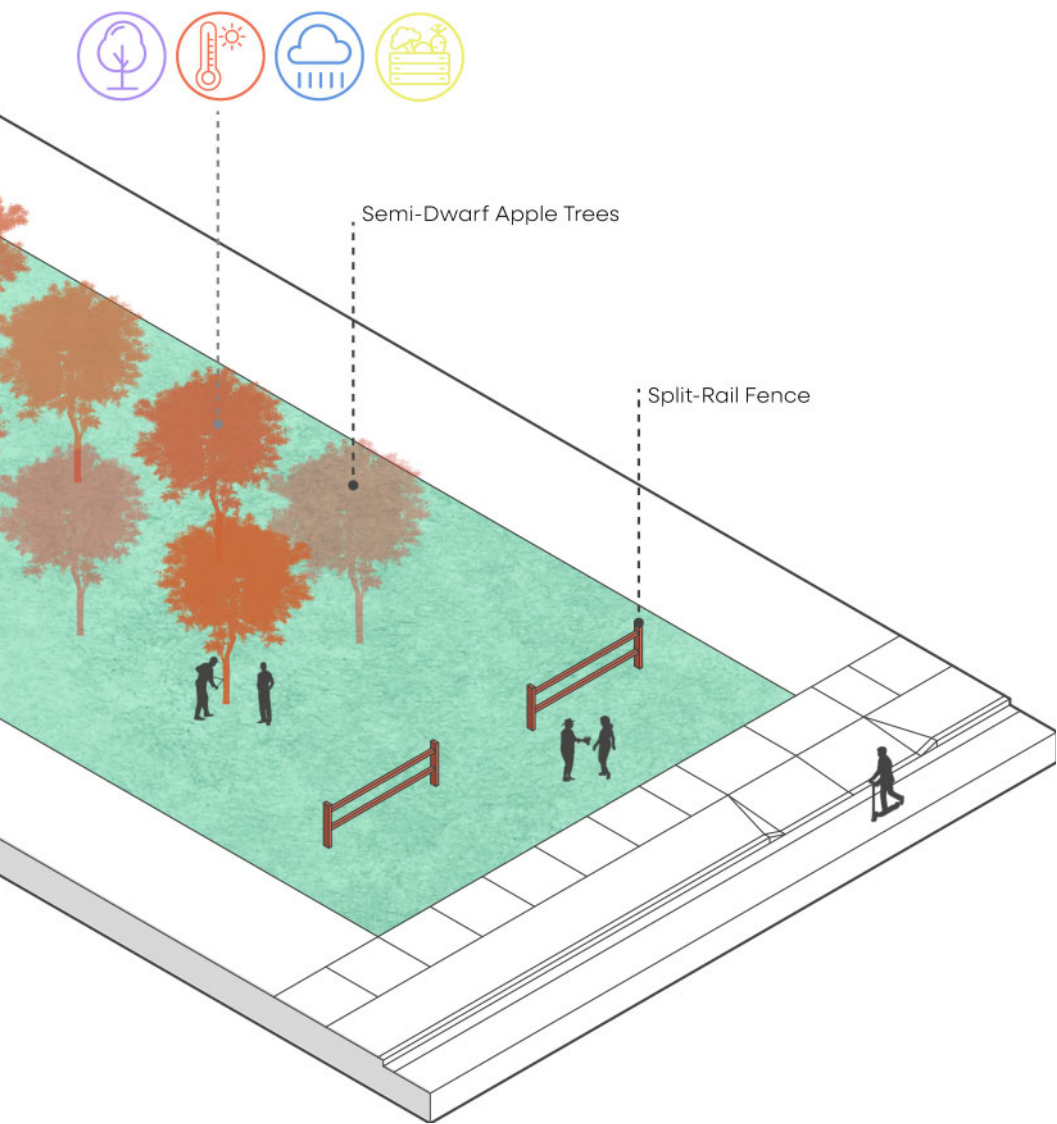


Figure 4.19 Orchard
An overview of the orchard design prototype

ORCHARD

This prototype (Figure 4.19) lot design aligns with the Giving Grove program’s urban orchard lot designs. Lots purchased from the Kansas City Missouri Land Bank for use as an urban orchard are required to participate in this program (Land Bank of Kansas City Missouri, 2022), which provides resources and support for the orchard’s long term success (The Giving Grove, 2020).



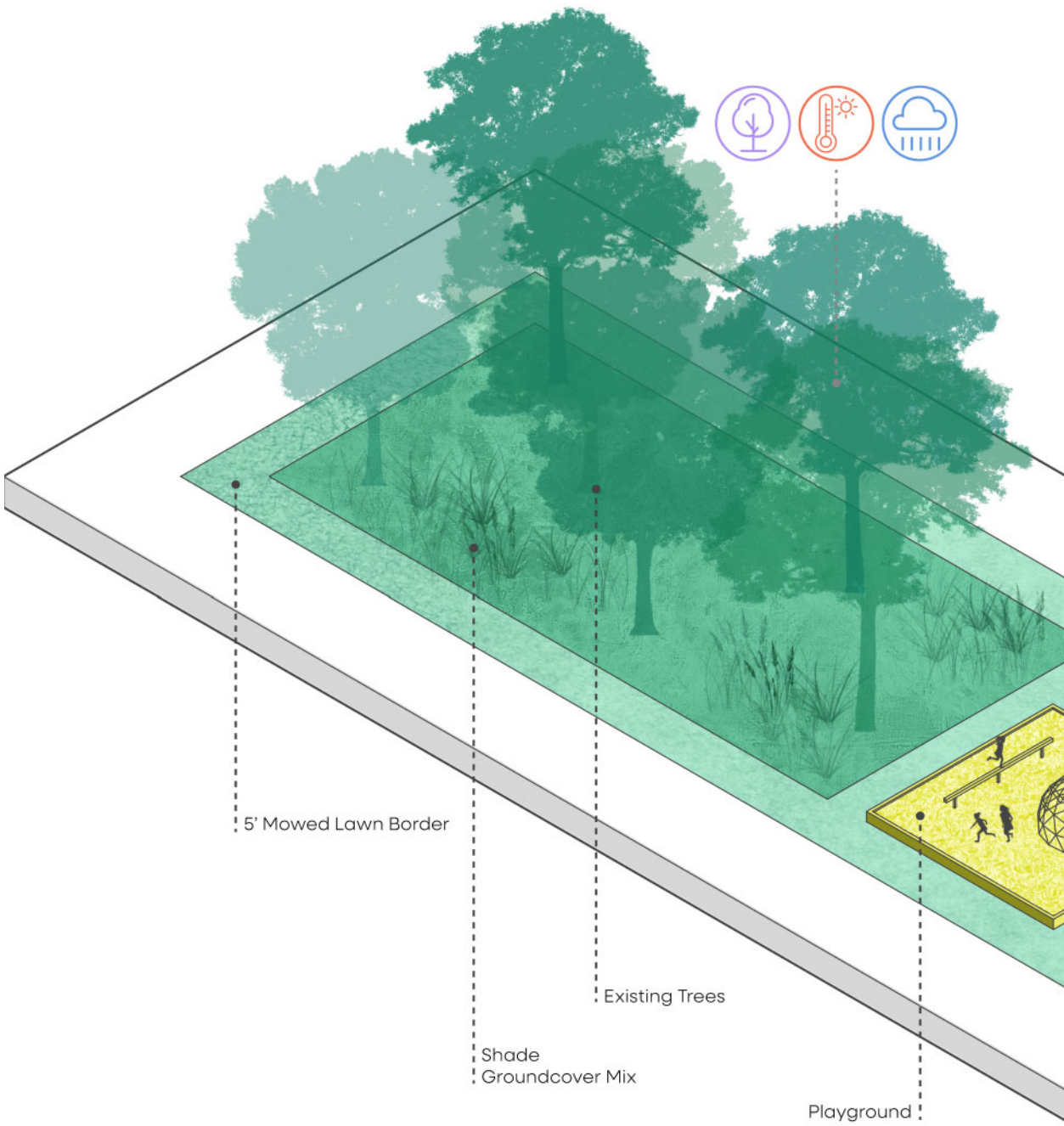
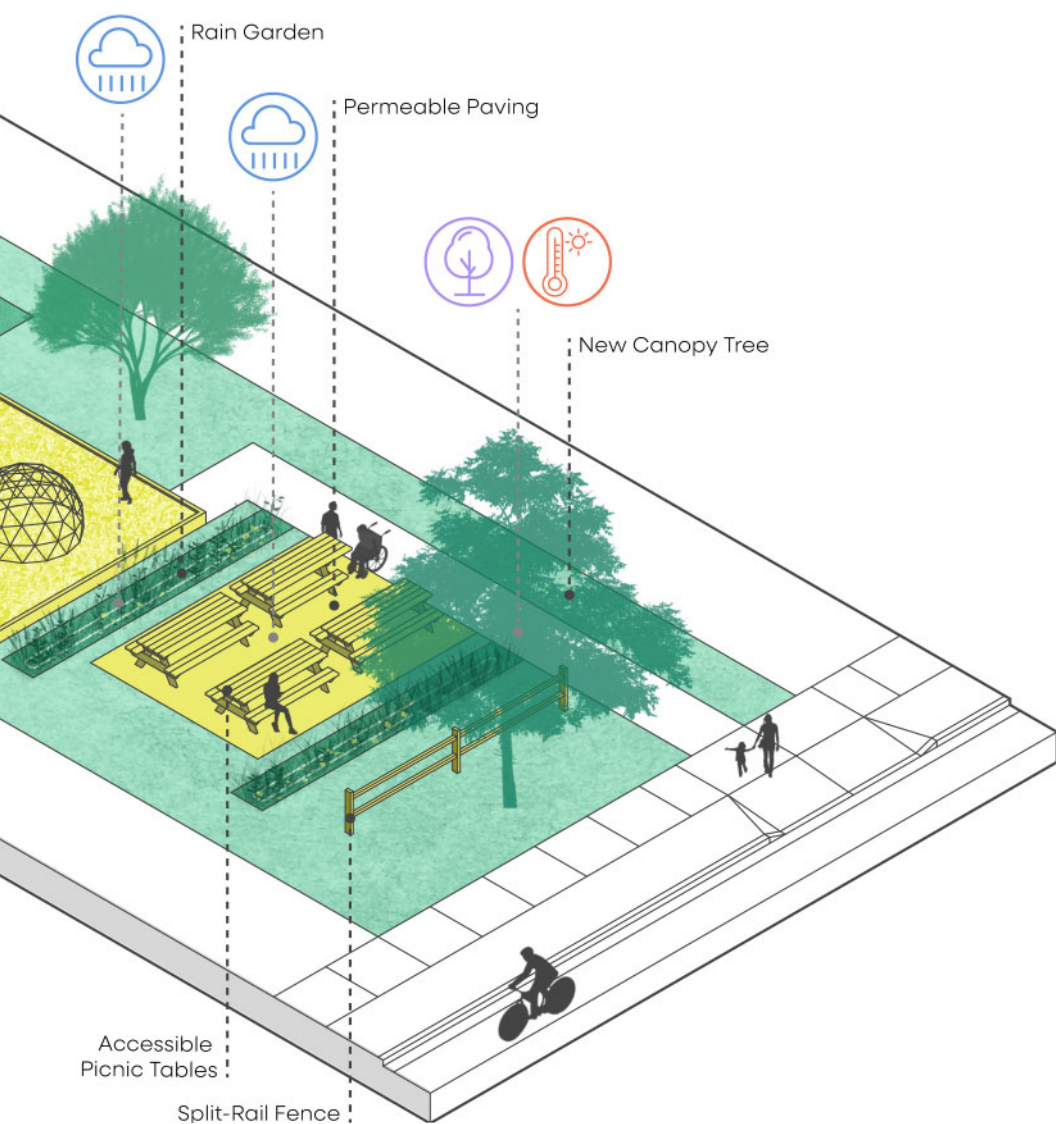


Figure 4.20 Parklet
An overview of the parklet design prototype

PARKLET

This type of prototype design (Figure 4.20) incorporates rain gardens and permeable paving to treat runoff from the paved sitting area with picnic tables. It also features an optional play space with play equipment recommended by Albro (2019), including a swing (not pictured), a geodome climber, or a balance beam. Alternatively, the play space area could be left as a lawn playfield.



ALTERNATIVE SCENARIOS

Three alternative scenarios were established to assess the potential contribution of the proposed design interventions to the provision of ecosystem services on the studied vacant lots (Figure 4.21). Scenario I applied a design intervention to each lot to 1.) estimate the maximum possible change in ecosystem services from applying design interventions on all the vacant lots within the focus area and 2.) estimate the average provision of ecosystem services by each design intervention. Scenario II assumed each lot was constructed as single-family housing to assess the change in ecosystem services provided between vacant and recently developed lots. Scenario III investigated socioeconomic conditions that would impact the real-world application of the proposed interventions and investigated the contribution to the provision of ecosystem services if only a portion of the interventions were implemented based on available resources.



SCENARIO I

Design Intervention Applied to Each Vacant Lot



SCENARIO II

Single-Family Housing Development



SCENARIO III

Socioeconomic Factors

Figure 4.21 Three Alternative Scenarios

Three alternative scenarios were developed to compare the potential provision of ecosystem services across the system of lots under changes to the applied design interventions.

SCENARIO I: DESIGN INTERVENTION APPLIED TO EACH VACANT LOT

In the first alternative scenario, the flowchart shown in Figure 3.15 was used to assign one of the five design interventions to each studied lot based on the lot’s existing conditions. Since the lots in the focus area were selected for having a similar proportion of the four lot types to the entire study area, the proportion of design interventions assigned to the focus area shown in Figure 4.22 should be proportionate to the design interventions that could be applied across the study area. Table 4.3 shows the estimated number of each design intervention anticipated when the proportion of each intervention shown in Figure 4.22 is applied to the number of lots owned by the Land Bank and Homesteading Authority in the larger study area and the entire city. Figure 4.23 shows the distribution of the design interventions across the focus area.

Table 4.3 Design Interventions in the Focus Area, Study Area, and City
Summary of lots and the recommended design intervention in the focus area, and an estimate for the number of each intervention in the entire study area and the entire city.

DESIGN INTERVENTION	FOCUS AREA	STUDY AREA (ESTIMATE)	CITY (ESTIMATE)
<i>Parklet</i>	9 (18%)	52	475
<i>Community Garden</i>	2 (4%)	12	106
<i>Orchard</i>	4 (8%)	23	211
<i>Woodland Restoration</i>	23 (46%)	132	1,213
<i>Meadow Restoration</i>	12 (24%)	69	633
<i>Total</i>	50	288	2,638

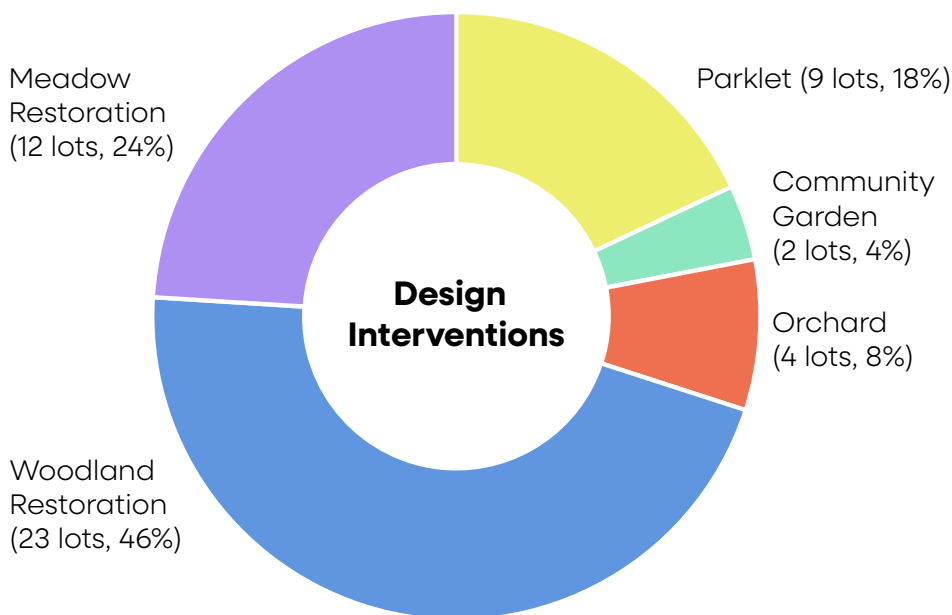


Figure 4.22 Proportion of the Design Interventions Proposed in the Focus Area—Scenario I
Percentage of each of the five design interventions in the focus area. The woodland restoration intervention is the most common one.



Figure 4.23 Map of Design Interventions Proposed in the Focus Area
The distribution of recommended design interventions across the focus area based on existing site conditions.



0 30 60 120 180 Yards



Focus Area Boundary



Community Garden



Meadow Restoration



Orchard



Parklet



Woodland Restoration

LAND COVER

After assigning design interventions to each lot, the land cover percentages calculated from the prototype designs were applied, and the percentage of each land cover type was assessed, considering the growth of newly planted trees after two, five, and ten years. Details on the land cover types found on each site are shown in Appendix E.1.2. For the “Parklet” and “Woodland Restoration” prototypes, if the existing tree canopy was over 70% and 80%, respectively, no new trees were proposed on the site as shown in the above prototype designs, as there would not be enough space on the site to accommodate them. An alternative land cover percentage that did not include new tree canopy cover was used in those situations. Figure 4.24 shows the change in each land cover type across all the studied lots between the existing conditions and ten years after implementing the proposed design interventions. The proposed design interventions would add an estimated 20,623 square feet of new tree canopy and decrease the percentage of lawn from thirty-one percent to twenty percent of the land cover. The design interventions would also increase the impervious surface area from 0.5% to 1.3% and add 3,640 square feet of permeable hardscape surface.

20,623 sq ft

New tree canopy added 10 years after implementation

36%

Decrease in lawn area 10 years after implementation

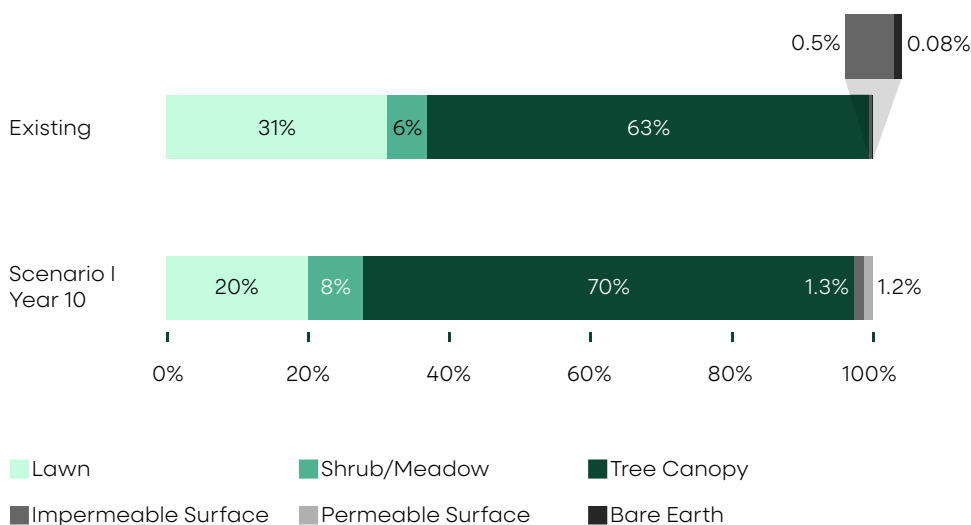


Figure 4.24 Land Cover Comparison—Scenario I

A comparison of the percentage of the different landcover types across all fifty lots between the existing conditions and Scenario I ten years after implementation.

CARBON SEQUESTRATION

As in Phase II, the net carbon sequestered and stored by each site was assessed based on the tree canopy area. Details on the net carbon sequestered and stored by each site can be found in Appendix E.2.2. The proposed design interventions are estimated to increase the net carbon sequestered per year by trees on all lots from 8,024 lbs. a year to 8,928 lbs. a year by year ten after implementation, an 11.2% increase. The net carbon stored by trees on all lots is estimated to increase from 216,275 lbs. to 219,123 lbs. by year ten, a 1.3% increase. Figures 4.25 and 4.26 show the estimated increase in the carbon sequestered and stored after implementing the design interventions, but the increase in carbon stored is slight.

The carbon estimated to be sequestered and stored per site where the orchard design intervention is applied is projected to increase by 87% on average, the greatest change between the existing conditions and year ten among the five design interventions. This significant potential increase in carbon sequestered and stored could be attributed to the large number of trees proposed to be planted on those sites. Sites where woodland restoration and parklet interventions are applied have the highest average estimated carbon sequestered and stored. Ten years after implementation, the trees on a site with the woodland restoration intervention are estimated to sequester an average of 216 lbs. of carbon a year and store an average of 5,212 pounds of carbon, and a site with the parklet intervention is estimated to sequester an average of 210 lbs. of carbon a year and store an average of 5,371 pounds of carbon. These two design interventions have the highest amount of preserved tree canopy, with the potential for planting new trees.

8,928 lbs

*Net carbon sequestered per year
10 years after implementation*

219,123 lbs

Net carbon stored 10 years after implementation

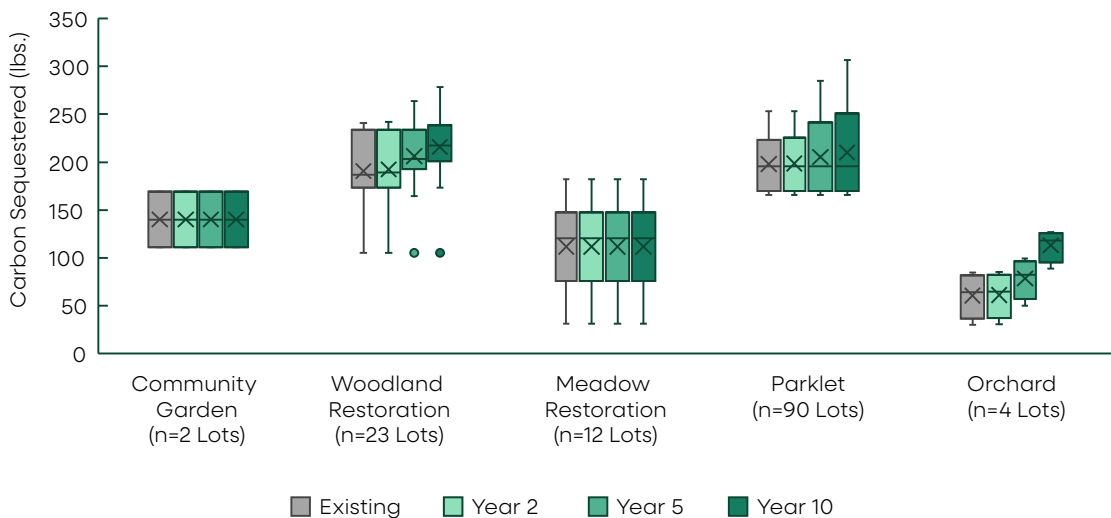


Figure 4.25 Net Carbon Sequestered Per Year by Each for Each Design Intervention—Scenario I
A comparison of the net carbon sequestered per year by each design intervention.

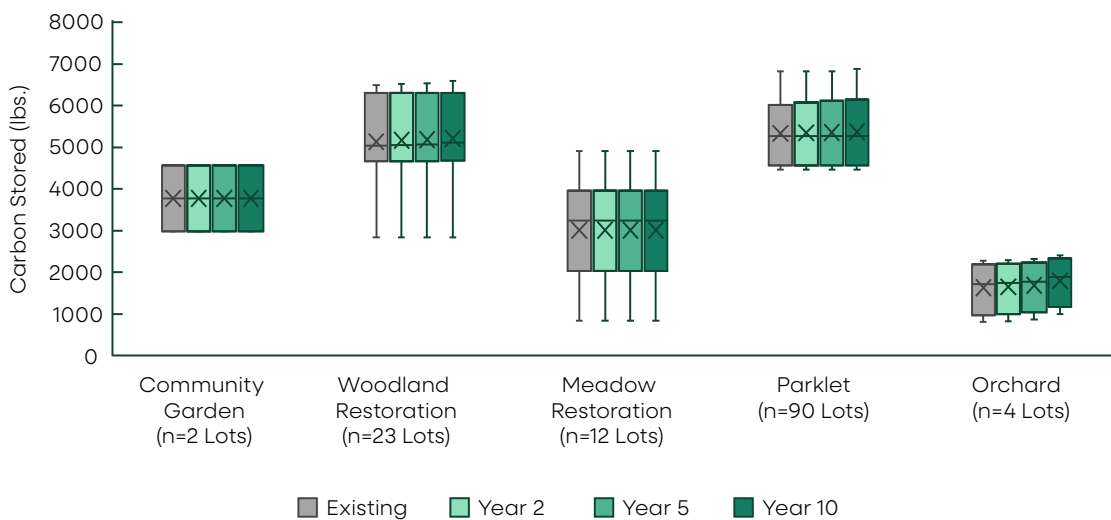


Figure 4.26 Net Carbon Stored by Each for Each Design Intervention—Scenario I
A comparison of the net carbon stored by each design intervention.

STORMWATER MANAGEMENT

As in Phase II, the stormwater conditions were analyzed using the EPA National Stormwater Calculator. For details on the stormwater conditions of each studied lot, see Appendix E.3.2. The proposed design interventions are estimated to reduce the average annual runoff per lot across all studied lots by 4.14%. The average maximum rainfall retained per lot across all studied lots is only estimated to increase by 0.08% by year ten.

As shown in Figure 4.27, the meadow restoration, woodland restoration, and orchard interventions are estimated to decrease the annual runoff compared to the existing conditions. In contrast, the community garden and parklet interventions, which have the highest percentage of impervious surfaces, are estimated to increase the average annual runoff. The parklet intervention has the greatest percent area of hardscape, but the stormwater runoff from that hardscape is treated by permeable paving and rain gardens. As with the existing conditions assessment, the outliers shown in Figure 4.27 are the handful of sites located in a different soil type with a higher runoff potential than the other studied lots.

As with the assessment of existing conditions, the maximum rainfall event retained varied little between the five design interventions and the existing conditions, and the only outliers were sites with high runoff potential (Figure 4.28). However, in addition to increasing the average annual stormwater runoff, the parklet and community garden design interventions were also estimated to decrease the average maximum rainfall retained per site compared to the existing conditions by 2% and 0.8%, respectively. This means sites with those design interventions would not be able to store as large of a rainfall event as in their existing conditions.

The average annual runoff per lot for lots with meadow and orchard design interventions is estimated to decrease by 7.9% and 8.1%, respectively, the greatest decrease between the existing conditions and year ten after project implementation among the five interventions. Additionally, on woodland restoration lots, the average annual runoff is the lowest—3.7 inches—and the average maximum rainfall retained is the highest—3.5 inches. However, the overall changes in average annual stormwater runoff and average maximum rainfall retained before and after design interventions are applied are estimated to be slight.

4.14 in

*Average annual runoff across
all lots in Year 10, 10.89% of annual rainfall*

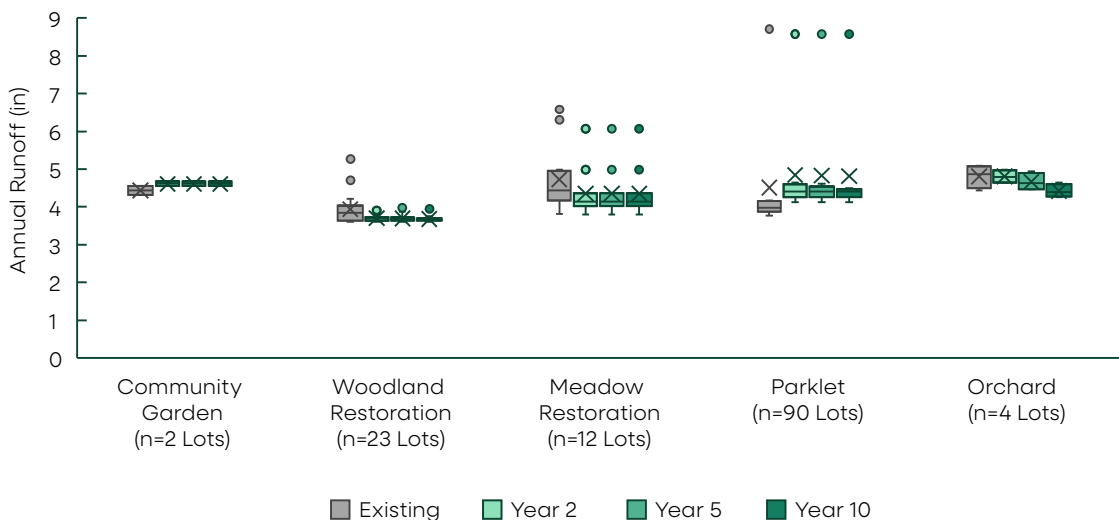


Figure 4.27 Average Annual Runoff for Each for Each Design Intervention—Scenario I
A comparison of the average annual runoff per year by each design intervention.



Figure 4.28 Maximum Rainfall Event Retained for Each for Each Design Intervention—Scenario I
A comparison of the maximum rainfall event retained by each design intervention.

FOOD PRODUCTION

For Scenario I, food production was estimated based on the area of proposed garden beds and orchard trees on lots where the community garden and orchard interventions were applied. For details on the food production of each studied lot, see Appendix E.4.1. However, this assessment is limited because only two community gardens and four orchards were proposed in the focus area. As shown in Figure 4.29, in total, the studied lots have the potential to grow 78,744 pounds of produce, 9,575 pounds produced by community gardens, and 69,169 pounds of apples produced by orchards starting five years after planting, as apple trees take multiple years to establish and begin bearing fruit (Tepe & Hoover, 2018). Each community garden is estimated to produce 479 pounds of produce per year, while each orchard is estimated to produce 3,458 pounds of food per year after reaching maturity. Overall, the orchard lots are calculated to produce 622% more food than community gardens over ten years. Orchards take a few years to establish, but once they do, they produce significantly more food than community gardens. There would be value in having a mix of both intervention types within a community. Community gardens produce food faster, making them a promising intervention for lots classified as “Short-Term,” and they produce a greater variety of food, while orchards are a longer-term investment.

Additionally, the potential food production across the entire system of lots owned by the Land Bank and Homesteading Authority in the larger study area and the entire city was projected. The number of lots where the community garden and orchard interventions would be applied, as previously calculated in Table 4.3, was multiplied by the average food production per lot by the respective interventions in the focus area. As shown in Table 4.4, the vacant lots owned by the Land Bank and Homesteading Authority across the city have the potential to produce a significant amount of produce if there is enough interest by residents to participate in the program.

78,743 lbs

Total food estimated to be produced over 10 years

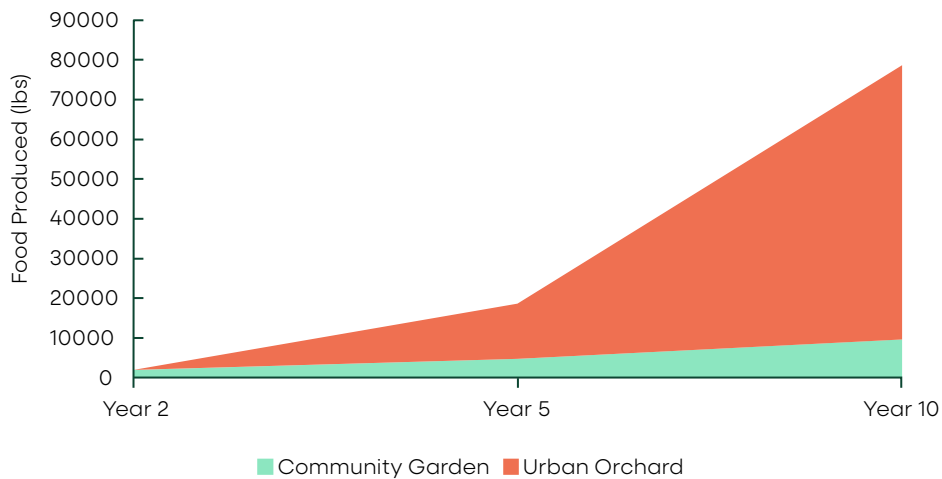


Figure 4.29 Total Food Produced—Scenario I
 The total food estimated to be produced by community gardens and orchards in the focus area.

Table 4.4 Total Food Production in Scenario I Extrapolated to the Study Area and City
 The food production rate calculated per year for Scenario I projected to the number of orchards and community gardens estimated to be proposed across the entire study area and the city.

ESTIMATED TOTAL FOOD PRODUCED	FOCUS AREA (LBS.)	STUDY AREA (LBS.)	CITY (LBS.)
Year 2	1,915.017	11,030.49506	101,036.2708
Year 5	18,621.25	10,7258.3906	982,457.0641
Year 10	78,743.62	453,563.2401	4,154,513.29

MICROCLIMATE

Lastly, as in Phase II, the microclimate conditions were assessed using a previously established index. For details on the microclimate values of each studied lot, see Appendix E.5.2. Overall, the proposed design interventions were estimated to increase the average microclimate index values of the studied lots by 4.3%, indicating a slightly higher comfort level. As shown in Figure 4.30, the woodland restoration and orchard design interventions are estimated to increase the average microclimate index score over the existing average score, indicating a cooler microclimate. However, the parklet and community garden interventions show a decrease in the microclimate index score and a less comfortable microclimate, which could be attributed to the introduction of hardscape in both prototypes. The average microclimate index score for lots where the orchard intervention is applied, is estimated to increase by 23% between the existing conditions and year ten after implementation, the greatest increase among the five design interventions. Additionally, the woodland restoration intervention is estimated to have the highest microclimate index score at year ten after implementation among the five design interventions, with a score of 470 out of the possible 500, which indicates a very comfortable microclimate.

408

*Average microclimate index score
10 years after implementation,
81.6% of a maximum 500 points*

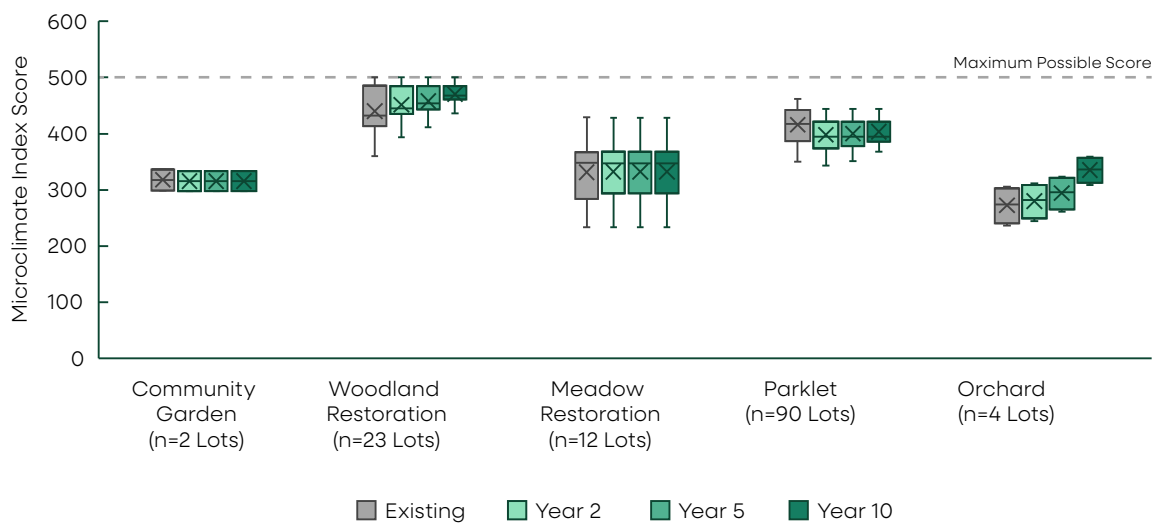


Figure 4.30 Microclimate Regulation Index for Each Design Intervention —Scenario I
A comparison of the microclimate index scores by each design intervention.

Across the five design interventions proposed, lots with proposed orchard design intervention are estimated to have the greatest increase in benefits for the carbon, stormwater, microclimate, and food production benefit categories. These sites have little vegetation besides lawn in their existing conditions but support the assessed ecosystem services by adding multiple fruit trees. However, the lots with proposed woodland design intervention are estimated to, on average, contribute the greatest total benefits for the carbon, stormwater, and microclimate categories (Table 4.5). These sites begin with existing mature tree canopy cover, supported by the potential addition of understory trees.

Table 4.5 Average Ecosystem Services Provided by Each Design Intervention
 The average ecosystem service provision by lots of each intervention. For each metric, the intervention with the greatest average provision of each service is bolded.

ECOSYSTEM SERVICE	METRIC (YEAR 10; AVERAGE ESTIMATED PER LOT)	MEADOW RESTORATION	WOODLAND RESTORATION	COMMUNITY GARDEN	ORCHARD	PARKLET
Carbon Sequestration	Net Carbon Sequestered per Year	112 lbs.	216 lbs.	140 lbs.	113 lbs.	210 lbs.
	Net Carbon Stored	3,009 lbs.	5,215 lbs.	3,774 lbs.	1,796 lbs.	5,371 lbs.
Stormwater Management	Average Annual Runoff	4.35 in	3.68 in	4.61 in	4.42 in	4.81 in
	Average Maximum Rainfall Retained	3.48 in	3.50 in	3.46 in	3.49 in	3.28 in
Food Production	Food Produced per Year	0 lbs.	0 lbs.	479 lbs.	3,458 lbs.	0 lbs.
Microclimate Regulation	Microclimate Index Score (out of 500 possible)	332	470	316	335	403

SCENARIO II: SINGLE-FAMILY HOUSING DEVELOPMENT

The second alternative scenario assumes that each lot is converted to single-family housing typical of the study area to assess the potential change in ecosystem services compared to the existing conditions (Figure 4.32).

LAND COVER

The percentage of each land cover type on recently developed single-family lots was evaluated as described in Chapter Three, “Methods,” and applied to each lot for analysis at one point in time. Details on the land cover types estimated for each site are shown in Appendix E.1.3. As shown in Figure 4.31, the percentage of lawn was estimated to increase slightly from thirty-one to thirty-six percent, the area of tree canopy cover was estimated to decrease significantly from sixty-two to twenty-six percent, and the area of impervious surface increased from 0.5 percent to thirty-five percent of the ground cover.

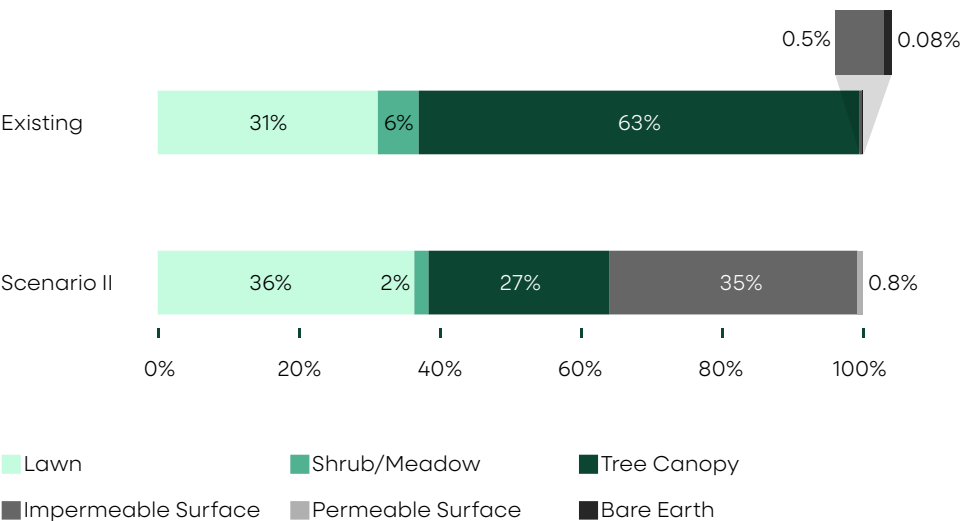


Figure 4.31 Land Cover Comparison—Scenario II
A comparison of the percentage of the different landcover types across all fifty lots between the existing conditions and Scenario II.

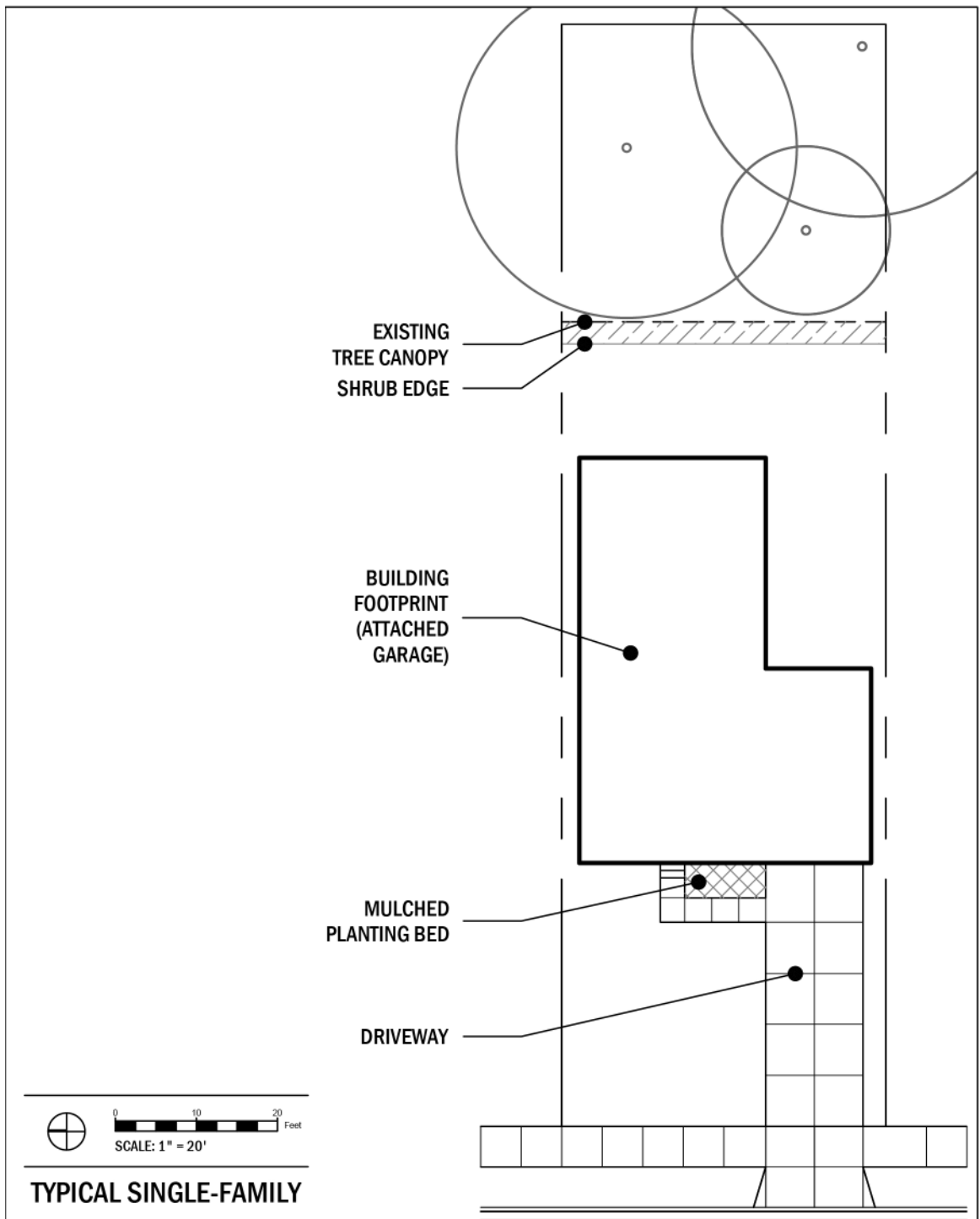


Figure 4.32 Typical Single-Family Lot Design

A typical site plan for a recently developed single-family house in the study area, based on an assessment of recently developed lots identified in Chapter Three, "Methods."

CARBON SEQUESTRATION

The carbon sequestered and stored by lots in the single-family development scenario were estimated using the methods outlined in previous sections. Details on the net carbon sequestered and stored by each site can be found in Appendix E.2.3. In this scenario, after development, the estimated net carbon sequestered by trees on all the studied lots is 3,288 pounds, and the estimated net carbon stored by trees on all the studied lots is 88,609 pounds. On average, a single-family lot is estimated to sequester and store 59% less carbon than an existing vacant lot. Additionally, this estimation does not consider the additional carbon emitted from removing trees for construction or embodied in construction materials. As shown by Figures 4.33 and 4.34, in the single-family development scenario, the carbon sequestered and stored is lower than the existing conditions. The range of values is also smaller because the same percentage of land cover was applied to all lots, and the outlier data are lots that are larger or smaller than average.

