

ADDRESSING ISSUES RELATING TO FOOD DESERTS THROUGH
EMPOWERMENT; A COMMUNITY GARDEN DESIGN PROPOSAL FOR
THE GLENCREST NEIGHBORHOOD OF FORT WORTH, TEXAS

by

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Presented to the Faculty of the Graduate School of
The University of Texas at Arlington in Partial Fulfillment
of the Requirements
for the Degree of

MASTER OF LANDSCAPE ARCHITECTURE

THE UNIVERSITY OF TEXAS AT ARLINGTON

December 2018

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ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my committee chair Dr. Diane Jones Allen, and my committee members David Hopman and Harper Keeler for their guidance, support, and mentorship throughout the development of this thesis.

Also, I would like to thank my family for their unwavering support and patience throughout this journey.

December 3, 2018

ABSTRACT

ADDRESSING ISSUES RELATING TO FOOD DESERTS THROUGH EMPOWERMENT; A COMMUNITY GARDEN DESIGN PROPOSAL FOR THE GLENCREST NEIGHBORHOOD OF FORT WORTH, TEXAS

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The high rate of population growth in urban areas over the past century has contributed to the creation of food deserts, which are areas characterized by the lack of access to affordable fresh and healthy foods. Food deserts, also known as low-access communities, are believed to be linked to food insecurity and diet related health issues such as obesity, diabetes, and cardiovascular disease. The United States Department of Agriculture (USDA) estimates that approximately 23.5 million Americans live in food deserts, often occurring in historically disadvantaged neighborhoods (USDA, 2009).

Introducing full-service grocery stores to these areas is frequently promoted as the solution to food desert issues. However, research shows that

solely introducing full-service grocery stores to these areas has a minimal effect on the food choices and buying habits of the local residents (Wright, J., Donley, A., Gualtieri, M., Strickhouser, S., 2016). Additional factors that contribute to food desert issues include income, education, limited mobility, and overall general health (Morris, 2013).

The purpose of this thesis is to examine how urban agriculture can empower people to holistically address the factors that contribute to food desert issues. Through literature review and precedent study analysis, we were able to identify community gardens as the most effective form of urban agriculture practice in addressing food desert issues, as well as determine the essential programmatic elements to include in the function of a community garden. Moreover, surveys and extensive analysis of the study area were conducted to develop a design proposal and identify the best location for the implementation of a community garden in a local USDA identified food desert, the Glencrest neighborhood of southeast Fort Worth, Texas.

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CHAPTER 1. INTRODUCTION

1.1 Overview

The technology introduced during the Industrial Revolution led to a high rate of population growth in urban areas and consequently the industrialization of agricultural production. Within a relatively short period of time, we have gone from an intimate relationship with our food systems to nearly a complete disconnect. This disconnection has drastically altered our food systems, and how we interact with them, creating a host of issues that affect our quality of life on an environmental, economic, and social level.

One of these issues is the creation of food deserts, also known as low-access communities. These food deserts are defined as areas lacking access to fresh and healthy foods - often found in historically disadvantaged and low-income areas (Gallagher, 2016). Moreover, food deserts are believed to be linked to diet related health ailments such as malnutrition, obesity, diabetes, and cardiovascular disease (National Research Council, 2009). As a result of limited access to affordable healthy foods, as well as limited mobility, many residents in these areas must rely on convenience stores and fast food restaurants to supplement their diets (Strome, S., Johns, T., Scichitano, M., Shelnut, K. 2016). The United States Department of Agriculture (USDA) estimates that approximately 23.5 million Americans live in food deserts (USDA, 2009).

This thesis explores the use of urban agriculture as a means of addressing food desert issues; more specifically, how community gardens can help empower communities to address the factors that contribute to these food desert issues. The main factors that contribute to food desert issues include: access to healthy foods, mobility, education, income, and overall health.

This thesis reviews literature on the food desert dilemma, the history and benefits of urban agriculture, and the role of community gardens in empowering communities. Furthermore, precedent study investigations were conducted on four urban agriculture projects in the United States, ranging from small-scale community gardens to large-scale 30+ acre fully functioning urban agriculture communities. Surveys from the community leadership of the study area were also conducted to gain a better understanding of their relationships to their food systems, attitudes towards urban agriculture, and to identify a preferred location for the implementation of a community garden in the study area – the Glencrest neighborhood of Fort Worth, Texas.

Findings from the literature review, precedent study investigations, and surveys were used to identify the programmatic elements of urban agriculture that are essential for empowering communities. In addition, an inventory and analysis of the study area were used to determine the ideal location for the implementation of a community garden in the study area. The collective findings of this thesis were then utilized to develop a design proposal for a community garden

appropriate for the study area, that incorporates the programmatic elements essential for empowering communities to address the factors that contribute to food desert issues.

1.2 A Local Food Desert Community

The USDA has identified over 6,500 food desert tracts (census tracts) in the United States (Dutko, Ver Ploeg, Farrigan, 2012). The Glencrest neighborhood of southeast Fort Worth, Texas is one of these USDA identified food deserts. A commonality amongst food deserts, the Glencrest neighborhood has limited access to affordable fresh and healthy foods. There are no farmers markets, community gardens, or large grocery stores located within its boundaries; however, convenience stores, liquor stores, and fast food restaurants are bountiful along its peripherals.

1.3 Hypothesis

Addressing food desert issues by solely introducing more grocery stores to low access areas does not effectively deal with the factors that contribute to food desert issues. Along with access, additional factors that contribute to food desert issues include income, education, mobility, and overall general health. Therefore, an approach that holistically addresses these factors is required to effectively improve the conditions in food desert communities.

Community gardens - through programmatic elements - offer a multitude of benefits that contribute to community empowerment. These programmatic

elements include educational programs, job training/entrepreneurial development, community leadership development, and community outreach opportunities.

Holistically, these programs help address the factors that contribute to food desert issues, which are access, income, education, mobility, and overall general health.

The implementation of a community garden in the Glencrest neighborhood of Fort Worth, Texas, will help address the factors that contribute to food deserts issues through community empowerment. Through extensive analysis, Tadlock Park was identified as the best location for the implementation of this community garden. Its central location is ideal due to its connectivity to the residential areas of the neighborhood, familiarity to its residents, and the existing infrastructure and resources available to support the multiple programmatic functions of a community garden. In addition, the garden can serve as a catalyst for the community-wide implementation of urban agriculture practices that is essential to remediate food desert issues.

1.4 Research Limitations

One limitation of this study is that there is a lack of data measuring the impact of urban agriculture practices on specific food desert issues. Much of the literature discusses the intended benefits urban agriculture to improve food desert issues, but lacks substantial data measuring the long-term effectiveness.

An additional limitation is the number of surveys and interviews conducted for this study. Ideally, additional input from experts and community members is

preferred when conducting community-based designs. This additional input improves the design to better serve the community it is intended for. However, this thesis has the potential to serve as a platform for future research to be conducted on the effectiveness of community gardens in addressing food desert issues.

1.5 Definition of Terms

Food Desert: areas that lack access to affordable, healthy, fresh food (Donely, Gualtieri, Strickhouser, Wright, 2016).

Food Sovereignty: the right to healthy and culturally appropriate food, and the right to define your own food systems (Food Sovereignty, 2018)

Food Insecurity: the lack of consistent access to enough food for an active, healthy life (Coleman-Jensen, A., Rabbitt, M., Gregory, C., Singh, A., 2018)

Mobility: the ability to move around freely for one's personal needs ("Mobility", 2018)

Empowerment: a multi-dimensional social process that enables people to take control over their own lives (Page, Czuba, 1999)

CHAPTER 2. LITERATURE REVIEW

2.1 Food Deserts

The United States Department of Agriculture (USDA) estimates that approximately 23.5 million Americans live in food deserts, often occurring in historically disadvantaged and low-income areas (USDA, 2009). These “Food deserts” are areas that lack access to affordable, healthy, fresh food (Donely, Gualtieri, Strickhouser, Wright, 2016). The USDA Economic Research Service (ERS) further defines these areas based on census tracts with the following criteria:

- Low Income – poverty rate of 20% or higher or median family income less than or equal to 80% of the statewide median family income
- Low Access – at least 500 people or 33% of the tract’s population is located greater than ½-mile from a supermarket, supercenter, or large grocery store (USDA ERS, 2017)

Consequently, residents from these areas must rely on convenience stores and fast food restaurants to supplement their diets. It is believed that populations in these areas are more likely to suffer from diet related health issues such as obesity, diabetes, and cardiovascular disease (National Research Council, 2009). Research shows that areas of low-income and high ethnic minority populations are underserved by food retailers – having fewer supermarkets or chain stores per capita – and have further distances to travel to supermarkets than higher income

areas (Beaulac, Kristjansson, Cummins, 2009). Adequate access to transportation in these areas is another important factor to consider, especially when buying groceries in bulk (Strome et al., 2016).

2.1.2 The Common Approach to Food Desert Remediation

The main factor that is characteristically associated with food deserts is limited access to affordable fresh and healthy foods. Therefore, if access is presented as a major factor in the creation of food deserts, then one would assume that the practical solution would be to encourage more grocery stores and other health food providers to open in food desert areas. However, research shows that introducing full-service grocery stores to these areas has a minimal effect on the food choices and buying habits of people; cultural background, tradition, education, custom and habit are factors that are far more influential in determining shopping habits (Wright, J., Donley, A., Gualtieri, M., Strickhouser, S., 2016). Additional factors that contribute to food desert issues include income, education, limited mobility, and overall general health (Morris, 2013). Consequently, it is evident that a holistic approach – in which all the factors are addressed - is necessary in order to effectively remediate food desert issues.

2.2 History of Urban Agriculture

Urban agriculture has gained mainstream popularity over the past decade, but it is by no means a new phenomenon. Historically, agriculture has been an important part of the development of urban centers and is believed to have “been

around since 3,500 BC when Mesopotamian farmers began setting aside plots in their growing cities” (Green, 2012).

Over time, agriculture has become industrialized – consequently creating a disconnect between the producers and the consumers. For instance, between 1850 and 2017, the percentage of the U.S. labor force employed in agriculture dropped from 64% to 1.66% (Spielmaker, 2018; “Distribution of the U.S. workforce”, 2018). Moreover, since the industrial revolution of the 19th century, we have seen a population shift from rural to urban, with an increase after World War II (Mougeot, 2006).

As a result of the poverty and economic needs of the depression of 1893, some cities began implementing large-scale urban agriculture programs (Hodgson, K., Campbell, M.C., Bailkey, M., 2011). The then Detroit mayor, Hazen S. Pingree, implemented a garden program – known as “the Potato Patch Farms” or the “Detroit Experiment” – that utilized vacant land throughout the city to supplement the food needs of the residents (Hodgson et al, 2011). This program served as a catalyst for the implementation of urban agriculture throughout the nation, ultimately being replicated in at least 19 cities during the depression, including New York, Boston, Philadelphia, Buffalo, and Seattle (Hayden-Smith, 2015).

During the first half of the 20th century, the United States encountered major economic challenges resulting from two world wars and the Great

Depression. During these tough times, the United States government utilized urban agriculture to supplement the country's food supply, increase employment, as well as boost the morale of the public (Hodgson et al, 2011). Citizens were encouraged to grow as much of their own food as possible in their own gardens, which were known as "Victory Gardens", "War Gardens", and "Depression Gardens" (Karsten, 2005; Hodgson et al, 2011). During World War II, over 20 million Victory Gardens were in planted, producing approximately 40% of the fruits and vegetables consumed by Americans during the war (Karsten, 2005).

During the second half of the 20th century, the nation experienced a drastic decline in the wide-spread use of urban agriculture. Furthermore, interest in urban agriculture has risen as today's society becomes more aware of some of the negative implications of industrial agriculture as well as the environmental, economic, and social benefits of urban agriculture. However, it is important to understand the importance of industrial agriculture in feeding the growing global population.

2.3 Benefits of Urban Agriculture

Urban agriculture is at times seen as a way for city dwellers to supplement their food source or as a side hobby; however, there are many additional benefits that are just as important, if not more. These benefits have a direct correlation to the three pillars of sustainability – environmental, social, and economic.

2.3.1 Environment

Development – especially urban development – has an immense impact on the environment. These implications have an accumulative effect on all life on this planet. Urban agriculture can help mitigate the negative impacts of development. The three primary benefits of urban agriculture can be defined as – preserving biodiversity, reducing urban waste, and decreasing the energy needs for production and transportation of agricultural goods (Viljoen, A., Bohn, K., Howe, J., 2016). Additional environmental benefits include reduction of stormwater runoff, improved water quality, mitigation of the urban heat island effect, improved soil quality, and other ecological services.

2.3.2 Social

Humans are naturally a social species, in which social engagement is a psychological need. According to the research of the Brandeis University psychologist Abraham Maslow, humans need to fulfill a set of needs, labeled deficiency needs, before a person can act unselfishly (Griffin, 1994). Figure 1 shows Maslow’s hierarchy of needs, in which the upward climb to satisfying those needs are described – beginning with basic physiological and safety needs, followed by psychological needs – which include esteem needs, belongingness and love needs, and finally self-fulfillment needs through self-actualization (Griffin, 1994).