3,288 lbs

Net carbon sequestered per year

88,609 lbs

Net carbon stored

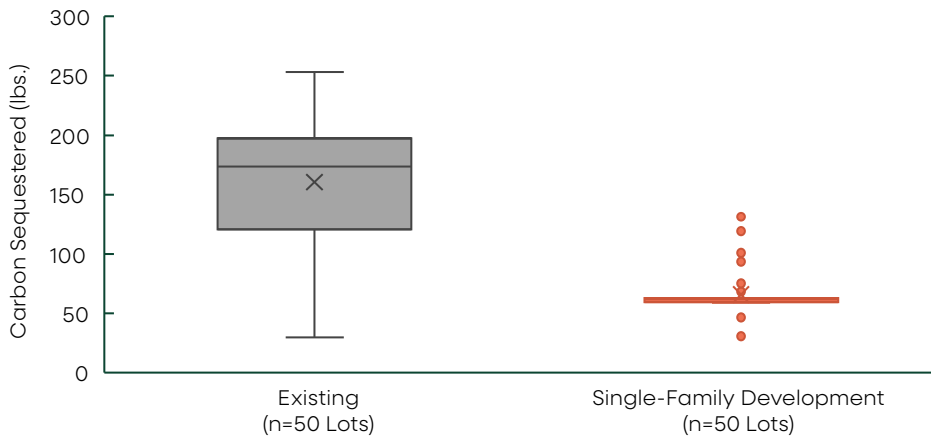


Figure 4.33 Net Carbon Sequestered—Scenario II

A comparison of the net carbon sequestered by the existing lots and by those same lots under the single-family development scenario.

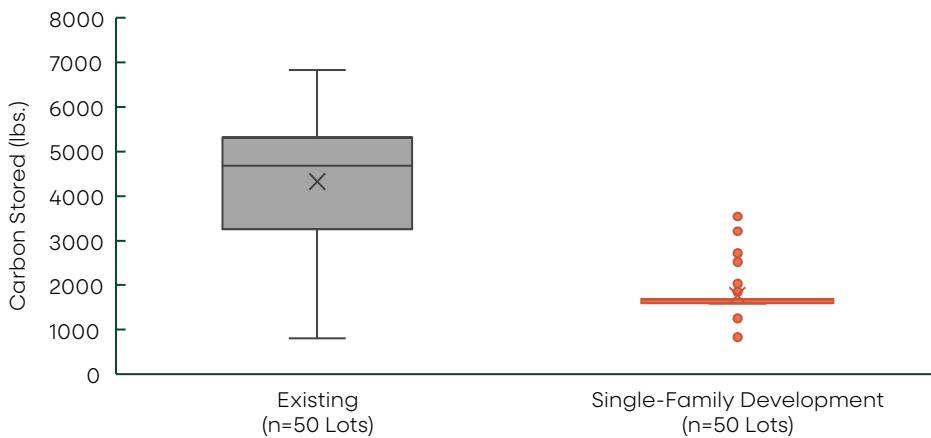


Figure 4.34 Net Carbon Stored—Scenario II

A comparison of the net carbon stored by the existing lots and by those same lots under the single-family development scenario.

STORMWATER MANAGEMENT

The ecosystem services in the stormwater category were estimated using the methods outlined in previous sections. For details on the stormwater conditions of each studied lot, see Appendix E.3.3. As with the stormwater assessments in the other scenarios, the outliers shown in Figures 4.35 and 4.36 are the sites located in a different soil type with a higher runoff potential than the other studied lots. The single-family development lots are estimated to have a 247% greater average annual runoff per lot than vacant lots in their existing state and retain a 36% smaller maximum rainfall event on average than the vacant lots in their existing state. While the stormwater conditions only changed slightly between the existing conditions and design interventions proposed in Scenario I, typical single-family housing development is estimated to greatly increase the stormwater runoff and reduce the maximum size of rainfall event retained.

15 in

*Average annual runoff across all lots
in scenario II, 39% of annual rainfall*

2.25 in

*Average maximum rainfall event
retained across all lots in scenario II*

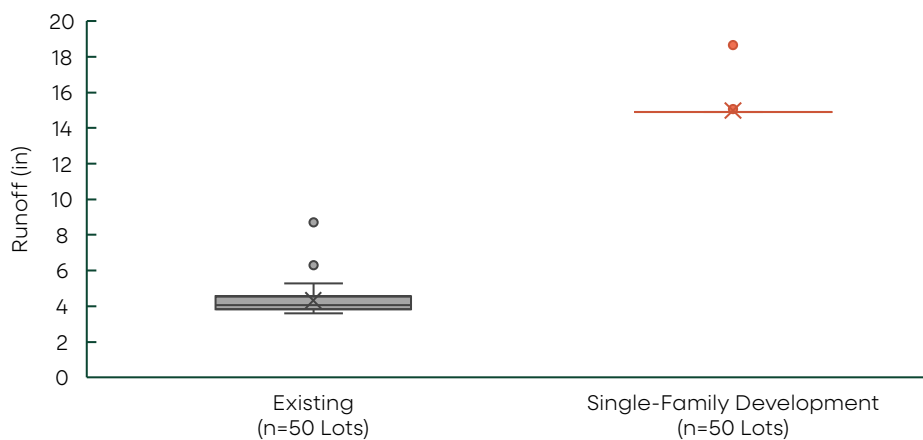


Figure 4.35 Average Annual Runoff—Scenario II

A comparison of the average annual runoff by the existing lots and by those same lots under the single-family development scenario.

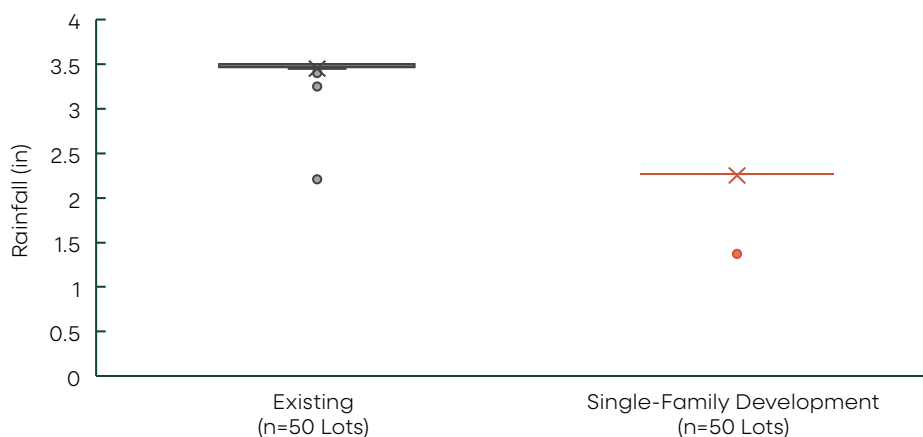


Figure 4.36 Maximum Rainfall Event Retained—Scenario II

A comparison of the maximum rainfall event retained by the existing lots and by those same lots under the single-family development scenario.

MICROCLIMATE

Lastly, the microclimate conditions were estimated using the methods outlined in previous sections. Because the microclimate analysis calculations relied on the percentage of each land cover type, and all the single-family development lots were assigned the same estimated land cover percentage, the microclimate index score was 204.8 for all single-family lots (see Appendix E.5.3). This microclimate index score is 48% lower than the average microclimate score estimated for the existing lots (Figure 4.37). Because a higher microclimate index score corresponds with a higher comfort level, this change indicates that the microclimate of a single-family development lot would be significantly less comfortable than the average across the vacant lots in their existing conditions.

The Scenario II analysis estimates that single-family development lots have a reduced average provision of all the ecosystem services assessed compared to the existing vacant lots. In alignment with the literature, vacant lots in this area potentially provide greater ecosystem services than recently developed single-family residential lots, including greater carbon sequestration, better stormwater management, and more comfortable microclimate.

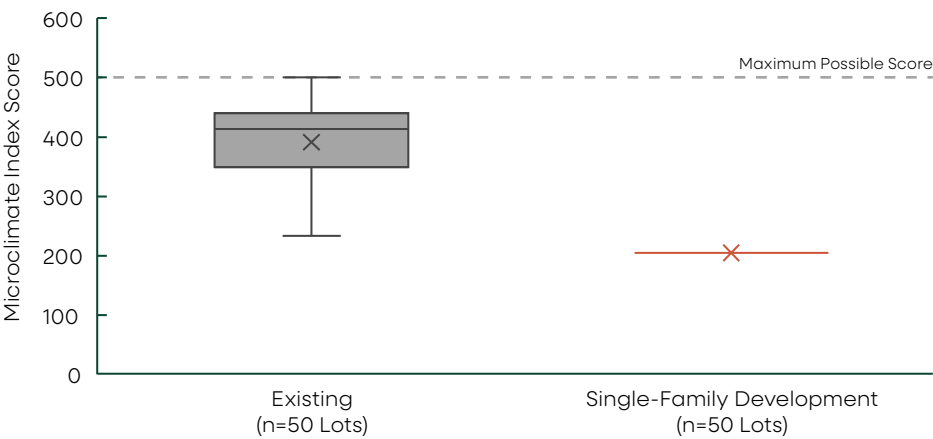


Figure 4.37 Microclimate Regulation Index—Scenario II
A comparison of the microclimate scores for the existing lots and those same lots under the single-family development scenario.

SCENARIO III: SOCIOECONOMIC FACTORS

The third scenario, socioeconomic factors, examined the vacant lot greening example projects discussed in Chapter Two, “Background” and developed a reasonable scenario for implementing the recommended design interventions, considering costs, resident participation, and long-term maintenance. First, the costs of implementing each intervention were calculated and can be found in Appendix C.2. As shown in Figure 4.38, the parklet design intervention is the most expensive to implement. It would also require hiring a contractor for construction, which is not included in the cost.

Table 4.6 summarizes key takeaways from example projects implemented in other cities. The estimated costs for constructing the design interventions proposed by this study are within the range of estimated lot construction costs from these examples. Of the examined programs, Philadelphia’s LandCare has addressed the highest percentage of vacant lots in the city at 32.5% by implementing lower-cost and easily replicable lot designs (Loder, 2020). Projects like *Detroit Future City* and *Vacant to Vibrant* addressed a smaller percentage of vacant lots, but the designs were more expensive and personalized for each site (Albro, 2019; Detroit Future

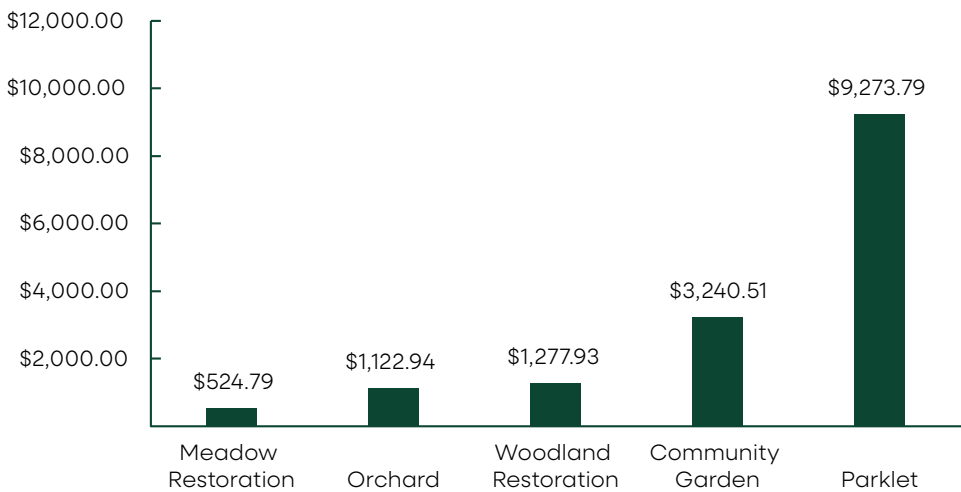


Figure 4.38 Design Intervention Implementation Cost Estimates
The estimated cost for each design intervention, not including the potential costs of purchasing land, hiring construction contractors, or ongoing maintenance. A breakdown of the items included in the cost calculations can be found in Appendix C.2.

City, 2024). The complexity and cost of the design interventions proposed in this study fall between these two sides.

A large-scale urban greening project like the ones pursued in these examples could be implemented by incorporating some of their approaches, as discussed in Chapter Two, “Background.” A non-profit organization could be created with the city’s support to guide project implementation and engage community partners. Ideally, the city would provide some funding for project implementation, like in Philadelphia, PA, and Flint, MI, but the non-profit could also pursue grants and donations from other sources, like Detroit Future Cities. However, as shown in Table 4.6, the projects with funding from the local government can address a larger percentage of the vacant lots in their community.

Community stewardship of project sites is essential for their long-term sustainability, and the non-profit should employ or provide stipends to local community members, especially local youth, in exchange for maintaining these lots. In Flint, Michigan’s vacant lot program, teams of approximately five people each were given a \$3,500 stipend to maintain 25 lots for one year, or \$140 a lot (Sadler & Pruett, 2017). From the estimated 359 residents of this study’s focus area in 2020 (Lebofsky, 2023), there is the potential to recruit a team of residents to maintain up to that many lots. Alternatively, such a program could work with existing green workforce training programs associated with Kansas City for landscape maintenance.

Additionally, increasing awareness of the value of these interventions by sharing the calculated benefits could aid volunteer recruitment. Because these interventions are intended to be temporary, either in the short or long-term, the existing framework for two to five-year leases to maintain lots owned by the Land Bank of Kansas City, Missouri, and Kansas City, Missouri Homesteading Authority would be applicable.

Table 4.6 Large Scale Vacant Lot Greening Case Studies

A comparison of construction and maintenance costs for each lot, the total yearly cost for all lots, funding sources, and the number of sites maintained between four vacant lot greening programs.

CASE STUDY	CONSTRUCTION COST (PER LOT)	MAINTENANCE COST (PER LOT)	TOTAL YEARLY COST
<i>Philadelphia PA, LandCare</i>	\$1,000 – \$1,300	\$150 (yearly)	\$3.89 million (per year)
<i>Flint, MI</i>		\$140 (yearly)	~\$252,000 (per year)
<i>Detroit, MI, Detroit Future Cities</i>	Up to \$5,000	\$1,500 (one-time grant)	~\$66,000 (per year)
<i>Vacant to Vibrant (Multiple Cities)</i>	\$7,000-\$35,000	\$1,000-\$2,000 (yearly)	\$330,000 total

For community gardens and orchards, the Land Bank and the Homesteading Authority require those who would like to purchase a lot for either use to participate in the Kansas City Community Garden or the Giving Grove programs, respectively. These programs require two coordinators or stewards to oversee each community garden or urban orchard. Additionally, a recent study estimated that only around 2% of urban residents participate in community gardening (Das & Ramaswami, 2022). Based on this information, no more than one community garden or orchard could be feasibly implemented in a community of the focus area’s population.

From this information from other cities and non-profits on their vacant lot greening practices, seventeen lots from the proposed design interventions in Scenario I were selected to receive design interventions for Scenario III, thirty-four percent of the lots owned by the Land Bank and Homesteading Authority in the focus area (Figure 4.40). Lots were selected to have a proportionate number of each design intervention and be distributed throughout the focus area. The locations of the lots within the focus area are shown in Figure 4.39. The remaining thirty-three lots, sixty-six percent, were assumed to be left in their existing conditions. This scenario reflects a more realistic implementation of a large-scale vacant lot greening program grounded in the local socioeconomic conditions than Scenario I.

A five-person maintenance team could maintain the seventeen greened lots. Additionally, the orchard would need two dedicated stewards, and the community garden would need two dedicated coordinators and between six and twelve households maintaining one to two lots. The greened lots would cost an estimated \$44,507 to construct, and maintenance for ten years could cost between \$23,800 and \$170,000, depending on the maintenance complexity of each lot and whether local community members are paid a stipend for their time or green workforce employees were hired. In total, the required investment for Scenario III would be \$68,307 to \$214,507 and would require a time commitment from fifteen to twenty-one community members.

FUNDING SOURCES	SITE NUMBER	REFERENCES
Public	13,000 (32.5% of all vacant lots in the city)	Garcia, 2023; Loder, 2020; Philadelphia Horticultural Society, 2021
Public	1,800 (15% of all vacant lots held by the Land Bank)	Genesee County Land Bank Authority & City of Flint, n.d.; Sadler & Pruett, 2017
Private	51 lots (0.08% of all vacant lots held by the Land Bank)	Detroit Future City, 2017, 2024; Detroit Land Bank Authority, 2024
Public-Private	9 (pilot program)	Albro, 2019



Jackson Ave



0 30 60 120 180 Yards



Focus Area Boundary



Community Garden



Meadow Restoration



Orchard



Parklet



Woodland Restoration



None

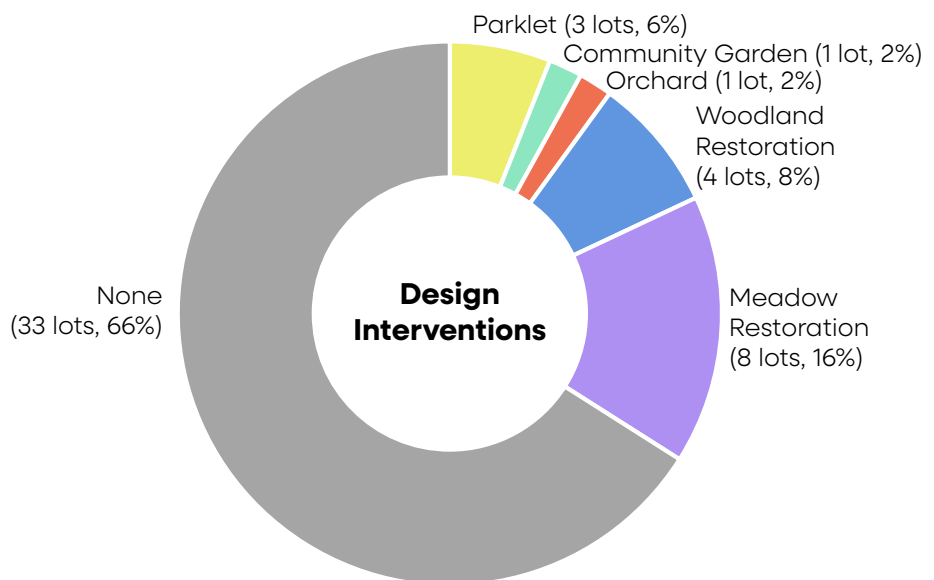


Figure 4.40 Proportion of the Design Interventions Proposed in the Study Area—Scenario III
Percentage of each of the five design interventions considered in Scenario III, while most of the lots were assumed to be left in their existing conditions.

LAND COVER

The changes in each land cover type in Scenario III were less drastic than changes in Scenario I (Figure 4.41). Across all fifty lots studied, lawn covered 18% less land area than the existing conditions, but 23.9% more land area than in Scenario I. Tree canopy covered 65.6% of the land area, 4.9% more than the existing conditions but 5.7% less than Scenario I. Lastly, the impermeable hardscape area increased by 21.7% over the existing conditions, but was 80% lower than in Scenario I.

9,202 sq ft

New tree canopy added 10 years after implementation

18%

Decrease in lawn area 10 years after implementation

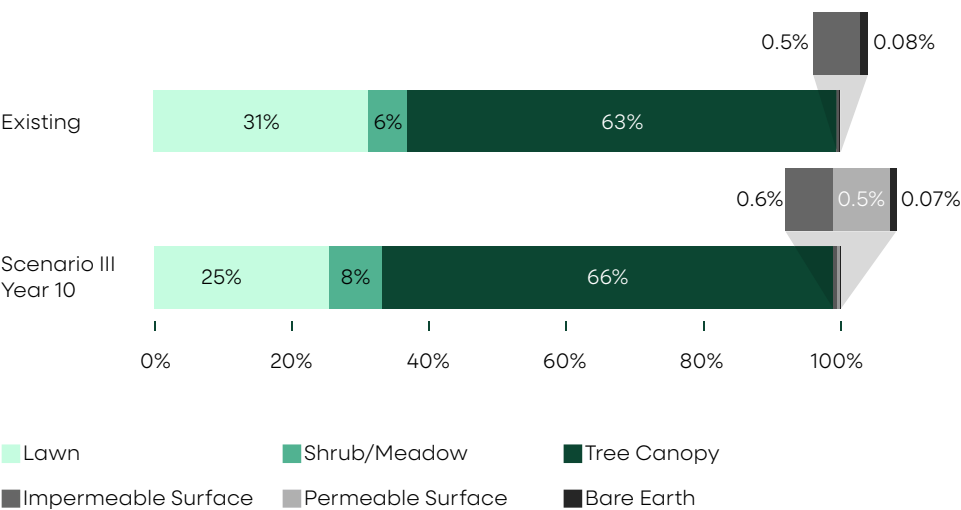


Figure 4.41 Land Cover Comparison—Scenario III
A comparison of the percentage of the different land cover types across all fifty lots between the existing conditions and Scenario III.

CARBON SEQUESTRATION

The carbon estimated to be sequestered and stored by trees on all fifty lots in Scenario III was estimated using the methods outlined in previous sections and was lower than in Scenario I but greater than the existing conditions. The net carbon sequestered per year in year ten after implementation was estimated to be 8,315.63 lbs., 3.63% higher than the existing conditions and 6.9% lower than Scenario I. Additionally, the total net carbon stored by trees on all lots in year ten after implementation was estimated to be 217,193.2 lbs., only 0.4% greater than the existing conditions and 0.9% less than Scenario I. The seventeen lots where design interventions were applied in Scenario III were estimated to sequester 14.8% and store 8.9% more carbon per lot on average than the thirty-three lots left in their existing conditions, as shown in Figures 4.42 and 4.43.

8,315 lbs

*Net carbon sequestered per year
10 years after implementation*

217,193 lbs

Net carbon stored 10 years after implementation

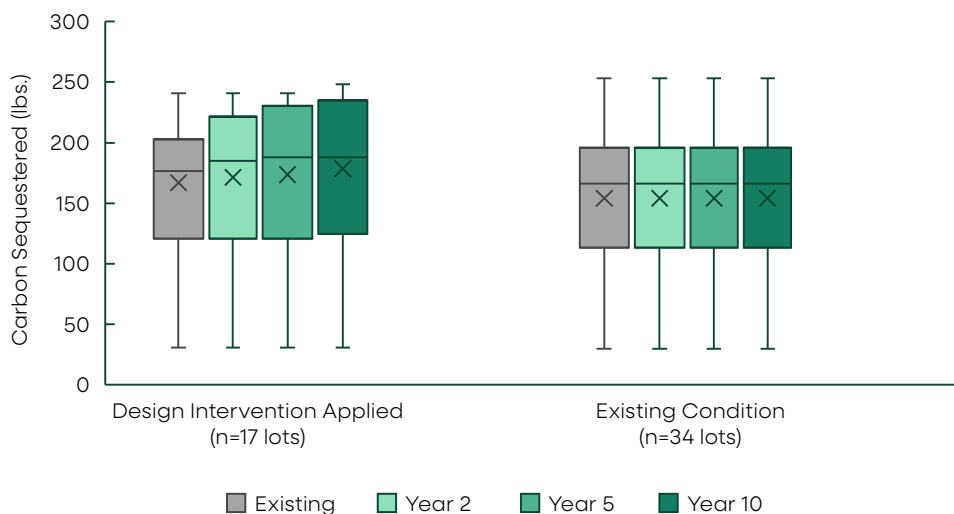


Figure 4.42 Net Carbon Sequestered Per Year—Scenario III

A comparison of the net carbon sequestered per year between lots where design interventions were applied and lots assumed to remain in their existing conditions.

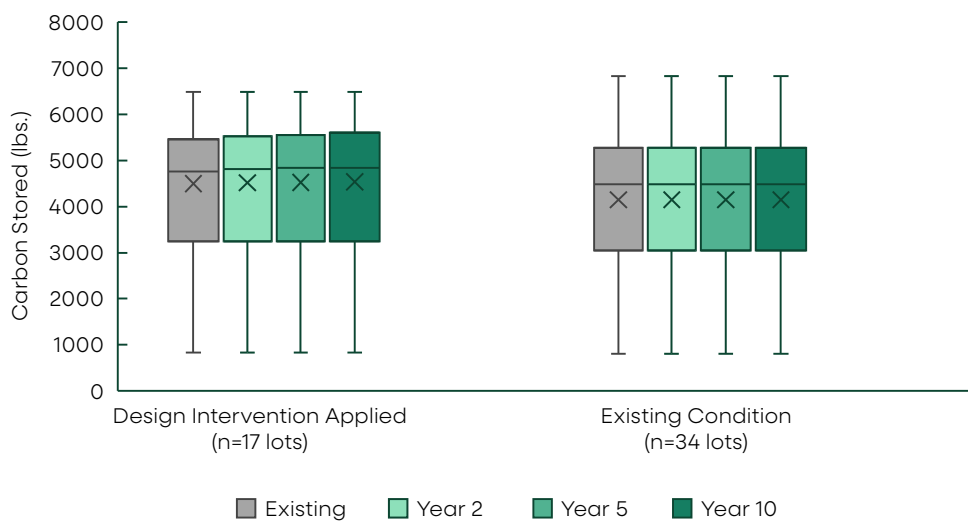


Figure 4.43 Net Carbon Stored—Scenario III

A comparison of the net carbon stored between lots where design interventions were applied and lots assumed to remain in their existing conditions.

STORMWATER MANAGEMENT

The stormwater conditions were again estimated using the methods outlined in previous sections, Across all fifty lots, the average annual runoff in year ten after implementation was estimated to be 4.12 inches, 10.8% of the total rainfall, 4.7% less than the existing conditions, and 0.5% less than in Scenario I. The average annual runoff was also estimated to be lower on the lots where the design interventions were applied compared to the lots left in their existing conditions (Figure 4.44). Additionally, the average maximum rainfall retained across all fifty lots was 3.45 inches, only 0.16% greater than the existing conditions and 0.07% greater than Scenario I (Figure 4.45).

4.12 in

*Average annual runoff across all lots in
scenario II, year 10, 10.8% of annual rainfall*

3.46 in

*Average maximum rainfall event retained
across all lots in scenario II, year 10*

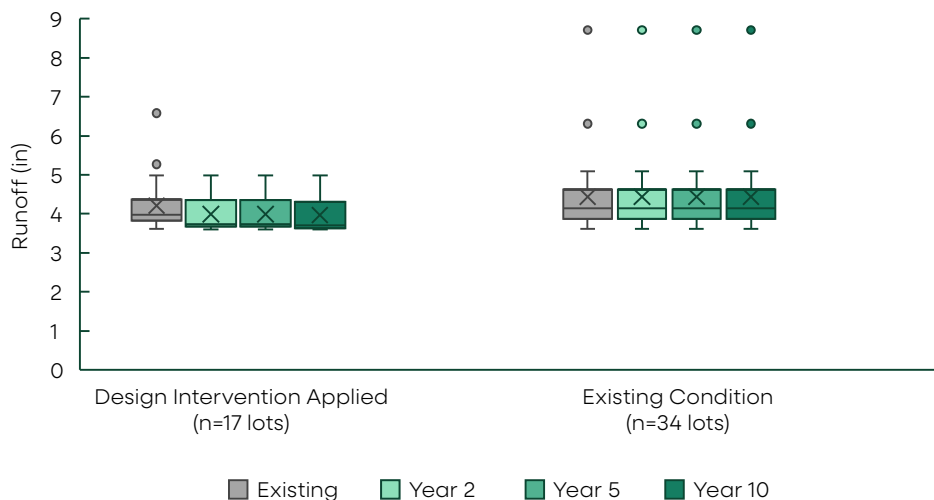


Figure 4.44 Average Annual Runoff—Scenario III

A comparison of the average annual runoff between lots where design interventions were applied and lots assumed to remain in their existing conditions.



Figure 4.45 Maximum Rainfall Event Retained—Scenario III

A comparison of the maximum rainfall event retained between lots where design interventions were applied and lots assumed to remain in their existing conditions.

FOOD PRODUCTION

The food produced was estimated using the same methods as Scenario I for the proposed community garden and orchard. The community garden was estimated to produce 2,628 total pounds of produce by year ten, and the community garden was estimated to produce 14,053 total pounds of produce by year ten, for a combined total of 16,682 pounds. In comparison to Scenario I, this scenario was estimated to produce 79% less food (Figure 4.46).

16,682 lbs
Total food estimated to be produced over 10 years

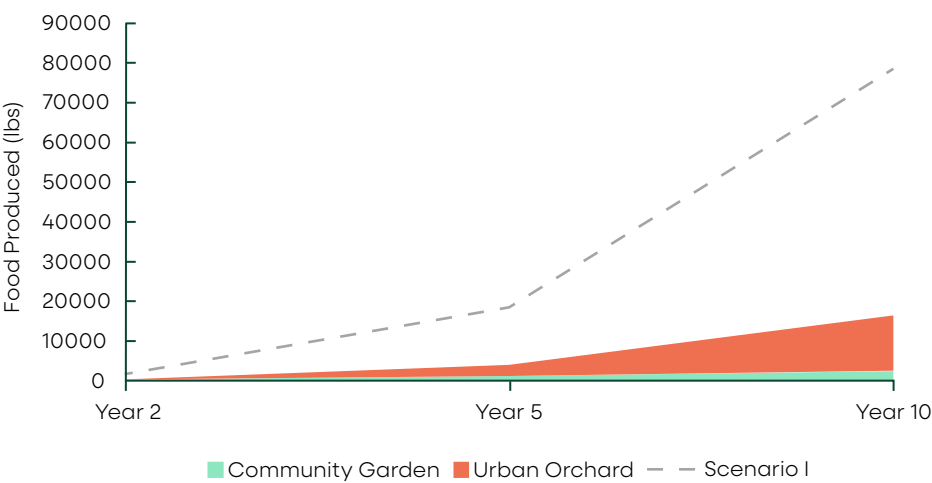


Figure 4.46 Total Food Produced—Scenario III
The total food produced over ten years in Scenario III in comparison to Scenario I.

MICROCLIMATE

Lastly, the microclimate values were estimated using the methods outlined in previous sections. The average microclimate index score across all fifty lots was 400, 2% higher than the existing conditions but 4% lower than Scenario I. Additionally, the seventeen lots where design interventions were applied had an 8.2% higher average microclimate score than the 33 lots left in their existing conditions, indicating that the lots where the design interventions were applied would have a higher comfort level (Figure 4.47).

400

Average microclimate index score 10 years after implementation, 80% of a maximum 500 points

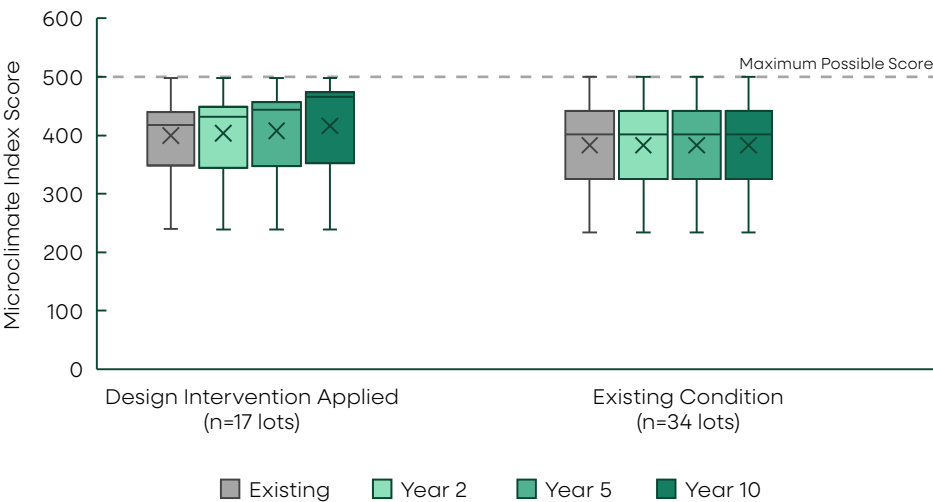


Figure 4.47 Microclimate Regulation Index—Scenario III
A comparison of the microclimate index score between lots where design interventions were applied and lots assumed to remain in their existing conditions.

Summary of Findings

In summary, implementing the recommended design interventions on vacant lots owned by the Kansas City Missouri Land Bank and Homesteading Authority could increase the provision of all studied ecosystem services. In Phase I: Vacant Lot Typology, after classifying the vacant lots by the established typology, thirty-nine percent of the studied lots in the study area were classified as being appropriate for short-term development, while sixty-one percent were recommended for long-term conservation as greenspace. The lots with conditions suited to development in the short term are more than sufficient to meet the development demand in communities like the study area, which are still experiencing urban shrinkage. Additionally, Phase II: Estimating the Current Provision of Ecosystem Services, estimated that the lots in the long-term conservation category currently provide greater ecosystem services than those in the short-term development category.

In Phase III, five design interventions were proposed and applied to lots in three different scenarios to compare the potential provision of ecosystem services over time. From the analysis of the first scenario, it was estimated that the woodland restoration intervention provided the greatest benefit across more of the assessed ecosystem services than any other intervention. Additionally, the community garden and parklet interventions were estimated to lower the provision of ecosystem services in the stormwater management and microclimate categories. However, across all fifty greened lots, the provision of all ecosystem services was estimated to improve to some degree over the existing conditions, as shown in Table 4.7.

In Scenario II of Phase III, the conversion of the studied lots to single-family housing was estimated to have a lower provision of ecosystem services than the existing conditions and the lowest among all scenarios. While the design interventions proposed in Scenario I and III were only estimated to slightly improve the provision of the selected ecosystem services, developing single-family housing was estimated to greatly decrease the provision of those ecosystem services.

Scenario III of Phase III proposed a realistic scenario for implementing the recommended greening projects, considering costs, resident participation, and long-term maintenance. The provision of ecosystem services in the carbon sequestration, food production, and microclimate categories was lower than Scenario I, but still greater than the existing conditions (Figures 4.48-4.52). In Scenario III, the provision of ecosystem services on all fifty lots was estimated to be slightly greater than Scenario I for the stormwater management category. However, the difference was only 0.5% for the average annual runoff and 0.07% for the maximum rainfall event retained.

Lastly, an estimate for the total potential carbon sequestered and stored and food produced if the scenarios were scaled up to the entire study area and the entire city was estimated. The total provision of those three ecosystem services by the 50 lots in the focus area was multiplied by the number of vacant lots owned by the Land Bank and Homesteading Authority across the study area and the city to obtain the estimates shown in Tables 4.8-4.10.

Table 4.7 Ecosystem Service Assessment Comparison Across Scenarios

Summary of Ecosystem Service Assessment Results for each scenario. All n=50 lots were included in each analysis. For each metric, the Scenario with the greatest provision of each service is bolded.

ECOSYSTEM SERVICE	METRIC	EXISTING	ALL DESIGN INTERVENTIONS (SCENARIO I; YEAR 10)	SINGLE-FAMILY HOUSING (SCENARIO II)	SOCIOECONOMIC FACTORS (SCENARIO III; YEAR 10)
<i>Carbon Sequestration</i>	Net Carbon Sequestered per Year (Average Estimated Per Lot)	160 lbs.	179 lbs.	66 lbs.	166 lbs.
	Net Carbon Sequestered per Year (n=50 lot total)	8,024 lbs.	8,928 lbs.	3,287 lbs.	8,315 lbs.
	Net Carbon Stored (Average Estimated Per Lot)	4,325 lbs.	4,382 lbs.	1,772 lbs.	4,344 lbs.
	Net Carbon Stored (n=50 lot total)	216,274 lbs.	219,123 lbs.	88,608 lbs.	217,193 lbs.
<i>Stormwater Management</i>	Average Annual Runoff (Average Estimated Per Lot)	4.32 in	4.14 in	14.98 in	4.12 in
	Average Maximum Rainfall Retained (Average Estimated Per Lot)	3.45 in	3.45 in	2.25 in	3.46 in
<i>Food Production</i>	Food Produced per Year (n=50 lot total)	0 lbs.	14,791 lbs.	0 lbs.	3,073 lbs.
<i>Microclimate Regulation</i>	Microclimate Index Score (Average Estimated Per Lot out of 500 possible)	391	408	205	400

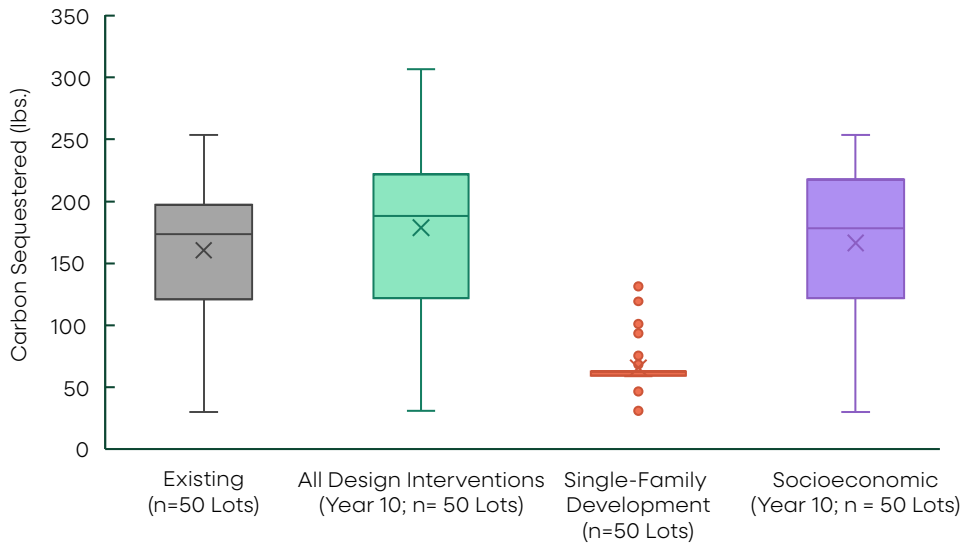


Figure 4.48 Net Carbon Sequestered

A comparison of the net carbon sequestered per year between the existing conditions and the three scenarios.

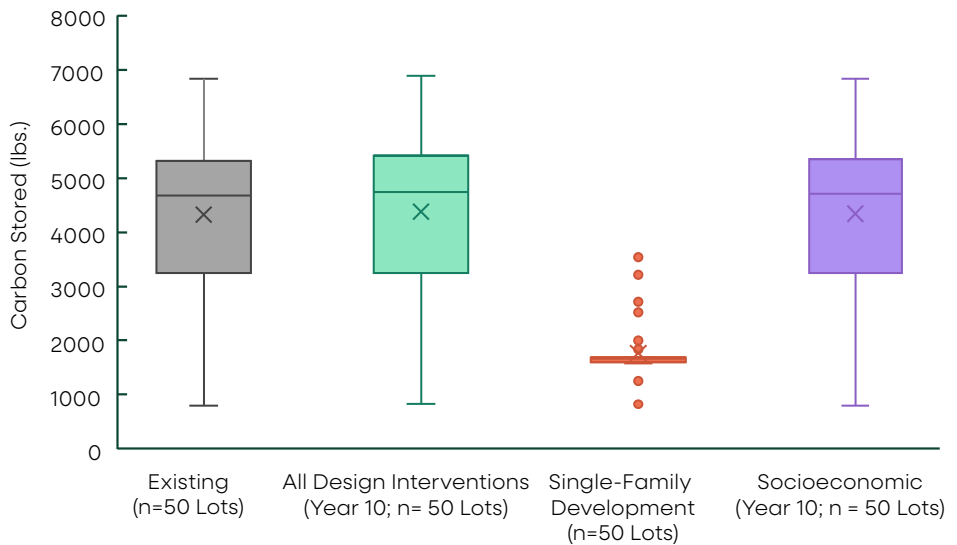


Figure 4.49 Net Carbon Stored

A comparison of the net carbon stored between the existing conditions and the three scenarios.

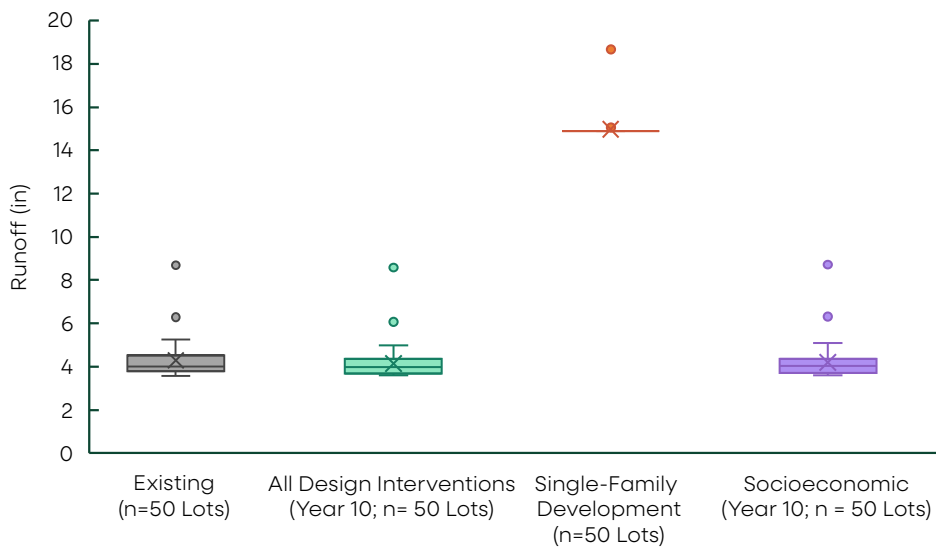


Figure 4.50 Average Annual Runoff

A comparison of the average annual runoff between the existing conditions and the three scenarios.

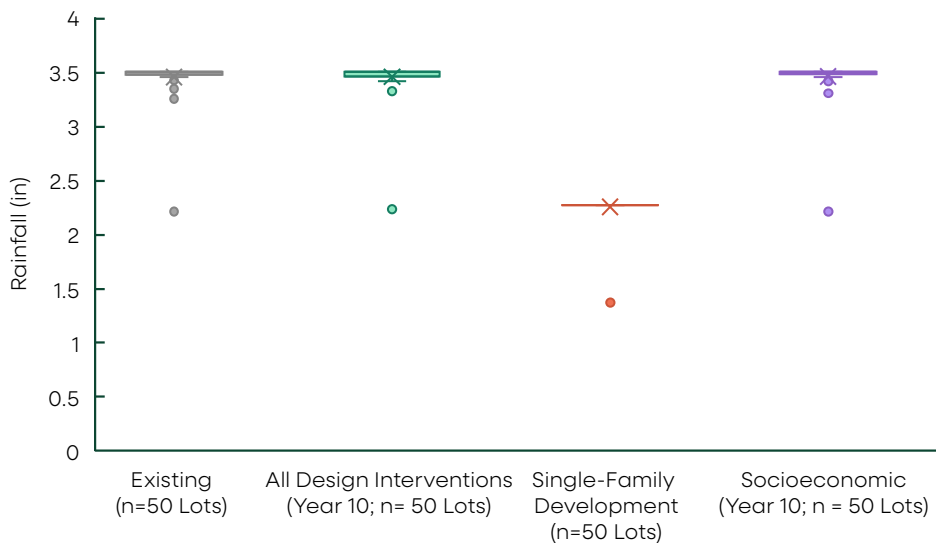


Figure 4.51 Maximum Rainfall Event Retained

A comparison of the maximum rainfall event retained between the existing conditions and the three scenarios.

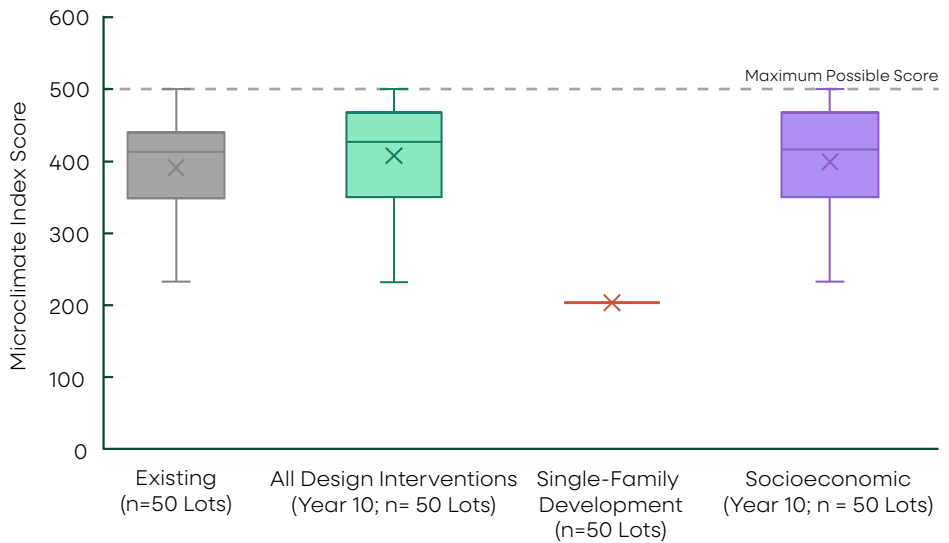


Figure 4.52 Microclimate Regulation Index

A comparison of the microclimate regulation index between the existing conditions and the three scenarios.

Table 4.8 Estimated Carbon Sequestered Across Scenarios and Scales

A comparison of the total net carbon sequestered per year by all lots in the focus area and an estimation of carbon sequestered by lots in the study area and the entire city.

NET CARBON SEQUESTERED PER YEAR (LBS.)		FOCUS AREA	STUDY AREA (ESTIMATE)	CITY (ESTIMATE)
<i>Existing</i>		8,024	46,221	423,369
<i>All Design Interventions (Scenario I)</i>	<i>Year 2</i>	8,077	46,521	426,117
	<i>Year 5</i>	8,523	49,094	449,686
	<i>Year 10</i>	8,928	51,424	471,027
<i>Single-Family Housing (Scenario II)</i>		3,288	18,937	173,456
<i>Socioeconomic Factors (Scenario III)</i>	<i>Year 2</i>	8,133	46,848	429,114
	<i>Year 5</i>	8,192	47,184	432,195
	<i>Year 10</i>	8,316	47,898	438,733

Table 4.9 Estimated Carbon Stored Across Scenarios and Scales
 A comparison of the total net carbon stored by all lots in the focus area and an estimation of carbon stored by lots in the study area and the entire city.

NET CARBON STORED (LBS.)		FOCUS AREA	STUDY AREA (ESTIMATE)	CITY (ESTIMATE)
<i>Existing</i>		216,275	1,245,744	11,410,667
<i>All Design Interventions (Scenario I)</i>	<i>Year 2</i>	217,270	1,251,474	11,463,156
	<i>Year 5</i>	217,848	1,254,804	11,493,655
	<i>Year 10</i>	219,123	1,262,151	11,560,952
<i>Single-Family Housing (Scenario II)</i>		88,609	510,387	4,675,005
<i>Socioeconomic Factors (Scenario III)</i>	<i>Year 2</i>	216,618	1,247,722	11,428,784
	<i>Year 5</i>	216,803	1,248,782	11,438,499
	<i>Year 10</i>	217,193	1,251,033	11,459,114

Table 4.10 Estimated Food Production Across Scenarios and Scales
 A comparison of the total food produced by orchard and community garden lots in the focus area and an estimation of potential food produced by lots in the study area and the entire city.

TOTAL FOOD PRODUCED (LBS.)		FOCUS AREA	STUDY AREA (ESTIMATE)	CITY (ESTIMATE)
<i>All Design Interventions (Scenario I)</i>	<i>Year 2</i>	1,915	11,030	101,036
	<i>Year 5</i>	18,621	107,258	982,457
	<i>Year 10</i>	78,744	453,563	4,154,513
<i>Socioeconomic Factors (Scenario III)</i>	<i>Year 2</i>	526	3,028	27,738
	<i>Year 5</i>	4,125	23,760	217,639
	<i>Year 10</i>	16,682	96,090	880,161



Chapter 5

Conclusion

Overview

This study sought to address two research questions. First, to what extent can greening projects on urban vacant land increase the ecosystem services provided to nearby residents? Second, how can aerial imagery be used to quantify ecosystem services and landscape performance benefits? While poorly managed vacant lots have adverse effects on residents of highly vacant communities, temporary design interventions can support their ability to provide ecosystem services and create community amenities for nearby residents, contributing to the social aspects of sustainability while future development is uncertain. This study proposed a large-scale system considering the benefits of multiple temporary interventions in a community. It focused on a study area in Kansas City, Missouri, to propose design interventions on lots owned by the Land Bank of Kansas City, Missouri, and Kansas City Missouri Homesteading Authority and used aerial imagery to estimate the provision of four ecosystem services: carbon sequestration, microclimate regulation, stormwater management, and food production.

Key Findings

GREENING PROJECTS ON VACANT URBAN LAND AND THE ECOSYSTEM SERVICES PROVIDED TO NEARBY RESIDENTS

The proposed design interventions were estimated to slightly increase the provision of ecosystem services for the community by the studied lots over their existing conditions. However, in comparison, typical single-family development was estimated to significantly reduce the ecosystem services provided. Therefore, the vacant lots in this area already provide ecosystem services through their existing vegetation; preserving as much existing vegetation as possible by focusing development on sites that do not have existing tree canopy would best preserve these ecosystem services.

For the carbon benefits, planting trees on a site did increase the calculated carbon sequestered, especially in comparison to typical development. The changes between the existing conditions and the proposed design interventions were slight for stormwater benefits, especially regarding the maximum rainfall event retained. The annual runoff generated and maximum rainfall event retained greatly depended on the underlying soil, and the slight changes to vegetated land cover had little impact. Because the soil type varies across different neighborhoods in the city, this data is particular to a site, and the averages calculated cannot be assumed to apply to other parts of the city. For food benefits, orchards were estimated to produce significantly more food for residents than community gardens but have a multi-year establishment period before they begin producing. Therefore, a combination of both community gardens and orchards in a community would be valuable. Lastly, the microclimate benefits are difficult to estimate, but the proposed design interventions were estimated to slightly improve microclimate conditions, especially compared to typical single-family development.

QUANTIFICATION OF ECOSYSTEM SERVICES AND ASSESSMENT OF LANDSCAPE PERFORMANCE BENEFITS THROUGH AERIAL IMAGERY

The methods used in this study generated estimates for landscape performance benefits for the four studied ecosystem services. Table 5.1 gives examples of such benefits for the Scenario I analysis. Even though the changes in ecosystem services calculated were not large, these methods could be applied to other project types. The results generated from these methods may be more impactful for urban redevelopment projects where the existing sites are predominantly hardscape.

Limitations

Some potential limitations result from limited time, seasonality, and metrics available in the literature. Firstly, using field-collected data to validate the aerial imagery ecosystem services assessment process would be ideal, but as mentioned in the literature, field data collection is time-consuming (Boehnke et al., 2022; Brzoska & Spaġe, 2020). Additionally, data collection for this study had to be carried out during the fall and winter seasons, which limited the potential to collect data in the field.

Secondly, while a broader range of ecosystem services could be studied, only four were selected for this study due to time constraints. These services were selected based on their prevalence in the literature (Brzoska & Spaġe, 2020; Haase, Laron-delle, et al., 2014; Kain et al., 2016; McPhearson et al., 2013; Speak et al., 2015) and their potential contribution to the quality of life of those living directly nearby. As discussed in Chapter Two, “Background,” these services have many benefits for

Table 5.1 Landscape Performance Benefits From the Results of Scenario I
Summary of the landscape performance benefit statements from the ecosystem services studied in Scenario I, ten years after implementation.

LANDSCAPE PERFORMANCE BENEFIT CALCULATED (FOR SCENARIO I YEAR 10)	
ECOSYSTEM SERVICE	The proposed design interventions are estimated to:
Carbon Sequestration	Increase the carbon sequestered per year by all lots from 8,024 lbs. a year to 8,928 lbs. a year by year ten after implementation, an 11% increase.
	Increase the net carbon stored by all lots from 216,275 lbs. to 219,123 lbs. by year ten after implementation, a 1.3% increase.
Stormwater Management	Reduce the average stormwater runoff per lot from 4.32 inches to 4.14 inches by year ten after implementation, a 4.2% decrease.
Food Production	Produce 14,791 lbs. of produce per year after the orchards reach maturity and a total of 78,744 pounds of produce over the first ten years after implementation.
Microclimate Regulation	Increase the average microclimate index score for all lots from 391 to 408 out of a possible 500 by year ten after implementation, a 4% increase, potentially providing a cooler microclimate.

human health and wellbeing. Carbon sequestration by trees is essential to reducing global climate change and its impacts (Derkzen et al., 2015; Gómez-Baggethun & Barton, 2013; Nowak et al., 2013). Vegetation can improve stormwater management and reduce flooding during storm events (Gómez-Baggethun & Barton, 2013; Millennium Ecosystem Assessment, 2005) which is particularly important in this area for reducing combined sewer system overflows. Food production by community gardens and orchards can improve food security in disinvested areas like the study area and reduce carbon emissions from food shipment (Brzoska & Spaġe, 2020; Burkhard et al., 2012). Lastly, microclimate regulation can reduce the urban heat island effect and improve human comfort in urban environments during extreme heat events (Andersson-Sköld et al., 2018; Gómez-Baggethun & Barton, 2013).

Thirdly, the difficulty of assessing microclimate regulation through aerial imagery is another limitation of the study. The impact of land cover changes on temperature is highly variable and complicated to evaluate through aerial imagery (Gluch et al., 2006; Schwarz et al., 2011). One approach, used by Kremer, Hamstead, and McPhearson (2016) and Schwarz et al. (2011), uses thermal data captured by Landsat aerial imagery to estimate thermal emissions or surface temperature for each land cover type in the specific climate region. However, the effectiveness of this method for this study is limited by the temperature data's coarse grain and the complexity of calculating the mean temperature of each land cover classification. Instead, the methods selected for assessing changes in microclimate in this study are more easily replicable by others in the profession. Derkzen et al. (2015) use a similar index approach to evaluate ecosystem service provision at a fine scale.

Fourthly, the ability to generalize the results to the more extensive system of lots owned by the Land Bank and Homesteading Authority in Kansas City is limited by the small focus area used for data collection. Studying multiple focus areas across the city would have provided more generalizable findings on the ecosystem services provided. This is especially true for stormwater management, which was highly dependent on underlying soil types, which vary throughout the city. However, assessing multiple focus areas was outside the project's scope due to time constraints.

Lastly, this project presents a planning-level concept for a system of vacant lot greening projects, using one community as an example. Design interventions were selected for each site based on physical conditions that could be remotely assessed. However, if a project like this were implemented, additional factors requiring community engagement and on-site analysis would need to be considered. Vacant lot greening projects such as these would need strong stakeholder support for success, as stakeholders and non-profit organizations would have to be involved in long-term stewardship of greened sites (Loder, 2020; Lokman, 2017). Additionally, community engagement would be an essential part of the decision-making process for selecting and refining design interventions that best suit the community and for selecting sites. Selection of sites and refinement of design interventions would also require consideration of factors that can only be investigated on-site, such as soil compaction and contamination. This level of detail was not within this project's scope but would be the next step in the implementation process.

Contribution

This project contributes to research on the ecosystem services provided by vacant lots and vacant lot greening projects, as well as estimating the potential for design projects to provide landscape performance benefits before construction. The results of this study show that vacant lots in this area with existing tree canopy and limited hardscape already provided ecosystem services to a greater degree than a typical single-family lot. Implementing design interventions like those proposed on vacant lots was estimated to slightly increase the ecosystem services provided across the system of lots. However, the collective benefit of multiple types of design interventions is greater than the individual benefits of any one intervention; each project provides ecosystem services to a different degree, and each site is appropriate for a different design intervention. An urban orchard could produce a significant amount of food on a lot with little existing tree canopy. In contrast, a woodland restoration could preserve the low stormwater runoff and cool microclimate of a lot with an existing tree canopy.

Based on the findings of this study, one recommendation for cities with highly vacant residential neighborhoods is to focus redevelopment on vacant lots with the least existing tree canopy to preserve the current benefits provided by those trees, including carbon sequestration, stormwater runoff reduction, and a cooler microclimate. In neighborhoods like those in the study area, where the population is expected to continue to decline for the next decades, vacant lots can be valued for their ecosystem services and their potential to contribute to improving the quality of life of nearby residents. The suggested design interventions can be implemented on a temporary basis to support those benefits until future redevelopment occurs. If community members see these lots as valuable, the city could consider reserving these lots as dedicated greenspaces for the long term.

Additionally, since single-family housing development was estimated to decrease the ecosystem services provided by the studied lots in comparison to their existing conditions and the design intervention, the reduction in the ecosystem services provided to nearby residents when redevelopment pressure returns to the area should be considered. The impact of development on the provision of ecosystem services could be mitigated by incorporating elements from the design interventions into single-family development lots. For example, limiting hardscape areas, such as driveways and patios, could improve stormwater management and microclimate on developed lots. Replacing hardscape areas with permeable pavement could further support stormwater management. To support local food production and food security, providing resources to encourage home gardening could replace community gardens and orchards. Furthermore, preserving the existing tree canopy to the maximum extent possible while limiting the lawn area can support carbon sequestration, stormwater management, and microclimate regulation.

This project contributed to research on landscape performance benefits by demonstrating a method for using aerial imagery and freely accessible online tools to estimate potential benefits before project implementation. Professionals can use programs their office likely has access to (e.g., AutoCAD, ArcGIS, Google Earth, Excel) as well as free online tools (e.g., EPA National Stormwater Calculator, i-Tree Suite). This project can serve as a guide for practitioners and decision-makers to assess

proposed projects, compare alternative scenarios, and generate metrics on potential project performance for vacant lot greening projects and other landscape designs.

Future Research

Future research expanding on this study could incorporate community involvement into the decision-making process and investigate additional landscape performance benefits. Engaging with the community at the early stages of the process could guide project values and priorities, including location and lot design, and build community interest in implementing the project. While this project assessed the potential ecosystem services provided by implementing the proposed design interventions, the next step would be to implement them by securing funding and recruiting community members, then measuring their actual performance in the selected ecosystem services. Future projects could prioritize the selection of ecosystem services based on community member's concerns and priorities. Additionally, because the environmental benefits assessed were minimal in most cases, the social value, or cultural ecosystem services, of greening vacant lots may be a stronger argument for implementing such projects.





References

- Accordino, J., & Johnson, G. T. (2000). Addressing the vacant and abandoned property problem. *Journal of Urban Affairs*, 22(3), 301–315. <https://doi.org/10.1111/0735-2166.00058>
- Ackerman, K. (2012). *The Potential for Urban Agriculture in New York City: Growing Capacity, Food Security, & Green Infrastructure*. www.urbadesignlab.columbia.edu
- Albro, S. L. (2019). *Vacant to Vibrant Creating Successful Green Infrastructure Networks* (1st ed.). Island Press.
- Anderson, E. C., & Minor, E. S. (2017). Vacant lots: An underexplored resource for ecological and social benefits in cities. *Urban Forestry & Urban Greening*, 21, 146–152. <https://doi.org/10.1016/J.UFUG.2016.11.015>
- Andersson-Sköld, Y., Klingberg, J., Gunnarsson, B., Cullinane, K., Gustafsson, I., Hedblom, M., Knez, I., Lindberg, F., Ode Sang, Å., Pleijel, H., Thorsson, P., & Thorsson, S. (2018). A framework for assessing urban greenery's effects and valuing its ecosystem services. *Journal of Environmental Management*, 205, 274–285. <https://doi.org/10.1016/j.jenvman.2017.09.071>
- Boehnke, D., Krehl, A., Mörmann, K., Volk, R., Lützkendorf, T., Naber, E., Becker, R., & Norra, S. (2022). Mapping Urban Green and Its Ecosystem Services at Microscale—A Methodological Approach for Climate Adaptation and Biodiversity. *Sustainability* 2022, Vol. 14, Page 9029, 14(15), 9029. <https://doi.org/10.3390/SU14159029>
- Bowman, A. O., & Pagano, M. A. (2004). *Terra Incognita: Vacant Land and Urban Strategies*. Georgetown University Press.
- Branas, C. C., Cheney, R. A., MacDonald, J. M., Tam, V. W., Jackson, T. D., & Ten Havey, T. R. (2011). A difference-in-differences analysis of health, safety, and greening vacant urban space. *American Journal of Epidemiology*, 174(11), 1296–1306. <https://doi.org/10.1093/aje/kwr273>
- Branas, C. C., Rubin, D., & Guo, W. (2012). Vacant Properties and Violence in Neighborhoods. *ISRN Public Health*, 2012, 1–9. <https://doi.org/10.5402/2012/246142>
- Brzoska, P., & Spaġe, A. (2020). From city-to site-dimension: Assessing the urban ecosystem services of different types of green infrastructure. In *Land* (Vol. 9, Issue 5). MDPI AG. <https://doi.org/10.3390/LAND9050150>
- Burkhard, B., Kroll, F., Müller, F., & Windhorst, W. (2009). Landscapes' capacities to provide ecosystem services - A concept for land-cover based assessments. *Landscape Online*, 15(1), 1–22. <https://doi.org/10.3097/LO.200915>
- Burkhard, B., Kroll, F., Nedkov, S., & Müller, F. (2012). Mapping ecosystem service supply, demand and budgets. *Ecological Indicators*, 21, 17–29. <https://doi.org/10.1016/J.ECOLIND.2011.06.019>
- Burkholder, S. (2012). The New Ecology of Vacancy: Rethinking Land Use in Shrinking Cities. *Sustainability* 2012, Vol. 4, Pages 1154-1172, 4(6), 1154–1172. <https://doi.org/10.3390/SU4061154>
- Canfield, J., Yang, B., & Whitlow, H. (2018). *Evaluating Landscape Performance: A Guidebook for Metrics and Methods Selection*. <https://doi.org/10.3153/gb001>

- Chen, L., & Conroy, M. M. (2023). Vacant urban land temporary use and neighborhood sustainability: A comparative study of two Midwestern cities. *Journal of Urban Affairs*. <https://doi.org/10.1080/07352166.2023.2168551>
- City of Kansas City Missouri Department of Housing & Community Development. (2021). *A Vision for Housing: Solutions for Kansas City*. <https://www.kcmo.gov/city-hall/housing/vision>
- Das, K., & Ramaswami, A. (2022). Who Gardens and How in Urban USA: Informing Social Equity in Urban Agriculture Action Plans. *Frontiers in Sustainable Food Systems*, 6. <https://doi.org/10.3389/fsufs.2022.923079>
- Derkzen, M. L., van Teeffelen, A. J. A., & Verburg, P. H. (2015). REVIEW: Quantifying urban ecosystem services based on high-resolution data of urban green space: an assessment for Rotterdam, the Netherlands. *Journal of Applied Ecology*, 52(4), 1020–1032. <https://doi.org/10.1111/1365-2664.12469>
- Detroit Future City. (2017). *Working with Lots Program – 2017*. <https://detroitfuturecity.com/our-programs/wwl-2017/>
- Detroit Future City. (2023). *The Field Guide to Working with Lots*. <https://detroitfuturecity.com/whatwedo/land-use/DFC-lots/>
- Detroit Future City. (2024). *Working With Lots Program*. <https://detroitfuturecity.com/our-programs/wwl-2020/>
- Detroit Land Bank Authority*. (2024). <https://buildingdetroit.org/>
- Eigenbrod, F., Armsworth, P. R., Anderson, B. J., Heinemeyer, A., Gillings, S., Roy, D. B., Thomas, C. D., & Gaston, K. J. (2010). Error propagation associated with benefits transfer-based mapping of ecosystem services. *Biological Conservation*, 143(11), 2487–2493. <https://doi.org/10.1016/J.BIOCON.2010.06.015>
- Elliot, T., Babí Almenar, J., & Rugani, B. (2020). Modelling the relationships between urban land cover change and local climate regulation to estimate urban heat island effect. *Urban Forestry & Urban Greening*, 50, 126650. <https://doi.org/10.1016/J.UFUG.2020.126650>
- Garcia, K. (2023, June 22). *City Council Approves FY2024 Budget*. City Council Philadelphia . <https://phlcouncil.com/city-council-approves-fy2024-budget/>
- Genesee County Land Bank Authority, & City of Flint. (n.d.). *Flint Property Portal*. Retrieved February 11, 2024, from <https://flintpropertyportal.com/>
- Gittleman, M., Jordan, K., & Brelsford, E. (2012). Using Citizen Science to Quantify Community Garden Crop Yields. *Cities and the Environment (CATE)*, 5(1).
- Gluch, R., Quattrochi, D. A., & Luvall, J. C. (2006). A multi-scale approach to urban thermal analysis. *Remote Sensing of Environment*, 104(2), 123–132. <https://doi.org/10.1016/J.RSE.2006.01.025>
- Gómez-Baggethun, E., & Barton, D. N. (2013). Classifying and valuing ecosystem services for urban planning. *Ecological Economics*, 86, 235–245. <https://doi.org/10.1016/J.ECOLECON.2012.08.019>

- Haase, D., Haase, A., & Rink, D. (2014). Conceptualizing the nexus between urban shrinkage and ecosystem services. *Landscape and Urban Planning*, 132, 159–169. <https://doi.org/10.1016/J.LANDURBPLAN.2014.09.003>
- Haase, D., Larondelle, N., Andersson, E., Artmann, M., Borgström, S., Breuste, J., Gomez-Baggethun, E., Gren, Å., Hamstead, Z., Hansen, R., Kabisch, N., Kremer, P., Langemeyer, J., Rall, E. L., McPhearson, T., Pauleit, S., Qureshi, S., Schwarz, N., Voigt, A., ... Elmqvist, T. (2014). A quantitative review of urban ecosystem service assessments: Concepts, models, and implementation. In *Ambio* (Vol. 43, Issue 4, pp. 413–433). Kluwer Academic Publishers. <https://doi.org/10.1007/s13280-014-0504-0>
- Hadavi, S., Rigolon, A., Gobster, P. H., & Stewart, W. P. (2021). Resident-led vacant lot greening and crime: Do ownership and visual condition-care matter? *Landscape and Urban Planning*, 211. <https://doi.org/10.1016/j.landurbplan.2021.104096>
- i-Tree. (2024a). *Canopy* (Version 7.1). <https://canopy.itreetools.org/>
- i-Tree. (2024b). *MyTree* (Version 2.23.10). <https://mytree.itreetools.org/#/>
- Kain, J. H., Larondelle, N., Haase, D., & Kaczorowska, A. (2016). Exploring local consequences of two land-use alternatives for the supply of urban ecosystem services in Stockholm year 2050. *Ecological Indicators*, 70, 615–629. <https://doi.org/10.1016/J.ECOLIND.2016.02.062>
- Kansas City Community Gardens. (2020). *Home*. <https://kccg.org/>
- Kansas City Missouri Homesteading Authority. (2013). *Policies and Procedures*. <https://www.kcmo.gov/home/showpublisheddocument/72/636944205627570000>
- Kim, G. (2016). The Public Value of Urban Vacant Land: Social Responses and Ecological Value. *Sustainability (Switzerland)*, 8(5). <https://doi.org/10.3390/su8050486>
- Kim, G., Miller, P. A., & Nowak, D. J. (2015). Assessing urban vacant land ecosystem services: Urban vacant land as green infrastructure in the City of Roanoke, Virginia. *Urban Forestry & Urban Greening*, 14(3), 519–526. <https://doi.org/10.1016/J.UFUG.2015.05.003>
- Kim, G., Miller, P. A., & Nowak, D. J. (2018). Urban vacant land typology: A tool for managing urban vacant land. *Sustainable Cities and Society*, 36, 144–156. <https://doi.org/10.1016/j.scs.2017.09.014>
- KCMO Parks and Recreation Department Forestry Technical Services. (2018). Forestry Section, Street Tree Planting Requirements. <https://kcparks.org/wp-content/uploads/2021/03/KCMO-TREE-PLANTING-SPECIFICATIONS-Nov-2018.pdf>
- Kremer, P., Hamstead, Z. A., & McPhearson, T. (2013). A social–ecological assessment of vacant lots in New York City. *Landscape and Urban Planning*, 120, 218–233. <https://doi.org/10.1016/J.LANDURBPLAN.2013.05.003>
- Kremer, P., Hamstead, Z. A., & McPhearson, T. (2016). The value of urban ecosystem services in New York City: A spatially explicit multicriteria analysis of landscape scale valuation scenarios. *Environmental Science & Policy*, 62, 57–68. <https://doi.org/10.1016/J.ENVSCI.2016.04.012>
- Kremer, P., Hamstead, Z., Haase, D., McPhearson, T., Frantzeskaki, N., Andersson, E., Kabisch, N., Larondelle, N., Rall, E. L., Voigt, A., Baró, F., Bertram, C.,

- Gómez-Baggethun, E., Hansen, R., Kaczorowska, A., Kain, J. H., Kronenberg, J., Langemeyer, J., Pauleit, S., ... Elmqvist, T. (2016). Key insights for the future of urban ecosystem services research. *Ecology and Society*, 21(2). <https://doi.org/10.5751/ES-08445-210229>
- Land Bank of Kansas City Missouri. (2013). *Policies and Procedures for the Acquisition and Disposal of Properties*.
- Land Bank of Kansas City Missouri. (2022). *Property Purchase Application: Urban Agriculture*. <https://www.kcmo.gov/home/showpublished-document/10658/638205234418830000>
- Lebofsky, S. (2023). *2020 MARC Population and Employment Forecasts for Census Tracts* [Data Set]. Mid-America Regional Council and Kansas City Planning and Development Department. Retrieved Feb. 21, 2024 from https://data.kcmo.org/Candidates-for-Deletion/2020-MARC-Population-and-Employment-Forecasts-for-/9w5v-zjy3/about_data
- Loder, A. (2020). *Small-Scale Urban Greening: Creating Places of Health, Creativity, and Ecological sustainability*. Routledge.
- Lokman, K. (2017). Vacancy as a laboratory: design criteria for reimagining social-ecological systems on vacant urban lands. *Landscape Research*, 42(7), 728–746. <https://doi.org/10.1080/01426397.2017.1355446>
- McPhearson, T., Kremer, P., & Hamstead, Z. A. (2013). Mapping ecosystem services in New York City: Applying a social–ecological approach in urban vacant land. *Ecosystem Services*, 5, 11–26. <https://doi.org/10.1016/J.ECOSER.2013.06.005>
- Mesa, K. (2023). Land Bank and Kansas City Missouri Homesteading Authority Data. [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>
- Millennium Ecosystem Assessment. (2005). *Ecosystems and Human Well-Being: Synthesis*.
- Nassauer, J. I., & Raskin, J. (2014). Urban vacancy and land use legacies: A frontier for urban ecological research, design, and planning. *Landscape and Urban Planning*, 125, 245–253. <https://doi.org/10.1016/J.LANDURBPLAN.2013.10.008>
- Nassauer, J. I., Webster, N. J., Sampson, N., & Li, J. (2021). Care and safety in neighborhood preferences for vacant lot greenspace in legacy cities. *Landscape and Urban Planning*, 214, 104156. <https://doi.org/10.1016/J.LANDURBPLAN.2021.104156>
- Ndubisi, F., Whitlow, H., & Deutsch, B. (2015). Landscape Performance: Past, Present, and Future. *Landscape Architecture*, 1, 40–51.
- Németh, J., & Langhorst, J. (2014). Rethinking urban transformation: Temporary uses for vacant land. *Cities*, 40, 143–150. <https://doi.org/10.1016/j.cities.2013.04.007>
- Nowak, D. J., Greenfield, E. J., Hoehn, R. E., & Lapoint, E. (2013). Carbon storage and sequestration by trees in urban and community areas of the United States. *Environmental Pollution*, 178, 229–236. <https://doi.org/10.1016/J.ENVPOL.2013.03.019>

- Open Data KC. (2023). *Land Bank and Homesteading Authority*. City of Kansas City, MO. <https://data.kcmo.org/stories/s/Land-Bank-and-Homesteading-Authority/t82c-gg6n/>
- Philadelphia Horticultural Society. (2021, February 2). *Who pays for the PHS Philadelphia LandCare Program? How much does it cost?* Ask PHS. [https://pennhort.libanswers.com/faq/251794#:~:text=The%20City%20of%20Philadelphia's%20Office%20of%20Housing,a%20property%20is%20\\$1000%2D\\$1300%20depending%20on%20size.](https://pennhort.libanswers.com/faq/251794#:~:text=The%20City%20of%20Philadelphia's%20Office%20of%20Housing,a%20property%20is%20$1000%2D$1300%20depending%20on%20size.)
- Rabin, J., Zinati, G., & Nitzsche, P. (2012). Yield Expectations for Mixed Stand, Small-Scale Agriculture. *Sustaining Farming on the Urban Fringe: Monthly Briefing from Rutgers New Jersey Agricultural Experiment Station*, 7(1).
- Rega-Brodsky, C. C., Nilon, C. H., & Warren, P. S. (2018). Balancing urban biodiversity needs and resident preferences for vacant lot management. *Sustainability (Switzerland)*, 10(5). <https://doi.org/10.3390/su10051679>
- Riley, C. B., Perry, K. I., Ard, K., & Gardiner, M. M. (2018). Asset or Liability? Ecological and Sociological Tradeoffs of Urban Spontaneous Vegetation on Vacant Land in Shrinking Cities. *Sustainability 2018, Vol. 10, Page 2139, 10(7)*, 2139. <https://doi.org/10.3390/SU10072139>
- Sadler, R. C., & Pruett, N. K. (2017). Mitigating blight and building community pride in a legacy city: lessons learned from a land bank's clean and green programme. *Community Development Journal*, 52(4), 591–610. <https://doi.org/10.1093/CDJ/BSV052>
- Sanches, P. M., & Pellegrino, P. R. M. (2016). Greening potential of derelict and vacant lands in urban areas. *Urban Forestry & Urban Greening*, 19, 128–139. <https://doi.org/10.1016/J.UFUG.2016.07.002>
- Schifman, L. A., Tryby, M. E., Berner, J., & Shuster, W. D. (2018). Managing Uncertainty in Runoff Estimation with the U.S. Environmental Protection Agency National Stormwater Calculator. *Journal of the American Water Resources Association*, 54(1), 148–159. <https://doi.org/10.1111/1752-1688.12599>
- Schwarz, N., Bauer, A., & Haase, D. (2011). Assessing climate impacts of planning policies-An estimation for the urban region of Leipzig (Germany). *Environmental Impact Assessment Review*, 31(2), 97–111. <https://doi.org/10.1016/j.eiar.2010.02.002>
- Shuster, W. D., Schifman, L., Kelleher, C., Golden, H. E., Bhaskar, A. S., Parolari, A. J., Stewart, R. D., & Herrmann, D. L. (2021). K in an Urban World: New Contexts for Hydraulic Conductivity. *Journal of the American Water Resources Association*, 57(3), 493–504. <https://doi.org/10.1111/1752-1688.12918>
- South, E. C., Hohl, B. C., Kondo, M. C., MacDonald, J. M., & Branas, C. C. (2018). Effect of Greening Vacant Land on Mental Health of Community-Dwelling Adults: A Cluster Randomized Trial. *JAMA Network Open*, 1(3), e180298. <https://doi.org/10.1001/jamanetworkopen.2018.0298>
- Speak, A. F., Mizgajski, A., & Borysiak, J. (2015). Allotment gardens and parks: Provision of ecosystem services with an emphasis on biodiversity. *Urban Forestry & Urban Greening*, 14(4), 772–781. <https://doi.org/10.1016/J.UFUG.2015.07.007>

- Spirn, A. W., Cameron, M., Pollio, M., & Smith, W. G. (1990). *Vacant Land: A Resource for Reshaping Urban Neighborhoods*.
- Tepe, E., & Hoover, E. (2018, May 1). *Before you start an apple orchard*. University of Minnesota: Minnesota Fruit Research. <https://fruit.umn.edu/content/before-start-apple-orchard>
- The Giving Grove. (2020). *Home*. <https://www.givinggrove.org/>
- United States Department of Agriculture National Agricultural Statistics Service. (2023). *Noncitrus Fruits and Nuts 2022 Summary*.
- U.S. Environmental Protection Agency. (2019). *National Stormwater Calculator* (2.0.0.1). <https://www.epa.gov/water-research/national-stormwater-calculator>
- U.S. Department of Agriculture. (2022). *National Agriculture Imagery Program* (M_3909460_SE_15_060_20220629) [Map]. U.S. Geological Survey (USGS) Earth Resources Observation and Science (EROS). <https://doi.org/10.5066/F7QN651G>
- U.S. Geological Survey. (2023) *3D Elevation Program 1/3 Arc Second Resolution Digital Elevation Model* (n40w095) [Map]. <https://www.sciencebase.gov/catalog/item/648a9b66d34ef77fcafe61c5>
- Wilson, B. (2018). *Resilience for All: Striving for Equity Through Community-Driven Design*. Island Press/Center for Resource Economics. <https://doi.org/10.5822/978-1-61091-893-0>
- Yang, B. (2020). Landscape performance evaluation in socio-ecological practice: current status and prospects. *Socio-Ecological Practice Research*, 2(1), 91–104. <https://doi.org/10.1007/s42532-019-00039-x>
- Yang, B., Li, S., & Binder, C. (2016). A research frontier in landscape architecture: landscape performance and assessment of social benefits. *Landscape Research*, 41(3), 314–329. <https://doi.org/10.1080/01426397.2015.1077944>
- Zhang, P., & Park, S. (2023). VLAS: Vacant Land Assessment System for Urban Renewal and Greenspace Planning in Legacy Cities. *Sustainability (Switzerland)*, 15(12). <https://doi.org/10.3390/su15129525>
- Zhao, C., & Sander, H. A. (2018). Assessing the sensitivity of urban ecosystem service maps to input spatial data resolution and method choice. *Landscape and Urban Planning*, 175, 11–22. <https://doi.org/10.1016/J.LANDURBPLAN.2018.03.007>



Figures

Cover: Hemsath, E. (2024). *Focus Area Rendering* [Image].

- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, from <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>
- OpenStreetMap. (n.d.). [Map of Project Focus Area]. Cadmapper. Retrieved March 12, 2024, from <https://cadmapper.com/>. Open Database License (ODbL 1.0) <https://www.openstreetmap.org/copyright>.

Figure 1.1: Hemsath, E. (2024). *Study Process* [Chart].

Figure 2.1: Hemsath, E. (2024). *Ecosystem Services and Landscape Performance Benefits* [Chart].

Figure 2.2: Hemsath, E. (2024). *Literature Map* [Chart].

Figure 3.1: Hemsath, E. (2024). *Design Goals* [Graphic].

- Muhamad. (n.d.). *Set of tree icon with simple line design* (254681647) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/set-of-tree-icon-with-simple-line-design/254681647?prev_url=detail. Adobe Stock Standard License.
- Pop Vectors. (n.d.). *Thermometer Icon* (583028397) [Vector Image]. Adobe Stock. November 13, 2023, https://stock.adobe.com/images/thermometer-icon/583028397?prev_url=detail&asset_id=583028397. Adobe Stock Standard License.
- Ralf's icons. (n.d.). *rain strong weather forecast atmosphere atmospheric condition vector icon* (227415003) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/rain-strong-weather-forecast-atmosphere-atmospheric-condition-vector-icon/227415003?prev_url=detail&asset_id=227415003. Adobe Stock Standard License.
- Vectorslab. (n.d.). *icon of vegetables crate, out* (414149866) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/icon-of-vegetables-crate-out/414149866?prev_url=detail&asset_id=414149866. Adobe Stock Standard License.

Figure 3.2: Hemsath, E. (2024). *Projected Decline in the Number of Households in the Study Area* [Graph].

- Lebofsky, S. (2023). *2020 MARC Population and Employment Forecasts for Census Tracts* [Data Set]. Mid-America Regional Council and Kansas City Planning and Development Department. Retrieved Feb. 21, 2024, from https://data.kcmo.org/Candidates-for-Deletion/2020-MARC-Population-and-Employment-Forecasts-for-/9w5v-zjy3/about_data.

Figure 3.3: Hemsath, E. (2024). *Study Area Context* [Map].

- Bender, K. (2020). *Kansas City Neighborhood Boundaries* [Data Set]. City of Kansas City, Missouri. Retrieved Sept. 21, 2023, from <https://data.kcmo.org/Neighborhoods/Kansas-City-Neighborhood-Boundaries/q45j-ejyk>.

- Esri. (2023). *USA States Generalized Boundaries* [Feature Layer]. ArcGIS Living Atlas of the World. Retrieved Feb. 21, 2024, from <https://www.arcgis.com/home/item.html?id=8c2d6d7df8fa4142b0a1211c8dd66903>.
- Esri. (2024). *World Imagery* [Tile Layer]. ArcGIS Living Atlas of the World. Retrieved Feb. 21, 2024, from <https://www.arcgis.com/home/item.html?id=10df2279f9684e4a9f6a7f08feb2a9>.

Figure 3.4: Hemsath, E. (2024). *Percent Change in Number of Households in Kansas City* [Map].

- Bender, K. (2020). *Kansas City Neighborhood Boundaries* [Data Set]. City of Kansas City, Missouri. Retrieved Sept. 21, 2023, from <https://data.kcmo.org/Neighborhoods/Kansas-City-Neighborhood-Boundaries/q45j-ejyk>.
- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Esri Landscape. (2023). *USA Flood Hazard Areas* [Feature Layer Map]. ArcGIS Living Atlas of the World. Retrieved Sept. 21, 2023, from <https://livingatlas-dcdev.opendata.arcgis.com/datasets/esri::usa-flood-hazard-areas-2/about>.
- Esri. (2023). *USA States Generalized Boundaries* [Feature Layer]. ArcGIS Living Atlas of the World. Retrieved Feb. 21, 2024, from <https://www.arcgis.com/home/item.html?id=8c2d6d7df8fa4142b0a1211c8dd66903>.
- Lebofsky, S. (2023). *2020 MARC Population and Employment Forecasts for Census Tracts* [Data Set]. Mid-America Regional Council and Kansas City Planning and Development Department. Retrieved Feb. 21, 2024, from https://data.kcmo.org/Candidates-for-Deletion/2020-MARC-Population-and-Employment-Forecasts-for-/9w5v-zjy3/about_data.
- United States Census Bureau. (2023). *TIGER/Line® Shapefiles: Census Tracts (Missouri)* [Shapefile]. Retrieved Feb. 21, 2024, <https://www.census.gov/cgi-bin/geo/shapefiles/index.php>

Figure 3.5: Hemsath, E. (2024). *Vacant Lots Owned by the Land Bank and Home-steading Authority Across Kansas City*. [Map].

- Bender, K. (2020). *Kansas City Neighborhood Boundaries* [Data Set]. City of Kansas City, Missouri. Retrieved Sept. 21, 2023, from <https://data.kcmo.org/Neighborhoods/Kansas-City-Neighborhood-Boundaries/q45j-ejyk>.
- City of Kansas City, MO. (2024a). *Cadastral* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Esri Landscape. (2023). *USA Flood Hazard Areas* [Feature Layer Map]. ArcGIS Living Atlas of the World. Retrieved Sept. 21, 2023, from <https://livingatlas-dcdev.opendata.arcgis.com/datasets/esri::usa-flood-hazard-areas-2/about>.

- Esri. (2023). *USA States Generalized Boundaries* [Feature Layer]. ArcGIS Living Atlas of the World. Retrieved Feb. 21, 2024, from <https://www.arcgis.com/home/item.html?id=8c2d6d7df8fa4142b0a1211c8dd66903>.
- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, from <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>

Figure 3.6: Hemsath, E. (2024). *Vacant Lot Ownership in the Study Area*. [Map].

- Bender, K. (2020). *Kansas City Neighborhood Boundaries* [Data Set]. City of Kansas City, Missouri. Retrieved Sept. 21, 2023, from <https://data.kcmo.org/Neighborhoods/Kansas-City-Neighborhood-Boundaries/q45j-ejyk>.
- City of Kansas City, MO. (2024a). *Cadastre* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Esri Landscape. (2023). *USA Flood Hazard Areas* [Feature Layer Map]. ArcGIS Living Atlas of the World. Retrieved Sept. 21, 2023, from <https://livingatlas-dcdev.opendata.arcgis.com/datasets/esri::usa-flood-hazard-areas-2/about>.
- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, from <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>

Figure 3.7: Hemsath, E. (2024). *Example of a Vacant Lot in the Study Area A* [Photograph].

Figure 3.8: Hemsath, E. (2023). *Example of a Vacant Lot in the Study Area B* [Photograph].

Figure 3.9: Hemsath, E. (2024). *The Kansas City Missouri Land Bank and Homesteading Authority*. [Diagram].

Figure 3.10: Hemsath, E. (2024). *Vacant Lots Owned by the Landbank and Homesteading Authority over Time*. [Chart].

- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>

Figure 3.11: Hemsath, E. (2024). *Typology of Vacant Lots* [Chart].

Figure 3.12: Hemsath, E. (2024). *Long-Term or Short-Term Flowchart* [Chart].

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Figure 4.1: Hemsath, E. (2024). *Proportion of Each Lot Type in the Study Area* [Pie Chart].

Figure 4.2: Hemsath, E. (2024). *Long-Term High Activity Lot Example* [Annotated Photograph].

- Google Earth V 7.3.6. (June 18, 2023). [Aerial image of a vacant lot in Kansas City MO, 39°02'50.89" N 94°32'17.33" W, eye alt 1190 ft]. Retrieved March 6, 2024, from <https://earth.google.com/web/@39.04742833,-94.53813504,-21076.09274616a,21438.96345075d,35y,0.4045h,0t,0r/data=OgMKATA>

Figure 4.3: Hemsath, E. (2024). *Short-Term High Activity Lot Example* [Annotated Photograph].

- Google Earth V 7.3.6. (June 18, 2023). [Aerial image of a vacant lot in Kansas City MO, 39°02'46.18" N 94°32'36.15" W, eye alt 1122 ft]. Retrieved March 6, 2024, from <https://earth.google.com/web/@39.04615709,-94.5433778,338.48983738a,9.99762561d,35y,0.4012h,0t,0r/data=OgMKATA>

Figure 4.4: Hemsath, E. (2024). *Long-Term Low Activity Lot Example* [Annotated Photograph].

- Google Earth V 7.3.6. (June 18, 2023). [Aerial image of a vacant lot in Kansas City MO, 39°02'43.50" N 94°32'23.90" W, eye alt 1086 ft]. Retrieved March 6, 2024, from <https://earth.google.com/web/@39.04542109,-94.53996541,337.31901697a,9.9903703d,35y,0.4033h,0t,0r/data=OgMKATA>

Figure 4.5: Hemsath, E. (2024). *Short-Term Low Activity Lot Example* [Annotated Photograph].

- Google Earth V 7.3.6. (June 18, 2023). [Aerial image of a vacant lot in Kansas City MO, 39°02'49.42" N 94°32'35.95" W, eye alt 1111 ft]. Retrieved March 6, 2024, from <https://earth.google.com/web/@39.04706015,-94.54331944,338.39158184a,9.99169722d,35y,0.4012h,0t,0r/data=OgMKATA>

Figure 4.6: Hemsath, E. (2024). *Lot Types Across the Study Area* [Map].

- Bender, K. (2020). *Kansas City Neighborhood Boundaries* [Data Set]. City of Kansas City, Missouri. Retrieved Sept. 21, 2023, from <https://data.kcmo.org/Neighborhoods/Kansas-City-Neighborhood-Boundaries/q45j-ejyk>.
- City of Kansas City, MO. (2024a). *Cadastre* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.

- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Esri Landscape. (2023). USA Flood Hazard Areas [Feature Layer Map]. ArcGIS Living Atlas of the World. Retrieved Sept. 21, 2023, from <https://livingatlas-dcdev.opendata.arcgis.com/datasets/esri::usa-flood-hazard-areas-2/about>.
- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>
- United States Census Bureau. (2023) *TIGER/Line® Shapefiles: Census Tracts* (Missouri) [Shapefile]. Retrieved Feb. 21, 2024, <https://www.census.gov/cgi-bin/geo/shapefiles/index.php>

Figure 4.7: Hemsath, E. (2024). *Focus Area Location*. [Map].

- Bender, K. (2020). *Kansas City Neighborhood Boundaries* [Data Set]. City of Kansas City, Missouri. Retrieved Sept. 21, 2023, from <https://data.kcmo.org/Neighborhoods/Kansas-City-Neighborhood-Boundaries/q45j-ejyk>.
- City of Kansas City, MO. (2024a). *Cadastre* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Esri Landscape. (2023). USA Flood Hazard Areas [Feature Layer Map]. ArcGIS Living Atlas of the World. Retrieved Sept. 21, 2023, from <https://livingatlas-dcdev.opendata.arcgis.com/datasets/esri::usa-flood-hazard-areas-2/about>.
- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, from <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>

Figure 4.8: Hemsath, E. (2024). *Focus Area Map*. [Map].