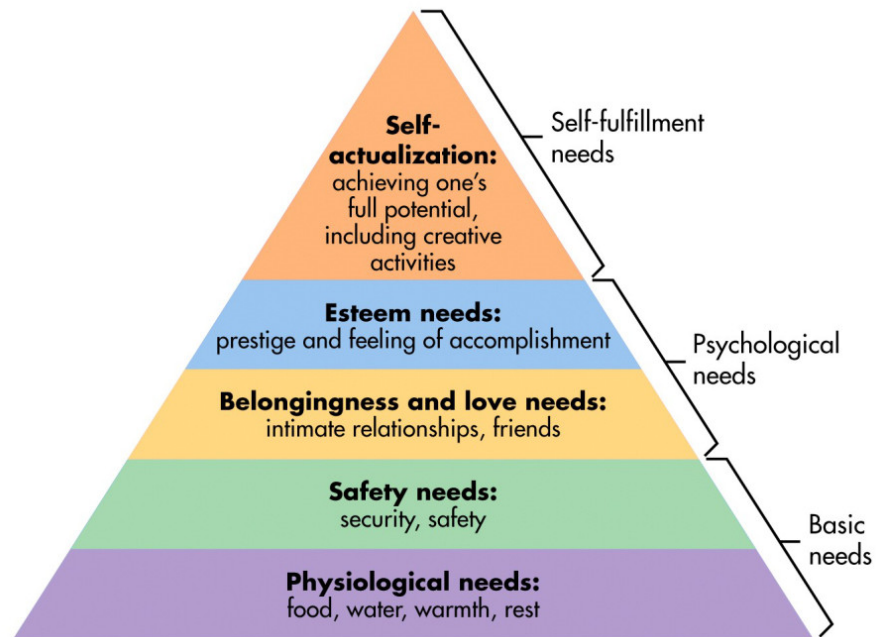


Figure 1: Source: <https://www.simplypsychology.org/maslow.html>

Many of the activities associated with agriculture – especially urban agriculture – provide a platform for satisfying these deficiency needs described by Maslow. Furthermore, fulfilling these needs also contributes to the empowerment of communities by building social cohesion. According to Hodgson, Campbell, and Bailkey (2011), “Urban agriculture can foster community building, mutual trust, sharing, feelings of safety and comfort, and friendships that translate to a collective investment in the common good of a neighborhood” (p. 21).

Opportunities to satisfy psychological needs are also abundant in urban agriculture. These opportunities come in the form of interacting within other people on the farm, establishing relationships with local restaurants, and engaging

with people at farmers markets and community gardens (Golden, 2013). Moreover, urban agriculture provides an avenue for educational and youth development programs, creating opportunities to engage through training, outreach, and advocacy events. (Golden, 2013). These activities allow for people to establish intimate relationships, feel accomplished, and achieve prestige within their communities (McLeod, 2017).

2.3.3 Economic

Urban agriculture can also have a positive economic impact on local economies – especially in low-income communities. It is estimated that approximately 50-80 percent of disposable incomes in low-income households are spent on purchasing food (Mougeot, 2005). Urban agriculture can contribute to a reduction in the amount of disposable income that is used for purchasing food – consequently freeing up income for additional purchases that contribute to the local economy.

Increasing regulatory avenues for people to grow and sell food in urban environments can also provide significant savings for residents. Some municipalities have developed new and/or modified their existing ordinances to support the growth of urban agriculture. For example, in 2016 The City of Fort Worth implemented an Urban Agriculture and Community Garden Ordinance - Number 22335-08-2016, that significantly increases opportunities for residents to participate in UA. With the implementation of this ordinance, residents can set up

food stands at their residence and sell produce up to three days a week without having to go through costly and time-consuming land-use zoning changes (Urban Ag and Community Garden Ordinance, 2016). Additionally, residents are permitted to build greenhouses on their residential property for year-around production (Urban Ag and Community Garden Ordinance, 2016). Ultimately, this saves the residents money from having to purchase commercial or agriculture zoned property for larger scale production.

A report on the impacts of urban agriculture, published by The University of California – Davis - Agricultural Sustainability Institute, states that urban agriculture contributes to (Golden, 2013):

- Job Creation, Training, and Business Incubation
- Market Expansion for Farmers
- Economic Savings on Food
- Savings for Municipal Agencies
- Increased Home Values

Urban agriculture can positively impact residents and the local economy in general; moreover, these economic benefits are especially impactful for low-income communities. Additional municipal regulatory adjustments to local urban agriculture ordinances are needed to increase the economic opportunities for residents interested in participating in local urban agricultural economies.

2.3.4 Horticulture Therapy

The removal of local food systems contributes to our disconnection from nature and from each other. Urban agriculture provides spaces for people to reconnect with nature and experience the therapeutic benefits of nature.

According to the Canadian Horticulture Therapy Association, “both Horticultural Therapy (HT) and Therapeutic Horticulture (TH) recognize the positive benefits of the interaction between people and plants and gardens to improve cognitive, physical, social, emotional, and spiritual wellbeing.” (“About Horticultural Therapy and Therapeutic Horticulture,” 2017).

HT has historically been used to treat veterans returning from war, dating back to WWI (Detweiler et al, 2012). Various studies have been conducted on the benefits of HT on other non-veteran groups such as the elderly, especially those suffering from Alzheimer’s disease (AD) and other forms of dementia. According to a preliminary study published in *Psychiatry Investigation*, reported benefits of HT were a reduction in stress, agitation, and pain, as well as a decrease in use of medications (Detweiler et al, 2012).

2.4 Community Gardens

As participatory landscapes, community gardens offer much more than a space for growing food. Driven by some type of contemporary issue(s), community gardens have historically served as a coping strategy during difficult social and economic times (Hou, J., Johnson, J.M., Lawson, L.J., 2009). They

often incorporate a multitude of programmatic elements that serve to empower communities, such as educational programs, job training, community leadership development, and outreach opportunities (Hou et al, 2009). Moreover, the American Community Garden Association (ACGA) recognizes that “community gardens improve people’s quality of life by providing a catalyst for neighborhood and community development, stimulating social interaction, encouraging self-reliance, beautifying neighborhoods, producing nutritious food, reducing family food budgets, conserving resources and creating opportunities for recreation, exercise, therapy and education” (“Growing Community,” 2018).

Locating a site for a community garden is critical to its long-term success. Site selection is less often chosen for its optimal growing conditions and more often limited to readily available land such as vacant lots, rights-of-way, utility easements, and underutilized park property (Harmon, L., Harrington, L., n.d.). Additionally, land ownership of the site is an important issue that greatly impacts the longevity of the community gardens. Many gardens occupy vacant land on a temporary status. Unfortunately, this temporary status leaves community gardens and other urban agricultural practices vulnerable to displacement by other “higher priority” land uses such housing and commercial development ((Hou et al, 2009).

2.5 Empowering Communities Through Urban Agriculture

Urban agriculture (UA) is defined as “practices that include production, distribution, and marketing of food and other products within the cores of

metropolitan areas and at their edges” (Golden, 2013). These practices include urban farms, market gardens, rooftop gardens, community gardens, school gardens, farmers markets, bee-keeping, and residential and commercial scale systems of hydroponics, aquaponics, and aeroponics. These agricultural practices offer vast opportunities to empower communities.

Empowerment, whether at an individual or community level, can be defined as a multi-dimensional social process that enables people to take control over their own lives (Page, Czuba, 1999). Throughout the food desert literature, there is a recurrent sense of powerlessness and vulnerability when describing these communities, which helps explain the argument for increasing access - via more grocery stores - as the common proposed solution for food desert remediation. However, this proposal implies that the solution must come from an external source (i.e. municipalities encouraging grocery stores to open in these areas). Consequently, this takes the power away from the people, leaving the community vulnerable to the economic factors that dictate the locations of grocery stores and farmers markets.

In contrast, urban agriculture can improve food desert conditions by offering vast opportunities for people to empower themselves and their communities to address food desert issues. Through an array of beneficial elements, community gardens are particularly suitable for addressing the main factors of food desert issues. In addition to providing a space to garden, many

community gardens incorporate additional programmatic elements such as educational programs, job training/entrepreneurial development, community leadership development, and community outreach opportunities (Hou, J., Johnson, J.M., Lawson, L.J. (2009).

The combination of these programmatic elements can help empower communities by improving the overall health of residents by creating a hub for building knowledge, confidence, trust, resources, support, and social cohesion. For example, educational programs can inform people on proper nutrition, job skills, growing food, culinary skills, and general health education. This approach in addressing food desert issues can generate longer-lasting results by changing habitual behaviors through community empowerment. In addition, the knowledge and confidence gained through community garden programs can serve as a catalyst for the wide-spread implementation of agricultural practices throughout the community.

2.6 Precedent Studies

The precedent studies analyzed for this research range from site scale projects of less than 1-acre to urban planning scale projects of over 30-acres. Many of the projects include community gardens and/or similar programmatic elements that are regularly found in community gardens. These projects provide insight into practical, innovative, and progressive strategies for incorporating urban agriculture into our existing urban environments.

2.6.1 Backyard Gardeners Network

Location: The Lower 9th Ward, New Orleans, LA., USA

Founded: 2009

The Backyard Gardeners Network was founded in 2009 by Jenga Mwendu, a lower 9th Ward native. In 2007, Jenga returned to the Lower 9th Ward neighborhood of New Orleans to help rebuild the community from the devastation caused by Hurricane Katrina in August of 2005. Upon her return to the Lower 9th Ward, she spent time talking to the locals and quickly realized that the neighborhood that she grew up in had a rich culture of backyard gardening that she was unaware of as a child (Backyard Gardeners Network - History, 2013). Through this insight, she realized the potential for urban agriculture to serve as a catalyst for urban revitalization, community building, and cultural/historic education.

Jenga believes that the growing traditions of this neighborhood “not only provided food, but were a part of creating a healthier, closer-knit and more self-reliant community” (Backyard Gardeners Network – History, 2013). Through her non-profit organization, Jenga has established two community gardens in the Lower 9th Ward – the Laurentine Ernst Community Garden and the Guerilla Garden. These gardens provide spaces for community members to garden, learn about healthy eating and growing your own food, learn about their culture and history, and connect with other residents in a peaceful and positive environment.

The non-profits mission is “to sustain and strengthen the historically self-sufficient and deeply rooted community of the Lower 9th Ward of New Orleans, LA using our own food growing traditions as a platform to build community, revitalize the neighborhood and preserve our cultural heritage.” (Backyard Gardeners Network – Mission, 2013).

2.6.2 Growing Home: Wood Street and Honore Street Urban Farms

Location: Chicago, IL., USA

Project Completion: 2009, 2011

Growing Home is a non-profit organization located in Chicago, IL. It currently manages two urban farms in the southside community of Englewood – a once thriving community that has suffered from decades of neglect and urban flight - resulting in hundreds of acres of vacant land, high crime rates, high rates of poverty and unemployment, and a lack of healthy food options for its residents (Gorgolewski, Komisar, Nasr, 2011; Growing Home – Mission and Vision, 2018). Growing Home utilizes urban agriculture to inspire healthy living, provide economic opportunities, and empower the Englewood community (Growing Home – About Us, 2018).

A social enterprise, Growing Home trains underserved Chicagoans – many who face employment barriers as a result of homelessness, prior incarceration, or substance abuse - through a six-month farming and employment training (Gorgolewski, Komisar, Nasr, 2011). The non-profit utilizes a training model that

immerses the trainees into all aspects of the farming process, which includes planting, harvesting, washing, weighing, packaging and selling the produce grown on the farms (Growing Home – Our Model, 2018). This training model ensures that the trainees are exposed to diverse working conditions and experiences that will better prepare them for future employment and entrepreneurship opportunities.

The two urban farms combine for a total of .87 acres of growing area. Most of the produce grown is sold in the Englewood neighborhood, with the rest being sold within a 20-mile radius of the farms. In 2017:

- 3,586 lbs. of organic produce were sold in the Englewood neighborhood
- 2,890 residents attended cooking demonstrations, workshops, and other community events
- 51 people participated in their job training program
- 531 K-12 students participated in activities through their Learning Garden
- 1,336 hours were spent by volunteers on the farm and in the classroom

(Growing Home – Our Model, 2018)

2.6.3 Troy Gardens

Location: Madison, WI

Founded: 1998

Located in Madison, WI, Troy Gardens is a 31-acre housing development that integrates urban agriculture with native landscape restoration (Gorgolewski,

Komisar, Nasr, 2011). The development includes a 5-acre community farm, multiple community gardens, a 30-unit mix-income housing development, and 10-acres of restored prairie and woodland open spaces (A Brief History of Troy, 2018).

The property was originally a state-owned surplus property that was intended to be sold for development, however, a coalition of community members, a host of local non-profit organizations, and the University of Wisconsin-Madison rallied to negotiate an agreement with the city for a long-term lease and ultimately the purchase of the property (Gorgolewski, Komisar, Nasr, 2011). Over the years, Troy Gardens has developed into a fully operational urban agriculture community. The community gardens offer plots for residents to grow their own food, the Troy Farm – certified organic since 2001 – grows food for the local Community Supported Agriculture (CSA), and they offer a host of educational opportunities through workshops, K-12 school programs, and their Beginning Farmer Training Program.

2.6.4 Archi's Acres

Location: Escondido, CA

Founded: 2006

Archi's Acres is a veteran-owned farm located in Escondido, California that uses agriculture as a form of vocational training for veterans and civilians interested in farming as a profession. This for-profit farm was founded in 2006 by

Colin and Karen Archipley with two core objectives, “first was to establish a viable and sustainable organic produce farm business and second was to develop a business that would provide entrepreneur opportunities for veterans in sustainable organic agriculture.” (“About Archi’s,” 2017). Their operation is separated into two separate components, a hydro-organic farm and an educational institute.

Their 5-acre hydro-organic farm consists of multiple large greenhouses where they grow organic produce through Nutrient Film Technique (NFT) and Dutch Bucket hydroponic growing systems. The produce grown in these systems supplies local and regional grocery stores in southern California and along the west coast of the United States. The Archi’s Institute for Sustainable Agriculture is their educational component. The institute is partnered with Cal Poly Pomona to offer an accredited 6-week Sustainable Agriculture Training Program. This intense program teaches:

- Sustainable agribusiness and farming production methods
- Soil Science
- Agricultural Irrigation Planning and Techniques
- Hydro-Organics
- Aeroponics
- Permaculture
- Greenhouse Design Considerations
- Farm Ownership and Management

- Business Development and Implementation (Archi's Institute, 2018)

Upon completion of the program, graduates earn 17-credit hours of undergraduate studies that can be applied towards an agriculture related degree.

During the summer of 2018, I was fortunate to spend 6-weeks training at the Archi's Institute for Sustainable Agriculture. During this time, I was able gathered data through direct and indirect observation and experience. Moreover, I gained valuable experience that was beneficial and applicable to this study.

2.6.5 Precedent Studies Summary

These precedent studies are sound examples of the use of urban agriculture as a catalyst for urban revitalization and addressing food desert issues. Through their progressive visions and tireless efforts, they have addressed food desert issues through community empowerment by teaching people how to grow their own food, educating their community on healthy eating, strengthened community unity, and improving their environments through urban agriculture.

Below is a matrix measuring the level of effectiveness of each precedent study in addressing factors that contribute to food desert issues (figure 2). The matrix measures the level of effectiveness based on the programmatic elements that are incorporated into the function of each of the precedent studies and how those elements address the factors that contribute to food desert issues.

| | Backyard Gardeners Network | Wood Street and Honore Street Urban Farms | Troy Gardens | Archi's Acres |
|---------------------------------|----------------------------|---|--------------|---------------|
| Increase Access to Healthy Food | Low | Medium | High | High |
| Education - Gardening | High | High | High | High |
| Education - Nutrition & Diet | High | Medium | High | Low |
| Connectivity/Accessibility | High | Medium | High | Low |
| Economic Opportunities | Low | High | High | High |
| Outreach Opportunities | High | High | High | Low |
| Physical Exercise Opportunities | Low | Medium | High | High |

Factors contributing to food desert issues






-  Access to healthy food
-  Mobility
-  Education
-  Income
-  Overall general health

Figure 2: Table measuring the level of effectiveness in addressing factors that contribute to food deserts

For instance, Troy Gardens is a fully functioning urban agriculture community that measured high on the matrix based on the diversity of programmatic elements that are systematically integrated into the function of the community. These elements include multiple acres of garden plots for residents, an urban farm for mass production of produce, a multitude of educational and outreach programs, maximum connectivity by being integrated into the framework of the community, and over 30-acres of accessible land that provides ample opportunities for physical exercise (figure 3).

Archi's Acres measured high in some categories such as economic opportunity, but low on connectivity and nutrition/diet education. However, the mission of Archi's Acres is not specifically to address food desert issues, but instead to improve the economic opportunities for farmers while increasing access to healthy organic produce. Moreover, their strategy for accomplishing this mission is two-fold. The first part is to be a high-production profitable hydro-organic farm. The second part is to educate and train future farmers on sustainable agricultural practices and on developing a profitable agriculture practice. Therefore, they measured low on connectivity (based on their geographical location), nutritional education, and outreach opportunities.



figure 3: Troy Gardens master plan (source: findingenvironmentality.blogspot.com)

In summary, the precedent studies provided examples on how urban agriculture can be utilized in addressing food desert issues through community empowerment. The programmatic elements included in these projects empower communities by education people on how to grow their own food, on healthy eating habits, building social cohesion, and improving their environments through urban agriculture.

CHAPTER 3. METHODOLOGY

This study was carried out in a five-step process. The five-steps include: (1) literature review; (2) precedent studies; (3) surveys; (4) inventory and analysis; and (5) a design proposal. In addition to the five steps listed above, I also incorporated the knowledge gained from over 4 years of agriculture experience in the overall methodology of this thesis. The expertise developed over the past 4 years proved to be especially useful for the analysis and design phases of this thesis.

3.1 Literature Review

This thesis reviews literature on the food desert dilemma, the history and benefits of urban agriculture, and the role of community gardens in empowering communities. The literature identified the factors that contribute to food desert issues. These factors were then used to formulate the overall approach of the study.

The literature also highlighted events throughout history in which urban agriculture was used as a coping mechanism during social and economic hardships in the United States. These events help to emphasize the potential of urban agriculture in addressing social and economic issues that are relative to food desert issues such as access, food security, and social cohesion. Furthermore, the literature on community gardens was critical in formulating the criteria used for the design guidelines. These guidelines include criteria for: the site selection,

garden design features, and the programmatic elements essential for a community garden to effectively empower people to address food desert issues.

3.2 Precedent Studies

Precedent study investigations were conducted on four urban agriculture projects in the United States. These projects ranged from small-scale community gardens to large-scale 30+ acre fully functioning urban agriculture communities.

The precedent studies were primarily conducted using secondary data gathered from literature and the project organizations websites. However, the precedent study conducted on Archi's Acres was primarily from empirical research. In the summer of 2018, I spent six weeks training at the Archi's Acres farm and therefore was able gathered data through direct and indirect observation and experience. Moreover, secondary data was also used to supplement the study for Archi's Acres.

3.3 Surveys

The primary goal of this study is to examine how urban agriculture can be utilized in addressing food desert issues. Therefore, surveys were conducted to gain a better understanding of the community members relationships to their food systems, attitudes towards urban agriculture, and to identify a preferred location for the implementation of a community garden in the study area – the Glencrest neighborhood of Fort Worth, Texas.

3.3.1 Survey Study Population

The board members of the local neighborhood association, the Glencrest Civic League, were chosen as the subjects for the surveys. The subjects were chosen because of their leadership involvement within the Glencrest community. As participatory landscapes, community gardens require leadership and consistent participation from the community. Consequently, I believe that surveying the community leadership that is currently active was the most effective form of determining the general attitudes towards urban agriculture as well as identifying the ideal location for the implementation of a community garden in the study area.

3.3.2 Survey Questions

The survey questions were developed in order gain a better understanding of the community members relationships to their food systems, attitudes towards urban agriculture, and to identify a preferred location for the implementation of a community garden in the study area. The survey questions were organized in two sections that included both closed and open-ended questions. The first section included 20 mostly open-ended questions and the second section comprised of 6 multiple choice questions using the Likert scale. A total of 13 surveys were collected. A list of the questions is included in appendix A.

3.4 Inventory and Analysis

Intensive inventory and site analysis were conducted for the study area, providing the critical data required to determine the best location for a community

garden and to formulate a suitable design solution for the Glencrest community.

The inventory and analysis included:

- Circulation
- Public transit network
- Land use
- Connectivity and proximity studies
- Identifying land with urban agricultural potential

In addition, demographic information about the community was collected to determine social and cultural features that could be incorporated into the design and function of the community garden. Furthermore, including features that reflect the demographics of the neighborhood can help to create a sense of ownership from the community, which contributes to an increase in participation of community garden programs.

3.5 Design Proposal

The collective findings from the literature review, precedent studies, surveys, and neighborhood inventory and analysis were then utilized to develop a design proposal for a community garden appropriate for the study area. The community garden design incorporates the programmatic elements essential for empowering communities to address the factors that contribute to food desert issues.

CHAPTER 4. SITE ANALYSIS AND FINDINGS

4.1 Study Area

4.1.1 Site Area and Boundaries

The area for this study is the Glencrest neighborhood of Fort Worth, Texas – located in the southeast sector of the city. The perimeter of the study area correlates with the boundary of the 2010 census tract #1046.05 - encompassing approximately 1,125 acres or 1.75 square miles (figure 4). It is located approximately 5-miles southeast of downtown Fort Worth. The major interstates within its proximity are I-35W (approximately 1-mile west), I-20 (approximately 1.5-miles south), and highway 287 - Martin Luther King Freeway (approximately 1-mile northeast). The major roads along the perimeter are South Riverside Drive and Mansfield Highway on the west; Mitchell Boulevard and Wichita Street on the east; East Berry and E. Berry South on the north; and East Seminary Drive on the south (figure 5).

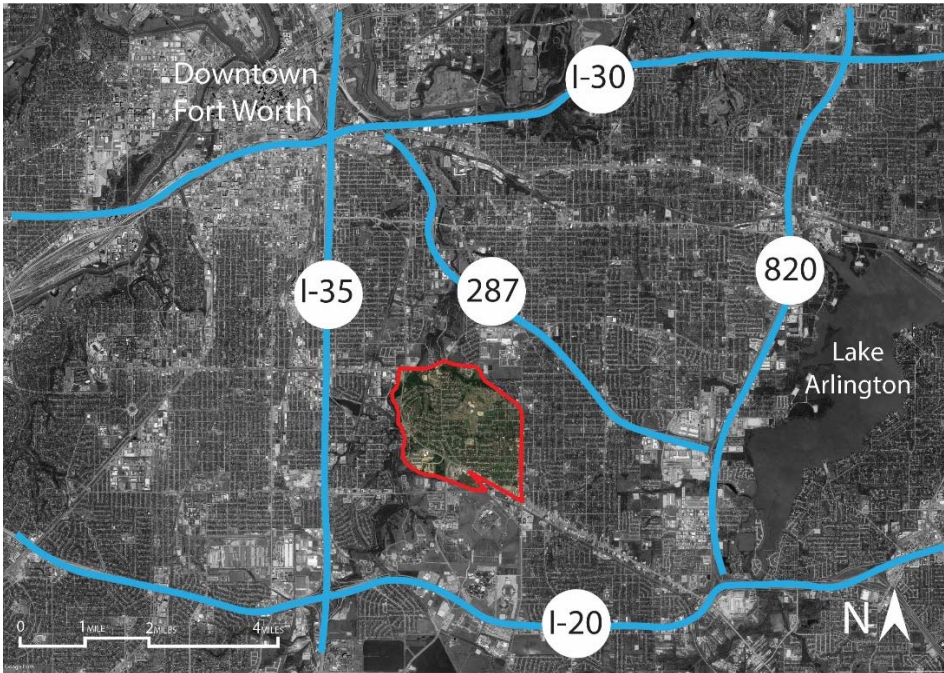


Figure 4. Site Study Area: Glencrest neighborhood boundary (source: adapted from Google Earth map)

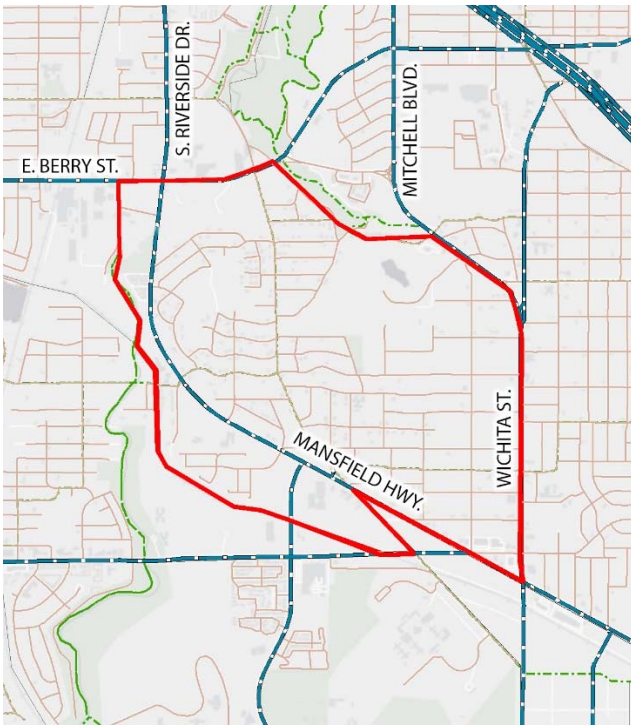


Figure 5. Major Roads Along Area Perimeter (source: adapted from ArcGIS map)

4.2 Site Background and Context

4.2.1 Fort Worth's Agricultural History

Fort Worth was established on June 6, 1849 as an army outpost named Camp Worth and was officially named Fort Worth on November 14, 1849 by the United States War Department (Schmelzer, 2017). Its strategic location along the Trinity River marked the line “Where the West Begins”, giving the city its first slogan (Fort Worth History, 2018). From the 1860’s to the 1880’s, Fort Worth acquired its second famous slogan, “Cowtown”. Fort Worth was located along the historic Chisholm Trail, which was a major route for herding livestock from Texas to Kansas (Figure 6).