- City of Kansas City, MO. (2024a). *Cadastre* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, from <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>
- OpenStreetMap. (n.d.). [Map of Project Focus Area]. Cadmapper. Retrieved March 12, 2024, from <https://cadmapper.com/>. Open Database License (ODbL 1.0) <https://www.openstreetmap.org/copyright>.

Figure 4.9: Hemsath, E. (2024). *Land Cover Comparison—Existing Conditions* [Chart].

Figure 4.10: Hemsath, E. (2024). *Net Carbon Sequestered Per Year—Existing Conditions* [Chart].

Figure 4.11: Hemsath, E. (2024). *Net Carbon Stored—Existing Conditions* [Chart].

Figure 4.12: Hemsath, E. (2024). *Average Annual Runoff—Existing Conditions* [Chart].

Figure 4.13: Hemsath, E. (2024). *Maximum Rainfall Event Retained—Existing Conditions* [Chart].

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Figure 4.16: Hemsath, E. (2024). *Meadow Restoration* [Axon Diagram].

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Figure 4.20: Hemsath, E. (2024). *Parklet* [Axon Diagram].

Figure 4.21: Hemsath, E. (2024). *Three Alternative Scenarios* [Graphic].

- Muhamad. (n.d.). *Set of tree icon with simple line design* (254681647) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/set-of-tree-icon-with-simple-line-design/254681647?prev_url=detail. Adobe Stock Standard License.
- KPPWC. (n.d.). *home flat icon design vector* (424527083) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/home-flat-icon-design-vector/424527083?prev_url=detail. Adobe Stock Standard License.
- Supanut. (n.d.). *flower outline icon* (474910034) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/flower-outline-icon/474910034?prev_url=detail&asset_id=474910034. Adobe Stock Standard License.
- Icons-Studio. (n.d.). *User and group of people vector icon set* (427838891) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/user-and-group-of-people-vector-icon-set/427838891?prev_url=detail. Adobe Stock Standard License.
- Ayub Irawan. (n.d.). *plant sprout outline icon vector* (298097059) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/plant-sprout-outline-icon-vector/298097059?prev_url=detail&asset_id=298097059. Adobe Stock Standard License.
- Kavya (n.d.). *Outline Dollar Money icon* (570069599) [Vector Image]. Adobe Stock. https://stock.adobe.com/images/outline-dollar-money-icon/570069599?prev_url=detail&asset_id=570069599. Adobe Stock Standard License.

Figure 4.22: Hemsath, E. (2024). *Proportion of the Design Interventions Proposed in the Focus Area—Scenario I* [Pie Chart].

Figure 4.23: Hemsath, E. (2024). *Map of Design Interventions Proposed in the Focus Area*. [Map].

- City of Kansas City, MO. (2024a). *Cadastre* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>
- OpenStreetMap. (n.d.). [Map of Project Focus Area]. Cadmapper. Retrieved March 12, 2024, from <https://cadmapper.com/>. Open Database License (ODbL 1.0) <https://www.openstreetmap.org/copyright>.

Figure 4.24: Hemsath, E. (2024). *Land Cover Comparison—Scenario I* [Chart].

Figure 4.25: Hemsath, E. (2024). *Net Carbon Sequestered Per Year by Each Design Intervention—Scenario I* [Chart].

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Figure 4.39: Hemsath, E. (2024). *Map of the Design Intervention Locations Recommended in Scenario III* [Chart].

- City of Kansas City, MO. (2024a). *Cadastre* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- City of Kansas City, MO. (2024b). *Centerline* [Data Set]. Retrieved Mar. 18, 2024, from <https://maps.kcmo.org/apps/parcelviewer/>.
- Mesa, K. (2023). *Land Bank and Kansas City Missouri Homesteading Authority Data* [Data Set]. City of Kansas City Neighborhoods and Housing Services. Retrieved Sept. 28, 2023, <https://data.kcmo.org/Neighborhoods/Land-Bank-and-Kansas-City-Missouri-Homesteading-Au/2ebw-sp7f>
- OpenStreetMap. (n.d.). [Map of Project Focus Area]. Cadmapper. Retrieved March 12, 2024, from <https://cadmapper.com/>. Open Database License (ODbL 1.0) <https://www.openstreetmap.org/copyright>.

Figure 4.40: Hemsath, E. (2024). *Proportion of the Design Interventions Proposed in the Study Area—Scenario III* [Pie Chart].

Figure 4.41: Hemsath, E. (2024). *Land Cover Comparison—Scenario III* [Chart].

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Figure 4.44: Hemsath, E. (2024). *Average Annual Runoff—Scenario III* [Chart].

Figure 4.45: Hemsath, E. (2024). *Maximum Rainfall Event Retained—Scenario III* [Chart].

Figure 4.46: Hemsath, E. (2024). *Total Food Produced—Scenario III* [Chart].

Figure 4.47: Hemsath, E. (2024). *Microclimate Regulation Index—Scenario III* [Chart].

Figure 4.48: Hemsath, E. (2024). *Net Carbon Sequestered* [Chart].

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Figure 4.50: Hemsath, E. (2024). *Average Annual Runoff* [Chart].

Figure 4.51: Hemsath, E. (2024). *Maximum Rainfall Event Retained* [Chart].

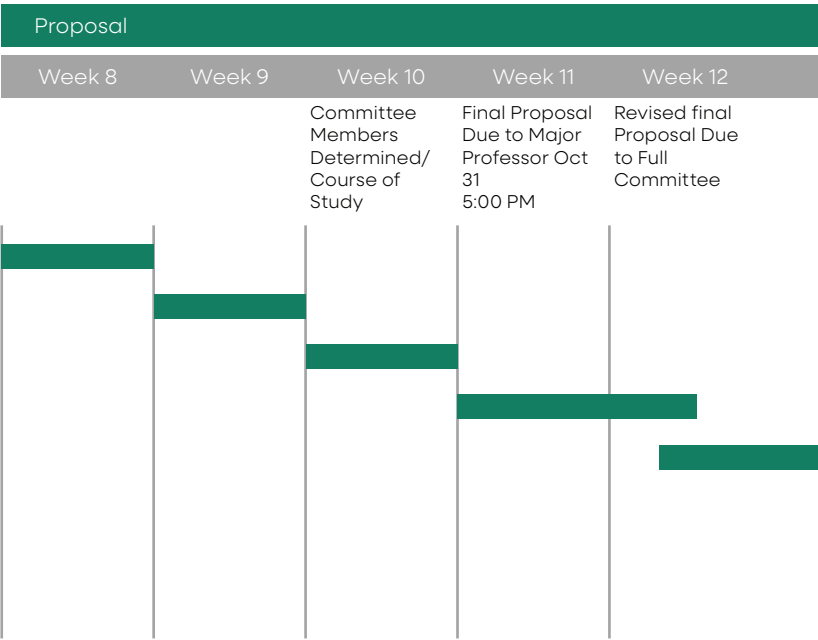
Figure 4.52: Hemsath, E. (2024). *Microclimate Regulation Index* [Chart].



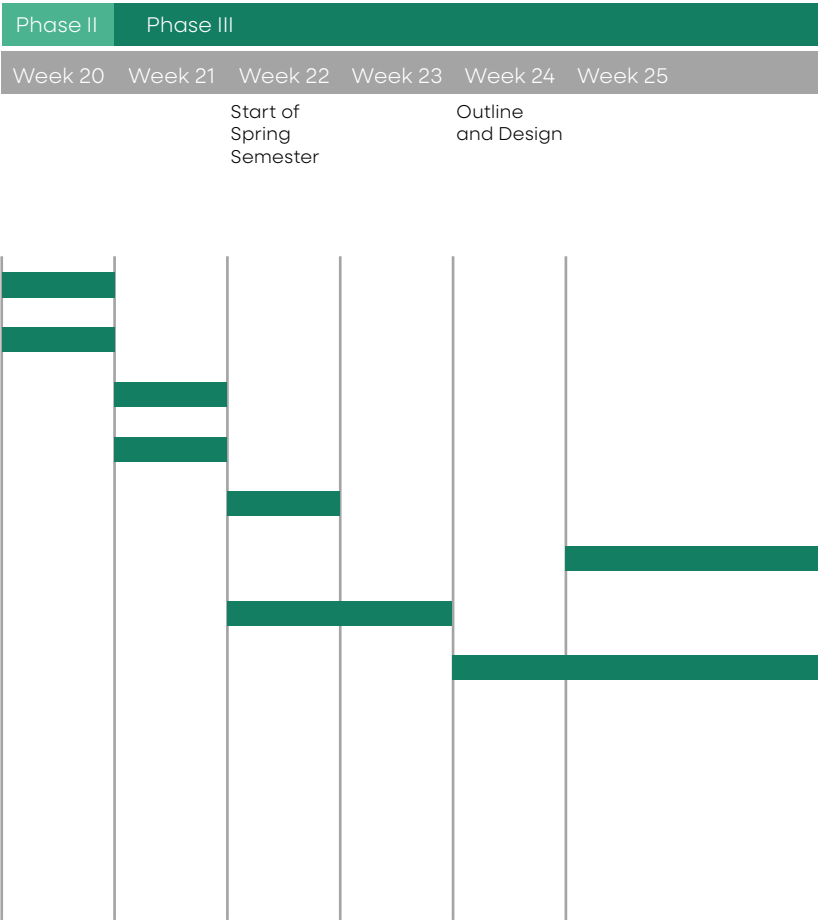
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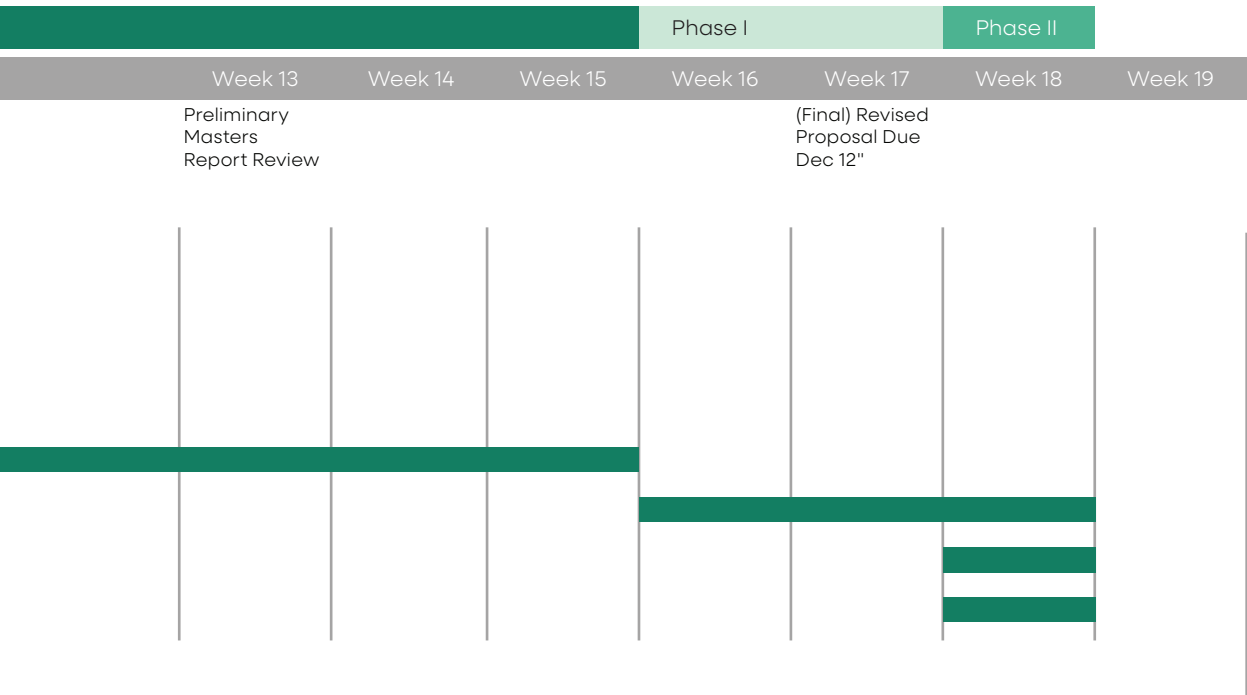
Appendix A: Schedule

- Develop Typology
- Test Typology
- Ecosystem Services Analysis Methods
- Finalize Proposal
- Final Proposal Revisions
- Categorize Study Area Lots by Type
- Select Focus Area
- Site Visit



- Calculate Areas of Land Cover Types
- Existing Ecosystem Service Analysis
- Finalize Prototype Designs
- Scenario I Ecosystem Service Analysis
- Scenario II Ecosystem Service Analysis
- Scenario III Ecosystem Service Analysis
- Book Design and Outline
- Complete Book Document
- Create Graphics
- Substantial Completion Revisions
- Final Draft Revisions
- Final Poster





Appendix B: Newly Planted Tree Canopy Growth and Carbon Sequestration Estimates

B.1: TREE GROWTH ASSUMPTIONS

Tree canopy area for newly proposed trees at two, five, and ten years after planting were estimated based on the size at planting, growth rate, and mature size. The Kansas City Missouri Parks and Recreation Department Forestry Technical Service (2018) requires that all street trees and trees in public parks are two-inch caliper at planting, which was assumed to be the size of all newly planted trees zero years after planting. It was also assumed that the five recommended species for overstory and understory trees were used evenly where new trees were proposed to support biodiversity across the system. Therefore, the average canopy width for all overstory trees and all understory trees at each time frame was used to estimate the canopy cover of a newly planted overstory or understory tree.

OVERSTORY TREES	GROWTH RATE	MATURE HEIGHT	MATURE WIDTH	HEIGHT/ WIDTH RATIO	HEIGHT AT PLANTING	WIDTH AT PLANTING
Swamp White Oak	1	50 - 60	50 - 60	1	12	12
Kentucky Coffee Tree	1	50 - 60	40 - 50	1.22	12	9.82
Bald Cypress	1.5	50 - 70	20 - 30	2.4	12	5
Northern Red Oak	1.5	60 - 70	50 - 60	1.18	12	10.15
Chinkapin Oak	1	50 - 80	50 - 70	1.08	12	11.08

UNDERSTORY TREES

Hophornbeam	1	25 - 40	15 - 40	1.18	12	10.15
Hornbeam	1	20 - 30	20 - 30	1	12	12
Serviceberry	1	15 - 25	15 - 25	1	12	12
Flowering Dogwood	1	20 - 40	20 - 20	1.5	12	8
Eastern Redbud	1	20 - 30	25 - 35	0.83	12	14.4

ORCHARD TREES

Semi-Dwarf Apple Tree	1	12 - 15	12 - 15	1	2	2
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YEAR 2 HEIGHT	WIDTH	YEAR 5 HEIGHT	WIDTH	YEAR 10 HEIGHT	WIDTH
14	14	17	17	22	22
14	11.45	17	13.91	22	18
15	6.25	19.5	8.13	27	11.25
15	12.69	19.5	16.5	27	22.85
14	12.92	17	15.69	22	20.31
Mean: 14.4	Mean: 11.46	Mean: 18	Mean: 14.25	Mean: 22	Mean: 18.88
14	11.84	17	14.38	22	18.6
14	14	17	17	22	22
14	14	17	17	22	22
14	9.33	17	11.33	22	14.67
14	16.8	17	20.4	22	26.4
Mean: 14	Mean: 13.20	Mean: 14.4	Mean: 16.02	Mean: 22	Mean: 20.7
4	4	7	7	12	12

B.2: CARBON SEQUESTRATION ESTIMATES

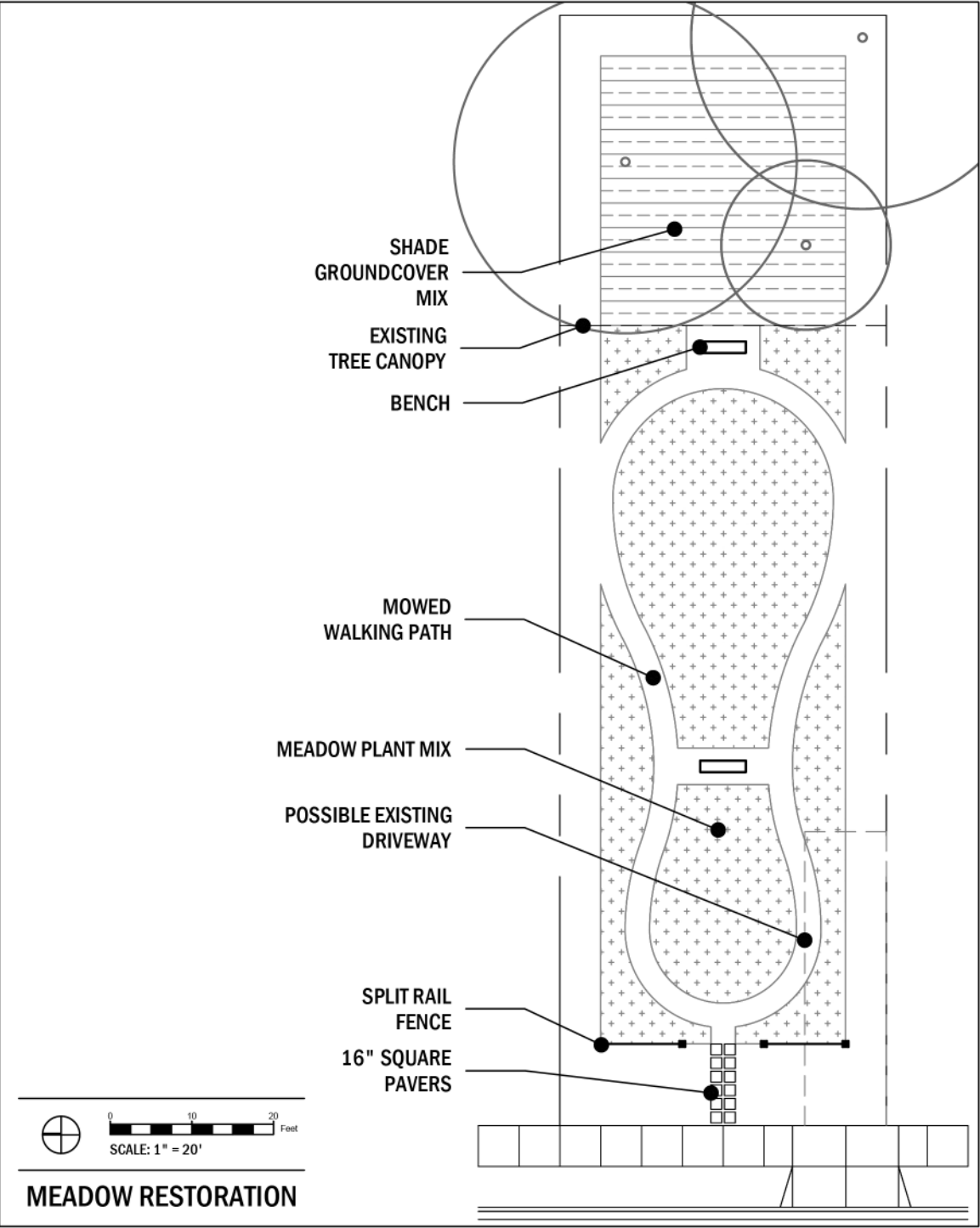
The net carbon storage rate of 1.1805 lb./ ft² x ft² tree canopy cover found by Nowak et al. (2013) presents an average across trees, regardless of age. Therefore, the value overestimates the carbon stored by one unit of young, newly planted tree canopy. To not overrepresent the carbon sequestered by the newly proposed trees in the prototype designs, the values for net carbon sequestration and net carbon storage calculated for newly planted trees by the methods outlined in section 3.2 were compared to the results obtained from the i-Tree My Tree web application (i-Tree, 2024b) for the selected tree species at sizes two, five, and ten years after planting. While the net carbon sequestration rate was similar between the methods outlined in section 3.2 and the i-Tree My Tree results, the carbon storage rate estimated by i-Tree My Tree was, on average, 11.7% of the value calculated by multiplying the area of the tree canopy cover by 1.1805 lb./ ft². To more accurately represent the carbon sequestered by proposed trees, for carbon storage estimates in phase III, the carbon stored by newly planted trees was multiplied by 0.117 to find the total carbon stored by trees on each lot.

		Year 2			Year 5		
		CARBON STORED (I-TREE)	CARBON STORED (CANOPY AREA ESTIMATE)	RATIO (I-TREE ESTIAMTE: CANOPY AREA ESTIMATE)	CARBON STORED (I-TREE)	CARBON STORED (CANOPY AREA ESTIMATE)	RATIO (I-TREE ESTIAMTE: CANOPY AREA ESTIMATE)
Overstory Tree	Swamp White Oak	28.07	121.8504586	0.230364336	41.32	188.147233	0.219615241
	Kentucky Coffee Tree	11.36	121.8504586	0.09322903	23.38	188.147233	0.124264384
	Northern Red Oak	10.27	121.8504586	0.084283639	19.42	188.147233	0.103217037
	Chinkapin Oak	29.77	121.8504586	0.244315864	43.82	188.147233	0.232902708
Understory Tree	Hophornbeam	6.82	161.4483963	0.040972844	10.07	238.054013	0.042301324
	Hornbeam	15.5	161.4483963	0.101336129	20.93	238.054013	0.087921223
	Flowering Dogwood	10.49	161.4483963	0.06339831	15.29	238.054013	0.064229121
	Eastern Redbud	9.1	161.4483963	0.057159647	12.84	238.054013	0.053937339
Average		15.1725	141.6494274	0.114382475	23.38375	213.100623	0.116048547

Year 10				
	<i>cont.</i>	CARBON STORED (I-TREE)	CARBON STORED (CANOPY AREA ESTIMATE)	RATIO (I-TREE ESTIAMTE: CANOPY AREA ESTIMATE)
Overstory Tree	Swamp White Oak	69.93	330.5180951	0.211576918
	Kentucky Coffee Tree	53.27	330.5180951	0.161171206
	Northern Red Oak	42.81	330.5180951	0.129523922
	Chinkapin Oak	74.17	330.5180951	0.224405263
Understory Tree	Hophornbeam	17.61	398.678693	0.044170908
	Hornbeam	32.74	398.678693	0.082121269
	Flowering Dogwood	26.15	398.678693	0.065591667
	Eastern Redbud	21.35	398.678693	0.053551896
Average		42.25375	364.598394	0.121514131
Average Ratio (i-Tree Estiamte: Canopy Area Estimate)				0.117315051

Appendix C: Vacant Lot Design Intervention Prototypes

C.1: PROTOTYPE DESIGN PLANS



SHADE
GROUNDCOVER
MIX

MULCH PAVING
EXISTING TREE
CANOPY

NEW
UNDERSTORY
TREE

BRICK EDGING
BENCH

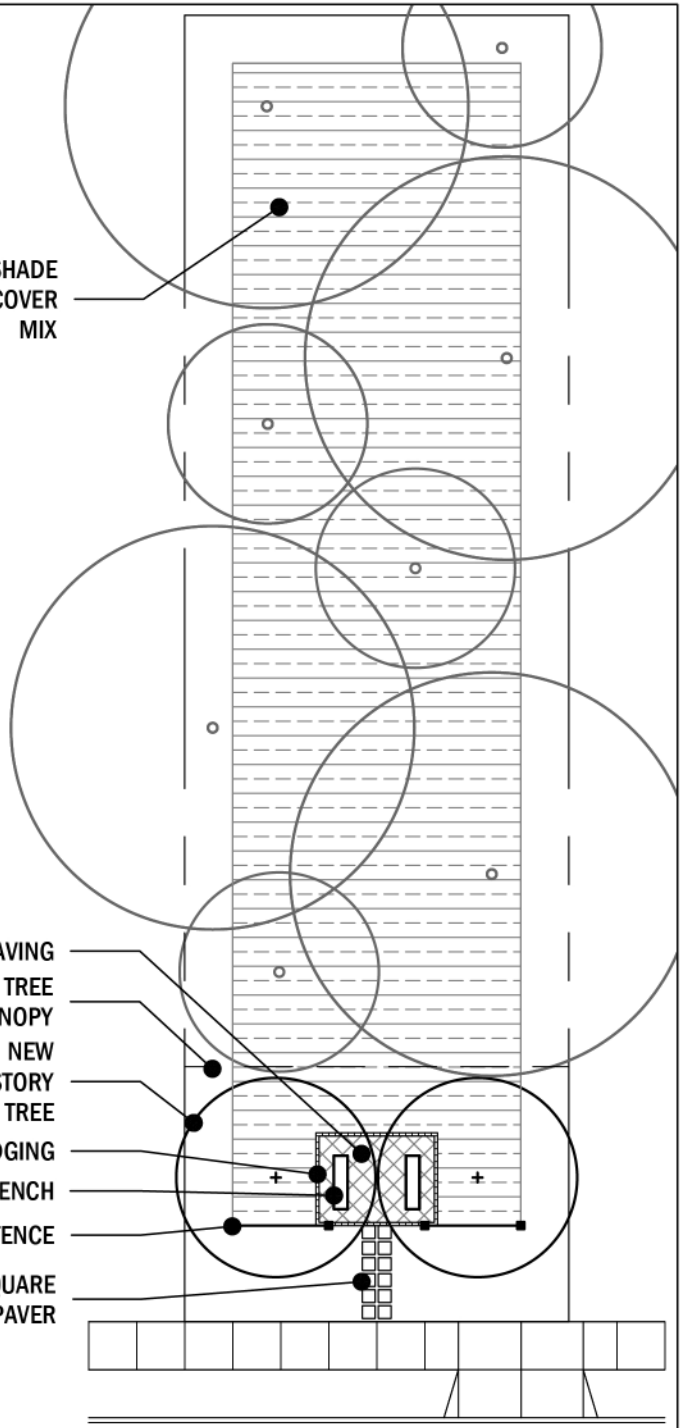
SPLIT RAIL FENCE

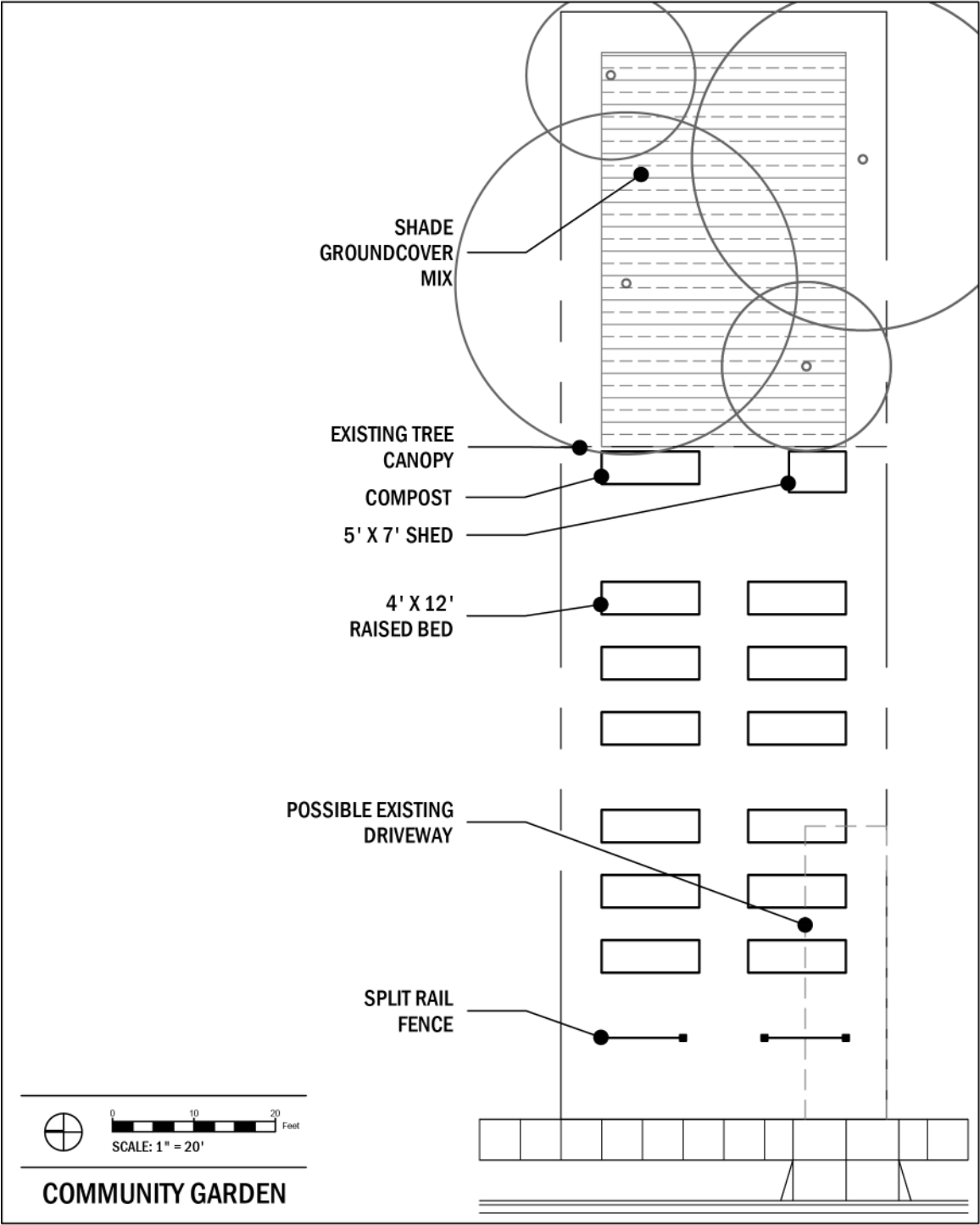
16" SQUARE
PAVER

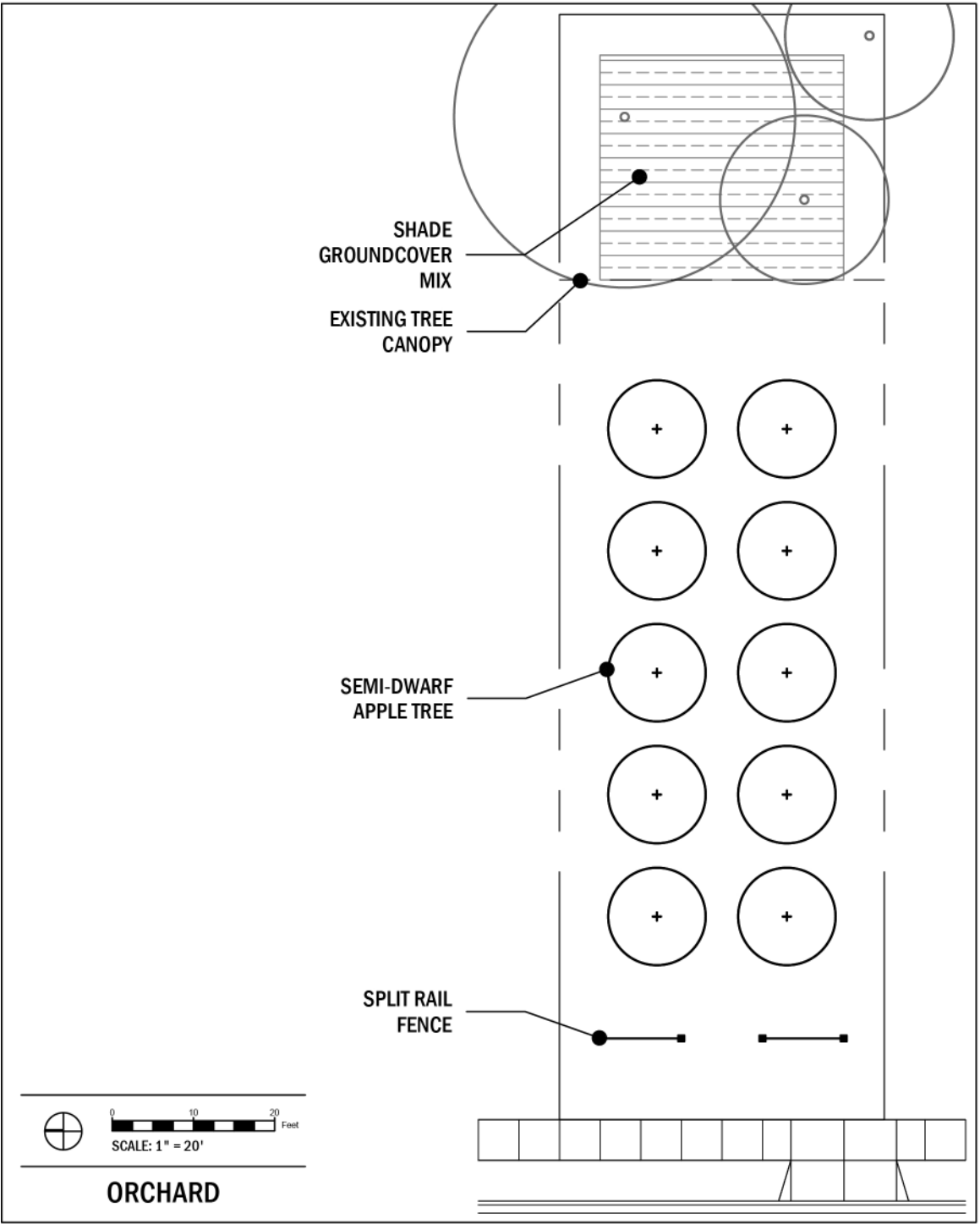


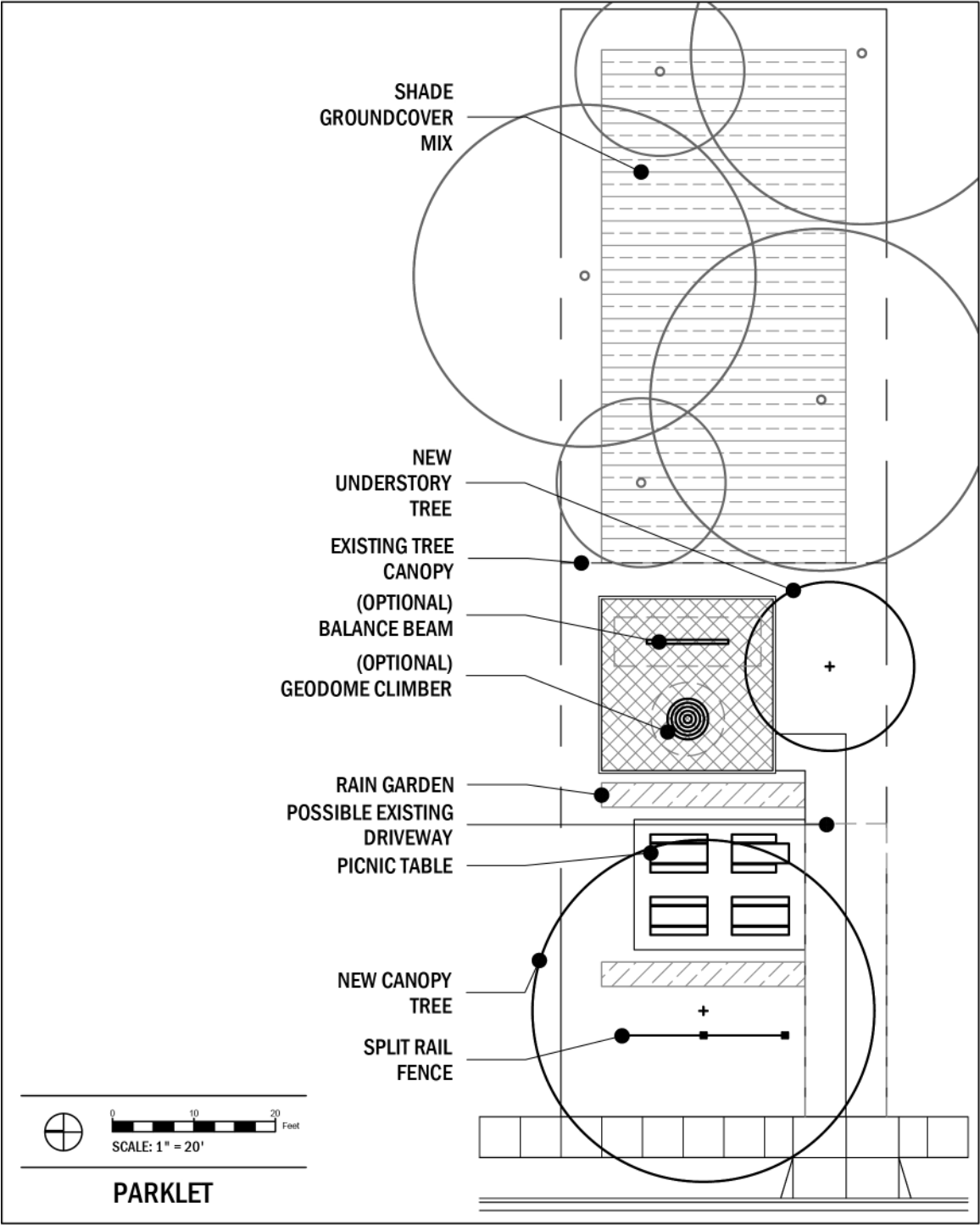
0 10 20 Feet
SCALE: 1" = 20'

WOODLAND RESTORATION









C.2: COST ESTIMATES

PROTOTYPE	CATEGORY	ITEM	COST (\$)	SOURCE
Meadow Restoration	Seed Mix	Pollinator Meadow Seed Mix	\$27.27	https://www.taylorcreeknurseries.com/product/pollinator-seed-mix-diversity-meadow-low-growing-pollinator-meadow-20-20/
		First Season Cover Crop	\$17.27	https://www.taylorcreeknurseries.com/product/327-conservation-cover-cp2-crp-15-20/
		Savanna and Open Woodland Mix	\$17.84	https://www.taylorcreeknurseries.com/product/special-use-savanna-and-open-woodland-mix-20-25/
		Fescue Lawn Mix	\$23.45	https://www.ernstseed.com/product/tall-fescue-raptor-iii-turf-type/
	Fence	Cedar Split-Rail Fence	\$111.24	https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-rail-fence-post/1731019/p-1444425723709-c-5774.htm
				https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-fence-rail-10-hand-split-fence-rail/1731006/p-1444425723668-c-5774.htm
	Site Furnishings	DIY Wooden Bench (x2)	\$93.44	https://www.iowadnr.gov/About-DNR/DNR-News-Releases/ArticleID/1218/Build-a-Leopold-bench
	Hardscape/ Ground Cover	Pavers (x12)	\$52.56	https://www.lowes.com/pd/Square-Gray-Concrete-Patio-Stone-Common-16-in-x-16-in-Actual-16-in-x-16-in/3034746?cm_mmc=shp-_-c-_-prd-_-lwn-_-ggl-_-LIA_LWN_236_Hardscapes-_-3034746-_-local-_-0-_-0&gad_source=1&gclid=Cj0KCQiAn-2tBhDVARIsAGmStVIM2njbkgLLzzwZoRGu3kdF8n7Va0VgVd1vMnZOGF3ldjHCJvDdaYlaAgvpEALw_wcB&gclsrc=aw.ds
	Other	Germination Blanket	\$181.72	https://www.homedepot.com/p/4-ft-x-112-5-ft-Green-Single-Net-Seed-Germination-and-Erosion-Control-Blanket-87361/305429573?source=shoppingads&locale=en-US&srsId=AfmBO-ooOllvHsOMQvMTShhzsC7fLkvfqA6Hm7WwVDzIIJGd_R9oFuJ2JJE
		Total	\$524.79	

Cost Estimates cont.

PROTOTYPE	CATEGORY	ITEM	COST (\$)	SOURCE
Woodland Restoration	Seed Mix	Savanna and Open Woodland Mix	\$65.42	https://www.taylorcreeknurseries.com/product/special-use-savanna-and-open-woodland-mix-20-25/
		First Season Cover Crop	\$23.75	https://www.taylorcreeknurseries.com/product/327-conservation-cover-cp2-crp-15-20/
		Fescue Lawn Mix	\$33.15	https://www.ernstseed.com/product/tall-fescue-raptor-iii-turf-type/
	New Trees	2" Caliper Understory Tree (see species list) (x2)	\$599.98	https://store.suburbanlg.com/departments/trees-%7C56.html
	Fence	Cedar Split-Rail Fence	\$111.24	https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-rail-fence-post/1731019/p-1444425723709-c-5774.htm
				https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-fence-rail-10-hand-split-fence-rail/1731006/p-1444425723668-c-5774.htm
	Site Furnishings	DIY Wooden Bench (x2)	\$93.44	https://www.iowadnr.gov/About-DNR/DNR-News-Releases/ArticleID/1218/Build-a-Leopold-bench
	Hardscape/ Ground Cover	Pavers (x12)	\$52.56	https://www.lowes.com/pd/Square-Gray-Concrete-Patio-Stone-Common-16-in-x-16-in-Actual-16-in-x-16-in/3034746?cm_mmc=shp_-_c_-_prd_-_lwn_-_ggl_-_LIA_LWN_236_Hardscapes_-_3034746_-_local_-_0_-_0&gad_source=1&gclid=Cj0KCQiAn-2tBhDVARIsAGmStVIM2njbkgLLzZwZoRGu3kdF8n7Va0VgVd1vMnZOGF3ldjHCJvDdaYlaAgvpEALw_wcB&gclsrc=aw.ds
		Mulch	\$30.99	https://kcmulch.com/product/estate-mulch
		Edging	\$85.68	https://www.lowes.com/pd/EasyFlex-Black-Plastic-Landscape-Edging-Roll/1001518344?user=shopping&feed=yes&srsId=AfmBOoouEpxlC5ytqQzUKl5Tc5ctV3fJ8g58eV0JkhWorYtT-mQMDTqcxw
	Other	Germination Blanket	\$181.72	https://www.homedepot.com/p/4-ft-x-112-5-ft-Green-Single-Net-Seed-Germination-and-Erosion-Control-Blanket-87361/305429573?source=shoppingads&locale=en-US&srsId=AfmBOoOllvHsOMQvMTShhzsC7fLkvfqQa6Hm7WwVDzIIJGd_R9oFuJ2JJE
		Total	\$1,277.93	

Cost Estimates cont.

PROTOTYPE	CATEGORY	ITEM	COST (\$)	SOURCE
Community Garden	Seed Mix	Fescue Lawn Mix	\$60.98	https://www.ernstseed.com/product/tall-fescue-raptor-iii-turf-type/
		Savanna and Open Woodland Mix	\$26.15	https://www.taylorcreeknurseries.com/product/special-use-savanna-and-open-woodland-mix-20-25/
		First Season Cover Crop	\$9.49	https://www.taylorcreeknurseries.com/product/327-conservation-cover-cp2-crp-15-20/
	Fence	Cedar Split-Rail Fence	\$111.24	https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-rail-fence-post/1731019/p-1444425723709-c-5774.htm
				https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-fence-rail-10-hand-split-fence-rail/1731006/p-1444425723668-c-5774.htm
	Site Furnishings	Shed	\$466.00	Average Pre-Fabricated Price From Multiple Sellers
		Concrete Slab for Shed	\$210.00	https://www.angi.com/articles/concrete-slab-cost.htm
		Double-Bin Compost Station	\$366.48	https://kccg.org/gardening-guidesheets/
		Raised Bed (x12)	\$531.48	https://kccg.org/gardening-guidesheets/
		Soil	\$916.98	https://kcmulch.com/product-category/soils
	Produce Seeds and Plants	Seeds Available from KCCG	\$360.00	https://kccg.org/store/
	Other	Germination Blanket	\$181.72	https://www.homedepot.com/p/4-ft-x-112-5-ft-Green-Single-Net-Seed-Germination-and-Erosion-Control-Blanket-87361/305429573?source=shoppingads&locale=en-US&srsitid=AfmBO-ooOllvHsOMQvMTShhzsC7fLkvfqA6Hm7WwVDzIIGd_R9oFuJ2JJE
		Total	\$3,240.51	

Cost Estimates cont.

PROTOTYPE	CATEGORY	ITEM	COST (\$)	SOURCE
Orchard	Seed Mix	Fescue Lawn Mix	\$60.98	https://www.ernstseed.com/product/tall-fescue-raptor-iii-turf-type/
		Savanna and Open Woodland Mix	\$26.15	https://www.taylorcreeknurseries.com/product/special-use-savanna-and-open-woodland-mix-20-25/
		First Season Cover Crop	\$9.49	https://www.taylorcreeknurseries.com/product/327-conservation-cover-cp2-crp-15-20/
	Fence	Cedar Split-Rail Fence	\$111.24	https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-rail-fence-post/1731019/p-1444425723709-c-5774.htm
				https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-fence-rail-10-hand-split-fence-rail/1731006/p-1444425723668-c-5774.htm
	New Trees	Semi-Dwarf Apple (x10)	\$449.90	https://www.starkbros.com/products/fruit-trees/apple-trees/liberty-apple
	Other	Mulch	\$108.47	https://kcmulch.com/product/estate-mulch
		compost	\$45.00	https://www.kccompost.com/compost
		Tree Stakes	\$100.00	Average Price From Multiple Sellers
		Deer Guards	\$30.00	Average Price From Multiple Sellers
		Germination Blanket	\$181.72	https://www.homedepot.com/p/4-ft-x-112-5-ft-Green-Single-Net-Seed-Germination-and-Erosion-Control-Blanket-87361/305429573?source=shoppingads&locale=en-US&srsId=AfmBO-ooOllvHsOMQvMTShhzsC7fLkvfqqA6Hm7WwVDzIIGd_R9oFuJ2JjE
		Total	\$1,122.94	

Cost Estimates cont.