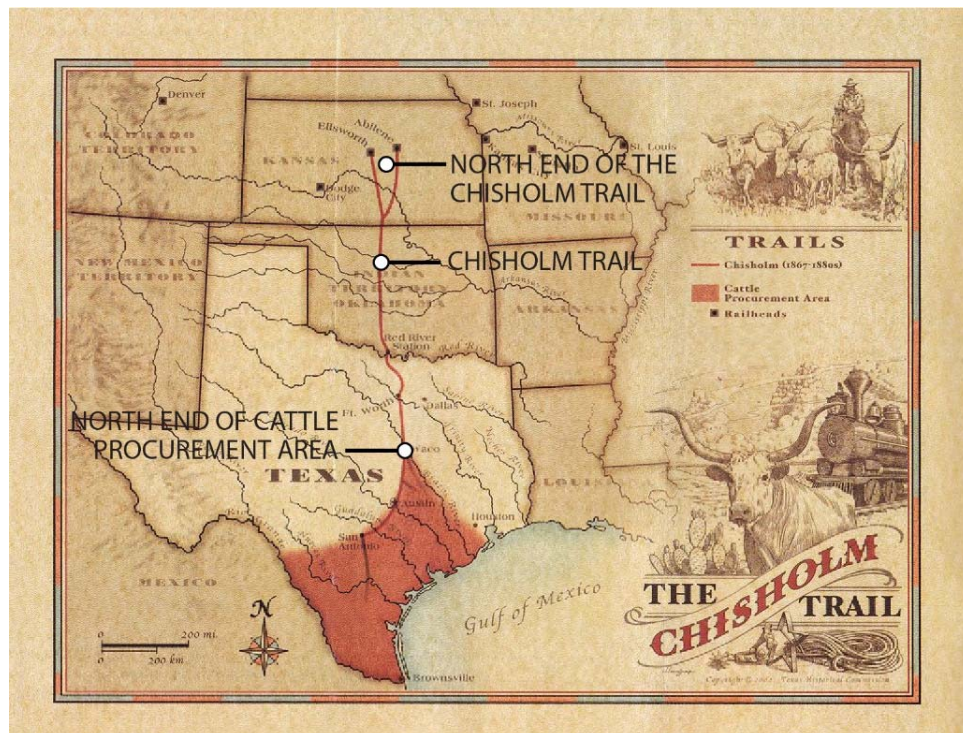


Figure 6. The Chisholm Trail (source: adapted from Texas State Historical Association map)

During its brief existence, over five million head of cattle passed through the Chisholm Trail (Worcester, 2018). With the arrival of the railroad in 1876, Fort Worth changed from a stopping point along the Chisholm Trail to a livestock shipping center (Fort Worth History, 2018). This new economic boom gave birth to multiple flour mills and meat packing houses, including Swift & Company, Armour & Company, and McNeill & Libby (Fort Worth History, 2018).

4.2.2 History of the Glencrest Neighborhood

The area where the Glencrest neighborhood is today was first developed during the early 1900's, when the area was not officially part of Fort Worth. Two of the major contributors to this area were the Cobb brothers - Horace and Lyman Cobb. Much of the area was comprised of the O.K. Cattle Company ranch, O.K. Dairy land, and the Cobb Brick Company – all owned by the Cobb Family. In addition, they also were instrumental in the founding of the Glencrest Country Club, which was built on the O.K. Cattle Ranch in 1913. The Glencrest Country Club is best known for producing two national golf champions, Byron Nelson and Ben Hogan. In 1921, the Cobb brothers donated 125-acres of the O.K. Cattle ranch to the City of Fort Worth to serve as a public park, which the city named Cobb Park (Figure 7).

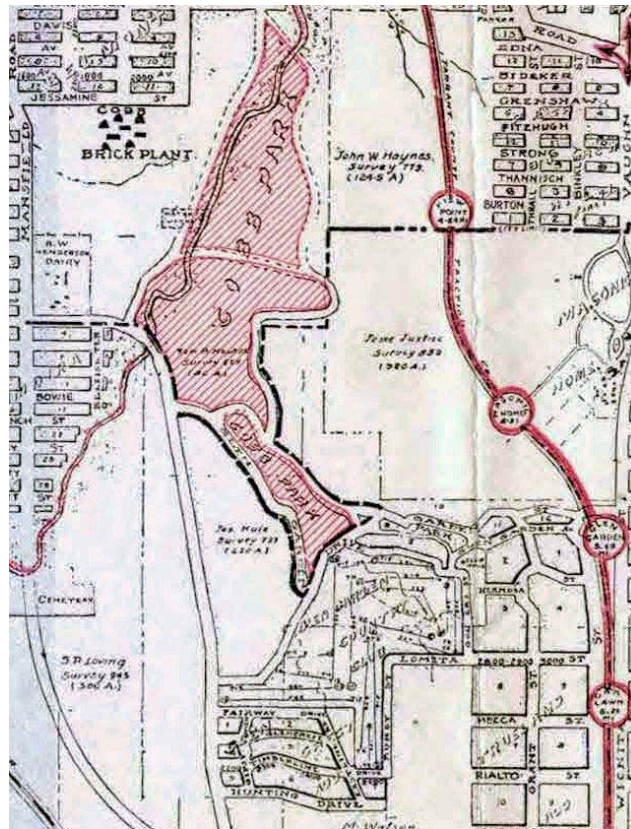


Figure 7. 1925 Glencrest Neighborhood Map (source: Hometown by Handlebar)

Most of the homes in this neighborhood were built during the mid-20th century, with a few homes dating back to the mid-1920's. Once a predominately white community, it experienced a drastic population shift as a result of urban flight. According to Jewel Day from the Glencrest Civic League, “the composition of the population from the mid-1960's to the late 1990's changed from an almost all white community to an approximate mixture of 80% black, 15% white, and 5% Hispanic” (A Revised History of The Glencrest Civic League,

2011). Currently, the population is approximately 60% black, 35% Hispanic, and less than 4% white (SimplyAnalytics, 2018).

The neighborhood is characterized by its rolling hills, varied topography, mature trees, and large lots. Much of the neighborhood is comprised of single-family residential properties. The smaller residential lots average over 0.25-acre, with many multi-acre residential lots up to 13.5-acres in size. There is a small amount of commercial and retail properties, mostly located near the major roads along the southern and eastern peripheries. Additionally, there are a significant number of religious institutions throughout the community. The Sycamore Creek – a tributary of the Trinity River – runs along the northwest sector of the area, merging with the Trinity River a few miles north of the site.

4.3 Neighborhood Inventory & Analysis

The area for this study is the Glencrest neighborhood of Fort Worth, Texas – located in the southeast sector of the city. The perimeter of the study area correlates with the boundary of the 2010 census tract #1046.05 - encompassing approximately 1,125 acres or 1.75 square miles (figure 8). It is located approximately 5-miles southeast of downtown Fort Worth. The major interstates within its proximity are I-35W (approximately 1-mile west), I-20 (approximately 1.5-miles south), and highway 287 - Martin Luther King Freeway (approximately 1-mile northeast). The major roads along the perimeter are South Riverside Drive and Mansfield Highway on the west; Mitchell Boulevard and Wichita Street on

the east; East Berry and E. Berry South on the north; and East Seminary Drive on the south (figure 9).

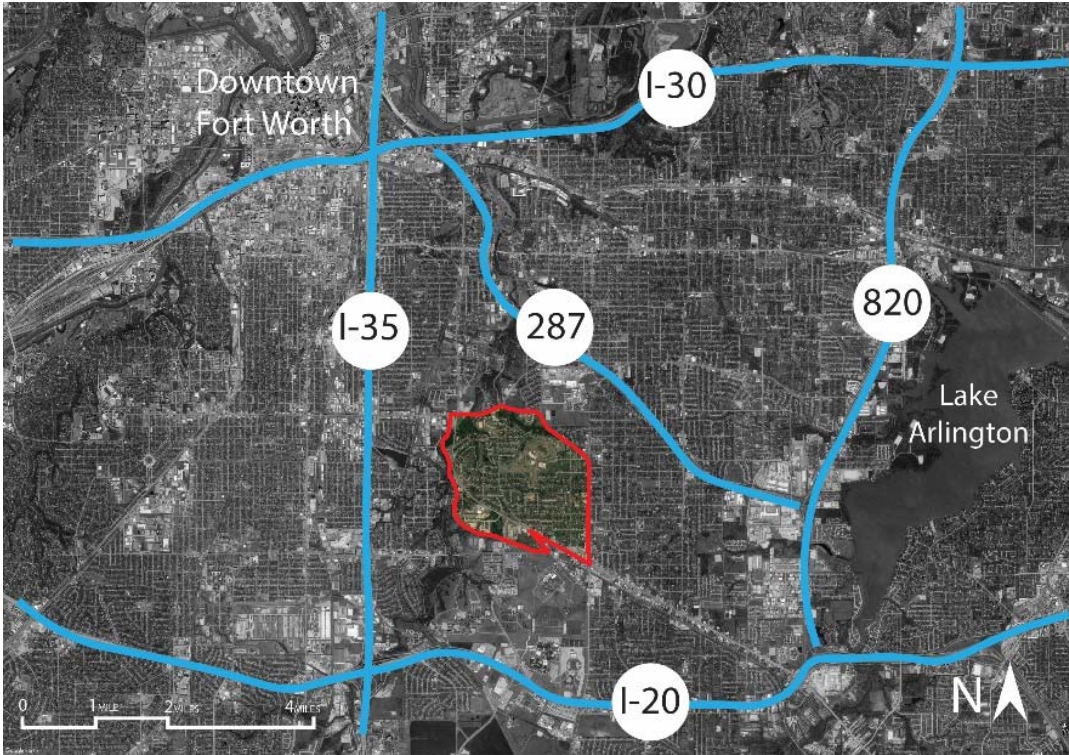


Figure 8: Glencrest neighborhood location (source: adapted from Google Earth)

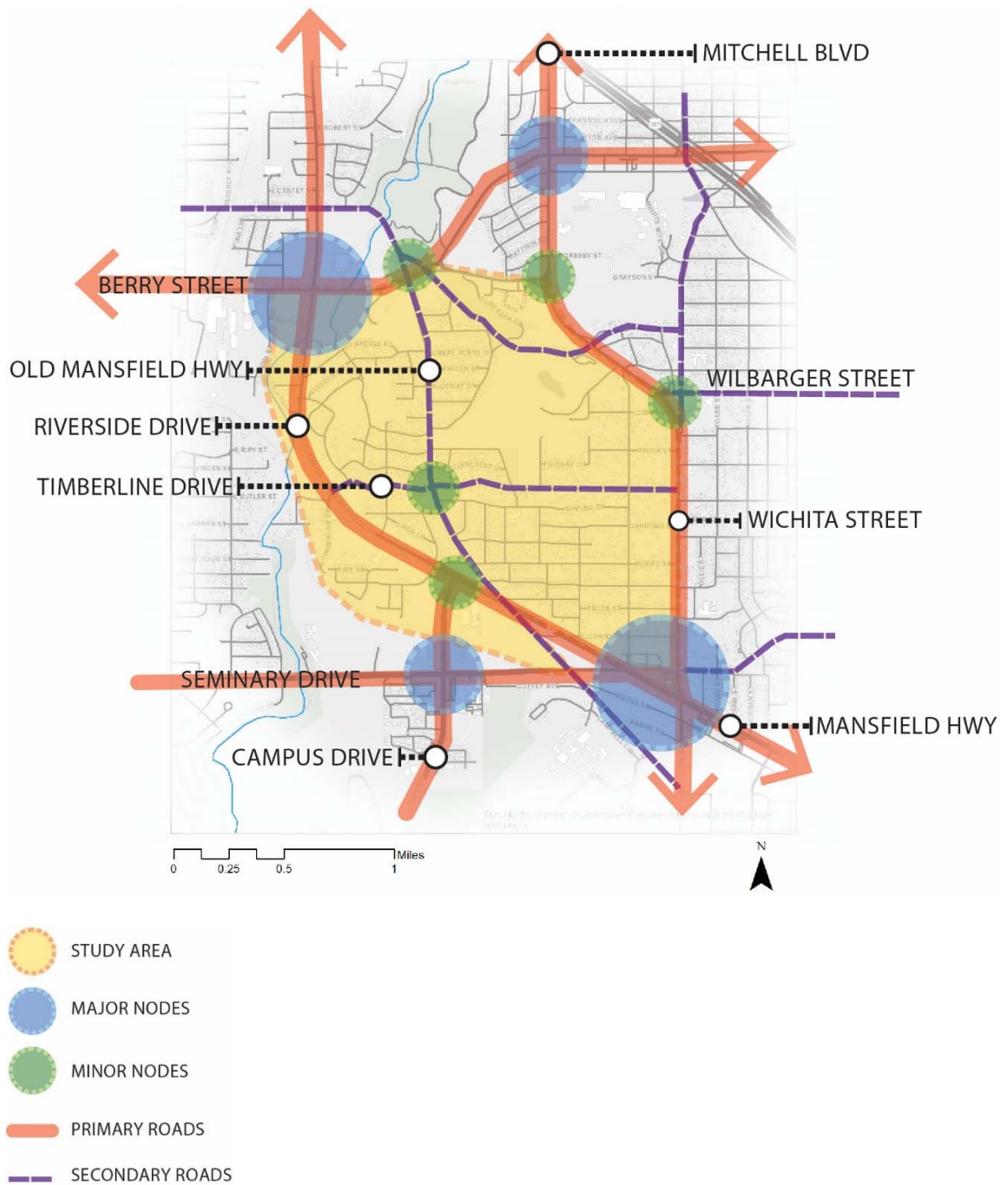


Figure 9: Vehicular circulation (source: adapted from ArcGIS map)

4.4 Demographics

The Glencrest neighborhood is a majority-minority community with a total population of 4,794 – a population density of 2,735 per square mile (SimplyAnalytics, 2018). The two largest ethnic-minority groups are African-Americans and Hispanics – accounting for 60% and 35% respectively (figure 10). The remainder of the population is approximately 3% White, 1% Asian, and 1% other. The median age for the neighborhood is 38 years old. The median family income is \$52,798, approximately 58% of the population is considered low-income, 32% are below the poverty rate and the unemployment rate is 3.5% (figure 11). Approximately 10.5% of the population has attained a bachelor’s degree, less than 3% a master’s degree, and 31.6% a high school diploma or equivalent (figure 12). All but 9% of households own at least one vehicle (figure 13).