PROTOTYPE	CATEGORY	ITEM	COST (\$)	SOURCE
Parklet	Seed Mix	First Season Cover Crop	\$12.37	https://www.taylorcreeknurseries.com/product/327-conservation-cover-cp2-crp-15-20/
		Savanna and Open Woodland Mix	\$34.06	https://www.taylorcreeknurseries.com/product/special-use-savanna-and-open-woodland-mix-20-25/
		Fescue Lawn Mix	\$43.36	https://www.ernstseed.com/product/tall-fescue-raptor-iii-turf-type/
	New Trees	2" Caliper Understory Tree (see species list)	\$299.99	https://store.suburbanlg.com/departments/trees-%7C56.html
		2" Caliper Shade Tree (see species list)	\$299.99	https://store.suburbanlg.com/departments/trees-%7C56.html
	Fence	Cedar Split-Rail Fence	\$111.24	https://www.kccompost.com/compost
				https://www.menards.com/main/building-materials/fencing/wood-fencing/cedar-split-fence-rail-10-hand-split-fence-rail/1731006/p-1444425723668-c-5774.htm
	Site Furnishings	Picnic Tables	\$429.08	https://www.bobsplans.com/BobsPlans/PicnicTable/FreePicnicTablePlans.htm
	Playground Equipment (Balance beam + geodome OR swing set)	12' aluminum balance beam	\$600.00	Albro, et al (2019) from https://www.sportsplayinc.com/product_detail.php?product=508
		8' geodome climber	\$700.00	Albro, et al (2019) from https://www.sportsplayinc.com/product_detail.php?product=335
		8' two seat swing set	\$800.00	Albro, et al (2019) from https://www.sportsplayinc.com/product_detail.php?product=305
	Hardscape/ Ground Cover	Concrete Slab and Walk	\$3,532.80	https://www.angi.com/articles/concrete-slab-cost.htm
		Playground Mulch	\$734.69	https://kcmulch.com/product/playground-chips
		Playground edging	\$600.00	https://www.activelyplay.com/collections/playground-borders/products/12-playground-border-with-spike
	Other	Rain garden	\$1,694.50	Average estiamte by the EPA Stormwater Calcuator
		Germination Blanket	\$181.72	https://www.homedepot.com/p/4-ft-x-112-5-ft-Green-Single-Net-Seed-Germination-and-Erosion-Control-Blanket-87361/305429573?source=shoppingads&locale=en-US&srsId=AfmBO-ooOllvHsOMQvMTShhzsC7fLkvfqQA6Hm7WwVDzIIJGd_R9oFuJ2JJE
		Total	\$9,273.79	

Appendix D: Vacant Lot Typology Assessment

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA306101334000000000	30967.16	N	Y	5+	N/A	N/A
JA301301623000000000	3756.71	N	Y	4	1.82	N
JA306100508000000000	6599.88	N	Y	5+	N/A	N/A
JA306101707000000000	5222.63	N	Y	5+	N/A	N/A
JA314200805000000000	5411.78	N	Y	0	2.86	Y
JA314100713000000000	5550.64	N	Y	4	2.12	N
JA314100711000000000	5547.02	N	Y	5	2.46	N/A
JA314100722020000000	4150.5	N	Y	5+	2.84	N/A
JA314101120000000000	5545.08	N	Y	3	3.77	N
JA313400902000000000	13943.14	N	Y	5+	N/A	N/A
JA314100630000000000	11717.54	N	Y	5+	1.85	Y
JA314100706000000000	5535.82	N	N	0	1.94	N
JA313300527000000000	5414.24	N	Y	5+	N/A	N/A
JA313300124000000000	4384.13	N	Y	1	2.35	N
JA312302118000000000	6758.06	N	Y	5+	N/A	N/A
JA312302213000000000	6730.11	N	Y	5+	N/A	N/A
JA314101804000000000	52202.51	N	Y	5+	N/A	N/A
JA314102031000000000	131969.95	N	Y	5+	N/A	N/A
JA314202001000000000	4149.25	N	Y	3	0.85	N
JA314202020000000000	2785.58	N	Y	3	2.71	Y
JA314201212000000000	4735.62	N	Y	5+	N/A	N/A
JA311201801000000000	8710.01	N	Y	5+	N/A	N/A
JA312300731000000000	11126.32	N	Y	5+	N/A	N/A
JA312302311000000000	6722.98	N	Y	5+	N/A	N/A
JA313401323000000000	7110.28	N	Y	2	1.9	Y
JA312301034000000000	108372.03	N	Y	5+	N/A	N/A
JA312300307000000000	6202.48	N	Y	3	2.93	Y
JA313400414000000000	4021.6	N	Y	0	3.27	Y
JA313302939000000000	4596.78	N	Y	2	2.35	Y
JA314100528000000000	5262.1	N	Y	4	1.64	Y
JA314201709000000000	3347.79	N	Y	2	1.87	N
JA314201826000000000	4077.9	N	N	0	3.68	N
JA312302049000000000	6916.23	N	Y	5+	N/A	N/A
JA315300302000000000	7775.49	N	Y	2	1.51	Y

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TPOLOGY CLASSIFICATION
LONG TERM	AGGREGATED	NATURAL AREA, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	CORNER LOT, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	RESIDENTIAL	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	NATURAL AREA, OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	NATURAL AREA, INDUSTRIAL, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	NATURAL AREA, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	NATURAL AREA, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	NATURAL AREA, VACANT LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	NATURAL AREA, OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	NATURAL AREA, OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA313400419000000000	8203.27	N	Y	5+	N/A	N/A
JA313400423000000000	3754.79	N	Y	5+	N/A	N/A
JA312300717000000000	5435.21	N	Y	5+	N/A	N/A
JA313401302000000000	4796.81	N	Y	5+	N/A	N/A
JA314201814000000000	3782.28	N	Y	3	3.68	N
JA314202613000000000	3906.35	N	N	5+	N/A	N/A
JA314102311000000000	6010.97	N	Y	3	3.3	N
JA314100819000000000	5453.99	N	Y	5+	3.95	N/A
JA315201001000000000	7691.13	N	Y	5+	N/A	N/A
JA314201121000000000	6378.75	N	Y	3	2.4	N
JA314100913000000000	2748.43	N	Y	5+	3	N/A
JA312301801000000000	6610.37	N	Y	5+	N/A	N/A
JA313401320000000000	16205.66	N	Y	5+	N/A	N/A
JA314101313000000000	5244.47	N	Y	5+	1.21	N/A
JA315201803000000000	14085.66	N	Y	5+	N/A	N/A
JA315201811000000000	6920.06	N	N	0	2.76	N
JA314202508000000000	3736.99	N	Y	3	1.77	N
JA314201804000000000	3823.37	N	Y	4	5.06	N/A
JA314101319000000000	5249.37	N	Y	5+	2.84	N/A
JA314201211000000000	4734.83	N	Y	5+	N/A	N/A
JA314201105000000000	4996.81	N	Y	0	2.66	Y
JA314201803000000000	3834.1	N	Y	5+	N/A	N/A
JA314202123000000000	4829.75	N	Y	4	2.48	N
JA314202122000000000	4832.13	N	Y	0	2.06	N
JA306100634000000000	75359.15	N	Y	5+	N/A	N/A
JA306100509000000000	3299.92	N	Y	5+	N/A	N/A
JA306100526000000000	6638.66	N	Y	3	1.5	Y
JA301301624000000000	3754.33	N	N	0	1.04	N
JA301301622000000000	6764.68	N	Y	5+	N/A	N/A
JA301301610000000000	3206.7	N	Y	3	3.27	Y
JA313301405000000000	4474.23	N	N	0	1.34	N
JA313301007000000000	5039.36	N	Y	4	2.55	N
JA314100610000000000	5583.73	N	Y	3	3.77	N
JA313401402000000000	5430.47	N	N	0	1.57	Y
JA313300922000000000	4507.06	N	Y	3	2.43	N

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TPOLOGY CLASSIFICATION
LONG TERM	AGGREGATED	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	NATURAL AREA, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	NATURAL AREA, VACANT LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LAND	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, VACANT LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	CORNER LOT, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	NATURAL AREA, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT, COMMERCIAL	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, VACANT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA315200813000000000	18405.25	N	Y	5+	N/A	N/A
JA315200904000000000	7310.28	N	Y	5+	N/A	N/A
JA314201306000000000	5089.78	N	Y	2	5.39	N/A
JA314201328000000000	5069.76	N	Y	5+	N/A	N/A
JA313300924000000000	4506.32	N	Y	1	2.26	N
JA313401403000000000	5474.33	N	Y	5+	N/A	N/A
JA313401414000000000	12117.05	N	Y	5+	N/A	N/A
JA314100527000000000	5263.2	N	Y	2	1.52	Y
JA314201101000000000	8132.72	N	Y	5+	N/A	N/A
JA314101210000000000	5270.27	N	Y	0	2.5	N
JA312400301000000000	5548.34	N	Y	4	N/A	N/A
JA314100720000000000	5531.16	N	Y	5+	2.88	N
JA314100723000000000	5532.61	N	Y	5+	2.14	N/A
JA313400807000000000	5780.92	N	Y	5+	N/A	N/A
JA314100605000000000	5589.31	N	Y	5+	2.37	N/A
JA315200303000000000	6819.46	N	Y	4	2.49	Y
JA313300618000000000	4070.39	N	Y	4	3.59	Y
JA315200302000000000	6833.54	N	Y	5+	N/A	N/A
JA314100525000000000	5287.29	N	Y	4	4.69	N
JA314100619000000000	5512.06	N	Y	4	3.1	N
JA314202033000000000	3916.63	N	Y	3	2.15	Y
JA313300713000000000	4650.03	N	Y	5+	N/A	N/A
JA314100608000000000	5585.81	N	Y	5+	3.58	N/A
JA314101126000000000	5527.67	N	Y	5+	3.24	N/A
JA301400905000000000	6148.1	N	Y	5+	N/A	N/A
JA301303110000000000	4620.78	N	Y	4	2.37	Y
JA306100116000000000	8410.08	N	N	0	2.68	N
JA301400941000000000	9717.49	N	Y	5+	N/A	N/A
JA301302908000000000	3592.04	N	Y	3	3.09	N
JA301402110000000000	3682.35	N	Y	4	3.02	Y
JA314103112000000000	4613.59	N	Y	5+	N/A	N/A
JA314101501000000000	6668.05	N	Y	5+	3.65	N/A
JA314100219000000000	5526.51	N	Y	5+	2.45	N/A
JA315201020000000000	11156.9	N	Y	5+	N/A	N/A
JA315200917000000000	5545.73	N	Y	5+	N/A	N/A
JA315200916000000000	5594.74	N	N	0	3.26	N
JA306101408000000000	4404.64	N	Y	5+	N/A	N/A

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TYPOLGY CLASSIFICATION
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	COMMERCIAL, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, COMMERCIAL	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME, CHURCH	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA306201423000000000	4718.22	N	Y	4	3.06	N
JA306201425000000000	4738.48	N	Y	3	3.44	N
JA315200405000000000	8552.56	N	N	0	1.91	N
JA306200337000000000	4696.06	N	Y	4	3.66	N
JA314202220000000000	5856.76	N	N	0	2.67	N
JA314100810000000000	5477.16	N	Y	4	2.57	N
JA315200509000000000	7068.55	N	N	0	4.21	N
JA313400435000000000	5143.08	N	Y	4	2.89	Y
JA312301934000000000	7520.39	N	Y	5+	N/A	N/A
JA314101304000000000	5298.81	N	Y	4	2.38	Y
JA314100307000000000	5552.71	N	Y	4	3.68	N
JA315201709000000000	6849.79	N	Y	5+	N/A	N/A
JA312301940000000000	7500.8	N	Y	4	3.28	N
JA312301944000000000	7491.18	N	Y	5+	N/A	N/A
JA314101401000000000	6633.68	N	Y	5+	3.05	N/A
JA314100324000000000	5521.74	N	Y	5+	2.7	N/A
JA314100301000000000	6155.16	N	Y	3	2.74	N
JA312300628000000000	11181.21	N	Y	5+	N/A	N/A
JA312300732000000000	27171.2	N	Y	5+	N/A	N/A
JA312300911000000000	7162.02	N	N	2	3.56	N
JA312302023000000000	13695.76	N	Y	5+	N/A	N/A
JA312300830020000000	25726.3	N	Y	5+	N/A	N/A
JA312302112000000000	7506.56	N	Y	5+	N/A	N/A
JA312301901000000000	11773.36	N	Y	5+	N/A	N/A
JA314101406000000000	5571.5	N	Y	4	3.62	Y
JA314101410000000000	5576.4	N	N	0	3.06	Y
JA312301954000000000	23247.96	N	Y	5+	N/A	N/A
JA312300733000000000	11121.28	N	Y	4	2.92	N
JA313302702000000000	5085.92	N	N	0	2.75	N
JA314101506000000000	5566.43	N	Y	5+	3.6	N/A
JA315200517000000000	6971.57	N	Y	5+	N/A	N/A
JA315200422000000000	6997.92	N	Y	5+	N/A	N/A
JA315200803000000000	18332.24	N	Y	5+	N/A	N/A
JA315200814000000000	9177.57	N	Y	5+	N/A	N/A
JA306102421000000000	3323.61	N	N	0	2.34	N
JA306101434000000000	4383.11	N	N	0	5.3	N/A
JA306101218000000000	7267.53	N	Y	3	0.82	Y

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TPOLOGY CLASSIFICATION
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, COMMERCIAL, OCCUPIED RESIDENTIAL	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	CORNER LOT, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT, INDUSTRIAL	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA306101402000000000	4279.97	N	N	0	2.42	Y
JA314201815000000000	3782.85	N	N	0	3.34	N
JA314200117000000000	5549.04	N	Y	1	1.95	N
JA301401311000000000	6881.58	N	Y	5+	N/A	N/A
JA313302533000000000	4643.13	N	N	0	1.66	N
JA301300309000000000	3456.17	N	Y	5+	N/A	N/A
JA313300316000000000	4484.14	N	Y	4	2.12	N
JA312301928000000000	6743.83	N	Y	2	4.05	N
JA314101513000000000	5582.26	N	Y	2	2.48	N
JA301300205000000000	3290.38	N	Y	2	1.93	N
JA301300438000000000	3942.6	N	Y	1	1.4	N
JA313302833000000000	4702.05	N	Y	0	2.75	Y
JA314201213000000000	4735.72	N	Y	4	3.58	N
JA301400923000000000	4655.37	N	Y	4	3.45	N
JA306201421000000000	4714.05	N	Y	3	3.21	N
JA314100509000000000	10530.48	N	Y	4	1.34	Y
JA314202514000000000	3730.93	N	N	2	1.84	N
JA314200604000000000	5513.13	N	N	0	2.64	N
JA313401207000000000	6949.61	N	Y	2	2.84	N
JA314100313000000000	5562.6	N	Y	2	3.59	N
JA314100827000000000	5441.89	N	Y	4	3.18	N
JA312302316020000000	6732.06	N	Y	5+	N/A	N/A
JA314101306000000000	5303.88	N	Y	5+	1.99	N/A
JA312300716000000000	5434.71	N	Y	5+	N/A	N/A
JA312302119000000000	7548.19	N	Y	5+	N/A	N/A
JA314202428000000000	4684.4	N	Y	3	1.77	N
JA315200515000000000	9799.78	N	Y	5+	N/A	N/A
JA312401650000000000	9137.68	N	N	0	1.37	Y
JA313300601000000000	2850.53	N	N	0	1.81	N
JA301402130000000000	4352.87	N	Y	3	2.82	N
JA315201025000000000	6953.41	N	Y	5+	N/A	N/A
JA312302043000000000	6904.61	N	Y	5+	N/A	N/A
JA315200905000000000	7015.92	N	Y	5+	N/A	N/A
JA314201914000000000	3891.53	N	N	0	3.66	N
JA312301902000000000	7660.75	N	Y	5+	N/A	N/A
JA301402232000000000	4562.91	N	Y	3	4.03	Y

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TYOLOGY CLASSIFICATION
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, NATURAL AREA	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT, NATURAL AREA	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA31330294000000000	4596.86	N	Y	2	1.28	Y
JA30610061600000000	7705.4	N	N	0	2.22	N
JA31330131800000000	5557.72	N	N	0	2.1	N
JA31420080700000000	4576.24	N	Y	1	3.27	Y
JA31420180500000000	3924.27	N	Y	3	4.7	N
JA31330071700000000	4049.44	N	Y	0	3.79	N
JA31340150200000000	5428.96	N	Y	4	1.22	N
JA30140210400000000	3280.79	N	Y	3	2.51	N
JA31340020700000000	4401.24	N	N	1	1.95	N
JA31340201700000000	5715.79	N	Y	3	2.88	N
JA31410072700000000	6913.73	N	Y	3	2.84	N
JA31410032600000000	5512.87	N	Y	5+	3.45	N/A
JA31520181000000000	6928.53	N	N	0	2.7	N
JA31520091800000000	5548.22	N	Y	5+	N/A	N/A
JA31520171100000000	6818.21	N	Y	3	1.87	Y
JA31340020500000000	4395.43	N	Y	3	2.08	N
JA31230192700000000	13336.51	N	Y	4	4.24	N
JA30130192100000000	2663.5	N	Y	4	2.4	Y
JA31420131100000000	5071.27	N	Y	1	5.3	N/A
JA31330121100000000	4717.72	N	Y	3	2.06	N
JA31410120900000000	5269.61	N	N	0	2.49	N
JA31410031200000000	8341.54	N	Y	4	3.93	N
JA31330092600000000	4506.07	N	Y	2	1.64	N
JA31330191100000000	4510.77	N	N	0	1.87	Y
JA31230193800000000	7508.59	N	Y	0	N/A	N/A
JA30610213100000000	19150.2	N	Y	5+	N/A	N/A
JA31520181300000000	7029.35	N	Y	3	1.03	N
JA31420141300000000	5259.53	N	N	0	2.06	N
JA31520080600000000	9215.89	N	Y	2	2.24	N
JA31340222000000000	9268.9	N	Y	5+	N/A	N/A
JA30610242600000000	6543.94	N	Y	5+	N/A	N/A
JA31520041900000000	6995.29	N	Y	5+	N/A	N/A
JA31230040500000000	4890.89	N	N	0	2.96	N
JA30140274000000000	12016.65	N	N	0	3.84	N

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TPOLOGY CLASSIFICATION
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, INDUSTRIAL	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT, COMMERCIAL	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	COMMERCIAL, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT, NATURAL AREA	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	VACANT LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT, NATURAL AREA	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	PERMANENT OPEN SPACE, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA312301019000000000	6860.49	N	Y	5+	N/A	N/A
JA306201514000000000	4670.74	N	Y	2	4.01	N
JA306102908000000000	4060.73	N	Y	1	1.81	N
JA315200519000000000	6968.06	N	Y	5+	N/A	N/A
JA313402027000000000	6191.07	N	Y	4	3.68	N
JA314100915000000000	5485.93	N	Y	1	3.32	Y
JA313302729000000000	4387.04	N	N	0	2.17	Y
JA301300105000000000	3214.63	N	N	0	2.26	Y
JA301303008000000000	3257.07	N	Y	5+	N/A	N/A
JA315202117000000000	5749.59	N	N	0	2.62	N
JA315200113000000000	7632.11	N	Y	1	2.89	N
JA314201017000000000	11089.59	N	N	0	3.35	N
JA313301806000000000	13160.09	N	Y	5+	N/A	N/A
JA301301835000000000	10705.62	N	Y	4	1.46	Y
JA313300633000000000	4690.07	N	Y	2	4.03	N
JA306200314000000000	4686.62	N	Y	3	3.77	N
JA306101931000000000	4125.9	N	Y	4	2.82	N
JA301402801000000000	19940.48	N	Y	5+	N/A	N/A
JA301402229000000000	4144.5	N	N	0	2.47	Y
JA301401414000000000	3411.93	N	N	0	0.45	Y
JA314100607000000000	5588.58	N	Y	3	3.19	N
JA301401524000000000	5754.55	N	Y	5+	N/A	N/A
JA301300440000000000	3945.26	N	Y	2	1.03	N
JA301303124000000000	3390.15	N	Y	5+	N/A	N/A
JA301300441000000000	3945.31	N	Y	3	1.12	N
JA301401118000000000	3629.2	N	N	0	1.42	N
JA301400626000000000	4834.28	N	Y	2	1.81	N
JA301402231000000000	4696.4	N	Y	1	3.02	Y
JA301300436000000000	3580.84	N	Y	2	2.29	N
JA313400437000000000	3098.27	N	Y	5+	N/A	N/A
JA313402107000000000	8999.07	N	Y	5+	2.29	N/A
JA313301119000000000	4707.27	N	Y	4	1.03	N
JA315201237000000000	9835.79	N	Y	5+	N/A	N/A
JA312301020000000000	6856.87	N	Y	5+	N/A	N/A
JA314201813000000000	3780.75	N	Y	3	3.84	N
JA312101901000000000	9284.76	N	Y	5+	N/A	N/A
JA314200815000000000	4574.34	N	Y	3	4.36	N

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TPOLOGY CLASSIFICATION
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	VACANT LOT, COMMERCIAL	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	SHORT TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOTS	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, INDUSTRIAL	LOW	SHORT TERM LOW ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA31230203500000000	6775.47	N	Y	4	2.1	N
JA31230193300000000	7533.26	N	Y	5+	N/A	N/A
JA31410131200000000	10634.03	N	Y	5+	0.76	N/A
JA31410110100000000	6722.15	N	N	0	3.12	Y
JA31330071500000000	4593.72	N	Y	4	5.23	N/A
JA30140143600000000	6819.3	N	Y	1	1.97	N
JA31410132000000000	5248.03	N	Y	2	2.24	N
JA31410071200000000	5549.47	N	Y	5+	2	N/A
JA31240142400000000	8792.07	N	Y	5+	N/A	N/A
JA31420190100000000	4088.9	N	N	0	1.98	Y
JA31340093300000000	14220.08	N	Y	5+	N/A	N/A
JA31420123000000000	10560.27	N	Y	5+	N/A	N/A
JA31230181701000000	53937.3	N	Y	5+	N/A	N/A
JA31340141300000000	6556.39	N	Y	5+	N/A	N/A
JA31230221400000000	6815.51	N	Y	5+	N/A	N/A
JA31230231500000000	15027.82	N	Y	5+	N/A	N/A
JA31230230800000000	6612.29	N	Y	5+	N/A	N/A
JA31230230900000000	6723.42	N	Y	5+	N/A	N/A
JA31420192700000000	3902.71	N	Y	1	2.83	N
JA31340202600000000	6198.99	N	Y	3	3.59	N
JA31230231000000000	6725.73	N	Y	5+	N/A	N/A
JA31340133700000000	4377.59	N	Y	4	1.97	Y
JA31340132100000000	150409.92	N	Y	5+	N/A	N/A
JA31420252100000000	3957.04	N	Y	3	1.23	Y
JA31410081800000000	5455.82	N	Y	2	3.68	N
JA31520102100000000	7209.68	N	Y	5+	N/A	N/A
JA31420252000000000	4066.82	N	N	0	1.2	Y
JA31520182800000000	9205.65	N	Y	3	2.02	N
JA31520081100000000	7404.8	N	Y	5+	N/A	N/A
JA31520092200000000	6945.23	N	Y	5+	N/A	N/A
JA31410131700000000	5250.38	N	Y	1	2.45	Y
JA31520102400000000	6955.89	N	Y	3	1.49	N
JA31520102200000000	6964.68	N	Y	5+	N/A	N/A

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TPOLOGY CLASSIFICATION
SHORT TERM	SINGLE	VACANT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME, VACANT COMMERCIAL	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, VACANT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, VACANT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT, NATURAL SPACE	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT, NATURAL AREA	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	CORNER LOT, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	AGGREGATED	VACANT LOTS	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, NATURAL AREA	LOW	SHORT TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	SHORT TERM HIGH ACTIVITY
LONG TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	HIGH	LONG TERM HIGH ACTIVITY

Vacant Lot Typology Assessment cont.

PARCEL	AREA (SF)	EXISTING HOUSE	> 30% TREE CANOPY	ESTIMATED MATURE TREES	SLOPE (%)	COLLECTING STORMWATER
JA314202017000000000	3936.18	N	Y	3	1.54	Y
JA313402101000000000	7444.24	N	Y	5	N/A	N/A
JA313402110000000000	6106.93	N	Y	2	2.5	N
JA314202124000000000	4808.78	N	Y	3	2.48	N
JA315100705000000000	8081.15	N	Y	4	0.5	N

LONG / SHORT TERM	SIZE	ADJACENCIES	HIGH / LOW ACTIVITY	TPOLOGY CLASSIFICATION
LONG TERM	SINGLE	OCCUPIED HOME	LOW	LONG TERM LOW ACTIVITY
LONG TERM	SINGLE	CORNER LOT, OCCUPIED HOME	HIGH	LONG TERM HIGH ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	AGGREGATED	OCCUPIED HOME, VACANT LOT	LOW	SHORT TERM LOW ACTIVITY
SHORT TERM	SINGLE	OCCUPIED HOME, NATURAL AREA	LOW	SHORT TERM LOW ACTIVITY

Appendix E: Ecosystem Services Assessment Data

E.1: LAND COVER

E.1.1: EXISTING CONDITIONS

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/SHRUB
JA314100713000000000	2940.012185	52.96708946	0	0
JA314100711000000000	722.5181356	13.025345	299.1037906	5.392155394
JA314100722020000000	97.65917734	2.35294954	72.35764275	1.743347496
JA314101120000000000	1809.029898	32.62405671	1924.55778	34.70748729
JA314100630000000000	7769.088918	66.30306644	0	0
JA314100706000000000	2162.110732	39.05671329	2300.186988	41.55094482
JA314100528000000000	340.8594906	6.477630256	252.5496315	4.799406146
JA314100819000000000	0	0	0	0
JA314100913000000000	175.2521376	6.376443037	129.8478229	4.724434506
JA314101313000000000	459.314886	8.758075697	0	0
JA314101319000000000	860.795434	16.39807798	0	0
JA314100610000000000	1375.048501	24.62597872	1462.861556	26.19863774
JA314100527000000000	888.904378	16.88903408	0	0
JA314101210000000000	1718.574926	32.60887717	1828.326193	34.69133835
JA314100720000000000	16.16462156	0.29224643	11.97669225	0.21653124
JA314100723000000000	678.2960177	12.25996121	280.7969794	5.075306334
JA314100605000000000	483.28407	8.646585133	0	0
JA314100525000000000	1031.136225	19.5021509	426.8636846	8.07338525
JA314100619000000000	867.6242724	15.74047478	359.1739721	6.516148786
JA314100608000000000	101.6945581	1.820587419	75.34753725	1.348909725
JA314101126000000000	96.89476794	1.752905347	71.7912765	1.298762721
JA314101501000000000	1093.857555	16.40445918	452.8286901	6.791021128
JA314100219000000000	38.07435944	0.68894018	28.21005637	0.510449594
JA314100810000000000	1302.374115	23.77825626	1385.546053	25.29677821
JA314101304000000000	684.8468922	12.92454663	283.5088717	5.350427481
JA314100307000000000	727.4641236	13.10105327	301.1513015	5.423496656
JA314101401000000000	259.824235	3.916744265	0	0
JA314100324000000000	341.6381784	6.187142086	253.1265769	4.584177636
JA314100301000000000	661.8929556	10.75346616	274.0065366	4.451656412
JA314101406000000000	604.8751422	10.85659295	250.402639	4.494348228
JA314101410000000000	4745.032255	85.09127565	0	0
JA314101506000000000	626.3934766	11.25305639	259.3106719	4.658473824
JA314101513000000000	1278.419675	22.90147719	1360.06184	24.36400646
JA314100313000000000	1337.386921	24.0424773	1422.794841	25.57787287
JA314100827000000000	609.1370404	11.19347809	648.0376206	11.90831361
JA314101306000000000	525.8220863	9.913914747	389.5921275	7.34541823

AREA TREE CANOPY (SF)	% TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
2527.627306	45.53758734	83	1.495323199	0	0
4423.303626	79.7420202	0	0	101.9952	1.838739545
3957.546569	95.35107334	0	0	22.93689391	0.552629619
1790.158573	32.28373113	0	0	21.3333	0.384724868
3865.451966	32.9885938	83	0.708339752	0	0
796.720173	14.39208035	255.472356	4.614893407	21.3333	0.385368136
4588.635997	87.20158361	0	0	80.0565619	1.521379988
5453.994226	100	0	0	0	0
2402.170146	87.40150798	0	0	41.16090056	1.497614474
4196.20638	80.01197923	335.842	6.403732489	253.1094	4.826212588
3799.621018	72.38244918	335.842	6.397760825	253.1094	4.821712007
2724.48802	48.79332181	0	0	21.3333	0.382061718
3785.348581	71.92098811	335.842	6.380941668	253.1094	4.809036145
1702.032684	32.29499854	0	0	21.3333	0.404785936
5499.223506	99.42258336	0	0	3.796532186	0.06863897
4471.43265	80.81956758	0	0	101.9952	1.843527255
4517.070164	80.81630277	335.842	6.008653346	253.1094	4.528458749
3727.162032	70.49279678	0	0	101.9952	1.92906207
4183.149762	75.89087284	0	0	101.9952	1.85040106
5384.88345	96.4029074	0	0	23.88467068	0.427595456
5336.223455	96.53663274	0	0	22.75735956	0.411699188
5019.222529	75.27271788	0	0	101.9952	1.529610586
5451.28485	98.63880108	0	0	8.942401187	0.161809143
2767.910628	50.53547017	0	0	21.3333	0.38949536
4228.365415	79.79842879	0	0	101.9952	1.924870702
4422.007004	79.63684726	0	0	101.9952	1.836852849
5784.903192	87.20505383	335.842	5.062681037	253.1094	3.815520869
4846.740303	87.7755263	0	0	80.23944977	1.453153974
5117.176037	83.13637258	0	0	101.9952	1.657068447
4614.146833	82.81694925	0	0	101.9952	1.830659406
831.3705179	14.90872435	0	0	0	0
4578.646712	82.25463957	0	0	101.9952	1.832327092
2922.443762	52.35235383	0	0	21.3333	0.382162519
2781.085267	49.99613674	0	0	21.3333	0.383513083
4163.3845	76.50618842	0	0	21.3333	0.392019875
4264.967103	80.41221805	0	0	123.4981262	2.32844897

Land Cover Existing Conditions cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/SHRUB
JA314100727000000000	680.5469202	9.843413443	281.7287947	4.074918162
JA314100326000000000	462.963835	8.397869992	0	0
JA314101209000000000	2200.779504	41.76363651	2341.325216	44.43073698
JA314100312000000000	2769.563434	33.20204915	2946.432706	35.32239135
JA314100915000000000	3449.749483	62.88355922	0	0
JA314100607000000000	776.4171149	13.89292873	321.4165717	5.751312584
JA313402107000000000	2974.173848	33.04978683	0	0
JA314101312000000000	3367.539979	31.66758636	0	0
JA314101101000000000	5299.576369	78.83746524	0	0
JA314101320000000000	1194.86213	22.76783558	494.6419679	9.425294106
JA314100712000000000	1021.217304	18.40207663	0	0
JA314100818000000000	636.4044787	11.66469409	677.0464063	12.4096223
JA314101317000000000	3484.421928	66.36517747	0	0
JA313402110000000000	1249.919251	20.46724229	1329.741328	21.77431697

AREA TREE CANOPY (SF)	% TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
5849.367084	84.60509757	0	0	101.9952	1.475255993
4460.956903	80.91892559	335.842	6.091960626	253.1094	4.591243796
706.168958	13.40078987	0	0	21.3333	0.404836643
2604.214246	31.21981187	0	0	21.3333	0.255747627
2036.182811	37.11644078	0	0	0	0
4388.645088	78.52883749	0	0	101.9952	1.825065441
4992.373553	55.47654242	588.842	6.543364163	443.6818	4.930306585
6233.964155	58.62279273	588.842	5.537337344	443.6818	4.172283567
1422.578323	21.16253476	0	0	0	0
3456.367975	65.86033296	0	0	101.9952	1.943496144
3939.299024	70.98516862	335.842	6.051787603	253.1094	4.560967149
4121.033808	75.53466434	0	0	21.3333	0.391019276
1765.954942	33.63482253	0	0	0	0
3505.931681	57.40911112	0	0	21.3333	0.349329622

E.1.2: LAND COVER SCENARIO I

YEAR 2

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)
JA31410071300000000	2940.012185	52.96708946	0	0	2527.627306
JA31410071100000000	619.8906245	11.17520633	299.1037906	5.392155394	4031.058985
JA31410072202000000	97.65917734	2.35294954	72.35764275	1.743347496	3957.546569
JA31410112000000000	1809.029898	32.62405671	1924.55778	34.70748729	1790.158573
JA31410063000000000	7769.088918	66.30306644	0	0	3865.451966
JA31410070600000000	2162.110732	39.05671329	2300.186988	41.55094482	796.720173
JA31410052800000000	340.8594906	6.477630256	252.5496315	4.799406146	4588.635997
JA31410081900000000	0	0	0	0	5453.994226
JA31410091300000000	175.2521376	6.376443037	129.8478229	4.724434506	2402.170146
JA31410131300000000	459.314886	8.758075697	0	0	4196.20638
JA31410131900000000	860.795434	16.39807798	0	0	3799.621018
JA31410061000000000	1375.048501	24.62597872	1462.861556	26.19863774	2724.48802
JA31410052700000000	888.904378	16.88903408	0	0	3785.348581
JA31410121000000000	1718.574926	32.60887717	1828.326193	34.69133835	1702.032684
JA31410072000000000	16.16462156	0.29224643	11.97669225	0.21653124	5499.223506
JA31410072300000000	582.6748585	10.53164249	280.7969794	5.075306334	4103.195556
JA31410060500000000	483.28407	8.646585133	0	0	4517.070164
JA31410052500000000	879.6126632	16.63634588	426.8636846	8.07338525	3167.373095
JA31410061900000000	742.0068028	13.46151755	359.1739721	6.516148786	3712.129098
JA31410060800000000	101.6945581	1.820587419	75.34753725	1.348909725	5384.88345
JA31410112600000000	96.89476794	1.752905347	71.7912765	1.298762721	5336.223455
JA31410150100000000	932.3967095	13.98304898	452.8286901	6.791021128	4425.38309
JA31410021900000000	38.07435944	0.68894018	28.21005637	0.510449594	5451.28485
JA31410081000000000	1302.374115	23.77825626	1385.546053	25.29677821	2767.910628
JA31410130400000000	588.1878422	11.10038065	283.5088717	5.350427481	3856.571946
JA31410030700000000	624.0529926	11.23870062	301.1513015	5.423496656	4027.077257
JA31410140100000000	259.824235	3.916744265	0	0	5784.903192
JA31410032400000000	341.6381784	6.187142086	253.1265769	4.584177636	4846.740303
JA31410030100000000	568.8706231	9.24217571	274.0065366	4.451656412	4757.843929
JA31410140600000000	520.8864536	9.349123156	250.402639	4.494348228	4285.76887
JA31410141000000000	4438.246273	79.58977236	0	0	682.62581
JA31410150600000000	538.9955207	9.682966402	259.3106719	4.658473824	4238.586757
JA31410151300000000	1278.419675	22.90147719	1360.06184	24.36400646	2922.443762
JA31410031300000000	1337.386921	24.0424773	1422.794841	25.57787287	2781.085267
JA31410082700000000	609.1370404	11.19347809	648.0376206	11.90831361	4163.3845
JA31410130600000000	525.8220863	9.913914747	389.5921275	7.34541823	4264.967103
JA31410072700000000	584.5691382	8.455193231	281.7287947	4.074918162	5479.908008

% EXISTING TREE CANOPY	AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
45.53758734	0	0	83	1.495323199	0	0
72.67074887	392.2446415	7.071271332	0	0	101.9952	1.838739545
95.35107334	0	0	0	0	22.93689391	0.552629619
32.28373113	0	0	0	0	21.3333	0.384724868
32.9885938	0	0	83	0.708339752	0	0
14.39208035	0	0	255.472356	4.614893407	21.3333	0.385368136
87.20158361	0	0	0	0	80.0565619	1.521379988
100	0	0	0	0	0	0
87.40150798	0	0	0	0	41.16090056	1.497614474
80.01197923	0	0	335.842	6.403732489	253.1094	4.826212588
72.38244918	0	0	335.842	6.397760825	253.1094	4.821712007
48.79332181	0	0	0	0	21.3333	0.382061718
71.92098811	0	0	335.842	6.380941668	253.1094	4.809036145
32.29499854	0	0	0	0	21.3333	0.404785936
99.42258336	0	0	0	0	3.796532186	0.06863897
74.16381203	368.2370936	6.655755548	0	0	101.9952	1.843527255
80.81630277	0	0	335.842	6.008653346	253.1094	4.528458749
59.90536123	559.788937	10.58743554	0	0	101.9952	1.92906207
67.34559683	471.0206636	8.545276005	0	0	101.9952	1.85040106
96.4029074	0	0	0	0	23.88467068	0.427595456
96.53663274	0	0	0	0	22.75735956	0.411699188
66.36697435	593.8394391	8.90574353	0	0	101.9952	1.529610586
98.63880108	0	0	0	0	8.942401187	0.161809143
50.53547017	0	0	0	0	21.3333	0.38949536
72.78187944	371.7934686	7.016549356	0	0	101.9952	1.924870702
72.524475	394.9297468	7.112372255	0	0	101.9952	1.836852849
87.20505383	0	0	335.842	5.062681037	253.1094	3.815520869
87.7755263	0	0	0	0	80.23944977	1.453153974
77.2984714	359.3321085	5.837901185	0	0	101.9952	1.657068447
76.92306203	328.3779626	5.893887223	0	0	101.9952	1.830659406
12.241329	148.7447079	2.667395343	0	0	0	0
76.14551808	340.059955	6.109121491	0	0	101.9952	1.832327092
52.35235383	0	0	0	0	21.3333	0.382162519
49.99613674	0	0	0	0	21.3333	0.383513083
76.50618842	0	0	0	0	21.3333	0.392019875
80.41221805	0	0	0	0	123.4981262	2.32844897
79.26125084	369.459076	5.343846731	0	0	101.9952	1.475255993

Land Cover Scenario I Year 2 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)
JA31410032600000000	462.963835	8.397869992	0	0	4460.956903
JA31410120900000000	2200.779504	41.76363651	2341.325216	44.43073698	706.168958
JA31410031200000000	2769.563434	33.20204915	2946.432706	35.32239135	2604.214246
JA31410091500000000	3226.708895	58.81787675	0	0	1928.041928
JA31410060700000000	665.2500939	11.90374602	321.4165717	5.751312584	3967.139471
JA31340210700000000	2743.352171	30.48483682	0	0	4499.280812
JA31410131200000000	3105.618654	29.2045373	0	0	5675.654654
JA31410110100000000	4956.936814	73.74029669	0	0	1256.450066
JA31410132000000000	1017.398578	19.38630655	494.6419679	9.425294106	2807.694613
JA31410071200000000	1021.217304	18.40207663	0	0	3939.299024
JA31410081800000000	636.4044787	11.66469409	677.0464063	12.4096223	4121.033808
JA31410131700000000	3259.139623	62.07439396	0	0	1656.727166
JA31340211000000000	1249.919251	20.46724229	1329.741328	21.77431697	3505.931681

YEAR 5

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)
JA31410071300000000	2940.012185	52.96708946	0	0	2527.627306
JA31410071100000000	619.8906245	11.17520633	248.0138504	4.47112094	4031.058985
JA31410072202000000	97.65917734	2.35294954	72.35764275	1.743347496	3957.546569
JA31410112000000000	1809.029898	32.62405671	1924.55778	34.70748729	1790.158573
JA31410063000000000	7769.088918	66.30306644	0	0	3865.451966
JA31410070600000000	2162.110732	39.05671329	2300.186988	41.55094482	796.720173
JA31410052800000000	340.8594906	6.477630256	252.5496315	4.799406146	4588.635997
JA31410081900000000	0	0	0	0	5453.994226
JA31410091300000000	175.2521376	6.376443037	129.8478229	4.724434506	2402.170146
JA31410131300000000	459.314886	8.758075697	0	0	4196.20638
JA31410131900000000	860.795434	16.39807798	0	0	3799.621018
JA31410061000000000	1375.048501	24.62597872	1462.861556	26.19863774	2724.48802
JA31410052700000000	888.904378	16.88903408	0	0	3785.348581
JA31410121000000000	1718.574926	32.60887717	1828.326193	34.69133835	1702.032684
JA31410072000000000	16.16462156	0.29224643	11.97669225	0.21653124	5499.223506
JA31410072300000000	582.6748585	10.53164249	233.1240859	4.213635604	4103.195556
JA31410060500000000	483.28407	8.646585133	0	0	4517.070164
JA31410052500000000	879.6126632	16.63634588	351.9267994	6.656084211	3167.373095
JA31410061900000000	742.0068028	13.46151755	296.8716688	5.385857871	3712.129098

% EXISTING TREE CANOPY	AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
80.91892559	0	0	335.842	6.091960626	253.1094	4.591243796
13.40078987	0	0	0	0	21.3333	0.404836643
31.21981187	0	0	0	0	21.3333	0.255747627
35.14520094	108.1408832	1.971239844	0	0	0	0
70.98656751	421.5056175	7.542269988	0	0	101.9952	1.825065441
49.99716872	493.0927405	5.479373699	588.842	6.543364163	443.6818	4.930306585
53.37257612	558.3095009	5.25021661	588.842	5.537337344	443.6818	4.172283567
18.69118049	166.1282572	2.471354272	0	0	0	0
53.50000446	648.6733619	12.3603285	0	0	101.9952	1.943496144
70.98516862	0	0	335.842	6.051787603	253.1094	4.560967149
75.53466434	0	0	0	0	21.3333	0.391019276
31.5544428	109.2277763	2.080379733	0	0	0	0
57.40911112	0	0	0	0	21.3333	0.349329622

% EXISTING TREE CANOPY	AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
45.53758734	0	0	83	1.495323199	0	0
72.67074887	573.6315056	10.34126051	0	0	74.4506	1.342173577
95.35107334	0	0	0	0	22.93689391	0.552629619
32.28373113	0	0	0	0	21.3333	0.384724868
32.9885938	0	0	83	0.708339752	0	0
14.39208035	0	0	255.472356	4.614893407	21.3333	0.385368136
87.20158361	0	0	0	0	80.0565619	1.521379988
100	0	0	0	0	0	0
87.40150798	0	0	0	0	41.16090056	1.497614474
80.01197923	0	0	335.842	6.403732489	253.1094	4.826212588
72.38244918	0	0	335.842	6.397760825	253.1094	4.821712007
48.79332181	0	0	0	0	21.3333	0.382061718
71.92098811	0	0	335.842	6.380941668	253.1094	4.809036145
32.29499854	0	0	0	0	21.3333	0.404785936
99.42258336	0	0	0	0	3.796532186	0.06863897
74.16381203	539.192953	9.745722393	0	0	74.4506	1.345668328
80.81630277	0	0	335.842	6.008653346	253.1094	4.528458749
59.90536123	813.971879	15.39486445	0	0	74.4506	1.408103799
67.34559683	686.6348073	12.45695656	0	0	74.4506	1.350685808

Land Cover Scenario I Year 5 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)
JA314100608000000000	101.6945581	1.820587419	75.34753725	1.348909725	5384.88345
JA314101126000000000	96.89476794	1.752905347	71.7912765	1.298762721	5336.223455
JA314101501000000000	932.3967095	13.98304898	373.0453227	5.594518905	4425.38309
JA314100219000000000	38.07435944	0.68894018	28.21005637	0.510449594	5451.28485
JA314100810000000000	1302.374115	23.77825626	1385.546053	25.29677821	2767.910628
JA314101304000000000	588.1878422	11.10038065	235.3297916	4.441183715	3856.571946
JA314100307000000000	624.0529926	11.23870062	249.6791844	4.496524554	4027.077257
JA314101401000000000	259.824235	3.916744265	0	0	5784.903192
JA314100324000000000	341.6381784	6.187142086	253.1265769	4.584177636	4846.740303
JA314100301000000000	568.8706231	9.24217571	227.6011091	3.697729073	4757.843929
JA314101406000000000	520.8864536	9.349123156	208.4029825	3.740517988	4285.76887
JA314101410000000000	4438.246273	79.58977236	0	0	682.62581
JA314101506000000000	538.9955207	9.682966402	215.648292	3.874086308	4238.586757
JA314101513000000000	1278.419675	22.90147719	1360.06184	24.36400646	2922.443762
JA314100313000000000	1337.386921	24.0424773	1422.794841	25.57787287	2781.085267
JA314100827000000000	609.1370404	11.19347809	648.0376206	11.90831361	4163.3845
JA314101306000000000	525.8220863	9.913914747	389.5921275	7.34541823	4264.967103
JA314100727000000000	584.5691382	8.455193231	233.8819738	3.382862954	5479.908008
JA314100326000000000	462.963835	8.397869992	0	0	4460.956903
JA314101209000000000	2200.779504	41.76363651	2341.325216	44.43073698	706.168958
JA314100312000000000	2769.563434	33.20204915	2946.432706	35.32239135	2604.214246
JA314100915000000000	3226.708895	58.81787675	0	0	1928.041928
JA314100607000000000	665.2500939	11.90374602	266.161853	4.762604512	3967.139471
JA313402107000000000	2743.352171	30.48483682	0	0	4499.280812
JA314101312000000000	3105.618654	29.2045373	0	0	5675.654654
JA314101101000000000	4956.936814	73.74029669	0	0	1256.450066
JA314101320000000000	1017.398578	19.38630655	407.0539686	7.756324008	2807.694613
JA314100712000000000	1021.217304	18.40207663	0	0	3939.299024
JA314100818000000000	636.4044787	11.66469409	677.0464063	12.4096223	4121.033808
JA314101317000000000	3259.139623	62.07439396	0	0	1656.727166
JA313402110000000000	1249.919251	20.46724229	1329.741328	21.77431697	3505.931681

YEAR 10

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)
JA314100713000000000	2940.012185	52.96708946	0	0	2527.627306
JA314100711000000000	405.3393073	7.307338126	145.622922	2.625247319	4031.058985

% EXISTING TREE CANOPY	AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
96.4029074	0	0	0	0	23.88467068	0.427595456
96.53663274	0	0	0	0	22.75735956	0.411699188
66.36697435	862.8169345	12.93956889	0	0	74.4506	1.116527306
98.63880108	0	0	0	0	8.942401187	0.161809143
50.53547017	0	0	0	0	21.3333	0.38949536
72.78187944	544.2945323	10.27201867	0	0	74.4506	1.405044342
72.524475	577.4832585	10.40001656	0	0	74.4506	1.340796397
87.20505383	0	0	335.842	5.062681037	253.1094	3.815520869
87.7755263	0	0	0	0	80.23944977	1.453153974
77.2984714	526.4188539	8.552481613	0	0	74.4506	1.209564177
76.92306203	482.0154861	8.651448143	0	0	74.4506	1.336275542
12.241329	455.53069	8.168898635	0	0	0	0
76.14551808	498.7731704	8.960378456	0	0	74.4506	1.337492856
52.35235383	0	0	0	0	21.3333	0.382162519
49.99613674	0	0	0	0	21.3333	0.383513083
76.50618842	0	0	0	0	21.3333	0.392019875
80.41221805	0	0	0	0	123.4981262	2.32844897
79.26125084	540.9458728	7.824227424	0	0	74.4506	1.076851595
80.91892559	0	0	335.842	6.091960626	253.1094	4.591243796
13.40078987	0	0	0	0	21.3333	0.404836643
31.21981187	0	0	0	0	21.3333	0.255747627
35.14520094	331.181471	6.036922318	0	0	0	0
70.98656751	615.6060407	11.01543318	0	0	74.4506	1.332192271
49.99716872	729.379513	8.105053252	588.842	6.543364163	438.2165	4.869574762
53.37257612	825.6958935	7.764657932	588.842	5.537337344	438.2165	4.120889119
18.69118049	508.7678123	7.568522827	0	0	0	0
53.50000446	941.4755688	17.93961027	0	0	74.4506	1.418639838
70.98516862	0	0	335.842	6.051787603	253.1094	4.560967149
75.53466434	0	0	0	0	21.3333	0.391019276
31.5544428	334.5100812	6.371163242	0	0	0	0
57.40911112	0	0	0	0	21.3333	0.349329622

% EXISTING TREE CANOPY	AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
45.53758734	0	0	83	1.495323199	0	0
72.67074887	935.0071331	16.85603431	0	0	29.9715	0.54031741

Land Cover Scenario I Year 10 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)
JA314100722020000000	97.65917734	2.35294954	72.35764275	1.743347496	3957.546569
JA314101120000000000	1809.029898	32.62405671	1924.55778	34.70748729	1790.158573
JA314100630000000000	7769.088918	66.30306644	0	0	3865.451966
JA314100706000000000	2162.110732	39.05671329	2300.186988	41.55094482	796.720173
JA314100528000000000	340.8594906	6.477630256	252.5496315	4.799406146	4588.635997
JA314100819000000000	0	0	0	0	5453.994226
JA314100913000000000	175.2521376	6.376443037	129.8478229	4.724434506	2402.170146
JA314101313000000000	459.314886	8.758075697	0	0	4196.20638
JA314101319000000000	860.795434	16.39807798	0	0	3799.621018
JA314100610000000000	1375.048501	24.62597872	1462.861556	26.19863774	2724.48802
JA314100527000000000	888.904378	16.88903408	0	0	3785.348581
JA314101210000000000	1718.574926	32.60887717	1828.326193	34.69133835	1702.032684
JA314100720000000000	16.16462156	0.29224643	11.97669225	0.21653124	5499.223506
JA314100723000000000	381.7327514	6.899684802	137.1419886	2.478793059	4103.195556
JA314100605000000000	483.28407	8.646585133	0	0	4517.070164
JA314100525000000000	570.0851527	10.78217058	204.809808	3.87362182	3167.373095
JA314100619000000000	482.7995534	8.758969102	173.451428	3.14676285	3712.129098
JA314100608000000000	101.6945581	1.820587419	75.34753725	1.348909725	5384.88345
JA314101126000000000	96.89476794	1.752905347	71.7912765	1.298762721	5336.223455
JA314101501000000000	603.5669179	9.051625439	216.8385266	3.251903088	4425.38309
JA314100219000000000	38.07435944	0.68894018	28.21005637	0.510449594	5451.28485
JA314100810000000000	1302.374115	23.77825626	1385.546053	25.29677821	2767.910628
JA314101304000000000	385.2297252	7.270120668	138.3983176	2.611876508	3856.571946
JA314100307000000000	407.979564	7.347389137	146.5714653	2.639636116	4027.077257
JA314101401000000000	259.824235	3.916744265	0	0	5784.903192
JA314100324000000000	341.6381784	6.187142086	253.1265769	4.584177636	4846.740303
JA314100301000000000	372.976504	6.059575316	133.9962036	2.176973828	4757.843929
JA314101406000000000	342.5393774	6.148063177	123.0613072	2.208764135	4285.76887
JA314101410000000000	3555.074474	63.75211079	0	0	682.62581
JA314101506000000000	354.0262484	6.360023669	127.188101	2.284913439	4238.586757
JA314101513000000000	1278.419675	22.90147719	1360.06184	24.36400646	2922.443762
JA314100313000000000	1337.386921	24.0424773	1422.794841	25.57787287	2781.085267
JA314100827000000000	609.1370404	11.19347809	648.0376206	11.90831361	4163.3845
JA314101306000000000	525.8220863	9.913914747	389.5921275	7.34541823	4264.967103
JA314100727000000000	382.9343233	5.538752368	137.5736675	1.989862047	5479.908008
JA314100326000000000	462.963835	8.397869992	0	0	4460.956903
JA314101209000000000	2200.779504	41.76363651	2341.325216	44.43073698	706.168958

% EXISTING TREE CANOPY	AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
95.35107334	0	0	0	0	22.93689391	0.552629619
32.28373113	0	0	0	0	21.3333	0.384724868
32.9885938	0	0	83	0.708339752	0	0
14.39208035	0	0	255.472356	4.614893407	21.3333	0.385368136
87.20158361	0	0	0	0	80.0565619	1.521379988
100	0	0	0	0	0	0
87.40150798	0	0	0	0	41.16090056	1.497614474
80.01197923	0	0	335.842	6.403732489	253.1094	4.826212588
72.38244918	0	0	335.842	6.397760825	253.1094	4.821712007
48.79332181	0	0	0	0	21.3333	0.382061718
71.92098811	0	0	335.842	6.380941668	253.1094	4.809036145
32.29499854	0	0	0	0	21.3333	0.404785936
99.42258336	0	0	0	0	3.796532186	0.06863897
74.16381203	880.5532527	15.91568937	0	0	29.9715	0.541724288
80.81630277	0	0	335.842	6.008653346	253.1094	4.528458749
59.90536123	1315.030826	24.87152423	0	0	29.9715	0.56685887
67.34559683	1113.686776	20.20455071	0	0	29.9715	0.54374417
96.4029074	0	0	0	0	23.88467068	0.427595456
96.53663274	0	0	0	0	22.75735956	0.411699188
66.36697435	1392.264119	20.87962899	0	0	29.9715	0.449479227
98.63880108	0	0	0	0	8.942401187	0.161809143
50.53547017	0	0	0	0	21.3333	0.38949536
72.78187944	888.6198166	16.7701838	0	0	29.9715	0.565627228
72.524475	941.0974846	16.94842106	0	0	29.9715	0.539763
87.20505383	0	0	335.842	5.062681037	253.1094	3.815520869
87.7755263	0	0	0	0	80.23944977	1.453153974
77.2984714	860.3549803	13.97778612	0	0	29.9715	0.486932983
76.92306203	790.1448379	14.18190346	0	0	29.9715	0.537943044
12.241329	1338.702489	24.00656021	0	0	0	0
76.14551808	816.6419137	14.67083846	0	0	29.9715	0.538433097
52.35235383	0	0	0	0	21.3333	0.382162519
49.99613674	0	0	0	0	21.3333	0.383513083
76.50618842	0	0	0	0	21.3333	0.392019875
80.41221805	0	0	0	0	123.4981262	2.32844897
79.26125084	883.3249512	12.77638975	0	0	29.9715	0.433507018
80.91892559	0	0	335.842	6.091960626	253.1094	4.591243796
13.40078987	0	0	0	0	21.3333	0.404836643

Land Cover Scenario I Year 10 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)
JA31410031200000000	2769.563434	33.20204915	2946.432706	35.32239135	2604.214246
JA31410091500000000	2584.622331	47.11363889	0	0	1928.041928
JA31410060700000000	434.1115446	7.767835916	155.9596872	2.790686575	3967.139471
JA31340210700000000	2358.077754	26.20356813	0	0	4499.280812
JA31410131200000000	2664.319829	25.05466268	0	0	5675.654654
JA31410110100000000	3970.550179	59.0666291	0	0	1256.450066
JA31410132000000000	657.4849634	12.52823164	236.2092198	4.500914826	2807.694613
JA31410071200000000	1021.217304	18.40207663	0	0	3939.299024
JA31410081800000000	636.4044787	11.66469409	677.0464063	12.4096223	4121.033808
JA31410131700000000	2610.59963	49.72213795	0	0	1656.727166
JA31340211000000000	1249.919251	20.46724229	1329.741328	21.77431697	3505.931681

% EXISTING TREE CANOPY	AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
31.21981187	0	0	0	0	21.3333	0.255747627
35.14520094	973.268035	17.74116017	0	0	0	0
70.98656751	1001.37683	17.91827701	0	0	29.9715	0.536299246
49.99716872	1173.031135	13.0350245	560.915	6.233032137	407.7665	4.531206509
53.37257612	1325.371951	12.46349887	560.915	5.537337344	407.7665	3.834544187
18.69118049	1495.154447	22.24219042	0	0	0	0
53.50000446	1516.638332	28.89921045	0	0	29.9715	0.571100353
70.98516862	0	0	335.842	6.051787603	253.1094	4.560967149
75.53466434	0	0	0	0	21.3333	0.391019276
31.5544428	983.0500736	18.72341925	0	0	0	0
57.40911112	0	0	0	0	21.3333	0.349329622

E.1.3: LAND COVER SCENARIO II

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/SHRUB
JA314100713000000000	2020.432775	36.4	111.0127898	2
JA314100711000000000	2019.114284	36.4	110.9403453	2
JA314100722020000000	1510.782103	36.4	83.01000566	2
JA314101120000000000	2018.408957	36.4	110.901591	2
JA314100630000000000	4265.184882	36.4	234.3508177	2
JA314100706000000000	2015.039772	36.4	110.716471	2
JA314100528000000000	1915.405012	36.4	105.2420336	2
JA314100819000000000	1985.253898	36.4	109.0798845	2
JA314100913000000000	1000.428887	36.4	54.96862014	2
JA314101313000000000	1908.98805	36.4	104.8894533	2
JA314101319000000000	1910.769898	36.4	104.987357	2
JA314100610000000000	2032.478221	36.4	111.6746275	2
JA314100527000000000	1915.806387	36.4	105.2640872	2
JA314101210000000000	1918.377225	36.4	105.4053421	2
JA314100720000000000	2013.342732	36.4	110.623227	2
JA314100723000000000	2013.870568	36.4	110.652229	2
JA314100605000000000	2034.507251	36.4	111.7861127	2
JA314100525000000000	1924.575335	36.4	105.7458975	2
JA314100619000000000	2006.389512	36.4	110.241182	2
JA314100608000000000	2033.234919	36.4	111.7162043	2
JA314101126000000000	2012.070737	36.4	110.5533372	2
JA314101501000000000	2427.170231	36.4	133.3610017	2
JA314100219000000000	2011.650247	36.4	110.5302333	2
JA314100810000000000	1993.687731	36.4	109.5432819	2
JA314101304000000000	1928.76606	36.4	105.9761571	2
JA314100307000000000	2021.188187	36.4	111.054296	2
JA314101401000000000	2414.659093	36.4	132.6735765	2
JA314100324000000000	2009.915001	36.4	110.4348902	2
JA314100301000000000	2240.477928	36.4	123.1031828	2
JA314101406000000000	2028.026222	36.4	111.4300122	2
JA314101410000000000	2029.810609	36.4	111.5280555	2
JA314101506000000000	2026.180422	36.4	111.3285946	2
JA314101513000000000	2031.942122	36.4	111.6451715	2
JA314100313000000000	2024.78652	36.4	111.2520066	2
JA314100827000000000	1980.848856	36.4	108.8378492	2
JA314101306000000000	1930.612117	36.4	106.0775889	2
JA314100727000000000	2516.597321	36.4	138.2745781	2
JA314100326000000000	2006.685458	36.4	110.2574428	2

AREA TREE CANOPY (SF)	% TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
1420.96371	25.6	1953.825101	35.2	44.40511593	0.8
1420.036419	25.6	1952.550077	35.2	44.3761381	0.8
1062.528072	25.6	1460.9761	35.2	33.20400226	0.8
1419.540365	25.6	1951.868002	35.2	44.36063641	0.8
2999.690466	25.6	4124.574391	35.2	93.74032707	0.8
1417.170829	25.6	1948.609889	35.2	44.28658839	0.8
1347.09803	25.6	1852.259792	35.2	42.09681345	0.8
1396.222522	25.6	1919.805968	35.2	43.63195381	0.8
703.5983378	25.6	967.4477145	35.2	21.98744806	0.8
1342.585002	25.6	1846.054378	35.2	41.95578133	0.8
1343.83817	25.6	1847.777484	35.2	41.99494282	0.8
1429.435233	25.6	1965.473445	35.2	44.66985102	0.8
1347.380316	25.6	1852.647934	35.2	42.10563487	0.8
1349.188378	25.6	1855.13402	35.2	42.16213682	0.8
1415.977306	25.6	1946.968796	35.2	44.24929082	0.8
1416.348531	25.6	1947.47923	35.2	44.2608916	0.8
1430.862242	25.6	1967.435583	35.2	44.71444507	0.8
1353.547488	25.6	1861.127796	35.2	42.29835901	0.8
1411.087129	25.6	1940.244803	35.2	44.09647279	0.8
1429.967415	25.6	1966.205196	35.2	44.68648173	0.8
1415.082716	25.6	1945.738734	35.2	44.22133487	0.8
1707.020822	25.6	2347.15363	35.2	53.34440069	0.8
1414.786987	25.6	1945.332107	35.2	44.21209334	0.8
1402.154009	25.6	1927.961762	35.2	43.81731277	0.8
1356.494811	25.6	1865.180366	35.2	42.39046286	0.8
1421.494989	25.6	1954.55561	35.2	44.4217184	0.8
1698.22178	25.6	2335.054947	35.2	53.06943062	0.8
1413.566594	25.6	1943.654067	35.2	44.17395606	0.8
1575.72074	25.6	2166.616018	35.2	49.24127314	0.8
1426.304156	25.6	1961.168215	35.2	44.57200488	0.8
1427.55911	25.6	1962.893776	35.2	44.61122218	0.8
1425.006011	25.6	1959.383265	35.2	44.53143785	0.8
1429.058196	25.6	1964.955019	35.2	44.65806862	0.8
1424.025684	25.6	1958.035316	35.2	44.50080263	0.8
1393.12447	25.6	1915.546146	35.2	43.53513969	0.8
1357.793137	25.6	1866.965564	35.2	42.43103554	0.8
1769.914599	25.6	2433.632574	35.2	55.30983122	0.8
1411.295267	25.6	1940.530993	35.2	44.1029771	0.8

Land Cover Scenario II cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/SHRUB
JA314101209000000000	1918.13694	36.4	105.3921396	2
JA314100312000000000	3036.321902	36.4	166.8308737	2
JA314100915000000000	1996.879355	36.4	109.7186459	2
JA314100607000000000	2034.242277	36.4	111.7715537	2
JA313402107000000000	3275.661917	36.4	179.981424	2
JA314101312000000000	3870.786168	36.4	212.6805587	2
JA314101101000000000	2446.864308	36.4	134.4430938	2
JA314101320000000000	1910.281783	36.4	104.9605375	2
JA314100712000000000	2020.006253	36.4	110.9893546	2
JA314100818000000000	1985.917749	36.4	109.1163599	2
JA314101317000000000	1911.137181	36.4	105.0075374	2
JA313402110000000000	2222.920904	36.4	122.1385112	2

AREA TREE CANOPY (SF)	% TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE
1349.019386	25.6	1854.901656	35.2	42.15685582	0.8
2135.435184	25.6	2936.223377	35.2	66.73234949	0.8
1404.398667	25.6	1931.048167	35.2	43.88745835	0.8
1430.675887	25.6	1967.179345	35.2	44.70862148	0.8
2303.762227	25.6	3167.673063	35.2	71.99256961	0.8
2722.311151	25.6	3743.177833	35.2	85.07222347	0.8
1720.871601	25.6	2366.198452	35.2	53.77723754	0.8
1343.494881	25.6	1847.305461	35.2	41.98421502	0.8
1420.663738	25.6	1953.41264	35.2	44.39574182	0.8
1396.689406	25.6	1920.447934	35.2	43.64654394	0.8
1344.096479	25.6	1848.132658	35.2	42.00301496	0.8
1563.372943	25.6	2149.637797	35.2	48.85540448	0.8

E.1.4: LAND COVER SCENARIO III

YEAR 2

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)	% EXISTING TREE CANOPY
JA314100713000000000	2940.012	52.967	0	0	2527.627	45.538
JA314100711000000000	722.518	52.967	299.104	5.392	4031.059	72.671
JA314100722020000000	97.659	2.353	72.358	1.743	3957.547	95.351
JA314101120000000000	2654.81	2.353	1100.102	19.839	1790.159	32.284
JA314100630000000000	7346.959	62.701	505.121	4.311	3865.452	32.989
JA314100706000000000	4170.805	75.342	312.831	5.651	796.72	14.392
JA314100528000000000	643.206	12.223	30.257	0.575	4588.636	87.202
JA314100819000000000	0	0	0	0	5453.994	100
JA314100913000000000	346.261	12.598	0	0	2402.17	87.402
JA314101313000000000	749.929	14.299	298.327	5.688	4196.206	80.012
JA314101319000000000	1338.201	25.493	111.545	2.125	3799.621	72.382
JA314100610000000000	1375.049	24.626	1462.862	26.199	2724.488	48.793
JA314100527000000000	1125.08	21.376	352.782	6.703	3785.349	71.921
JA314101210000000000	1718.575	32.609	1828.326	34.691	1702.033	32.295
JA314100720000000000	16.165	0.292	11.977	0.217	5499.224	99.423
JA314100723000000000	678.296	12.26	280.797	5.075	4103.196	74.164
JA314100605000000000	1072.232	19.184	0	0	4517.07	80.816
JA314100525000000000	1253.79	23.713	866.14	16.382	3167.373	59.905
JA314100619000000000	1799.933	32.654	0	0	3712.129	67.346
JA314100608000000000	101.695	1.821	75.348	1.349	5384.883	96.403
JA314101126000000000	96.895	1.753	71.791	1.299	5336.223	96.537
JA314101501000000000	1517.539	22.758	725.149	10.875	4425.383	66.367
JA314100219000000000	38.074	0.689	28.21	0.51	5451.285	98.639
JA314100810000000000	2471.088	45.116	238.151	4.348	2767.911	50.535
JA314101304000000000	684.847	12.925	283.509	5.35	3856.572	72.782
JA314100307000000000	1082.242	19.49	301.918	5.437	4027.077	72.524
JA314101401000000000	848.768	12.795	0	0	5784.903	87.205
JA314100324000000000	675.005	12.224	0	0	4846.74	87.776
JA314100301000000000	661.893	10.753	274.007	4.452	4757.844	77.298
JA314101406000000000	604.875	10.857	250.403	4.494	4285.769	76.923
JA314101410000000000	3825.01	68.593	1068.76	19.166	682.626	12.241
JA314101506000000000	626.393	11.253	259.311	4.658	4238.587	76.146
JA314101513000000000	1278.42	22.901	1360.062	24.364	2922.444	52.352
JA314100313000000000	1337.387	24.042	1422.795	25.578	2781.085	49.996
JA314100827000000000	609.137	11.193	648.038	11.908	4163.385	76.506
JA314101306000000000	386.603	7.289	546.574	10.305	4264.967	80.412
JA314100727000000000	680.547	9.843	281.729	4.075	5479.908	79.261

AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE	AREA BARE EARTH (SF)	% BARE EARTH
0	0	83	1.495	0	0	0	0
392.245	7.071	0	0	101.995	1.839	0	0
0	0	0	0	22.937	0.553	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	255.472	4.615	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	21.333	0.382	0	0
0	0	0	0	0	0	0	0
0	0	0	0	21.333	0.405	0	0
0	0	0	0	3.797	0.069	0	0
368.237	6.656	0	0	101.995	1.844	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	23.885	0.428	0	0
0	0	0	0	22.757	0.412	0	0
0	0	0	0	0	0	0	0
0	0	0	0	8.942	0.162	0	0
0	0	0	0	0	0	0	0
371.793	7.017	0	0	101.995	1.925	0	0
0	0	99.561	1.793	0	0	11.946	0.215
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
359.332	5.838	0	0	101.995	1.657	0	0
328.378	5.894	0	0	101.995	1.831	0	0
0	0	0	0	0	0	0	0
340.06	6.109	0	0	101.995	1.832	0	0
0	0	0	0	21.333	0.382	0	0
0	0	0	0	21.333	0.384	0	0
0	0	0	0	21.333	0.392	0	0
0	0	0	0	0	0	105.733	1.993
369.459	5.344	0	0	101.995	1.475	0	0

Land Cover Scenario III Year 2 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)	% EXISTING TREE CANOPY
JA31410032600000000	462.964	8.398	0	0	4460.957	80.919
JA31410120900000000	2200.78	41.764	2341.325	44.431	706.169	13.401
JA31410031200000000	2769.563	33.202	2946.433	35.322	2604.214	31.22
JA31410091500000000	3449.749	62.884	0	0	1928.042	35.145
JA31410060700000000	776.417	13.893	321.417	5.751	3967.139	70.987
JA31340210700000000	2974.174	33.05	0	0	4499.281	49.997
JA31410131200000000	3645.395	34.28	1312.991	12.347	5675.655	53.373
JA31410110100000000	5066.495	75.37	301.329	4.483	1256.45	18.691
JA31410132000000000	1736.226	33.083	694.293	13.23	2807.695	53.5
JA31410071200000000	1021.217	18.402	0	0	3939.299	70.985
JA31410081800000000	1334.788	24.465	0	0	4121.034	75.535
JA31410131700000000	3593.645	68.445	0	0	1656.727	31.554
JA31340211000000000	2111.806	34.581	489.216	8.011	3505.932	57.409

YEAR 5

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)	% EXISTING TREE CANOPY
JA31410071300000000	2940.012	52.967	0	0	2527.627	45.538
JA31410071100000000	619.891	11.175	248.014	4.471	4031.059	72.671
JA31410072202000000	97.659	2.353	72.358	1.743	3957.547	95.351
JA31410112000000000	2654.81	47.877	1100.102	19.839	1790.159	32.284
JA31410063000000000	7346.959	62.701	505.121	4.311	3865.452	32.989
JA31410070600000000	4170.805	75.342	312.831	5.651	796.72	14.392
JA31410052800000000	643.206	12.223	30.257	0.575	4588.636	87.202
JA31410081900000000	0	0	0	0	5453.994	100
JA31410091300000000	346.261	12.598	0	0	2402.17	87.402
JA31410131300000000	749.929	14.299	298.327	5.688	4196.206	80.012
JA31410131900000000	1338.201	25.493	111.545	2.125	3799.621	72.382
JA31410061000000000	1375.049	24.626	1462.862	26.199	2724.488	48.793
JA31410052700000000	1125.08	21.376	352.782	6.703	3785.349	71.921
JA31410121000000000	1718.575	32.609	1828.326	34.691	1702.033	32.295
JA31410072000000000	16.165	0.292	11.977	0.217	5499.224	99.423
JA31410072300000000	582.675	10.532	233.124	4.214	4103.196	74.164
JA31410060500000000	1072.232	19.184	0	0	4517.07	80.816
JA31410052500000000	1253.79	23.713	866.14	16.382	3167.373	59.905
JA31410061900000000	1799.933	32.654	0	0	3712.129	67.346

AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE	AREA BARE EARTH (SF)	% BARE EARTH
0	0	335.842	6.092	253.109	4.591	0	0
0	0	0	0	21.333	0.405	0	0
0	0	0	0	21.333	0.256	0	0
108.141	1.971	0	0	0	0	0	0
421.506	7.542	0	0	101.995	1.825	0	0
493.093	5.479	588.842	6.543	443.682	4.93	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	97.879	1.456
0	0	0	0	0	0	0	0
0	0	335.842	6.052	253.109	4.561	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE	AREA BARE EARTH (SF)	% BARE EARTH
0	0	83	1.495	0	0	0	0
573.632	10.341	0	0	74.451	1.342	0	0
0	0	0	0	22.937	0.553	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	255.472	4.615	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	21.333	0.382	0	0
0	0	0	0	0	0	0	0
0	0	0	0	21.333	0.405	0	0
0	0	0	0	3.797	0.069	0	0
539.193	9.746	0	0	74.451	1.346	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

Land Cover Scenario III Year 5 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)	% EXISTING TREE CANOPY
JA314100608000000000	101.695	1.821	75.348	1.349	5384.883	96.403
JA314101126000000000	96.895	1.753	71.791	1.299	5336.223	96.537
JA314101501000000000	1517.539	22.758	725.149	10.875	4425.383	66.367
JA314100219000000000	38.074	0.689	28.21	0.51	5451.285	98.639
JA314100810000000000	2471.088	45.116	238.151	4.348	2767.911	50.535
JA314101304000000000	588.188	11.1	235.33	4.441	3856.572	72.782
JA314100307000000000	1082.242	19.49	301.918	5.437	4027.077	72.524
JA314101401000000000	848.768	12.795	0	0	5784.903	87.205
JA314100324000000000	675.005	12.224	0	0	4846.74	87.776
JA314100301000000000	568.871	9.242	227.601	3.698	4757.844	77.298
JA314101406000000000	520.886	9.349	208.403	3.741	4285.769	76.923
JA314101410000000000	3825.01	68.593	1068.76	19.166	682.626	12.241
JA314101506000000000	538.996	9.683	215.648	3.874	4238.587	76.146
JA314101513000000000	1278.42	22.901	1360.062	24.364	2922.444	52.352
JA314100313000000000	1337.387	24.042	1422.795	25.578	2781.085	49.996
JA314100827000000000	609.137	11.193	648.038	11.908	4163.385	76.506
JA314101306000000000	386.603	7.289	546.574	10.305	4264.967	80.412
JA314100727000000000	584.569	8.455	233.882	3.383	5479.908	79.261
JA314100326000000000	462.964	8.398	0	0	4460.957	80.919
JA314101209000000000	2200.78	41.764	2341.325	44.431	706.169	13.401
JA314100312000000000	2769.563	33.202	2946.433	35.322	2604.214	31.22
JA314100915000000000	3226.709	58.818	0	0	1928.042	35.145
JA314100607000000000	665.25	11.904	266.162	4.763	3967.139	70.987
JA313402107000000000	2743.352	30.485	0	0	4499.281	49.997
JA314101312000000000	3645.395	34.28	1312.991	12.347	5675.655	53.373
JA314101101000000000	5066.495	75.37	301.329	4.483	1256.45	18.691
JA314101320000000000	1736.226	33.083	694.293	13.23	2807.695	53.5
JA314100712000000000	1021.217	18.402	0	0	3939.299	70.985
JA314100818000000000	1334.788	24.465	0	0	4121.034	75.535
JA314101317000000000	3593.645	68.445	0	0	1656.727	31.554
JA313402110000000000	2111.806	34.581	489.216	8.011	3505.932	57.409

YEAR 10

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)	% EXISTING TREE CANOPY
JA314100713000000000	2940.012	52.967	0	0	2527.627	45.538
JA314100711000000000	405.339	7.307	145.623	2.625	4031.059	72.671

AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE	AREA BARE EARTH (SF)	% BARE EARTH
0	0	0	0	23.885	0.428	0	0
0	0	0	0	22.757	0.412	0	0
0	0	0	0	0	0	0	0
0	0	0	0	8.942	0.162	0	0
0	0	0	0	0	0	0	0
544.295	10.272	0	0	74.451	1.405	0	0
0	0	99.561	1.793	0	0	11.946	0.215
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
526.419	8.552	0	0	74.451	1.21	0	0
482.015	8.651	0	0	74.451	1.336	0	0
0	0	0	0	0	0	0	0
498.773	8.96	0	0	74.451	1.337	0	0
0	0	0	0	21.333	0.382	0	0
0	0	0	0	21.333	0.384	0	0
0	0	0	0	21.333	0.392	0	0
0	0	0	0	0	0	105.733	1.993
540.946	7.824	0	0	74.451	1.077	0	0
0	0	335.842	6.092	253.109	4.591	0	0
0	0	0	0	21.333	0.405	0	0
0	0	0	0	21.333	0.256	0	0
331.181	6.037	0	0	0	0	0	0
615.606	11.015	0	0	74.451	1.332	0	0
729.38	8.105	588.842	6.543	438.217	4.87	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	97.879	1.456
0	0	0	0	0	0	0	0
0	0	335.842	6.052	253.109	4.561	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE	AREA BARE EARTH (SF)	% BARE EARTH
0	0	83	1.495	0	0	0	0
935.007	16.856	0	0	29.972	0.54	0	0

Land Cover Scenario III Year 10 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)	% EXISTING TREE CANOPY
JA314100722020000000	97.659	2.353	72.358	1.743	3957.547	95.351
JA314101120000000000	2654.81	47.877	1100.102	19.839	1790.159	32.284
JA314100630000000000	7346.959	62.701	505.121	4.311	3865.452	32.989
JA314100706000000000	4170.805	75.342	312.831	5.651	796.72	14.392
JA314100528000000000	643.206	12.223	30.257	0.575	4588.636	87.202
JA314100819000000000	0	0	0	0	5453.994	100
JA314100913000000000	346.261	12.598	0	0	2402.17	87.402
JA314101313000000000	749.929	14.299	298.327	5.688	4196.206	80.012
JA314101319000000000	1338.201	25.493	111.545	2.125	3799.621	72.382
JA314100610000000000	1375.049	24.626	1462.862	26.199	2724.488	48.793
JA314100527000000000	1125.08	21.376	352.782	6.703	3785.349	71.921
JA314101210000000000	1718.575	32.609	1828.326	34.691	1702.033	32.295
JA314100720000000000	16.165	0.292	11.977	0.217	5499.224	99.423
JA314100723000000000	381.733	6.9	137.142	2.479	4103.196	74.164
JA314100605000000000	1072.232	19.184	0	0	4517.07	80.816
JA314100525000000000	1253.79	23.713	866.14	16.382	3167.373	59.905
JA314100619000000000	1799.933	32.654	0	0	3712.129	67.346
JA314100608000000000	101.695	1.821	75.348	1.349	5384.883	96.403
JA314101126000000000	96.895	1.753	71.791	1.299	5336.223	96.537
JA314101501000000000	1517.539	22.758	725.149	10.875	4425.383	66.367
JA314100219000000000	38.074	0.689	28.21	0.51	5451.285	98.639
JA314100810000000000	2471.088	45.116	238.151	4.348	2767.911	50.535
JA314101304000000000	385.23	7.27	138.398	2.612	3856.572	72.782
JA314100307000000000	1082.242	19.49	301.918	5.437	4027.077	72.524
JA314101401000000000	848.768	12.795	0	0	5784.903	87.205
JA314100324000000000	675.005	12.224	0	0	4846.74	87.776
JA314100301000000000	372.977	6.06	133.996	2.177	4757.844	77.298
JA314101406000000000	342.539	6.148	123.061	2.209	4285.769	76.923
JA314101410000000000	3825.01	68.593	1068.76	19.166	682.626	12.241
JA314101506000000000	354.026	6.36	127.188	2.285	4238.587	76.146
JA314101513000000000	1278.42	22.901	1360.062	24.364	2922.444	52.352
JA314100313000000000	1337.387	24.042	1422.795	25.578	2781.085	49.996
JA314100827000000000	609.137	11.193	648.038	11.908	4163.385	76.506
JA314101306000000000	386.603	7.289	546.574	10.305	4264.967	80.412
JA314100727000000000	382.934	5.539	137.574	1.99	5479.908	79.261
JA314100326000000000	462.964	8.398	0	0	4460.957	80.919
JA314101209000000000	2200.78	41.764	2341.325	44.431	706.169	13.401

AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE	AREA BARE EARTH (SF)	% BARE EARTH
0	0	0	0	22.937	0.553	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	255.472	4.615	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	21.333	0.382	0	0
0	0	0	0	0	0	0	0
0	0	0	0	21.333	0.405	0	0
0	0	0	0	3.797	0.069	0	0
880.553	15.916	0	0	29.972	0.542	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	23.885	0.428	0	0
0	0	0	0	22.757	0.412	0	0
0	0	0	0	0	0	0	0
0	0	0	0	8.942	0.162	0	0
0	0	0	0	0	0	0	0
888.62	16.77	0	0	29.972	0.566	0	0
0	0	99.561	1.793	0	0	11.946	0.215
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
860.355	13.978	0	0	29.972	0.487	0	0
790.145	14.182	0	0	29.972	0.538	0	0
0	0	0	0	0	0	0	0
816.642	14.671	0	0	29.972	0.538	0	0
0	0	0	0	21.333	0.382	0	0
0	0	0	0	21.333	0.384	0	0
0	0	0	0	21.333	0.392	0	0
0	0	0	0	0	0	105.733	1.993
883.325	12.776	0	0	29.972	0.434	0	0
0	0	335.842	6.092	253.109	4.591	0	0
0	0	0	0	21.333	0.405	0	0

Land Cover Scenario III Year 10 cont.

PARCEL	AREA LAWN (SF)	% LAWN	AREA MEADOW/ SHRUB (SF)	% MEADOW/ SHRUB	AREA EXISTING TREE CANOPY (SF)	% EXISTING TREE CANOPY
JA314100312000000000	2769.563	33.202	2946.433	35.322	2604.214	31.22
JA314100915000000000	2584.622	47.114	0	0	1928.042	35.145
JA314100607000000000	434.112	7.768	155.96	2.791	3967.139	70.987
JA313402107000000000	2358.078	26.204	0	0	4499.281	49.997
JA314101312000000000	3645.395	34.28	1312.991	12.347	5675.655	53.373
JA314101101000000000	5066.495	75.37	301.329	4.483	1256.45	18.691
JA314101320000000000	1736.226	33.083	694.293	13.23	2807.695	53.5
JA314100712000000000	1021.217	18.402	0	0	3939.299	70.985
JA314100818000000000	1334.788	24.465	0	0	4121.034	75.535
JA314101317000000000	3593.645	68.445	0	0	1656.727	31.554
JA313402110000000000	2111.806	34.581	489.216	8.011	3505.932	57.409

AREA NEW TREE CANOPY (SF)	% NEW TREE CANOPY	AREA IMPERMEABLE SURFACE (SF)	% IMPERMEABLE SURFACE	AREA PERMEABLE SURFACE (SF)	% PERMEABLE SURFACE	AREA BARE EARTH (SF)	% BARE EARTH
0	0	0	0	21.333	0.256	0	0
973.268	17.741	0	0	0	0	0	0
1001.377	17.918	0	0	29.972	0.536	0	0
1173.031	13.035	560.915	6.233	407.767	4.531	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	97.879	1.456
0	0	0	0	0	0	0	0
0	0	335.842	6.052	253.109	4.561	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

E.2: CARBON SEQUESTRATION

E.2.1: EXISTING CONDITIONS

PARCEL	TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA314100713000000000	2527.627306	110.710076	2983.864035
JA314100711000000000	4031.058985	176.5603835	4758.665132
JA314100722020000000	3957.546569	173.3405397	4671.883725
JA314101120000000000	1790.158573	78.4089455	2113.282195
JA314100630000000000	3865.451966	169.3067961	4563.166046
JA314100706000000000	796.720173	34.89634358	940.5281642
JA314100528000000000	4588.635997	200.9822567	5416.884794
JA314100819000000000	5453.994226	238.8849471	6438.440184
JA314100913000000000	2402.170146	105.2150524	2835.761857
JA314101313000000000	4196.20638	183.7938394	4953.621632
JA314101319000000000	3799.621018	166.4234006	4485.452612
JA314100610000000000	2724.48802	119.3325753	3216.258108
JA314100527000000000	3785.348581	165.7982678	4468.604
JA314101210000000000	1702.032684	74.54903156	2009.249583
JA314100720000000000	5499.223506	240.8659896	6491.833349
JA314100723000000000	4103.195556	179.7199654	4843.822354
JA314100605000000000	4517.070164	197.8476732	5332.401329
JA314100525000000000	3167.373095	138.7309416	3739.083939
JA314100619000000000	3712.129098	162.5912545	4382.1684
JA314100608000000000	5384.88345	235.8578951	6356.854913
JA314101126000000000	5336.223455	233.7265873	6299.411789
JA314101501000000000	4425.38309	193.8317793	5224.164738
JA314100219000000000	5451.28485	238.7662764	6435.241765
JA314100810000000000	2767.910628	121.2344855	3267.518496
JA314101304000000000	3856.571946	168.9178512	4552.683182
JA314100307000000000	4027.077257	176.3859839	4753.964702
JA314101401000000000	5784.903192	253.3787598	6829.078218
JA314100324000000000	4846.740303	212.2872253	5721.576928
JA314100301000000000	4757.843929	208.3935641	5616.634758
JA314101406000000000	4285.76887	187.7166765	5059.350151
JA314101410000000000	682.62581	29.89901048	805.8397687
JA314101506000000000	4238.586757	185.6501	5003.651667
JA314101513000000000	2922.443762	128.0030368	3449.944861
JA314100313000000000	2781.085267	121.8115347	3283.071158
JA314100827000000000	4163.3845	182.3562411	4914.875402
JA314101306000000000	4264.967103	186.8055591	5034.793665
JA314100727000000000	5479.908008	240.0199708	6469.031403
JA314100326000000000	4460.956903	195.3899124	5266.159624

Carbon Sequestration Existing Conditions cont.

PARCEL	TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA314101209000000000	706.168958	30.93020036	833.6324549
JA314100312000000000	2604.214246	114.064584	3074.274917
JA314100915000000000	1928.041928	84.44823645	2276.053496
JA314100607000000000	3967.139471	173.7607088	4683.208146
JA313402107000000000	4499.280812	197.0684996	5311.400999
JA314101312000000000	5675.654654	248.5936738	6700.110319
JA314101101000000000	1256.450066	55.03251289	1483.239303
JA314101320000000000	2807.694613	122.977024	3314.483491
JA314100712000000000	3939.299024	172.5412973	4650.342498
JA314100818000000000	4121.033808	180.5012808	4864.88041
JA314101317000000000	1656.727166	72.56464987	1955.766419
JA313402110000000000	3505.931681	153.5598076	4138.752349

E.2.2: CARBON SEQUESTRATION SCENARIO I

YEAR 2

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410071300000000	2527.627306	0	110.710076	2983.864035
JA31410071100000000	4031.058985	392.2446415	193.7406988	4812.841373
JA31410072202000000	3957.546569	0	173.3405397	4671.883725
JA31410112000000000	1790.158573	0	78.4089455	2113.282195
JA31410063000000000	3865.451966	0	169.3067961	4563.166046
JA31410070600000000	796.720173	0	34.89634358	940.5281642
JA31410052800000000	4588.635997	0	200.9822567	5416.884794
JA31410081900000000	5453.994226	0	238.8849471	6438.440184
JA31410091300000000	2402.170146	0	105.2150524	2835.761857
JA31410131300000000	4196.20638	0	183.7938394	4953.621632
JA31410131900000000	3799.621018	0	166.4234006	4485.452612
JA31410061000000000	2724.48802	0	119.3325753	3216.258108
JA31410052700000000	3785.348581	0	165.7982678	4468.604
JA31410121000000000	1702.032684	0	74.54903156	2009.249583
JA31410072000000000	5499.223506	0	240.8659896	6491.833349
JA31410072300000000	4103.195556	368.2370936	181.6070332	4894.682709
JA31410060500000000	4517.070164	0	197.8476732	5332.401329
JA31410052500000000	3167.373095	559.788937	141.5996359	3816.401147
JA31410061900000000	3712.129098	471.0206636	165.005047	4447.225068
JA31410060800000000	5384.88345	0	235.8578951	6356.854913
JA31410112600000000	5336.223455	0	233.7265873	6299.411789
JA31410150100000000	4425.38309	593.8394391	196.8749689	5306.18495
JA31410021900000000	5451.28485	0	238.7662764	6435.241765
JA31410081000000000	2767.910628	0	121.2344855	3267.518496
JA31410130400000000	3856.571946	371.7934686	170.823144	4604.034738
JA31410030700000000	4027.077257	394.9297468	178.4098408	4808.511806
JA31410140100000000	5784.903192	0	253.3787598	6829.078218
JA31410032400000000	4846.740303	0	212.2872253	5721.576928
JA31410030100000000	4757.843929	359.3321085	210.2349974	5666.26517
JA31410140600000000	4285.76887	328.3779626	189.3994822	5104.705223
JA31410141000000000	682.62581	148.7447079	30.66126761	826.3841646
JA31410150600000000	4238.586757	340.059955	187.3927712	5050.620238
JA31410151300000000	2922.443762	0	128.0030368	3449.944861
JA31410031300000000	2781.085267	0	121.8115347	3283.071158
JA31410082700000000	4163.3845	0	182.3562411	4914.875402
JA31410130600000000	4264.967103	0	186.8055591	5034.793665
JA31410072700000000	5479.908008	369.459076	241.9133007	6520.060537

Carbon Sequestration Scenario / Year 2 cont.