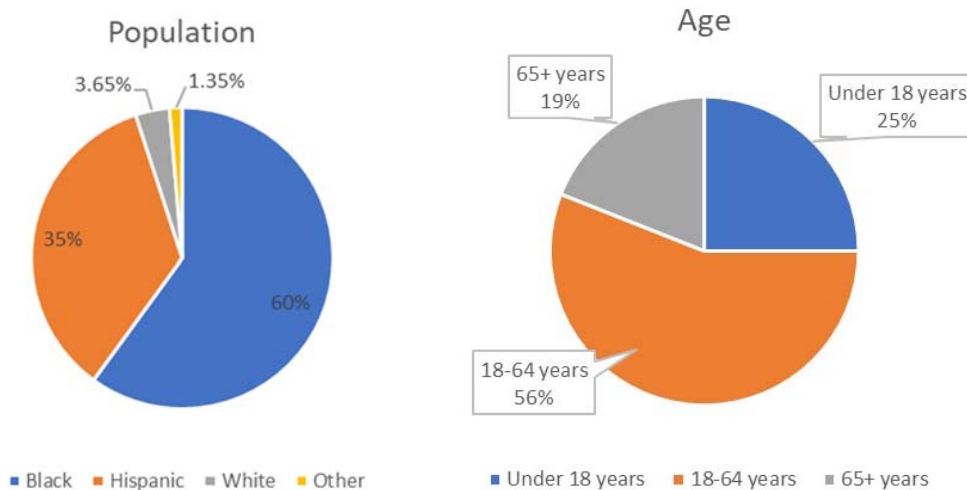


Figure 10: Study areas racial and age demographics (source: adapted from SimplyAnalytics, 2018)

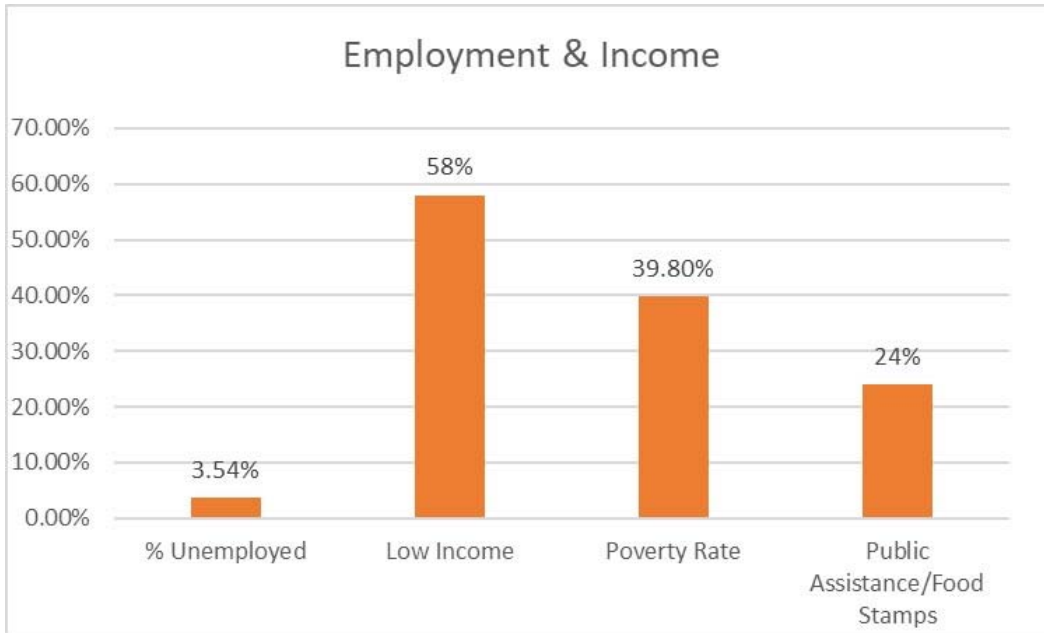


Figure 11: Study areas employment and income levels (source: adapted SimplyAnalytics, 2018)

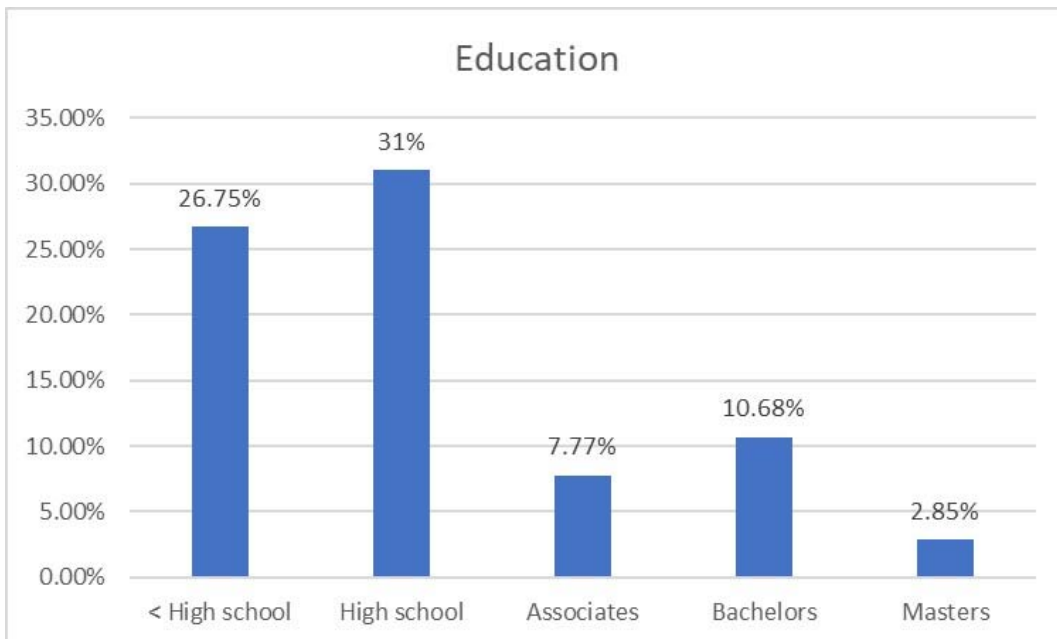


Figure 12: Study areas education levels (source: adapted from SimplyAnalytics, 2018)

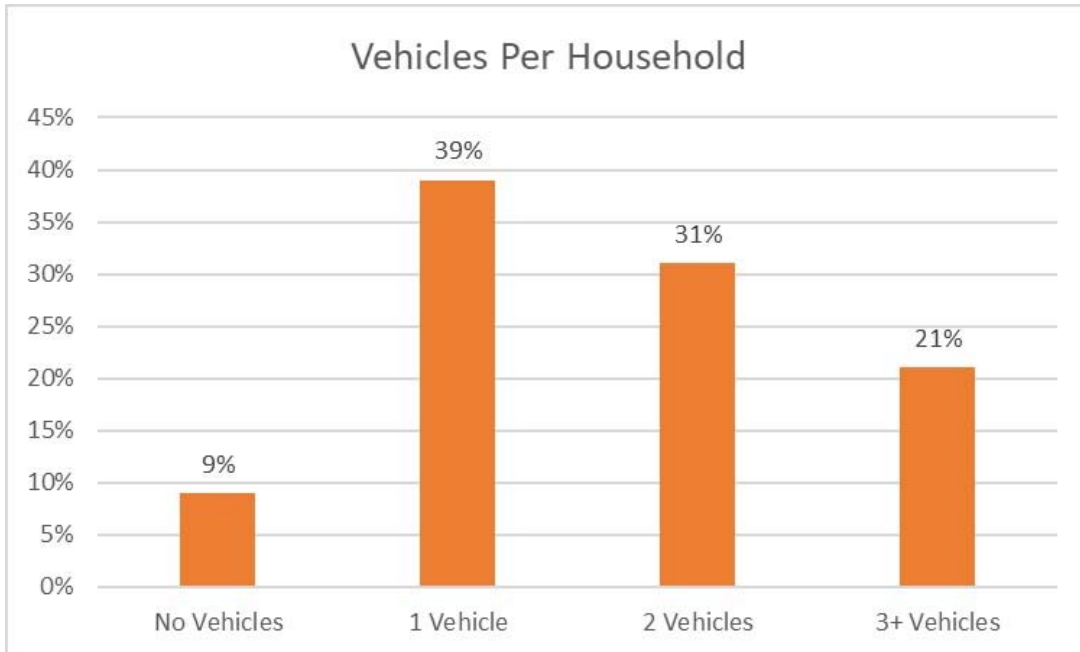


Figure 13: Study areas number of vehicles per household (source: adapted from SimplyAnalytics, 2018)

4.5 Public Transportation

The City of Fort Worth has an extensive public bus system. There are three bus routes that serve the study area – the 3-line, 23-line, and the 5b-line. The 3 and 23 line stop every thirty minutes and the 5b line stops every sixty minutes (figure 14). Within the perimeter of the study area, there are a total of twenty-two bus stops and one transfer station where all three bus routes converge (figure 15). However, all the bus stops are located along the perimeter roads of the neighborhood, with the average distance to a bus stop from the residential area is less than half a mile or approximately a ten-minute walk.

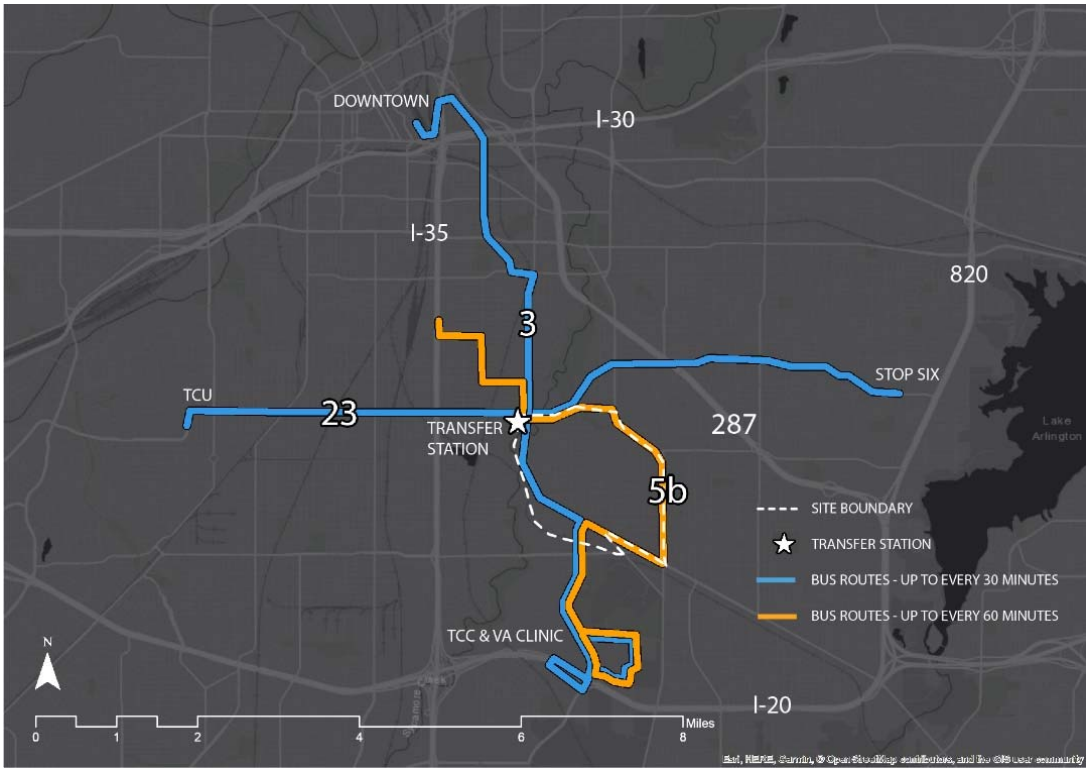
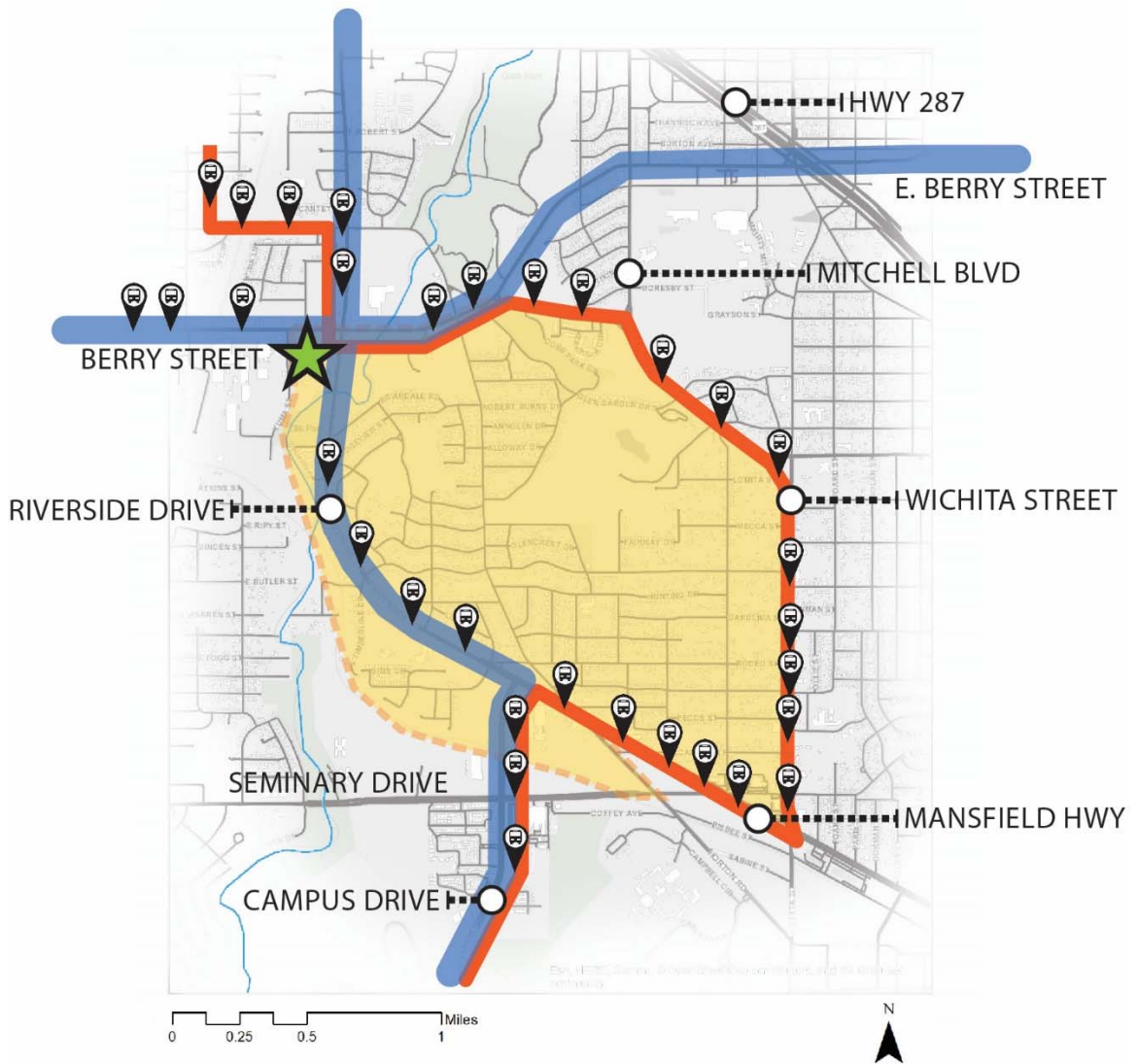


Figure 14: Neighborhood bus routes (source: adapted from ArcGIS and Trinity Metro maps and schedules)








-  STUDY AREA
-  TRANSFER STATION
-  BUS STOPS
-  BUS ROUTES - EVERY 30 MINUTES
-  BUS ROUTES - EVERY 60 MINUTES

Figure 15: Neighborhood bus stops (source: adapted from ArcGIS and Trinity Metro maps and schedules)

4.6 Study Area Food Sources

Typical of a food desert, the Glencrest neighborhood is a high ratio of unhealthy to healthy food sources. Figure 16 shows the location and proximity of area grocery stores and figure 17 shows the number and location of neighborhood convenience stores, fast food restaurants, and liquor stores. These two diagrams highlight the disparity between healthy and unhealthy food options in the study area.

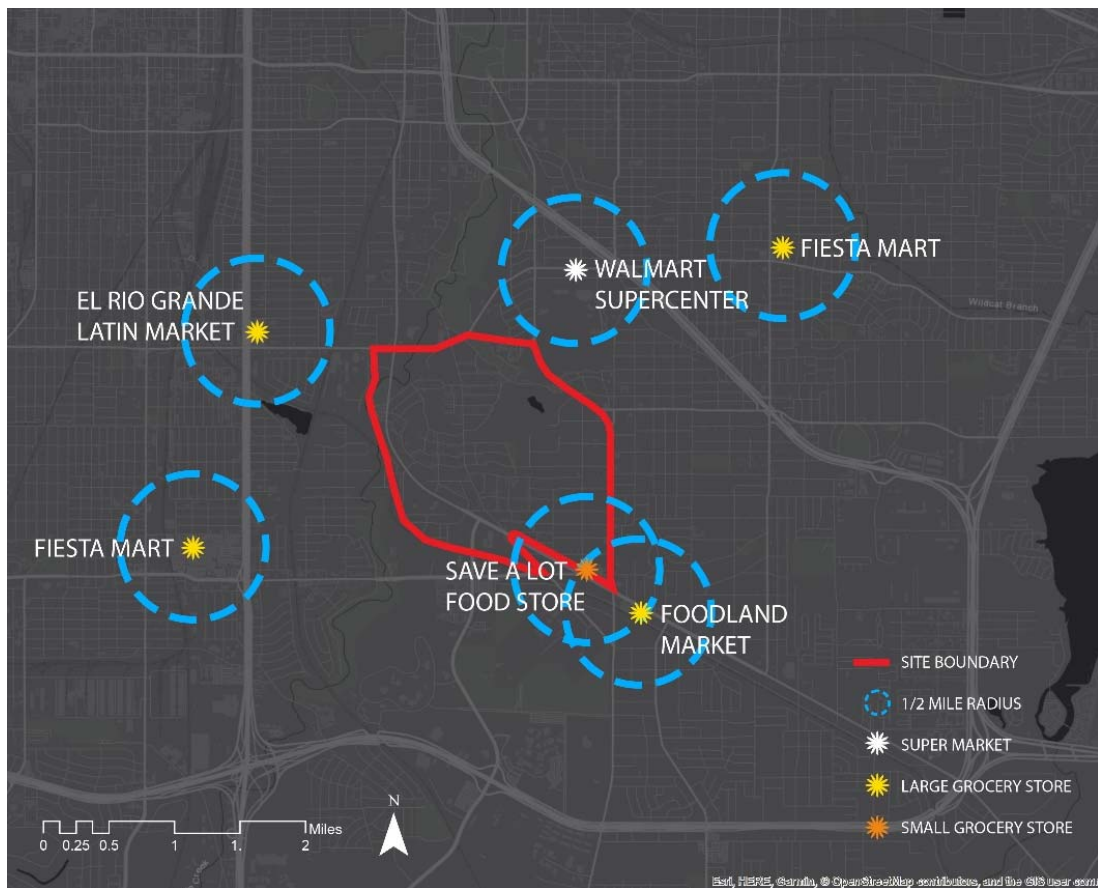
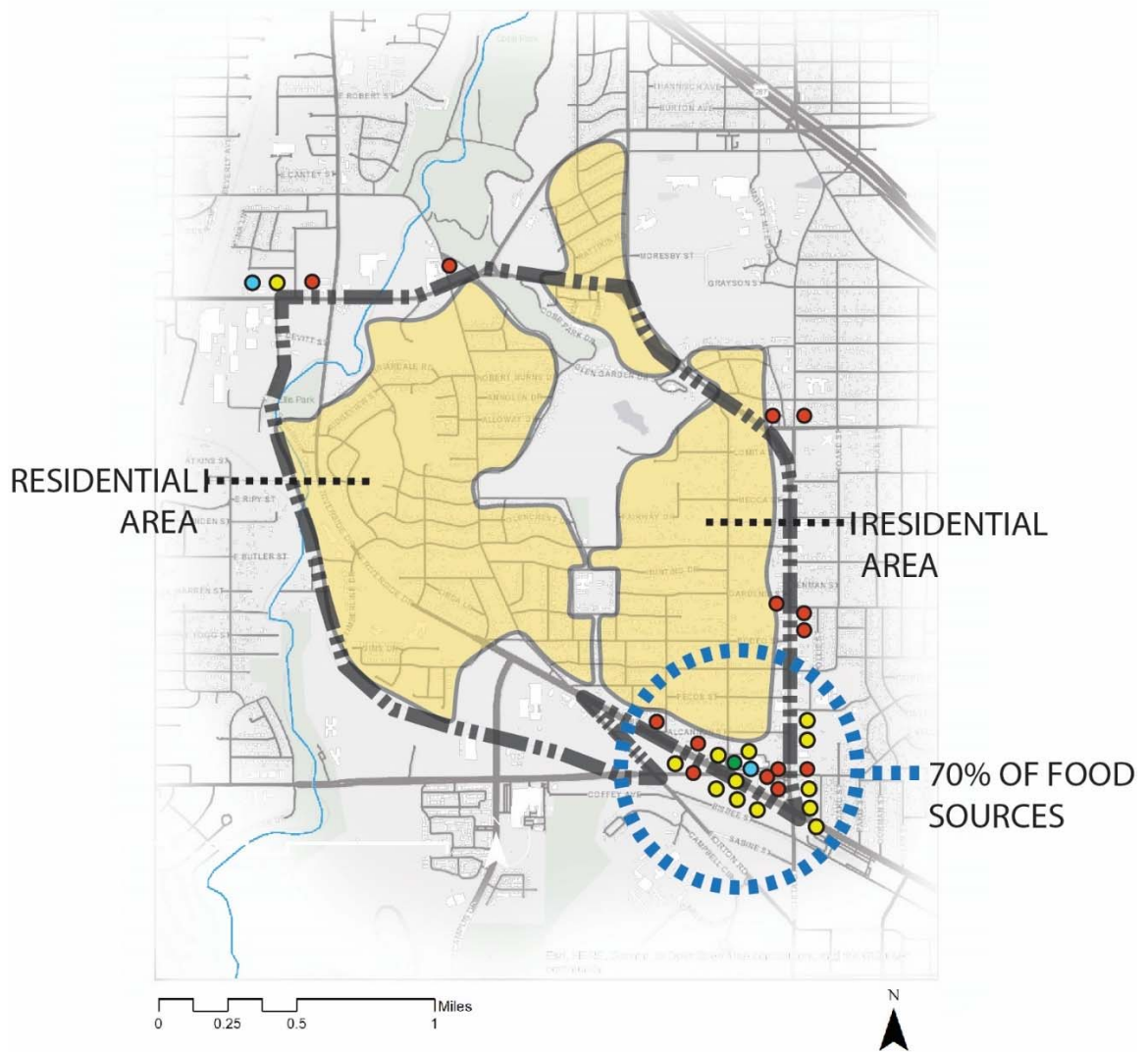


Figure 16: Proximity to nearest grocery stores (source: adapted from ArcGIS map)



FOOD SOURCES

- GROCERY STORE (1)
- CONVENIENCE STORES (14)
- FASTFOOD RESTAURANTS (13)
- LIQUOR STORES (2)

Figure 17: Proximity to local food sources (source: adapted from ArcGIS map)

4.7 Land Use

The Glencrest neighborhood is predominately zoned residential with a few commercial zones along the perimeter of the neighborhood (figure 18). Most of the commercial activity is located along the southeast boundary of the neighborhood. The commercial uses include retail, fast-food restaurants, pawn shops, convenience stores, auto parts stores, furniture stores, one pharmacy and one small grocery store. Additionally, there are three parks within the neighborhood, which are Ellis Park, Cobb Park, and Tadlock Park. Tadlock Park is the most centrally located park and houses the C.R. Bradley Community Center, which is regularly used for community meetings and social gatherings.

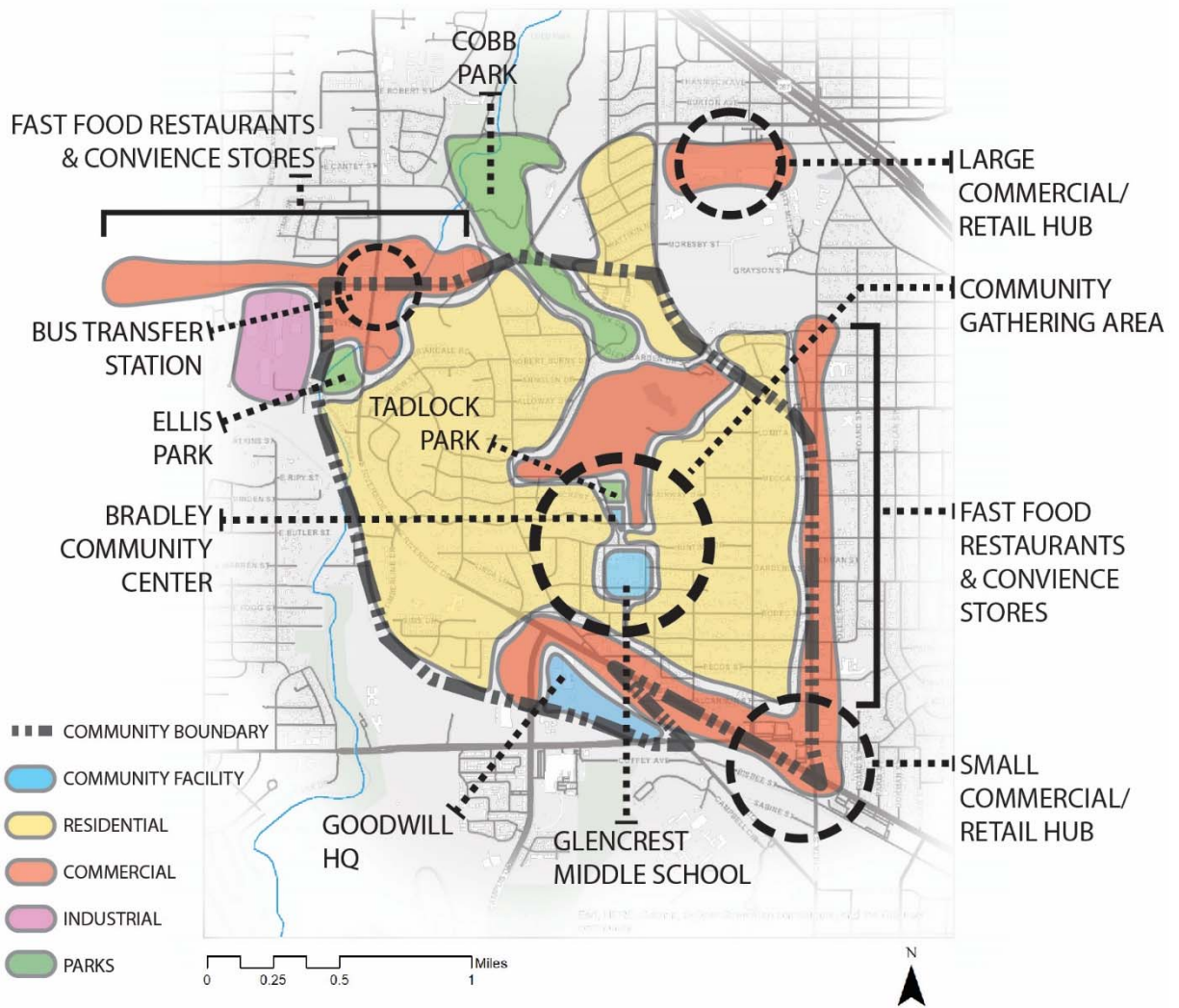


Figure 18: Glencrest neighborhood land-use diagram (source: adapted from ArcGIS map and City of Fort Worth zoning map)

4.7.1 Urban Agriculture Potential

The study area has an abundance of large properties that are ideal for urban agricultural practices. The average single-family residential lot is over $\frac{1}{4}$ of an acre in size, with many properties measuring 1-acre or larger. Figure 19

illustrates which urban agricultural practices are best suited for varying property sizes, while figures 20 and 21 identify ideal properties for implementing urban agricultural practices based on size, location, sunlight exposure, and topography. These assessments are based primarily on the experience gathered during my 4+ years of agriculture training, in which I visited dozens of farms, community gardens, farmers markets, and various other agriculture practices.