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410032600000000	4460.956903	0	195.3899124	5266.159624
JA31410120900000000	706.168958	0	30.93020036	833.6324549
JA31410031200000000	2604.214246	0	114.064584	3074.274917
JA31410091500000000	1928.041928	108.1408832	85.00241522	2290.989753
JA31410060700000000	3967.139471	421.5056175	175.9207565	4741.425869
JA31340210700000000	4499.280812	493.0927405	199.5954026	5379.506228
JA31410131200000000	5675.654654	558.3095009	251.4547867	6777.22319
JA31410110100000000	1256.450066	166.1282572	55.88385376	1506.184689
JA31410132000000000	2807.694613	648.6733619	126.3012156	3404.077282
JA31410071200000000	3939.299024	0	172.5412973	4650.342498
JA31410081800000000	4121.033808	0	180.5012808	4864.88041
JA31410131700000000	1656.727166	109.2277763	73.12439853	1970.852796
JA31340211000000000	3505.931681	0	153.5598076	4138.752349

YEAR 5

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410071300000000	2527.627306	0	110.710076	2983.864035
JA31410071100000000	4031.058985	573.6315056	201.6854435	4837.894255
JA31410072202000000	3957.546569	0	173.3405397	4671.883725
JA31410112000000000	1790.158573	0	78.4089455	2113.282195
JA31410063000000000	3865.451966	0	169.3067961	4563.166046
JA31410070600000000	796.720173	0	34.89634358	940.5281642
JA31410052800000000	4588.635997	0	200.9822567	5416.884794
JA31410081900000000	5453.994226	0	238.8849471	6438.440184
JA31410091300000000	2402.170146	0	105.2150524	2835.761857
JA31410131300000000	4196.20638	0	183.7938394	4953.621632
JA31410131900000000	3799.621018	0	166.4234006	4485.452612
JA31410061000000000	2724.48802	0	119.3325753	3216.258108
JA31410052700000000	3785.348581	0	165.7982678	4468.604
JA31410121000000000	1702.032684	0	74.54903156	2009.249583
JA31410072000000000	5499.223506	0	240.8659896	6491.833349
JA31410072300000000	4103.195556	539.192953	203.3366167	4918.294876
JA31410060500000000	4517.070164	0	197.8476732	5332.401329
JA31410052500000000	3167.373095	813.971879	174.3829099	3851.508514
JA31410061900000000	3712.129098	686.6348073	192.6658591	4477.00537
JA31410060800000000	5384.88345	0	235.8578951	6356.854913
JA31410112600000000	5336.223455	0	233.7265873	6299.411789
JA31410150100000000	4425.38309	862.8169345	231.6231611	5343.335719
JA31410021900000000	5451.28485	0	238.7662764	6435.241765
JA31410081000000000	2767.910628	0	121.2344855	3267.518496
JA31410130400000000	3856.571946	544.2945323	192.7579517	4627.860327
JA31410030700000000	4027.077257	577.4832585	201.6797506	4833.725823
JA31410140100000000	5784.903192	0	253.3787598	6829.078218
JA31410032400000000	4846.740303	0	212.2872253	5721.576928
JA31410030100000000	4757.843929	526.4188539	231.4507099	5689.342941
JA31410140600000000	4285.76887	482.0154861	208.8289548	5125.925407
JA31410141000000000	682.62581	455.53069	49.8512547	868.7569843
JA31410150600000000	4238.586757	498.7731704	207.4963648	5072.541469
JA31410151300000000	2922.443762	0	128.0030368	3449.944861
JA31410031300000000	2781.085267	0	121.8115347	3283.071158
JA31410082700000000	4163.3845	0	182.3562411	4914.875402
JA31410130600000000	4264.967103	0	186.8055591	5034.793665
JA31410072700000000	5479.908008	540.9458728	263.7134	6543.746036

Carbon Sequestration Scenario I Year 5 cont.

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410032600000000	4460.956903	0	195.3899124	5266.159624
JA31410120900000000	706.168958	0	30.93020036	833.6324549
JA31410031200000000	2604.214246	0	114.064584	3074.274917
JA31410091500000000	1928.041928	331.181471	98.95398488	2321.795784
JA31410060700000000	3967.139471	615.6060407	200.7242534	4768.234728
JA31340210700000000	4499.280812	729.379513	229.0153222	5412.141803
JA31410131200000000	5675.654654	825.6958935	284.759154	6814.154197
JA31410110100000000	1256.450066	508.7678123	77.31654307	1553.50955
JA31410132000000000	2807.694613	941.4755688	164.213654	3444.518684
JA31410071200000000	3939.299024	0	172.5412973	4650.342498
JA31410081800000000	4121.033808	0	180.5012808	4864.88041
JA31410131700000000	1656.727166	334.5100812	87.21619143	2001.96845
JA31340211000000000	3505.931681	0	153.5598076	4138.752349

YEAR 10

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410071300000000	2527.627306	0	110.710076	2983.864035
JA31410071100000000	4031.058985	935.0071331	217.513696	4887.806915
JA31410072202000000	3957.546569	0	173.3405397	4671.883725
JA31410112000000000	1790.158573	0	78.4089455	2113.282195
JA31410063000000000	3865.451966	0	169.3067961	4563.166046
JA31410070600000000	796.720173	0	34.89634358	940.5281642
JA31410052800000000	4588.635997	0	200.9822567	5416.884794
JA31410081900000000	5453.994226	0	238.8849471	6438.440184
JA31410091300000000	2402.170146	0	105.2150524	2835.761857
JA31410131300000000	4196.20638	0	183.7938394	4953.621632
JA31410131900000000	3799.621018	0	166.4234006	4485.452612
JA31410061000000000	2724.48802	0	119.3325753	3216.258108
JA31410052700000000	3785.348581	0	165.7982678	4468.604
JA31410121000000000	1702.032684	0	74.54903156	2009.249583
JA31410072000000000	5499.223506	0	240.8659896	6491.833349
JA31410072300000000	4103.195556	880.5532527	218.2881978	4965.443048
JA31410060500000000	4517.070164	0	197.8476732	5332.401329
JA31410052500000000	3167.373095	1315.030826	196.3292918	3920.714024
JA31410061900000000	3712.129098	1113.686776	211.3707353	4535.989147
JA31410060800000000	5384.88345	0	235.8578951	6356.854913
JA31410112600000000	5336.223455	0	233.7265873	6299.411789
JA31410150100000000	4425.38309	1392.264119	254.8129477	5416.462169
JA31410021900000000	5451.28485	0	238.7662764	6435.241765
JA31410081000000000	2767.910628	0	121.2344855	3267.518496
JA31410130400000000	3856.571946	888.6198166	207.8393992	4675.418018
JA31410030700000000	4027.077257	941.0974846	217.6060537	4883.947675
JA31410140100000000	5784.903192	0	253.3787598	6829.078218
JA31410032400000000	4846.740303	0	212.2872253	5721.576928
JA31410030100000000	4757.843929	860.3549803	246.0771122	5735.465698
JA31410140600000000	4285.76887	790.1448379	222.3250204	5168.483771
JA31410141000000000	682.62581	1338.702489	88.5341795	990.7393484
JA31410150600000000	4238.586757	816.6419137	221.4190158	5116.445023
JA31410151300000000	2922.443762	0	128.0030368	3449.944861
JA31410031300000000	2781.085267	0	121.8115347	3283.071158
JA31410082700000000	4163.3845	0	182.3562411	4914.875402
JA31410130600000000	4264.967103	0	186.8055591	5034.793665
JA31410072700000000	5479.908008	883.3249512	278.7096036	6591.034921

Carbon Sequestration Scenario I Year 10 cont.

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410032600000000	4460.956903	0	195.3899124	5266.159624
JA31410120900000000	706.168958	0	30.93020036	833.6324549
JA31410031200000000	2604.214246	0	114.064584	3074.274917
JA31410091500000000	1928.041928	973.268035	127.0773764	2410.479817
JA31410060700000000	3967.139471	1001.37683	217.621014	4821.516811
JA31340210700000000	4499.280812	1173.031135	248.4472633	5473.418299
JA31410131200000000	5675.654654	1325.371951	306.6449653	6883.168705
JA31410110100000000	1256.450066	1495.154447	120.5202777	1689.747792
JA31410132000000000	2807.694613	1516.638332	189.405783	3523.959302
JA31410071200000000	3939.299024	0	172.5412973	4650.342498
JA31410081800000000	4121.033808	0	180.5012808	4864.88041
JA31410131700000000	1656.727166	983.0500736	115.6222431	2091.543821
JA31340211000000000	3505.931681	0	153.5598076	4138.752349

E.2.3: CARBON SEQUESTRATION SCENARIO II

PARCEL	TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA314100713000000000	1420.96371	62.23821048	1677.447659
JA314100711000000000	1420.036419	62.19759517	1676.352993
JA314100722020000000	1062.528072	46.53872957	1254.31439
JA314101120000000000	1419.540365	62.17586799	1675.767401
JA314100630000000000	2999.690466	131.3864424	3541.134595
JA314100706000000000	1417.170829	62.07208229	1672.970163
JA314100528000000000	1347.09803	59.00289373	1590.249225
JA314100819000000000	1396.222522	61.15454646	1648.240687
JA314100913000000000	703.5983378	30.8176072	830.5978378
JA314101313000000000	1342.585002	58.80522311	1584.921595
JA314101319000000000	1343.83817	58.8601185	1586.40096
JA314100610000000000	1429.435233	62.60926318	1687.448292
JA314100527000000000	1347.380316	59.01525784	1590.582463
JA314101210000000000	1349.188378	59.09445097	1592.716881
JA314100720000000000	1415.977306	62.01980601	1671.56121
JA314100723000000000	1416.348531	62.03606567	1671.999441
JA314100605000000000	1430.862242	62.67176621	1689.132877
JA314100525000000000	1353.547488	59.28537999	1597.86281
JA314100619000000000	1411.087129	61.80561627	1665.788356
JA314100608000000000	1429.967415	62.63257279	1688.076534
JA314101126000000000	1415.082716	61.98062296	1670.505146
JA314101501000000000	1707.020822	74.767512	2015.13808
JA314100219000000000	1414.786987	61.96767002	1670.156038
JA314100810000000000	1402.154009	61.41434558	1655.242807
JA314101304000000000	1356.494811	59.41447274	1601.342125
JA314100307000000000	1421.494989	62.26148051	1678.074834
JA314101401000000000	1698.22178	74.38211395	2004.750811
JA314100324000000000	1413.566594	61.91421682	1668.715364
JA314100301000000000	1575.72074	69.01656843	1860.138334
JA314101406000000000	1426.304156	62.47212204	1683.752056
JA314101410000000000	1427.55911	62.52708901	1685.233529
JA314101506000000000	1425.006011	62.41526329	1682.219596
JA314101513000000000	1429.058196	62.59274897	1687.0032
JA314100313000000000	1424.025684	62.37232497	1681.06232
JA314100827000000000	1393.12447	61.01885179	1644.583437
JA314101306000000000	1357.793137	59.47133942	1602.874799
JA314100727000000000	1769.914599	77.52225944	2089.384184
JA314100326000000000	1411.295267	61.81473271	1666.034063

Carbon Sequestration Scenario II cont.

PARCEL	TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA314101209000000000	1349.019386	59.08704912	1592.517386
JA314100312000000000	2135.435184	93.53206104	2520.881234
JA314100915000000000	1404.398667	61.51266163	1657.892627
JA314100607000000000	1430.675887	62.66360387	1688.912885
JA313402107000000000	2303.762227	100.9047856	2719.59131
JA314101312000000000	2722.311151	119.2372284	3213.688314
JA314101101000000000	1720.871601	75.37417613	2031.488925
JA314101320000000000	1343.494881	58.84507577	1585.995706
JA314100712000000000	1420.663738	62.22507174	1677.093543
JA314100818000000000	1396.689406	61.17499599	1648.791844
JA314101317000000000	1344.096479	58.87142577	1586.705893
JA313402110000000000	1563.372943	68.47573492	1845.56176

E.2.4: CARBON SEQUESTRATION SCENARIO III

YEAR 2

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410071300000000	2527.627306	0	110.710076	2983.864035
JA31410071100000000	4031.058985	392.2446415	193.7406988	4812.841373
JA31410072202000000	3957.546569	0	173.3405397	4671.883725
JA31410112000000000	1790.158573	0	78.4089455	2113.282195
JA31410063000000000	3865.451966	0	169.3067961	4563.166046
JA31410070600000000	796.720173	0	34.89634358	940.5281642
JA31410052800000000	4588.635997	0	200.9822567	5416.884794
JA31410081900000000	5453.994226	0	238.8849471	6438.440184
JA31410091300000000	2402.170146	0	105.2150524	2835.761857
JA31410131300000000	4196.20638	0	183.7938394	4953.621632
JA31410131900000000	3799.621018	0	166.4234006	4485.452612
JA31410061000000000	2724.48802	0	119.3325753	3216.258108
JA31410052700000000	3785.348581	0	165.7982678	4468.604
JA31410121000000000	1702.032684	0	74.54903156	2009.249583
JA31410072000000000	5499.223506	0	240.8659896	6491.833349
JA31410072300000000	4103.195556	0	179.7199654	4843.822354
JA31410060500000000	4517.070164	0	197.8476732	5332.401329
JA31410052500000000	3167.373095	0	138.7309416	3739.083939
JA31410061900000000	3712.129098	0	162.5912545	4382.1684
JA31410060800000000	5384.88345	0	235.8578951	6356.854913
JA31410112600000000	5336.223455	0	233.7265873	6299.411789
JA31410150100000000	4425.38309	0	193.8317793	5224.164738
JA31410021900000000	5451.28485	0	238.7662764	6435.241765
JA31410081000000000	2767.910628	0	121.2344855	3267.518496
JA31410130400000000	3856.571946	371.7934686	185.2024052	4604.034738
JA31410030700000000	4027.077257	0	176.3859839	4753.964702
JA31410140100000000	5784.903192	0	253.3787598	6829.078218
JA31410032400000000	4846.740303	0	212.2872253	5721.576928
JA31410030100000000	4757.843929	359.3321085	224.1323104	5666.26517
JA31410140600000000	4285.76887	0	187.7166765	5059.350151
JA31410141000000000	682.62581	0	29.89901048	805.8397687
JA31410150600000000	4238.586757	340.059955	200.544726	5050.620238
JA31410151300000000	2922.443762	0	128.0030368	3449.944861
JA31410031300000000	2781.085267	0	121.8115347	3283.071158
JA31410082700000000	4163.3845	0	182.3562411	4914.875402
JA31410130600000000	4264.967103	0	186.8055591	5034.793665
JA31410072700000000	5479.908008	0	240.0199708	6469.031403

Carbon Sequestration Scenario III Year 2 cont.

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410032600000000	4460.956903	0	195.3899124	5266.159624
JA31410120900000000	706.168958	0	30.93020036	833.6324549
JA31410031200000000	2604.214246	0	114.064584	3074.274917
JA31410091500000000	1928.041928	108.1408832	89.18480713	2290.989753
JA31410060700000000	3967.139471	421.5056175	192.2226549	4741.425869
JA31340210700000000	4499.280812	493.0927405	218.6659616	5379.506228
JA31410131200000000	5675.654654	0	248.5936738	6700.110319
JA31410110100000000	1256.450066	0	55.03251289	1483.239303
JA31410132000000000	2807.694613	0	122.977024	3314.483491
JA31410071200000000	3939.299024	0	172.5412973	4650.342498
JA31410081800000000	4121.033808	0	180.5012808	4864.88041
JA31410131700000000	1656.727166	0	72.56464987	1955.766419
JA31340211000000000	3505.931681	0	153.5598076	4138.752349

YEAR 5

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410071300000000	2527.627306	0	110.710076	2983.864035
JA31410071100000000	4031.058985	573.6315056	201.6854435	4837.894255
JA31410072202000000	3957.546569	0	173.3405397	4671.883725
JA31410112000000000	1790.158573	0	78.4089455	2113.282195
JA31410063000000000	3865.451966	0	169.3067961	4563.166046
JA31410070600000000	796.720173	0	34.89634358	940.5281642
JA31410052800000000	4588.635997	0	200.9822567	5416.884794
JA31410081900000000	5453.994226	0	238.8849471	6438.440184
JA31410091300000000	2402.170146	0	105.2150524	2835.761857
JA31410131300000000	4196.20638	0	183.7938394	4953.621632
JA31410131900000000	3799.621018	0	166.4234006	4485.452612
JA31410061000000000	2724.48802	0	119.3325753	3216.258108
JA31410052700000000	3785.348581	0	165.7982678	4468.604
JA31410121000000000	1702.032684	0	74.54903156	2009.249583
JA31410072000000000	5499.223506	0	240.8659896	6491.833349
JA31410072300000000	4103.195556	0	179.7199654	4843.822354
JA31410060500000000	4517.070164	0	197.8476732	5332.401329
JA31410052500000000	3167.373095	0	138.7309416	3739.083939
JA31410061900000000	3712.129098	0	162.5912545	4382.1684
JA31410060800000000	5384.88345	0	235.8578951	6356.854913
JA31410112600000000	5336.223455	0	233.7265873	6299.411789
JA31410150100000000	4425.38309	0	193.8317793	5224.164738
JA31410021900000000	5451.28485	0	238.7662764	6435.241765
JA31410081000000000	2767.910628	0	121.2344855	3267.518496
JA31410130400000000	3856.571946	544.2945323	192.7579517	4627.860327
JA31410030700000000	4027.077257	0	176.3859839	4753.964702
JA31410140100000000	5784.903192	0	253.3787598	6829.078218
JA31410032400000000	4846.740303	0	212.2872253	5721.576928
JA31410030100000000	4757.843929	526.4188539	231.4507099	5689.342941
JA31410140600000000	4285.76887	0	187.7166765	5059.350151
JA31410141000000000	682.62581	0	29.89901048	805.8397687
JA31410150600000000	4238.586757	498.7731704	207.4963648	5072.541469
JA31410151300000000	2922.443762	0	128.0030368	3449.944861
JA31410031300000000	2781.085267	0	121.8115347	3283.071158
JA31410082700000000	4163.3845	0	182.3562411	4914.875402
JA31410130600000000	4264.967103	0	186.8055591	5034.793665
JA31410072700000000	5479.908008	0	240.0199708	6469.031403

Carbon Sequestration Scenario III Year 5 cont.

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410032600000000	4460.956903	0	195.3899124	5266.159624
JA31410120900000000	706.168958	0	30.93020036	833.6324549
JA31410031200000000	2604.214246	0	114.064584	3074.274917
JA31410091500000000	1928.041928	331.181471	98.95398488	2321.795784
JA31410060700000000	3967.139471	615.6060407	200.7242534	4768.234728
JA31340210700000000	4499.280812	729.379513	229.0153222	5412.141803
JA31410131200000000	5675.654654	0	248.5936738	6700.110319
JA31410110100000000	1256.450066	0	55.03251289	1483.239303
JA31410132000000000	2807.694613	0	122.977024	3314.483491
JA31410071200000000	3939.299024	0	172.5412973	4650.342498
JA31410081800000000	4121.033808	0	180.5012808	4864.88041
JA31410131700000000	1656.727166	0	72.56464987	1955.766419
JA31340211000000000	3505.931681	0	153.5598076	4138.752349

YEAR 10

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410071300000000	2527.627306	0	110.710076	2983.864035
JA31410071100000000	4031.058985	935.0071331	217.513696	4887.806915
JA31410072202000000	3957.546569	0	173.3405397	4671.883725
JA31410112000000000	1790.158573	0	78.4089455	2113.282195
JA31410063000000000	3865.451966	0	169.3067961	4563.166046
JA31410070600000000	796.720173	0	34.89634358	940.5281642
JA31410052800000000	4588.635997	0	200.9822567	5416.884794
JA31410081900000000	5453.994226	0	238.8849471	6438.440184
JA31410091300000000	2402.170146	0	105.2150524	2835.761857
JA31410131300000000	4196.20638	0	183.7938394	4953.621632
JA31410131900000000	3799.621018	0	166.4234006	4485.452612
JA31410061000000000	2724.48802	0	119.3325753	3216.258108
JA31410052700000000	3785.348581	0	165.7982678	4468.604
JA31410121000000000	1702.032684	0	74.54903156	2009.249583
JA31410072000000000	5499.223506	0	240.8659896	6491.833349
JA31410072300000000	4103.195556	0	179.7199654	4843.822354
JA31410060500000000	4517.070164	0	197.8476732	5332.401329
JA31410052500000000	3167.373095	0	138.7309416	3739.083939
JA31410061900000000	3712.129098	0	162.5912545	4382.1684
JA31410060800000000	5384.88345	0	235.8578951	6356.854913
JA31410112600000000	5336.223455	0	233.7265873	6299.411789
JA31410150100000000	4425.38309	0	193.8317793	5224.164738
JA31410021900000000	5451.28485	0	238.7662764	6435.241765
JA31410081000000000	2767.910628	0	121.2344855	3267.518496
JA31410130400000000	3856.571946	888.6198166	207.8393992	4675.418018
JA31410030700000000	4027.077257	0	176.3859839	4753.964702
JA31410140100000000	5784.903192	0	253.3787598	6829.078218
JA31410032400000000	4846.740303	0	212.2872253	5721.576928
JA31410030100000000	4757.843929	860.3549803	246.0771122	5735.465698
JA31410140600000000	4285.76887	0	187.7166765	5059.350151
JA31410141000000000	682.62581	0	29.89901048	805.8397687
JA31410150600000000	4238.586757	816.6419137	221.4190158	5116.445023
JA31410151300000000	2922.443762	0	128.0030368	3449.944861
JA31410031300000000	2781.085267	0	121.8115347	3283.071158
JA31410082700000000	4163.3845	0	182.3562411	4914.875402
JA31410130600000000	4264.967103	0	186.8055591	5034.793665
JA31410072700000000	5479.908008	0	240.0199708	6469.031403

Carbon Sequestration Scenario III Year 10 cont.

PARCEL	EXISTING TREE CANOPY COVER (SF)	NEW TREE CANOPY COVER (SF)	CARBON SEQUESTERED PER YEAR (LBS)	CARBON STORED (LBS)
JA31410032600000000	4460.956903	0	195.3899124	5266.159624
JA31410120900000000	706.168958	0	30.93020036	833.6324549
JA31410031200000000	2604.214246	0	114.064584	3074.274917
JA31410091500000000	1928.041928	973.268035	127.0773764	2410.479817
JA31410060700000000	3967.139471	1001.37683	217.621014	4821.516811
JA31340210700000000	4499.280812	1173.031135	248.4472633	5473.418299
JA31410131200000000	5675.654654	0	248.5936738	6700.110319
JA31410110100000000	1256.450066	0	55.03251289	1483.239303
JA31410132000000000	2807.694613	0	122.977024	3314.483491
JA31410071200000000	3939.299024	0	172.5412973	4650.342498
JA31410081800000000	4121.033808	0	180.5012808	4864.88041
JA31410131700000000	1656.727166	0	72.56464987	1955.766419
JA31340211000000000	3505.931681	0	153.5598076	4138.752349

E.3: STORMWATER MANAGEMENT

E.3.1: STORMWATER MANAGEMENT EXISTING CONDITIONS

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	45.54	7.95
JA314100711000000000	0.13	2.458	72.67	6.75
JA314100722020000000	0.1	2.843	95.35	0
JA314101120000000000	0.13	3.774	32.28	19.84
JA314100630000000000	0.27	1.854	32.99	4.31
JA314100706000000000	0.13	1.941	14.39	5.65
JA314100528000000000	0.12	1.64	87.2	0.58
JA314100819000000000	0.13	3.954	100	0
JA314100913000000000	0.06	3	87.4	0
JA314101313000000000	0.12	1.207	80.01	5.69
JA314101319000000000	0.12	2.838	72.38	2.12
JA314100610000000000	0.13	3.773	48.79	0
JA314100527000000000	0.12	1.52	71.92	6.7
JA314101210000000000	0.12	2.497	32.29	0
JA314100720000000000	0.13	2.885	99.42	0
JA314100723000000000	0.13	2.136	74.16	0
JA314100605000000000	0.13	2.365	80.82	0
JA314100525000000000	0.12	4.693	59.91	16.38
JA314100619000000000	0.13	3.097	67.35	0
JA314100608000000000	0.13	3.58	96.4	3.59
JA314101126000000000	0.13	3.237	96.54	0
JA314101501000000000	0.15	3.647	66.37	10.87
JA314100219000000000	0.13	2.452	98.64	0
JA314100810000000000	0.13	2.568	50.54	4.35
JA314101304000000000	0.12	2.378	72.78	5.68
JA314100307000000000	0.13	3.677	72.52	5.44
JA314101401000000000	0.15	3.045	87.21	0
JA314100324000000000	0.13	2.703	87.78	0
JA314100301000000000	0.14	2.743	77.3	9.55
JA314101406000000000	0.13	3.62	76.92	0.4
JA314101410000000000	0.13	3.061	12.24	19.17
JA314101506000000000	0.13	3.596	76.15	8.53
JA314101513000000000	0.13	2.479	52.35	0
JA314100313000000000	0.13	3.593	50	4.61
JA314100827000000000	0.12	3.177	76.51	18.15
JA314101306000000000	0.12	1.993	80.41	10.31
JA314100727000000000	0.16	2.843	79.26	0
JA314100326000000000	0.13	3.446	80.92	1.51
JA314101209000000000	0.12	2.485	13.4	0

% LAWN	% IMPERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
46.51	0	4.32	3.49
20.58	0	3.91	3.5
4.65	0	3.63	3.5
47.88	0	4.56	3.48
62.7	0	4.56	3.48
75.34	4.61	6.31	3.3
12.22	0	3.77	3.5
0	0	3.61	3.5
12.6	0	3.77	3.5
14.3	0	8.71	2.21
25.49	0	3.91	3.5
51.21	0	4.31	3.49
21.38	0	3.91	3.5
67.7	0	4.68	3.47
0.58	0	3.61	3.5
21.26	4.57	5.27	3.34
19.18	0	3.83	3.5
23.71	0	4.22	3.5
32.65	0	4.04	3.5
0	0	3.62	3.5
3.46	0	3.63	3.5
22.76	0	3.99	3.5
1.36	0	3.61	3.5
45.12	0	4.26	3.5
21.54	0	3.91	3.5
19.49	2.01	4.7	3.41
12.79	0	3.77	3.5
12.22	0	3.72	3.5
13.15	0	3.84	3.5
22.68	0	3.9	3.5
68.59	0	5.04	3.45
15.32	0	3.84	3.5
44.82	2.82	4.86	3.4
45.39	0	4.31	3.5
5.34	0	3.81	3.5
7.29	1.99	4.05	3.45
20.74	0	3.83	3.5
16.98	0.59	4.14	3.47
86.6	0	4.99	3.45

Stormwater Management Existing Conditions cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100312000000000	0.19	3.932	31.22	17.61
JA314100915000000000	0.13	3.316	35.15	19.7
JA314100607000000000	0.13	3.192	70.99	0.03
JA313402107000000000	0.21	2.293	50	16.68
JA314101312000000000	0.24	0.761	53.37	12.35
JA314101101000000000	0.15	3.116	18.69	4.48
JA314101320000000000	0.12	2.241	53.5	13.23
JA314100712000000000	0.13	2.005	70.99	0
JA314100818000000000	0.13	3.682	75.53	0
JA314101317000000000	0.12	2.451	31.55	0
JA313402110000000000	0.14	2.505	57.41	8.01

% LAWN	% IMPERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
44.26	6.92	6.58	3.25
45.15	0	4.43	3.49
29.01	0	3.98	3.5
33.33	0	4.17	3.5
34.28	0	4.15	3.5
75.37	1.46	5.09	3.42
33.08	0	4.2	3.49
29.01	0	3.98	3.5
24.47	0	3.9	3.5
68.45	0	4.68	3.47
34.58	0	4.14	3.5

E.3.2: STORMWATER MANAGEMENT SCENARIO I

YEAR 2

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	45.54	0
JA314100711000000000	0.13	2.458	79.74	5.39
JA314100722020000000	0.1	2.843	95.35	1.74
JA314101120000000000	0.13	3.774	32.28	34.71
JA314100630000000000	0.27	1.854	32.99	0
JA314100706000000000	0.13	1.941	14.39	41.55
JA314100528000000000	0.12	1.64	87.2	4.8
JA314100819000000000	0.13	3.954	100	0
JA314100913000000000	0.06	3	87.4	4.72
JA314101313000000000	0.12	1.207	80.01	0
JA314101319000000000	0.12	2.838	72.38	0
JA314100610000000000	0.13	3.773	48.79	26.2
JA314100527000000000	0.12	1.52	71.92	0
JA314101210000000000	0.12	2.497	32.29	34.69
JA314100720000000000	0.13	2.885	99.42	0.22
JA314100723000000000	0.13	2.136	80.82	5.08
JA314100605000000000	0.13	2.365	80.82	0
JA314100525000000000	0.12	4.693	70.49	8.07
JA314100619000000000	0.13	3.097	75.89	6.52
JA314100608000000000	0.13	3.58	96.4	1.35
JA314101126000000000	0.13	3.237	96.54	1.3
JA314101501000000000	0.15	3.647	75.27	6.79
JA314100219000000000	0.13	2.452	98.64	0.51
JA314100810000000000	0.13	2.568	50.54	25.3
JA314101304000000000	0.12	2.378	79.8	5.35
JA314100307000000000	0.13	3.677	79.64	5.42
JA314101401000000000	0.15	3.045	87.21	0
JA314100324000000000	0.13	2.703	87.78	4.58
JA314100301000000000	0.14	2.743	83.14	4.45
JA314101406000000000	0.13	3.62	82.82	4.49
JA314101410000000000	0.13	3.061	14.91	0
JA314101506000000000	0.13	3.596	82.25	4.66
JA314101513000000000	0.13	2.479	52.35	24.36
JA314100313000000000	0.13	3.593	50	25.58
JA314100827000000000	0.12	3.177	76.51	11.91
JA314101306000000000	0.12	1.993	80.41	7.35
JA314100727000000000	0.16	2.843	84.61	4.07
JA314100326000000000	0.13	3.446	80.92	0
JA314101209000000000	0.12	2.485	13.4	44.43

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
52.97	1.5	0	4.55	3.46
13.03	0	1.84	3.71	3.5
2.35	0	0.55	3.63	3.5
32.62	0	0.38	4.36	3.49
66.3	0.71	0	4.67	3.45
39.06	4.61	0.39	6.07	3.32
6.48	0	1.52	3.66	3.5
0	0	0	3.61	3.5
6.38	0	1.5	3.67	3.5
8.76	6.4	4.83	8.57	2.23
16.4	6.4	4.82	4.41	3.41
24.63	0	0.38	4.17	3.5
16.89	6.38	4.81	4.41	3.41
32.61	0	0.4	4.36	3.49
0.29	0	0.07	3.61	3.5
12.26	0	1.84	3.71	3.5
8.65	6.01	4.53	4.25	3.41
19.5	0	1.93	4.05	3.5
15.74	0	1.85	3.77	3.5
1.82	0	0.43	3.6	3.5
1.75	0	0.41	3.6	3.5
16.4	0	1.53	3.79	3.5
0.69	0	0.16	3.61	3.5
23.78	0	0.39	4.1	3.5
12.92	0	1.92	3.7	3.5
13.1	0	1.84	3.71	3.5
3.92	5.06	3.82	4.12	3.43
6.19	0	1.45	3.67	3.5
10.75	0	1.66	3.72	3.5
10.86	0	1.83	3.71	3.5
85.09	0	0	4.99	3.45
11.25	0	1.83	3.71	3.5
22.9	0	0.38	4.08	3.5
24.04	0	0.38	4.1	3.5
11.19	0	0.39	3.8	3.5
9.91	0	2.33	3.7	3.5
9.84	0	1.48	3.67	3.5
8.4	6.09	4.59	4.26	3.41
41.76	0	0.4	4.99	3.45

Stormwater Management Scenario I Year 2 cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100312000000000	0.19	3.932	31.22	35.32
JA314100915000000000	0.13	3.316	37.12	0
JA314100607000000000	0.13	3.192	78.53	5.75
JA313402107000000000	0.21	2.293	55.48	0
JA314101312000000000	0.24	0.761	58.62	0
JA314101101000000000	0.15	3.116	21.16	0
JA314101320000000000	0.12	2.241	65.86	9.43
JA314100712000000000	0.13	2.005	70.99	0
JA314100818000000000	0.13	3.682	75.53	12.41
JA314101317000000000	0.12	2.451	33.63	0
JA313402110000000000	0.14	2.505	57.41	21.77

YEAR 5

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	45.54	0
JA314100711000000000	0.13	2.458	83.01	4.47
JA314100722020000000	0.1	2.843	95.35	1.74
JA314101120000000000	0.13	3.774	32.28	34.71
JA314100630000000000	0.27	1.854	32.99	0
JA314100706000000000	0.13	1.941	14.39	41.55
JA314100528000000000	0.12	1.64	87.2	4.8
JA314100819000000000	0.13	3.954	100	0
JA314100913000000000	0.06	3	87.4	4.72
JA314101313000000000	0.12	1.207	80.01	0
JA314101319000000000	0.12	2.838	72.38	0
JA314100610000000000	0.13	3.773	48.79	26.2
JA314100527000000000	0.12	1.52	71.92	0
JA314101210000000000	0.12	2.497	32.29	34.69
JA314100720000000000	0.13	2.885	99.42	0.22
JA314100723000000000	0.13	2.136	83.91	4.21
JA314100605000000000	0.13	2.365	80.82	0
JA314100525000000000	0.12	4.693	75.3	6.66
JA314100619000000000	0.13	3.097	79.8	5.39
JA314100608000000000	0.13	3.58	96.4	1.35
JA314101126000000000	0.13	3.237	96.54	1.3
JA314101501000000000	0.15	3.647	79.31	5.59
JA314100219000000000	0.13	2.452	98.64	0.51
JA314100810000000000	0.13	2.568	50.54	25.3

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
33.2	0	0.26	4.34	3.49
62.88	0	0	4.64	3.48
13.89	0	1.83	3.72	3.5
33.05	6.54	4.93	4.64	3.4
31.67	5.54	4.17	4.56	3.42
78.84	0	0	4.94	3.46
22.77	0	1.94	3.91	3.5
18.4	6.05	4.56	4.38	3.41
11.66	0	0.39	3.85	3.5
66.37	0	0	4.65	3.48
20.47	0	0.35	4.01	3.5

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
52.97	1.5	0	4.55	3.46
11.18	0	1.34	3.73	3.5
2.35	0	0.55	3.63	3.5
32.62	0	0.38	4.36	3.49
66.3	0.71	0	4.67	3.45
39.06	4.61	0.39	6.07	3.32
6.48	0	1.52	3.66	3.5
0	0	0	3.61	3.5
6.38	0	1.5	3.67	3.5
8.76	6.4	4.83	8.57	2.23
16.4	6.4	4.82	4.41	3.41
24.63	0	0.38	4.17	3.5
16.89	6.38	4.81	4.41	3.41
32.61	0	0.4	4.36	3.49
0.29	0	0.07	3.61	3.5
10.53	0	1.35	3.73	3.5
8.65	6.01	4.53	4.25	3.41
16.64	0	1.41	3.98	3.5
13.46	0	1.35	3.73	3.5
1.82	0	0.43	3.6	3.5
1.75	0	0.41	3.6	3.5
13.98	0	1.12	3.75	3.5
0.69	0	0.16	3.61	3.5
23.78	0	0.39	4.1	3.5

Stormwater Management Scenario I Year 5 cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314101304000000000	0.12	2.378	83.05	4.44
JA314100307000000000	0.13	3.677	82.92	4.5
JA314101401000000000	0.15	3.045	87.21	0
JA314100324000000000	0.13	2.703	87.78	4.58
JA314100301000000000	0.14	2.743	85.85	3.7
JA314101406000000000	0.13	3.62	85.57	3.74
JA314101410000000000	0.13	3.061	20.41	0
JA314101506000000000	0.13	3.596	85.11	3.87
JA314101513000000000	0.13	2.479	52.35	24.36
JA314100313000000000	0.13	3.593	50	25.58
JA314100827000000000	0.12	3.177	76.51	11.91
JA314101306000000000	0.12	1.993	80.41	7.35
JA314100727000000000	0.16	2.843	87.09	3.38
JA314100326000000000	0.13	3.446	80.92	0
JA314101209000000000	0.12	2.485	13.4	44.43
JA314100312000000000	0.19	3.932	31.22	35.32
JA314100915000000000	0.13	3.316	41.18	0
JA314100607000000000	0.13	3.192	82	4.76
JA313402107000000000	0.21	2.293	58.1	0
JA314101312000000000	0.24	0.761	61.14	0
JA314101101000000000	0.15	3.116	26.26	0
JA314101320000000000	0.12	2.241	71.44	7.76
JA314100712000000000	0.13	2.005	70.99	0
JA314100818000000000	0.13	3.682	75.53	12.41
JA314101317000000000	0.12	2.451	37.93	0
JA313402110000000000	0.14	2.505	57.41	21.77

YEAR 10

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	45.54	0
JA314100711000000000	0.13	2.458	89.53	2.63
JA314100722020000000	0.1	2.843	95.35	1.74
JA314101120000000000	0.13	3.774	32.28	34.71
JA314100630000000000	0.27	1.854	32.99	0
JA314100706000000000	0.13	1.941	14.39	41.55
JA314100528000000000	0.12	1.64	87.2	4.8
JA314100819000000000	0.13	3.954	100	0
JA314100913000000000	0.06	3	87.4	4.72
JA314101313000000000	0.12	1.207	80.01	0

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
11.1	0	1.41	3.72	3.5
11.24	0	1.34	3.72	3.5
3.92	5.06	3.82	4.12	3.43
6.19	0	1.45	3.67	3.5
9.24	0	1.21	3.68	3.5
9.35	0	1.34	3.67	3.5
79.59	0	0	4.94	3.46
9.68	0	1.34	3.67	3.5
22.9	0	0.38	4.08	3.5
24.04	0	0.38	4.1	3.5
11.19	0	0.39	3.8	3.5
9.91	0	2.33	3.7	3.5
8.46	0	1.08	3.68	3.5
8.4	6.09	4.59	4.26	3.41
41.76	0	0.4	4.99	3.45
33.2	0	0.26	4.34	3.49
58.82	0	0	4.47	3.49
11.9	0	1.33	3.73	3.5
30.48	6.54	4.87	4.62	3.4
29.2	5.54	4.12	4.45	3.42
73.74	0	0	4.79	3.47
19.39	0	1.42	3.87	3.5
18.4	6.05	4.56	4.38	3.41
11.66	0	0.39	3.85	3.5
62.07	0	0	4.47	3.49
20.47	0	0.35	4.01	3.5

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
52.97	1.5	0	4.55	3.46
7.31	0	0.54	3.7	3.5
2.35	0	0.55	3.63	3.5
32.62	0	0.38	4.36	3.49
66.3	0.71	0	4.67	3.45
39.06	4.61	0.39	6.07	3.32
6.48	0	1.52	3.66	3.5
0	0	0	3.61	3.5
6.38	0	1.5	3.67	3.5
8.76	6.4	4.83	8.57	2.23

Stormwater Management Scenario I Year 10 cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314101319000000000	0.12	2.838	72.38	0
JA314100610000000000	0.13	3.773	48.79	26.2
JA314100527000000000	0.12	1.52	71.92	0
JA314101210000000000	0.12	2.497	32.29	34.69
JA314100720000000000	0.13	2.885	99.42	0.22
JA314100723000000000	0.13	2.136	90.08	2.48
JA314100605000000000	0.13	2.365	80.82	0
JA314100525000000000	0.12	4.693	84.78	3.87
JA314100619000000000	0.13	3.097	87.55	3.15
JA314100608000000000	0.13	3.58	96.4	1.35
JA314101126000000000	0.13	3.237	96.54	1.3
JA314101501000000000	0.15	3.647	87.25	3.25
JA314100219000000000	0.13	2.452	98.64	0.51
JA314100810000000000	0.13	2.568	50.54	25.3
JA314101304000000000	0.12	2.378	89.55	2.61
JA314100307000000000	0.13	3.677	89.47	2.64
JA314101401000000000	0.15	3.045	87.21	0
JA314100324000000000	0.13	2.703	87.78	4.58
JA314100301000000000	0.14	2.743	91.28	2.18
JA314101406000000000	0.13	3.62	91.1	2.21
JA314101410000000000	0.13	3.061	36.25	0
JA314101506000000000	0.13	3.596	90.82	2.28
JA314101513000000000	0.13	2.479	52.35	24.36
JA314100313000000000	0.13	3.593	50	25.58
JA314100827000000000	0.12	3.177	76.51	11.91
JA314101306000000000	0.12	1.993	80.41	7.35
JA314100727000000000	0.16	2.843	92.04	1.99
JA314100326000000000	0.13	3.446	80.92	0
JA314101209000000000	0.12	2.485	13.4	44.43
JA314100312000000000	0.19	3.932	31.22	35.32
JA314100915000000000	0.13	3.316	52.89	0
JA314100607000000000	0.13	3.192	88.9	2.79
JA313402107000000000	0.21	2.293	63.03	0
JA314101312000000000	0.24	0.761	65.84	0
JA314101101000000000	0.15	3.116	40.93	0
JA314101320000000000	0.12	2.241	82.4	4.5
JA314100712000000000	0.13	2.005	70.99	0
JA314100818000000000	0.13	3.682	75.53	12.41
JA314101317000000000	0.12	2.451	50.28	0
JA313402110000000000	0.14	2.505	57.41	21.77

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
16.4	6.4	4.82	4.41	3.41
24.63	0	0.38	4.17	3.5
16.89	6.38	4.81	4.41	3.41
32.61	0	0.4	4.36	3.49
0.29	0	0.07	3.61	3.5
6.9	0	0.54	3.7	3.5
8.65	6.01	4.53	4.25	3.41
10.78	0	0.57	3.95	3.5
8.76	0	0.54	3.7	3.5
1.82	0	0.43	3.6	3.5
1.75	0	0.41	3.6	3.5
9.05	0	0.45	3.7	3.5
0.69	0	0.16	3.61	3.5
23.78	0	0.39	4.1	3.5
7.27	0	0.57	3.7	3.5
7.35	0	0.54	3.7	3.5
3.92	5.06	3.82	4.12	3.43
6.19	0	1.45	3.67	3.5
6.06	0	0.49	3.64	3.5
6.15	0	0.54	3.63	3.5
63.75	0	0	4.64	3.48
6.36	0	0.54	3.7	3.5
22.9	0	0.38	4.08	3.5
24.04	0	0.38	4.1	3.5
11.19	0	0.39	3.8	3.5
9.91	0	2.33	3.7	3.5
5.54	0	0.43	3.64	3.5
8.4	6.09	4.59	4.26	3.41
41.76	0	0.4	4.99	3.45
33.2	0	0.26	4.34	3.49
47.11	0	0	4.26	3.5
7.77	0	0.54	3.7	3.5
26.2	6.23	4.53	4.49	3.41
25.05	5.54	3.83	4.44	3.42
59.07	0	0	4.47	3.49
12.53	0	0.57	3.76	3.5
18.4	6.05	4.56	4.38	3.41
11.66	0	0.39	3.85	3.5
49.72	0	0	4.31	3.49
20.47	0	0.35	4.01	3.5

E.3.3: STORMWATER MANAGEMENT SCENARIO II

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	25.6	2
JA314100711000000000	0.13	2.458	25.6	2
JA314100722020000000	0.1	2.843	25.6	2
JA314101120000000000	0.13	3.774	25.6	2
JA314100630000000000	0.27	1.854	25.6	2
JA314100706000000000	0.13	1.941	25.6	2
JA314100528000000000	0.12	1.64	25.6	2
JA314100819000000000	0.13	3.954	25.6	2
JA314100913000000000	0.06	3	25.6	2
JA314101313000000000	0.12	1.207	25.6	2
JA314101319000000000	0.12	2.838	25.6	2
JA314100610000000000	0.13	3.773	25.6	2
JA314100527000000000	0.12	1.52	25.6	2
JA314101210000000000	0.12	2.497	25.6	2
JA314100720000000000	0.13	2.885	25.6	2
JA314100723000000000	0.13	2.136	25.6	2
JA314100605000000000	0.13	2.365	25.6	2
JA314100525000000000	0.12	4.693	25.6	2
JA314100619000000000	0.13	3.097	25.6	2
JA314100608000000000	0.13	3.58	25.6	2
JA314101126000000000	0.13	3.237	25.6	2
JA314101501000000000	0.15	3.647	25.6	2
JA314100219000000000	0.13	2.452	25.6	2
JA314100810000000000	0.13	2.568	25.6	2
JA314101304000000000	0.12	2.378	25.6	2
JA314100307000000000	0.13	3.677	25.6	2
JA314101401000000000	0.15	3.045	25.6	2
JA314100324000000000	0.13	2.703	25.6	2
JA314100301000000000	0.14	2.743	25.6	2
JA314101406000000000	0.13	3.62	25.6	2
JA314101410000000000	0.13	3.061	25.6	2
JA314101506000000000	0.13	3.596	25.6	2
JA314101513000000000	0.13	2.479	25.6	2
JA314100313000000000	0.13	3.593	25.6	2
JA314100827000000000	0.12	3.177	25.6	2
JA314101306000000000	0.12	1.993	25.6	2
JA314100727000000000	0.16	2.843	25.6	2
JA314100326000000000	0.13	3.446	25.6	2
JA314101209000000000	0.12	2.485	25.6	2