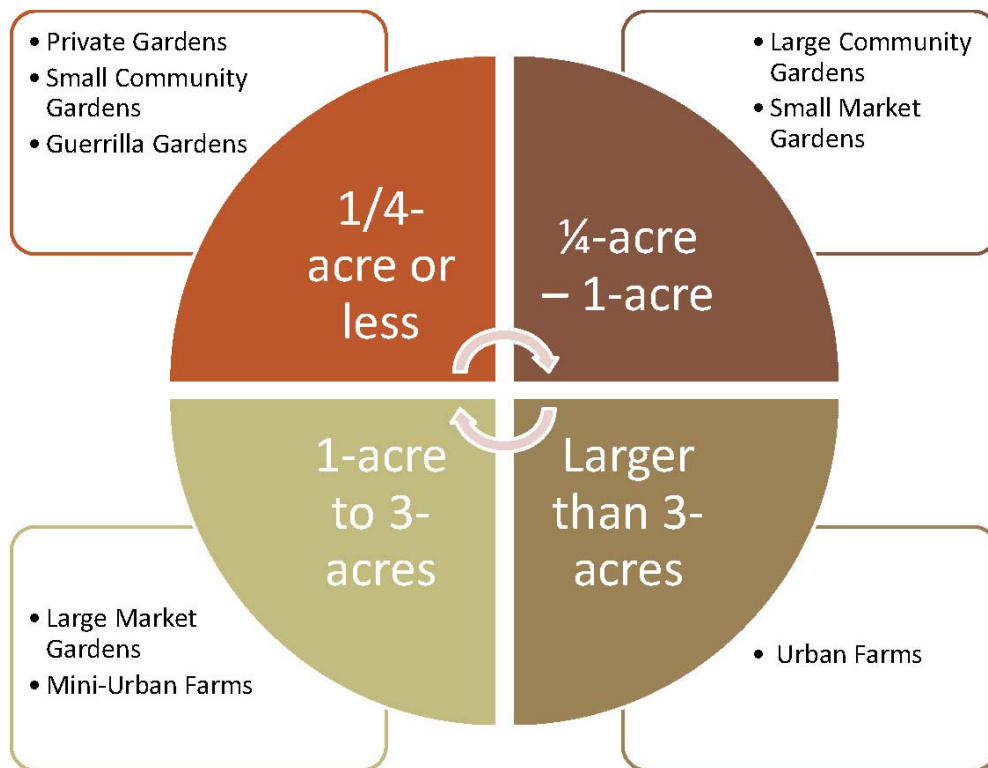


Figure 19: Urban agricultural practices based on property size

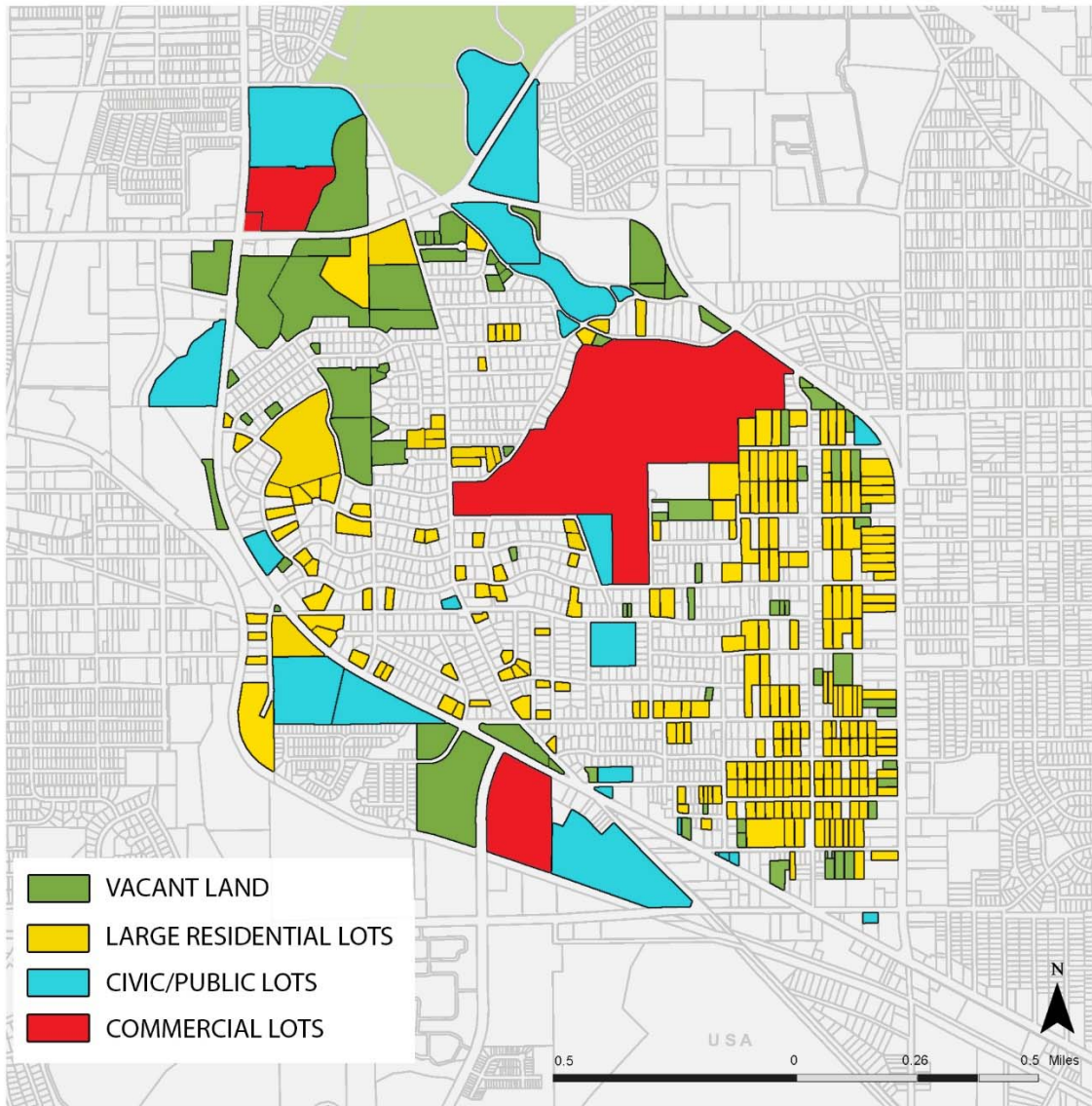


Figure 20: Properties ideal for urban agriculture uses (adapted from City of Fort Worth zoning map)

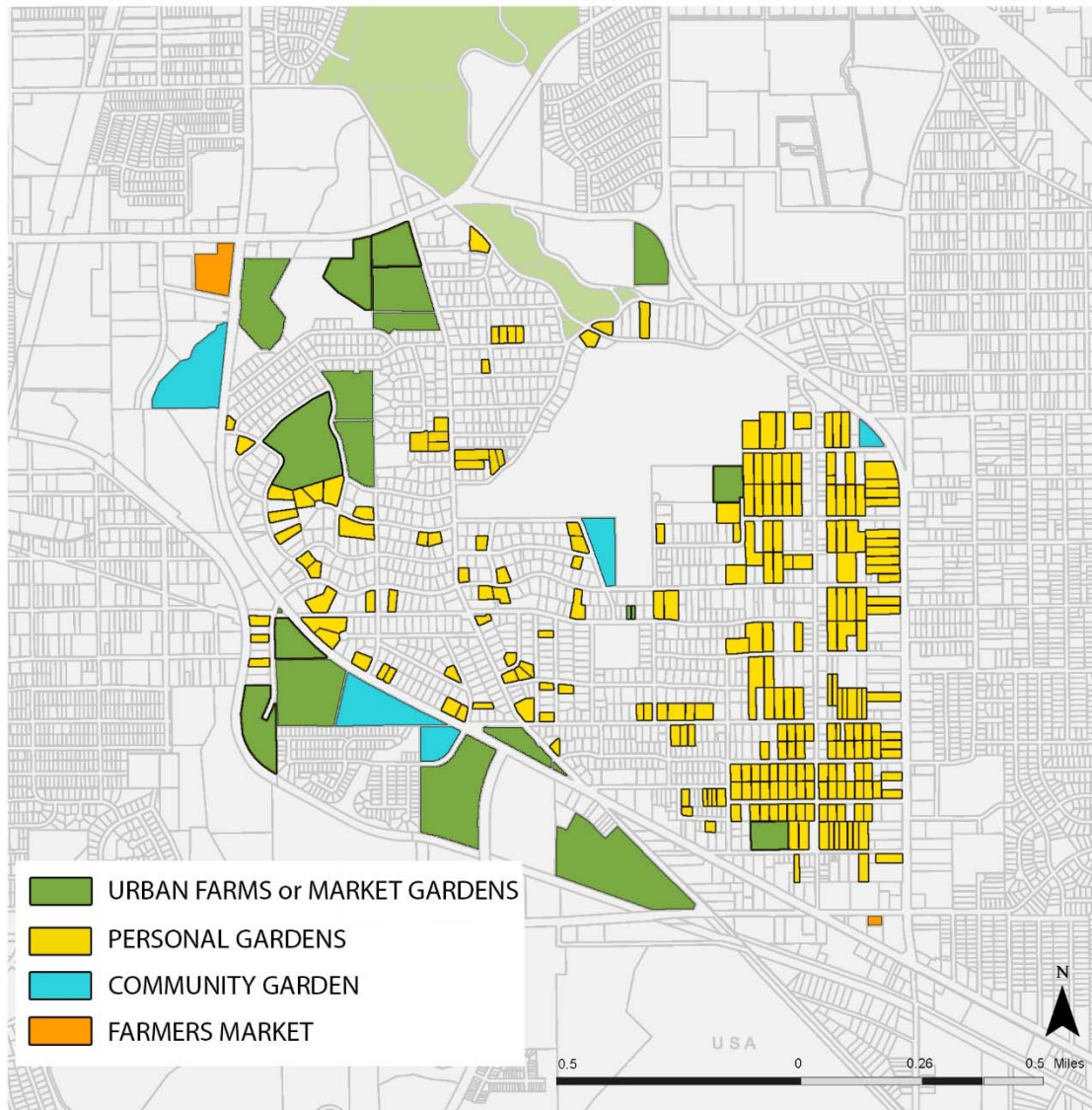


Figure 21: Properties ideal for urban agriculture practices based on size (adapted from City of Fort Worth zoning map)

4.8 Site Inventory & Analysis

4.8.1 Site Selection

The neighborhood inventory and analysis helped to identify the best location suited for a community garden. The criteria used to identify the location was based on:

- Connectivity and accessibility to the residential areas of the neighborhood
- Proximity to the Glencrest Middle School
- Familiarity of the location to the community and
- Access to existing infrastructure and resources that compliment and/or support the functions of a community garden

Tadlock Park was selected for the location of the community garden (figure 22).



Figure 22: Tadlock Park (adapted from Google Earth map)

The park is located centrally to the residential area, one city block away from the local middle school, and most of the existing sidewalks in the neighborhood lead to the park (figure 23). In addition, the C.R. Bradley Community Center is located on the park premises. The community center is where the Glencrest Neighborhood Association conduct their monthly meetings and annual gatherings.