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Stormwater Management Scenario II cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100312000000000	0.19	3.932	25.6	2
JA314100915000000000	0.13	3.316	25.6	2
JA314100607000000000	0.13	3.192	25.6	2
JA313402107000000000	0.21	2.293	25.6	2
JA314101312000000000	0.24	0.761	25.6	2
JA314101101000000000	0.15	3.116	25.6	2
JA314101320000000000	0.12	2.241	25.6	2
JA314100712000000000	0.13	2.005	25.6	2
JA314100818000000000	0.13	3.682	25.6	2
JA314101317000000000	0.12	2.451	25.6	2
JA313402110000000000	0.14	2.505	25.6	2

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27
36.4	36	2.27	14.9	2.27

E.3.4: STORMWATER MANAGEMENT SCENARIO III

YEAR 2

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	45.54	0
JA314100711000000000	0.13	2.458	79.74	5.39
JA314100722020000000	0.1	2.843	95.35	1.74
JA314101120000000000	0.13	3.774	32.28	19.84
JA314100630000000000	0.27	1.854	32.99	4.31
JA314100706000000000	0.13	1.941	14.39	5.65
JA314100528000000000	0.12	1.64	87.2	0.58
JA314100819000000000	0.13	3.954	100	0
JA314100913000000000	0.06	3	87.4	0
JA314101313000000000	0.12	1.207	80.01	5.69
JA314101319000000000	0.12	2.838	72.38	2.12
JA314100610000000000	0.13	3.773	48.79	26.2
JA314100527000000000	0.12	1.52	71.92	6.7
JA314101210000000000	0.12	2.497	32.29	34.69
JA314100720000000000	0.13	2.885	99.42	0.22
JA314100723000000000	0.13	2.136	80.82	5.08
JA314100605000000000	0.13	2.365	80.82	0
JA314100525000000000	0.12	4.693	59.91	16.38
JA314100619000000000	0.13	3.097	67.35	0
JA314100608000000000	0.13	3.58	96.4	1.35
JA314101126000000000	0.13	3.237	96.54	1.3
JA314101501000000000	0.15	3.647	66.37	10.87
JA314100219000000000	0.13	2.452	98.64	0.51
JA314100810000000000	0.13	2.568	50.54	4.35
JA314101304000000000	0.12	2.378	79.8	5.35
JA314100307000000000	0.13	3.677	72.52	5.44
JA314101401000000000	0.15	3.045	87.21	0
JA314100324000000000	0.13	2.703	87.78	0
JA314100301000000000	0.14	2.743	83.14	4.45
JA314101406000000000	0.13	3.62	82.82	4.49
JA314101410000000000	0.13	3.061	12.24	19.17
JA314101506000000000	0.13	3.596	82.25	4.66
JA314101513000000000	0.13	2.479	52.35	24.36
JA314100313000000000	0.13	3.593	50	25.58
JA314100827000000000	0.12	3.177	76.51	11.91
JA314101306000000000	0.12	1.993	80.41	10.31
JA314100727000000000	0.16	2.843	84.61	4.07
JA314100326000000000	0.13	3.446	80.92	0
JA314101209000000000	0.12	2.485	13.4	44.43

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
52.97	1.5	0	4.55	3.46
13.03	0	1.84	3.73	3.5
2.35	0	0.55	3.63	3.5
47.88	0	0	4.56	3.48
62.7	0	1	4.56	3.48
75.34	4.61	2	6.31	3.3
12.22	0	3	3.77	3.5
0	0	4	3.61	3.5
12.6	0	5	3.77	3.5
14.3	0	6	8.71	2.21
25.49	0	7	3.91	3.5
24.63	0	0.38	4.17	3.5
21.38	0	7	3.91	3.5
32.61	0	0.4	4.36	3.49
0.29	0	0.07	3.61	3.5
12.26	0	1.84	3.73	3.5
19.18	0	7	3.83	3.5
23.71	0	7	4.22	3.5
32.65	0	7	4.04	3.5
1.82	0	0.43	3.6	3.5
1.75	0	0.41	3.6	3.5
22.76	0	7	3.99	3.5
0.69	0	0.16	3.61	3.5
45.12	0	7	4.26	3.5
12.92	0	1.92	3.72	3.5
19.49	2.01	7	4.7	3.41
12.79	0	7	3.77	3.5
12.22	0	7	3.72	3.5
10.75	0	1.66	3.68	3.5
10.86	0	1.83	3.67	3.5
68.59	0	7	5.04	3.45
11.25	0	1.83	3.67	3.5
22.9	0	0.38	4.08	3.5
24.04	0	0.38	4.1	3.5
11.19	0	0.39	3.8	3.5
7.29	1.99	7	4.05	3.45
9.84	0	1.48	3.68	3.5
8.4	6.09	4.59	4.26	3.41
41.76	0	0.4	4.99	3.45

Stormwater Management Scenario III Year 2 cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100312000000000	0.19	3.932	31.22	35.32
JA314100915000000000	0.13	3.316	37.12	0
JA314100607000000000	0.13	3.192	78.53	5.75
JA313402107000000000	0.21	2.293	55.48	0
JA314101312000000000	0.24	0.761	53.37	12.35
JA314101101000000000	0.15	3.116	18.69	4.48
JA314101320000000000	0.12	2.241	53.5	13.23
JA314100712000000000	0.13	2.005	70.99	0
JA314100818000000000	0.13	3.682	75.53	0
JA314101317000000000	0.12	2.451	31.55	0
JA313402110000000000	0.14	2.505	57.41	8.01

YEAR 5

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	45.54	0
JA314100711000000000	0.13	2.458	83.01	4.47
JA314100722020000000	0.1	2.843	95.35	1.74
JA314101120000000000	0.13	3.774	32.28	19.84
JA314100630000000000	0.27	1.854	32.99	4.31
JA314100706000000000	0.13	1.941	14.39	5.65
JA314100528000000000	0.12	1.64	87.2	0.58
JA314100819000000000	0.13	3.954	100	0
JA314100913000000000	0.06	3	87.4	0
JA314101313000000000	0.12	1.207	80.01	5.69
JA314101319000000000	0.12	2.838	72.38	2.12
JA314100610000000000	0.13	3.773	48.79	26.2
JA314100527000000000	0.12	1.52	71.92	6.7
JA314101210000000000	0.12	2.497	32.29	34.69
JA314100720000000000	0.13	2.885	99.42	0.22
JA314100723000000000	0.13	2.136	83.91	4.21
JA314100605000000000	0.13	2.365	80.82	0
JA314100525000000000	0.12	4.693	59.91	16.38
JA314100619000000000	0.13	3.097	67.35	0
JA314100608000000000	0.13	3.58	96.4	1.35
JA314101126000000000	0.13	3.237	96.54	1.3
JA314101501000000000	0.15	3.647	66.37	10.87
JA314100219000000000	0.13	2.452	98.64	0.51
JA314100810000000000	0.13	2.568	50.54	4.35

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
33.2	0	0.26	4.34	3.49
62.88	0	0	4.47	3.48
13.89	0	1.83	3.73	3.5
33.05	6.54	4.93	4.62	3.4
34.28	0	7	4.15	3.5
75.37	1.46	7	5.09	3.42
33.08	0	7	4.2	3.49
18.4	6.05	4.56	4.38	3.41
24.47	0	7	3.9	3.5
68.45	0	7	4.68	3.47
34.58	0	7	4.14	3.5

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
52.97	1.5	0	4.55	3.46
11.18	0	1.34	3.73	3.5
2.35	0	0.55	3.63	3.5
47.88	0	0	4.56	3.48
62.7	0	0	4.56	3.48
75.34	4.61	0	6.31	3.3
12.22	0	0	3.77	3.5
0	0	0	3.61	3.5
12.6	0	0	3.77	3.5
14.3	0	0	8.71	2.21
25.49	0	0	3.91	3.5
24.63	0	0.38	4.17	3.5
21.38	0	0	3.91	3.5
32.61	0	0.4	4.36	3.49
0.29	0	0.07	3.61	3.5
10.53	0	1.35	3.73	3.5
19.18	0	0	3.83	3.5
23.71	0	0	4.22	3.5
32.65	0	0	4.04	3.5
1.82	0	0.43	3.6	3.5
1.75	0	0.41	3.6	3.5
22.76	0	0	3.99	3.5
0.69	0	0.16	3.61	3.5
45.12	0	0	4.26	3.5

Stormwater Management Scenario III Year 5 cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314101304000000000	0.12	2.378	83.05	4.44
JA314100307000000000	0.13	3.677	72.52	5.44
JA314101401000000000	0.15	3.045	87.21	0
JA314100324000000000	0.13	2.703	87.78	0
JA314100301000000000	0.14	2.743	85.85	3.7
JA314101406000000000	0.13	3.62	85.57	3.74
JA314101410000000000	0.13	3.061	12.24	19.17
JA314101506000000000	0.13	3.596	85.11	3.87
JA314101513000000000	0.13	2.479	52.35	24.36
JA314100313000000000	0.13	3.593	50	25.58
JA314100827000000000	0.12	3.177	76.51	11.91
JA314101306000000000	0.12	1.993	80.41	10.31
JA314100727000000000	0.16	2.843	87.09	3.38
JA314100326000000000	0.13	3.446	80.92	0
JA314101209000000000	0.12	2.485	13.4	44.43
JA314100312000000000	0.19	3.932	31.22	35.32
JA314100915000000000	0.13	3.316	41.18	0
JA314100607000000000	0.13	3.192	82	4.76
JA313402107000000000	0.21	2.293	58.1	0
JA314101312000000000	0.24	0.761	53.37	12.35
JA314101101000000000	0.15	3.116	18.69	4.48
JA314101320000000000	0.12	2.241	53.5	13.23
JA314100712000000000	0.13	2.005	70.99	0
JA314100818000000000	0.13	3.682	75.53	0
JA314101317000000000	0.12	2.451	31.55	0
JA313402110000000000	0.14	2.505	57.41	8.01

YEAR 10

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314100713000000000	0.13	2.119	45.54	0
JA314100711000000000	0.13	2.458	89.53	2.63
JA314100722020000000	0.1	2.843	95.35	1.74
JA314101120000000000	0.13	3.774	32.28	19.84
JA314100630000000000	0.27	1.854	32.99	4.31
JA314100706000000000	0.13	1.941	14.39	5.65
JA314100528000000000	0.12	1.64	87.2	0.58
JA314100819000000000	0.13	3.954	100	0
JA314100913000000000	0.06	3	87.4	0
JA314101313000000000	0.12	1.207	80.01	5.69

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
11.1	0	1.41	3.72	3.5
19.49	2.01	0	4.7	3.41
12.79	0	0	3.77	3.5
12.22	0	0	3.72	3.5
9.24	0	1.21	3.68	3.5
9.35	0	1.34	3.67	3.5
68.59	0	0	5.04	3.45
9.68	0	1.34	3.67	3.5
22.9	0	0.38	4.08	3.5
24.04	0	0.38	4.1	3.5
11.19	0	0.39	3.8	3.5
7.29	1.99	0	4.05	3.45
8.46	0	1.08	3.68	3.5
8.4	6.09	4.59	4.26	3.41
41.76	0	0.4	4.99	3.45
33.2	0	0.26	4.34	3.49
58.82	0	0	4.47	3.49
11.9	0	1.33	3.73	3.5
30.48	6.54	4.87	4.62	3.4
34.28	0	0	4.15	3.5
75.37	1.46	0	5.09	3.42
33.08	0	0	4.2	3.49
18.4	6.05	4.56	4.38	3.41
24.47	0	0	3.9	3.5
68.45	0	0	4.68	3.47
34.58	0	0	4.14	3.5

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
52.97	1.5	0	4.55	3.46
7.31	0	0.54	3.7	3.5
2.35	0	0.55	3.63	3.5
47.88	0	0	4.56	3.48
62.7	0	0	4.56	3.48
75.34	4.61	0	6.31	3.3
12.22	0	0	3.77	3.5
0	0	0	3.61	3.5
12.6	0	0	3.77	3.5
14.3	0	0	8.71	2.21

Stormwater Management Scenario III Year 10 cont.

PARCEL	AREA (ACRES)	% SLOPE	% FOREST	% SHRUB/MEADOW
JA314101319000000000	0.12	2.838	72.38	2.12
JA314100610000000000	0.13	3.773	48.79	26.2
JA314100527000000000	0.12	1.52	71.92	6.7
JA314101210000000000	0.12	2.497	32.29	34.69
JA314100720000000000	0.13	2.885	99.42	0.22
JA314100723000000000	0.13	2.136	90.08	2.48
JA314100605000000000	0.13	2.365	80.82	0
JA314100525000000000	0.12	4.693	59.91	16.38
JA314100619000000000	0.13	3.097	67.35	0
JA314100608000000000	0.13	3.58	96.4	1.35
JA314101126000000000	0.13	3.237	96.54	1.3
JA314101501000000000	0.15	3.647	66.37	10.87
JA314100219000000000	0.13	2.452	98.64	0.51
JA314100810000000000	0.13	2.568	50.54	4.35
JA314101304000000000	0.12	2.378	89.55	2.61
JA314100307000000000	0.13	3.677	72.52	5.44
JA314101401000000000	0.15	3.045	87.21	0
JA314100324000000000	0.13	2.703	87.78	0
JA314100301000000000	0.14	2.743	91.28	2.18
JA314101406000000000	0.13	3.62	91.1	2.21
JA314101410000000000	0.13	3.061	12.24	19.17
JA314101506000000000	0.13	3.596	90.82	2.28
JA314101513000000000	0.13	2.479	52.35	24.36
JA314100313000000000	0.13	3.593	50	25.58
JA314100827000000000	0.12	3.177	76.51	11.91
JA314101306000000000	0.12	1.993	80.41	10.31
JA314100727000000000	0.16	2.843	92.04	1.99
JA314100326000000000	0.13	3.446	80.92	0
JA314101209000000000	0.12	2.485	13.4	44.43
JA314100312000000000	0.19	3.932	31.22	35.32
JA314100915000000000	0.13	3.316	52.89	0
JA314100607000000000	0.13	3.192	88.9	2.79
JA313402107000000000	0.21	2.293	63.03	0
JA314101312000000000	0.24	0.761	53.37	12.35
JA314101101000000000	0.15	3.116	18.69	4.48
JA314101320000000000	0.12	2.241	53.5	13.23
JA314100712000000000	0.13	2.005	70.99	0
JA314100818000000000	0.13	3.682	75.53	0
JA314101317000000000	0.12	2.451	31.55	0
JA313402110000000000	0.14	2.505	57.41	8.01

% LAWN	% IMPERVIOUS	% PERVIOUS	AVERAGE ANNUAL RUNOFF (IN)	MAX RAINFALL RETAINED (IN)
25.49	0	0	3.91	3.5
24.63	0	0.38	4.17	3.5
21.38	0	0	3.91	3.5
32.61	0	0.4	4.36	3.49
0.29	0	0.07	3.61	3.5
6.9	0	0.54	3.7	3.5
19.18	0	0	3.83	3.5
23.71	0	0	4.22	3.5
32.65	0	0	4.04	3.5
1.82	0	0.43	3.6	3.5
1.75	0	0.41	3.6	3.5
22.76	0	0	3.99	3.5
0.69	0	0.16	3.61	3.5
45.12	0	0	4.26	3.5
7.27	0	0.57	3.7	3.5
19.49	2.01	0	4.7	3.41
12.79	0	0	3.77	3.5
12.22	0	0	3.72	3.5
6.06	0	0.49	3.64	3.5
6.15	0	0.54	3.63	3.5
68.59	0	0	5.04	3.45
6.36	0	0.54	3.7	3.5
22.9	0	0.38	4.08	3.5
24.04	0	0.38	4.1	3.5
11.19	0	0.39	3.8	3.5
7.29	1.99	0	4.05	3.45
5.54	0	0.43	3.64	3.5
8.4	6.09	4.59	4.26	3.41
41.76	0	0.4	4.99	3.45
33.2	0	0.26	4.34	3.49
47.11	0	0	4.26	3.5
7.77	0	0.54	3.7	3.5
26.2	6.23	4.53	4.49	3.41
34.28	0	0	4.15	3.5
75.37	1.46	0	5.09	3.42
33.08	0	0	4.2	3.49
18.4	6.05	4.56	4.38	3.41
24.47	0	0	3.9	3.5
68.45	0	0	4.68	3.47
34.58	0	0	4.14	3.5

E.4: FOOD PRODUCTION

E.4.1: SCENARIO I

COMMUNITY GARDENS

PARCEL	GARDEN (SF)	LBS. FOOD PRODUCED / YR	YEAR 2 TOTAL LBS. FOOD PRODUCED	YEAR 5 TOTAL LBS. FOOD PRODUCED	YEAR 10 TOTAL LBS. FOOD PRODUCED
JA314200805000000000	525.7371093	262.8685547	525.7371093	1314.342773	2628.685547
JA314100630000000000	1389.279395	694.6396975	1389.279395	3473.198487	6946.396975

ORCHARDS

PARCEL	GARDEN (SF)	LBS. FOOD PRODUCED / YR	YEAR 2 TOTAL LBS. FOOD PRODUCED	YEAR 5 TOTAL LBS. FOOD PRODUCED	YEAR 10 TOTAL LBS. FOOD PRODUCED
JA314101410000000000	4893.776963	3866.083801		3866.083801	19330.419
JA314100915000000000	3557.890366	2810.733389		2810.733389	14053.66695
JA314101101000000000	5465.704626	4317.906655		4317.906655	21589.53327
JA314101317000000000	3593.649704	2838.983266		2838.983266	14194.91633

E.4.2: SCENARIO III

COMMUNITY GARDEN

PARCEL	GARDEN (SF)	LBS. FOOD PRODUCED / YR	YEAR 2 TOTAL LBS. FOOD PRODUCED	YEAR 5 TOTAL LBS. FOOD PRODUCED	YEAR 10 TOTAL LBS. FOOD PRODUCED
JA31420080500000000	525.7371093	262.8685547	525.7371093	1314.342773	2628.685547

ORCHARD

PARCEL	GARDEN (SF)	LBS. FOOD PRODUCED / YR	YEAR 2 TOTAL LBS. FOOD PRODUCED	YEAR 5 TOTAL LBS. FOOD PRODUCED	YEAR 10 TOTAL LBS. FOOD PRODUCED
JA31410091500000000	3557.890366	2810.733389		2810.733389	14053.66695

E.5: MICROCLIMATE

E.5.1: EXISTING CONDITIONS

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA314100713000000000	54.46254821	45.53758734	336.6130331
JA314100711000000000	27.32872878	72.67074887	418.0112019
JA314100722020000000	4.649083842	95.35107334	486.0535344
JA314101120000000000	67.71610893	32.28373113	296.8508735
JA314100630000000000	67.01132971	32.9885938	298.9656284
JA314100706000000000	80.99311337	14.39208035	233.9466285
JA314100528000000000	12.79836949	87.20158361	461.604657
JA314100819000000000	0	100	500
JA314100913000000000	12.59849693	87.40150798	462.2045338
JA314101313000000000	19.9878308	80.01197923	440.0355577
JA314101319000000000	27.61754539	72.38244918	417.1473367
JA314100610000000000	51.20692727	48.79332181	346.3804636
JA314100527000000000	28.07913726	71.92098811	415.763215
JA314101210000000000	67.70485435	32.29499854	296.8847014
JA314100720000000000	0.577463953	99.42258336	498.2678447
JA314100723000000000	21.26428143	74.16381203	413.347623
JA314100605000000000	19.18363502	80.81630277	442.4487839
JA314100525000000000	40.09478691	59.90536123	379.71638
JA314100619000000000	32.65446271	67.34559683	402.0369096
JA314100608000000000	3.591843676	96.4029074	489.1982243
JA314101126000000000	3.463389924	96.53663274	489.6099436
JA314101501000000000	33.63335332	66.36697435	399.1015784
JA314100219000000000	1.361195769	98.63880108	495.9163969
JA314100810000000000	49.46426905	50.53547017	351.605889
JA314101304000000000	27.21807737	72.78187944	418.3455519
JA314100307000000000	24.92762794	72.524475	412.4776309
JA314101401000000000	12.79483427	87.20505383	461.6149377
JA314100324000000000	12.22449432	87.7755263	463.3266202
JA314100301000000000	22.70146293	77.2984714	431.8952829
JA314101406000000000	23.07691696	76.92306203	430.769144
JA314101410000000000	87.75854011	12.241329	236.7237252
JA314101506000000000	23.85456311	76.14551808	428.4367166
JA314101513000000000	44.82258667	52.35235383	351.4069425
JA314100313000000000	50.00382941	49.99613674	349.9883425
JA314100827000000000	23.49388537	76.50618842	429.5187129
JA314101306000000000	17.59423788	80.41221805	437.249566
JA314100727000000000	20.738705	79.26125084	437.7836642
JA314100326000000000	18.49046823	80.91892559	441.5755644
JA314101209000000000	86.5990909	13.40078987	240.2021311

Microclimate Existing Conditions cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	61.86271149	31.21981187	279.8244823
JA31410091500000000	64.85446293	35.14520094	305.4349305
JA31410060700000000	29.04097412	70.98656751	413.0147858
JA31340210700000000	50.00276595	49.99716872	349.9913755
JA31410131200000000	46.62753656	53.37257612	360.1179537
JA31410110100000000	79.85272015	18.69118049	253.1613427
JA31410132000000000	46.31299856	53.50000446	360.1260194
JA31410071200000000	29.01469425	70.98516862	412.9552316
JA31410081800000000	24.46540108	75.53466434	426.6041239
JA31410131700000000	68.44546984	31.5544428	294.6631537
JA31340211000000000	42.59135007	57.40911112	372.2282558

E.5.2: MICROCLIMATE SCENARIO I

YEAR 2

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410071300000000	52.96708946	45.53758734	333.6221156
JA31410071100000000	18.41750039	79.7420202	435.5451018
JA31410072202000000	4.096297036	95.35107334	484.9479608
JA31410112000000000	67.33154401	32.28373113	296.0817436
JA31410063000000000	66.30306644	32.9885938	297.5491019
JA31410070600000000	80.60765811	14.39208035	233.175718
JA31410052800000000	11.2770364	87.20158361	458.5619909
JA31410081900000000	0	100	500
JA31410091300000000	11.10087754	87.40150798	459.209295
JA31410131300000000	8.758075697	80.01197923	417.5760475
JA31410131900000000	16.39807798	72.38244918	394.7084019
JA31410061000000000	50.82461647	48.79332181	345.615842
JA31410052700000000	16.88903408	71.92098811	393.3830087
JA31410121000000000	67.30021552	32.29499854	296.0754238
JA31410072000000000	0.508777669	99.42258336	498.1304721
JA31410072300000000	17.33526754	80.81956758	438.768373
JA31410060500000000	8.646585133	80.81630277	421.3746841
JA31410052500000000	27.57553615	70.49279678	407.6150562
JA31410061900000000	22.25662357	75.89087284	423.9676113
JA31410060800000000	3.169497145	96.4029074	488.3535313
JA31410112600000000	3.051668068	96.53663274	488.7864999
JA31410150100000000	23.19548031	75.27271788	422.75455
JA31410021900000000	1.199389774	98.63880108	495.592785
JA31410081000000000	49.07503447	50.53547017	350.8274198
JA31410130400000000	18.27497411	79.79842879	435.5420922
JA31410030700000000	18.52454992	79.63684726	435.2333361
JA31410140100000000	3.916744265	87.20505383	443.8587577
JA31410032400000000	10.77131972	87.7755263	460.420271
JA31410030100000000	15.20512257	83.13637258	446.0921081
JA31410140600000000	15.35094117	82.81694925	444.7866286
JA31410141000000000	85.09127565	14.90872435	244.726173
JA31410150600000000	15.91153021	82.25463957	443.0962583
JA31410151300000000	47.26548365	52.35235383	356.2927365
JA31410031300000000	49.62035017	49.99613674	349.2213841
JA31410082700000000	23.1017917	76.50618842	428.7345255
JA31410130600000000	17.25933298	80.41221805	436.5797562
JA31410072700000000	13.9183316	84.60509757	450.862151
JA31410032600000000	8.397869992	80.91892559	421.3903679
JA31410120900000000	86.19437349	13.40078987	239.3926963

Microclimate Scenario I Year 2 cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	68.5244405	31.21981187	293.1479404
JA31410091500000000	62.88355922	37.11644078	311.3493223
JA31410060700000000	19.64424132	78.52883749	431.9326701
JA31340210700000000	33.04978683	55.47654242	343.4822858
JA31410131200000000	31.66758636	58.62279273	356.4491364
JA31410110100000000	78.83746524	21.16253476	263.4876043
JA31410132000000000	32.19312968	65.86033296	393.6879242
JA31410071200000000	18.40207663	70.98516862	391.7299963
JA31410081800000000	24.07431638	75.53466434	425.8219545
JA31410131700000000	66.36517747	33.63482253	300.9044676
JA31340211000000000	42.24155925	57.40911112	371.5286741

YEAR 5

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA314100713000000000	52.96708946	45.53758734	333.6221156
JA314100711000000000	15.64632727	83.01200938	446.3527014
JA314100722020000000	4.096297036	95.35107334	484.9479608
JA314101120000000000	67.33154401	32.28373113	296.0817436
JA314100630000000000	66.30306644	32.9885938	297.5491019
JA314100706000000000	80.60765811	14.39208035	233.175718
JA314100528000000000	11.2770364	87.20158361	458.5619909
JA314100819000000000	0	100	500
JA314100913000000000	11.10087754	87.40150798	459.209295
JA314101313000000000	8.758075697	80.01197923	417.5760475
JA314101319000000000	16.39807798	72.38244918	394.7084019
JA314100610000000000	50.82461647	48.79332181	345.615842
JA314100527000000000	16.88903408	71.92098811	393.3830087
JA314101210000000000	67.30021552	32.29499854	296.0754238
JA314100720000000000	0.508777669	99.42258336	498.1304721
JA314100723000000000	14.7452781	83.90953442	449.0382283
JA314100605000000000	8.646585133	80.81630277	421.3746841
JA314100525000000000	23.29243009	75.30022568	423.0859886
JA314100619000000000	18.84737542	79.80255339	436.7075178
JA314100608000000000	3.169497145	96.4029074	488.3535313
JA314101126000000000	3.051668068	96.53663274	488.7864999
JA314101501000000000	19.57756788	79.30654324	435.687852
JA314100219000000000	1.199389774	98.63880108	495.592785
JA314100810000000000	49.07503447	50.53547017	350.8274198
JA314101304000000000	15.54156437	83.0538981	446.3526193
JA314100307000000000	15.73522517	82.92449156	446.0929081
JA314101401000000000	3.916744265	87.20505383	443.8587577
JA314100324000000000	10.77131972	87.7755263	460.420271
JA314100301000000000	12.93990478	85.85095301	455.1345746
JA314101406000000000	13.08964114	85.57451017	454.0518331
JA314101410000000000	79.58977236	20.41022764	261.2306829
JA314101506000000000	13.55705271	85.10589653	452.6435881
JA314101513000000000	47.26548365	52.35235383	356.2927365
JA314100313000000000	49.62035017	49.99613674	349.2213841
JA314100827000000000	23.1017917	76.50618842	428.7345255
JA314101306000000000	17.25933298	80.41221805	436.5797562
JA314100727000000000	11.83805619	87.08547826	459.1035037
JA314100326000000000	8.397869992	80.91892559	421.3903679
JA314101209000000000	86.19437349	13.40078987	239.3926963

Microclimate Scenario I Year 5 cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	68.5244405	31.21981187	293.1479404
JA31410091500000000	58.81787675	41.18212325	323.5463698
JA31410060700000000	16.66635053	82.00200069	443.3427045
JA31340210700000000	30.48483682	58.10222198	351.4807835
JA31410131200000000	29.2045373	61.13723405	364.0952449
JA31410110100000000	73.74029669	26.25970331	278.7791099
JA31410132000000000	27.14263056	71.43961473	411.4833348
JA31410071200000000	18.40207663	70.98516862	391.7299963
JA31410081800000000	24.07431638	75.53466434	425.8219545
JA31410131700000000	62.07439396	37.92560604	313.7768181
JA31340211000000000	42.24155925	57.40911112	371.5286741

YEAR 10

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA314100713000000000	52.96708946	45.53758734	333.6221156
JA314100711000000000	9.932585444	89.52678318	467.4990868
JA314100722020000000	4.096297036	95.35107334	484.9479608
JA314101120000000000	67.33154401	32.28373113	296.0817436
JA314100630000000000	66.30306644	32.9885938	297.5491019
JA314100706000000000	80.60765811	14.39208035	233.175718
JA314100528000000000	11.2770364	87.20158361	458.5619909
JA314100819000000000	0	100	500
JA314100913000000000	11.10087754	87.40150798	459.209295
JA314101313000000000	8.758075697	80.01197923	417.5760475
JA314101319000000000	16.39807798	72.38244918	394.7084019
JA314100610000000000	50.82461647	48.79332181	345.615842
JA314100527000000000	16.88903408	71.92098811	393.3830087
JA314101210000000000	67.30021552	32.29499854	296.0754238
JA314100720000000000	0.508777669	99.42258336	498.1304721
JA314100723000000000	9.378477861	90.0795014	469.1544627
JA314100605000000000	8.646585133	80.81630277	421.3746841
JA314100525000000000	14.6557924	84.77688547	453.1960121
JA314100619000000000	11.90573195	87.55014754	461.5622016
JA314100608000000000	3.169497145	96.4029074	488.3535313
JA314101126000000000	3.051668068	96.53663274	488.7864999
JA314101501000000000	12.30352853	87.24660334	460.8400737
JA314100219000000000	1.199389774	98.63880108	495.592785
JA314100810000000000	49.07503447	50.53547017	350.8274198
JA314101304000000000	9.881997176	89.55206323	467.5243105
JA314100307000000000	9.987025253	89.47289606	467.3385308
JA314101401000000000	3.916744265	87.20505383	443.8587577
JA314100324000000000	10.77131972	87.7755263	460.420271
JA314100301000000000	8.236549143	91.27625752	472.8543859
JA314101406000000000	8.356827312	91.10496549	472.2384821
JA314101410000000000	63.75211079	36.24788921	308.7436676
JA314101506000000000	8.644937108	90.81635653	471.3716569
JA314101513000000000	47.26548365	52.35235383	356.2927365
JA314100313000000000	49.62035017	49.99613674	349.2213841
JA314100827000000000	23.1017917	76.50618842	428.7345255
JA314101306000000000	17.25933298	80.41221805	436.5797562
JA314100727000000000	7.528614415	92.03764059	475.2454318
JA314100326000000000	8.397869992	80.91892559	421.3903679
JA314101209000000000	86.19437349	13.40078987	239.3926963

Microclimate Scenario I Year 10 cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	68.5244405	31.21981187	293.1479404
JA31410091500000000	47.11363889	52.88636111	358.6590833
JA31410060700000000	10.55852249	88.90484451	465.6412675
JA31340210700000000	26.20356813	63.03219322	367.5681024
JA31410131200000000	25.05466268	65.83607499	379.2897003
JA31410110100000000	59.0666291	40.9333709	322.8001127
JA31410132000000000	17.02914646	82.3992149	446.0543674
JA31410071200000000	18.40207663	70.98516862	391.7299963
JA31410081800000000	24.07431638	75.53466434	425.8219545
JA31410131700000000	49.72213795	50.27786205	350.8335861
JA31340211000000000	42.24155925	57.40911112	371.5286741

E.5.3: MICROCLIMATE SCENARIO II

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA314100713000000000	38.4	25.6	204.8
JA314100711000000000	38.4	25.6	204.8
JA314100722020000000	38.4	25.6	204.8
JA314101120000000000	38.4	25.6	204.8
JA314100630000000000	38.4	25.6	204.8
JA314100706000000000	38.4	25.6	204.8
JA314100528000000000	38.4	25.6	204.8
JA314100819000000000	38.4	25.6	204.8
JA314100913000000000	38.4	25.6	204.8
JA314101313000000000	38.4	25.6	204.8
JA314101319000000000	38.4	25.6	204.8
JA314100610000000000	38.4	25.6	204.8
JA314100527000000000	38.4	25.6	204.8
JA314101210000000000	38.4	25.6	204.8
JA314100720000000000	38.4	25.6	204.8
JA314100723000000000	38.4	25.6	204.8
JA314100605000000000	38.4	25.6	204.8
JA314100525000000000	38.4	25.6	204.8
JA314100619000000000	38.4	25.6	204.8
JA314100608000000000	38.4	25.6	204.8
JA314101126000000000	38.4	25.6	204.8
JA314101501000000000	38.4	25.6	204.8
JA314100219000000000	38.4	25.6	204.8
JA314100810000000000	38.4	25.6	204.8
JA314101304000000000	38.4	25.6	204.8
JA314100307000000000	38.4	25.6	204.8
JA314101401000000000	38.4	25.6	204.8
JA314100324000000000	38.4	25.6	204.8
JA314100301000000000	38.4	25.6	204.8
JA314101406000000000	38.4	25.6	204.8
JA314101410000000000	38.4	25.6	204.8
JA314101506000000000	38.4	25.6	204.8
JA314101513000000000	38.4	25.6	204.8
JA314100313000000000	38.4	25.6	204.8
JA314100827000000000	38.4	25.6	204.8
JA314101306000000000	38.4	25.6	204.8
JA314100727000000000	38.4	25.6	204.8
JA314100326000000000	38.4	25.6	204.8
JA314101209000000000	38.4	25.6	204.8

Microclimate Scenario II cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	38.4	25.6	204.8
JA31410091500000000	38.4	25.6	204.8
JA31410060700000000	38.4	25.6	204.8
JA31340210700000000	38.4	25.6	204.8
JA31410131200000000	38.4	25.6	204.8
JA31410110100000000	38.4	25.6	204.8
JA31410132000000000	38.4	25.6	204.8
JA31410071200000000	38.4	25.6	204.8
JA31410081800000000	38.4	25.6	204.8
JA31410131700000000	38.4	25.6	204.8
JA31340211000000000	38.4	25.6	204.8

E.5.4: MICROCLIMATE SCENARIO III

YEAR 2

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA314100713000000000	52.96708946	45.53758734	333.6221156
JA314100711000000000	18.41750039	79.7420202	435.5451018
JA314100722020000000	4.096297036	95.35107334	484.9479608
JA314101120000000000	67.71610893	32.28373113	296.8508735
JA314100630000000000	67.01132971	32.9885938	298.9656284
JA314100706000000000	80.99311337	14.39208035	233.9466285
JA314100528000000000	12.79836949	87.20158361	461.604657
JA314100819000000000	0	100	500
JA314100913000000000	12.59849693	87.40150798	462.2045338
JA314101313000000000	19.9878308	80.01197923	440.0355577
JA314101319000000000	27.61754539	72.38244918	417.1473367
JA314100610000000000	50.82461647	48.79332181	345.615842
JA314100527000000000	28.07913726	71.92098811	415.763215
JA314101210000000000	67.30021552	32.29499854	296.0754238
JA314100720000000000	0.508777669	99.42258336	498.1304721
JA314100723000000000	17.33526754	80.81956758	438.768373
JA314100605000000000	19.18363502	80.81630277	442.4487839
JA314100525000000000	40.09478691	59.90536123	379.71638
JA314100619000000000	32.65446271	67.34559683	402.0369096
JA314100608000000000	3.169497145	96.4029074	488.3535313
JA314101126000000000	3.051668068	96.53663274	488.7864999
JA314101501000000000	33.63335332	66.36697435	399.1015784
JA314100219000000000	1.199389774	98.63880108	495.592785
JA314100810000000000	49.46426905	50.53547017	351.605889
JA314101304000000000	18.27497411	79.79842879	435.5420922
JA314100307000000000	24.92762794	72.524475	412.4776309
JA314101401000000000	12.79483427	87.20505383	461.6149377
JA314100324000000000	12.22449432	87.7755263	463.3266202
JA314100301000000000	15.20512257	83.13637258	446.0921081
JA314101406000000000	15.35094117	82.81694925	444.7866286
JA314101410000000000	87.75854011	12.241329	236.7237252
JA314101506000000000	15.91153021	82.25463957	443.0962583
JA314101513000000000	47.26548365	52.35235383	356.2927365
JA314100313000000000	49.62035017	49.99613674	349.2213841
JA314100827000000000	23.1017917	76.50618842	428.7345255
JA314101306000000000	17.59423788	80.41221805	437.249566
JA314100727000000000	13.9183316	84.60509757	450.862151
JA314100326000000000	8.397869992	80.91892559	421.3903679
JA314101209000000000	86.19437349	13.40078987	239.3926963

Microclimate Scenario III Year 2 cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	68.5244405	31.21981187	293.1479404
JA31410091500000000	62.88355922	37.11644078	311.3493223
JA31410060700000000	19.64424132	78.52883749	431.9326701
JA31340210700000000	33.04978683	55.47654242	343.4822858
JA31410131200000000	46.62753656	53.37257612	360.1179537
JA31410110100000000	79.85272015	18.69118049	253.1613427
JA31410132000000000	46.31299856	53.50000446	360.1260194
JA31410071200000000	18.40207663	70.98516862	391.7299963
JA31410081800000000	24.46540108	75.53466434	426.6041239
JA31410131700000000	68.44546984	31.5544428	294.6631537
JA31340211000000000	42.59135007	57.40911112	372.2282558

YEAR 5

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA314100713000000000	52.96708946	45.53758734	333.6221156
JA314100711000000000	15.64632727	83.01200938	446.3527014
JA314100722020000000	4.096297036	95.35107334	484.9479608
JA314101120000000000	67.71610893	32.28373113	296.8508735
JA314100630000000000	67.01132971	32.9885938	298.9656284
JA314100706000000000	80.99311337	14.39208035	233.9466285
JA314100528000000000	12.79836949	87.20158361	461.604657
JA314100819000000000	0	100	500
JA314100913000000000	12.59849693	87.40150798	462.2045338
JA314101313000000000	19.9878308	80.01197923	440.0355577
JA314101319000000000	27.61754539	72.38244918	417.1473367
JA314100610000000000	50.82461647	48.79332181	345.615842
JA314100527000000000	28.07913726	71.92098811	415.763215
JA314101210000000000	67.30021552	32.29499854	296.0754238
JA314100720000000000	0.508777669	99.42258336	498.1304721
JA314100723000000000	14.7452781	83.90953442	449.0382283
JA314100605000000000	19.18363502	80.81630277	442.4487839
JA314100525000000000	40.09478691	59.90536123	379.71638
JA314100619000000000	32.65446271	67.34559683	402.0369096
JA314100608000000000	3.169497145	96.4029074	488.3535313
JA314101126000000000	3.051668068	96.53663274	488.7864999
JA314101501000000000	33.63335332	66.36697435	399.1015784
JA314100219000000000	1.199389774	98.63880108	495.592785
JA314100810000000000	49.46426905	50.53547017	351.605889
JA314101304000000000	15.54156437	83.0538981	446.3526193
JA314100307000000000	24.92762794	72.524475	412.4776309
JA314101401000000000	12.79483427	87.20505383	461.6149377
JA314100324000000000	12.22449432	87.7755263	463.3266202
JA314100301000000000	12.93990478	85.85095301	455.1345746
JA314101406000000000	13.08964114	85.57451017	454.0518331
JA314101410000000000	87.75854011	12.241329	236.7237252
JA314101506000000000	13.55705271	85.10589653	452.6435881
JA314101513000000000	47.26548365	52.35235383	356.2927365
JA314100313000000000	49.62035017	49.99613674	349.2213841
JA314100827000000000	23.1017917	76.50618842	428.7345255
JA314101306000000000	17.59423788	80.41221805	437.249566
JA314100727000000000	11.83805619	87.08547826	459.1035037
JA314100326000000000	8.397869992	80.91892559	421.3903679
JA314101209000000000	86.19437349	13.40078987	239.3926963

Microclimate Scenario III Year 5 cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	68.5244405	31.21981187	293.1479404
JA31410091500000000	58.81787675	41.18212325	323.5463698
JA31410060700000000	16.66635053	82.00200069	443.3427045
JA31340210700000000	30.48483682	58.10222198	351.4807835
JA31410131200000000	46.62753656	53.37257612	360.1179537
JA31410110100000000	79.85272015	18.69118049	253.1613427
JA31410132000000000	46.31299856	53.50000446	360.1260194
JA31410071200000000	18.40207663	70.98516862	391.7299963
JA31410081800000000	24.46540108	75.53466434	426.6041239
JA31410131700000000	68.44546984	31.5544428	294.6631537
JA31340211000000000	42.59135007	57.40911112	372.2282558

YEAR 10

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA314100713000000000	52.96708946	45.53758734	333.6221156
JA314100711000000000	9.932585444	89.52678318	467.4990868
JA314100722020000000	4.096297036	95.35107334	484.9479608
JA314101120000000000	67.71610893	32.28373113	296.8508735
JA314100630000000000	67.01132971	32.9885938	298.9656284
JA314100706000000000	80.99311337	14.39208035	233.9466285
JA314100528000000000	12.79836949	87.20158361	461.604657
JA314100819000000000	0	100	500
JA314100913000000000	12.59849693	87.40150798	462.2045338
JA314101313000000000	19.9878308	80.01197923	440.0355577
JA314101319000000000	27.61754539	72.38244918	417.1473367
JA314100610000000000	50.82461647	48.79332181	345.615842
JA314100527000000000	28.07913726	71.92098811	415.763215
JA314101210000000000	67.30021552	32.29499854	296.0754238
JA314100720000000000	0.508777669	99.42258336	498.1304721
JA314100723000000000	9.378477861	90.0795014	469.1544627
JA314100605000000000	19.18363502	80.81630277	442.4487839
JA314100525000000000	40.09478691	59.90536123	379.71638
JA314100619000000000	32.65446271	67.34559683	402.0369096
JA314100608000000000	3.169497145	96.4029074	488.3535313
JA314101126000000000	3.051668068	96.53663274	488.7864999
JA314101501000000000	33.63335332	66.36697435	399.1015784
JA314100219000000000	1.199389774	98.63880108	495.592785
JA314100810000000000	49.46426905	50.53547017	351.605889
JA314101304000000000	9.881997176	89.55206323	467.5243105
JA314100307000000000	24.92762794	72.524475	412.4776309
JA314101401000000000	12.79483427	87.20505383	461.6149377
JA314100324000000000	12.22449432	87.7755263	463.3266202
JA314100301000000000	8.236549143	91.27625752	472.8543859
JA314101406000000000	8.356827312	91.10496549	472.2384821
JA314101410000000000	87.75854011	12.241329	236.7237252
JA314101506000000000	8.644937108	90.81635653	471.3716569
JA314101513000000000	47.26548365	52.35235383	356.2927365
JA314100313000000000	49.62035017	49.99613674	349.2213841
JA314100827000000000	23.1017917	76.50618842	428.7345255
JA314101306000000000	17.59423788	80.41221805	437.249566
JA314100727000000000	7.528614415	92.03764059	475.2454318
JA314100326000000000	8.397869992	80.91892559	421.3903679
JA314101209000000000	86.19437349	13.40078987	239.3926963

Microclimate Scenario III Year 10 cont.

PARCEL	% NON-TREE VEGETATION	% TREE CANOPY	MICROCLIMATE REGULATION SCORE
JA31410031200000000	68.5244405	31.21981187	293.1479404
JA31410091500000000	47.11363889	52.88636111	358.6590833
JA31410060700000000	10.55852249	88.90484451	465.6412675
JA31340210700000000	26.20356813	63.03219322	367.5681024
JA31410131200000000	46.62753656	53.37257612	360.1179537
JA31410110100000000	79.85272015	18.69118049	253.1613427
JA31410132000000000	46.31299856	53.50000446	360.1260194
JA31410071200000000	18.40207663	70.98516862	391.7299963
JA31410081800000000	24.46540108	75.53466434	426.6041239
JA31410131700000000	68.44546984	31.5544428	294.6631537
JA31340211000000000	42.59135007	57.40911112	372.2282558