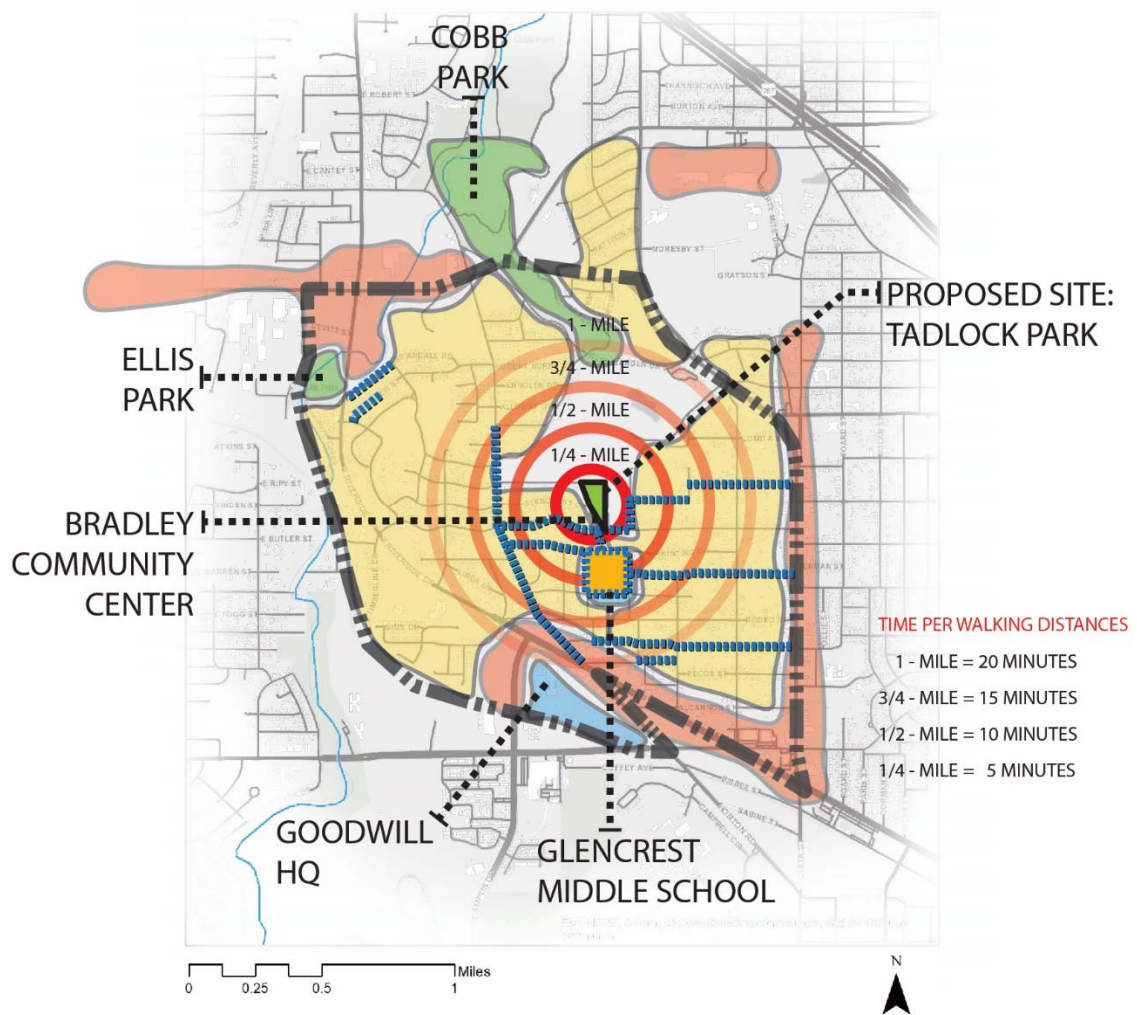


Figure 23: Connectivity Analysis (adapted from ArcGIS map)

Tadlock Park is approximately 4.4 acres in size and is located adjacent to the old Glen Garden Golf and Country Club (currently Firestone & Robertson Distillery). The existing park features include a (figure 24):

- 22 space parking lot
- 24'x24' pavilion with (3) picnic tables and a charcoal grill
- 6,500 square foot playground
- Open-air picnic area with (3) picnic tables and (2) charcoal grills
- 4,500 square foot community center with and outdoor patio with (3) picnic tables and a large charcoal grill
- Tennis court
- and approximately 1.75 acres of open green space suitable for gardening/farming



Figure 24: Site Inventory

4.8.2 Site Hydrology Analysis

A drainage study of the adjacent golf course was conducted to determine the location(s) where the runoff from the golf course drained onto the park premises (figure 25). The study identified that a small section of the southern end of the golf course drains partially onto the open green space of Tadlock park. This run-off can be redirected around the growing areas of the garden and towards the existing storm drain inlets along the western perimeter of the park.

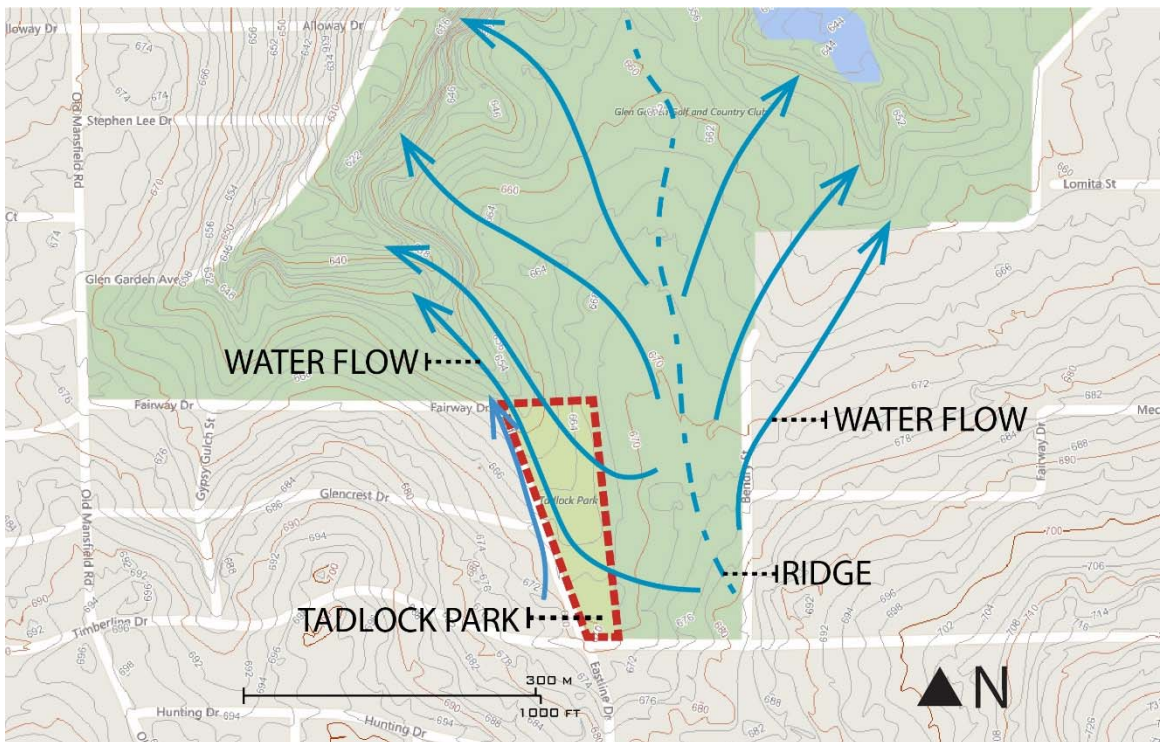


Figure 25: Drainage study of adjacent golf course (adapted from NCTCOG map)

4.8.3 Soil Analysis

A soil report was generated from the Natural Resources Conservation Services (appendix B). The soil type is Ponder-Urban land complex with moderate slopes between 0-3 percent. The parent material is Clayey alluvium with the typical profiles of:

- H1 – 0 to 7 inches: clay loam
- H2 – 7 to 53 inches: clay
- H3 – 53 to 80 inches: silty clay loam

The soil is moderately well drained and has a depth to the water table of more than 80 inches with no frequent flooding. The soil report is valuable in identifying which type of fruit and nut trees should be planted on the site. However, the existing soil conditions are less relevant to the raised garden beds, as those will be filled with a mixture of compost and suitable gardening soil from offsite. Furthermore, the soil can then be further improved over the years by amending it with compost and other beneficial inputs.

4.8.4 Suitability Analysis

A suitability analysis was conducted to determine the ideal location for the placement of the community garden, as well as identifying issues that may need to be addressed as part of the design process (figure 26). The analysis includes a site and adjacent drainage study, sun/shade study, connectivity to adjacent land uses, soil analysis, and potential uses/repurposing of existing park infrastructures.

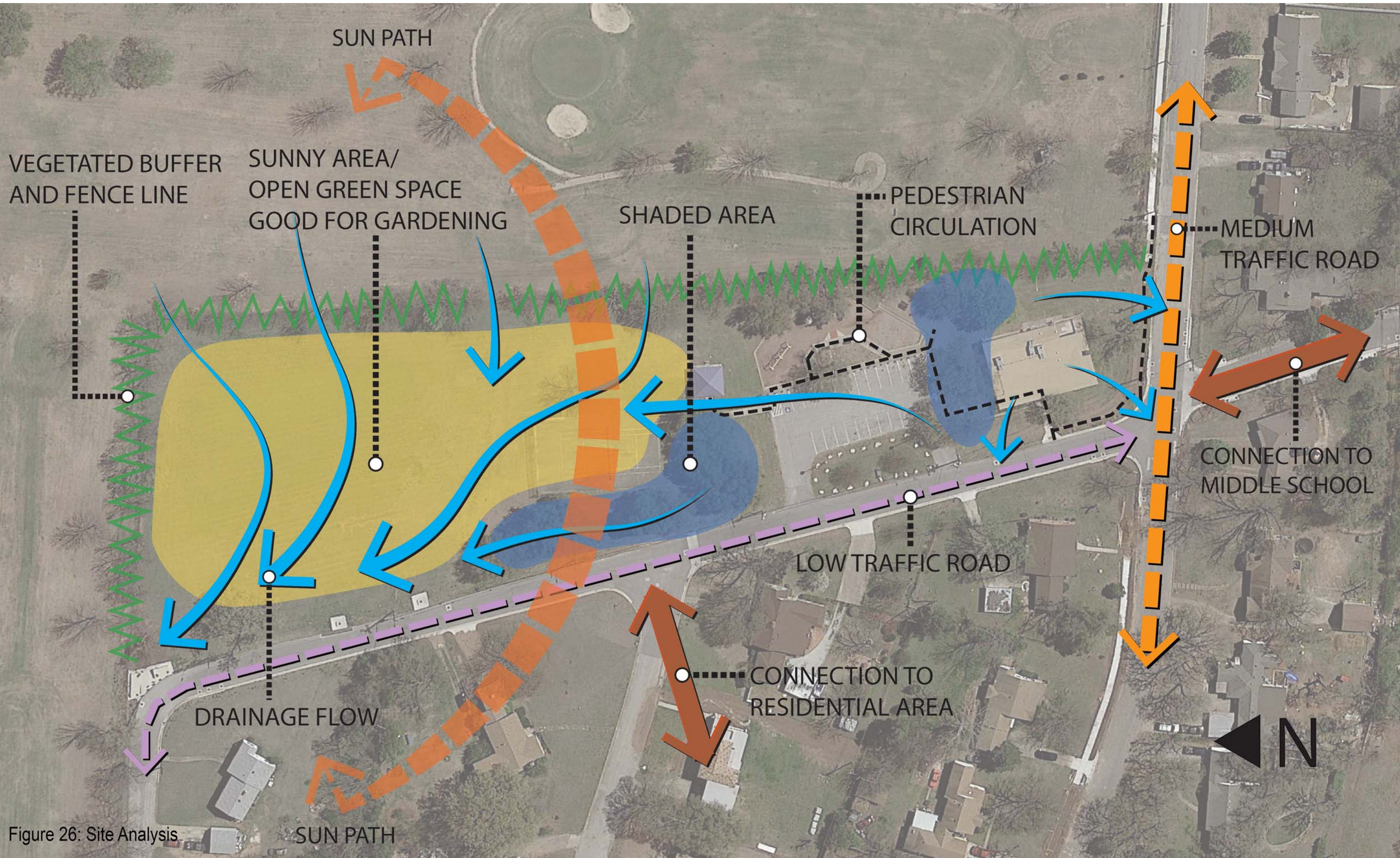


Figure 26: Site Analysis

4.8.5 Inventory and Analysis Summary

The data gathered from the inventory and analysis phase was crucial in identifying the best agricultural practice to propose and where to locate it within the Glencrest neighborhood. Additionally, the site-specific information gathered helped identify the best location for the placement of the community garden within Tadlock Park, as well as issues that would need to be addressed in the design such as drainage, fencing of the existing playground, and additional sidewalks to be added around the parking lot.

4.9 Survey Findings

4.9.1 Survey Overview

The goal of the surveys was to gain a better understanding of the community members relationship to their food systems, their attitudes towards urban agricultural practices, and to identify a preferred location for the implementation of a community garden in the Glencrest neighborhood of Fort Worth, Texas. A total of 13 surveys were collected. The subjects were chosen because of their leadership involvement within the community as board members of the local neighborhood association - the Glencrest Civic League. A list of the survey questions is in appendix A.

4.9.2 Survey Results

The survey results highlight an overall interest in incorporating a community garden in the neighborhood (figure 27). Additionally, the results identified preferred programs to be incorporated into the function of the garden (figure 28). Figure 29 identifies potential locations for a community garden, with a majority interest in locating a community garden in Tadlock Park or a central location within the neighborhood.

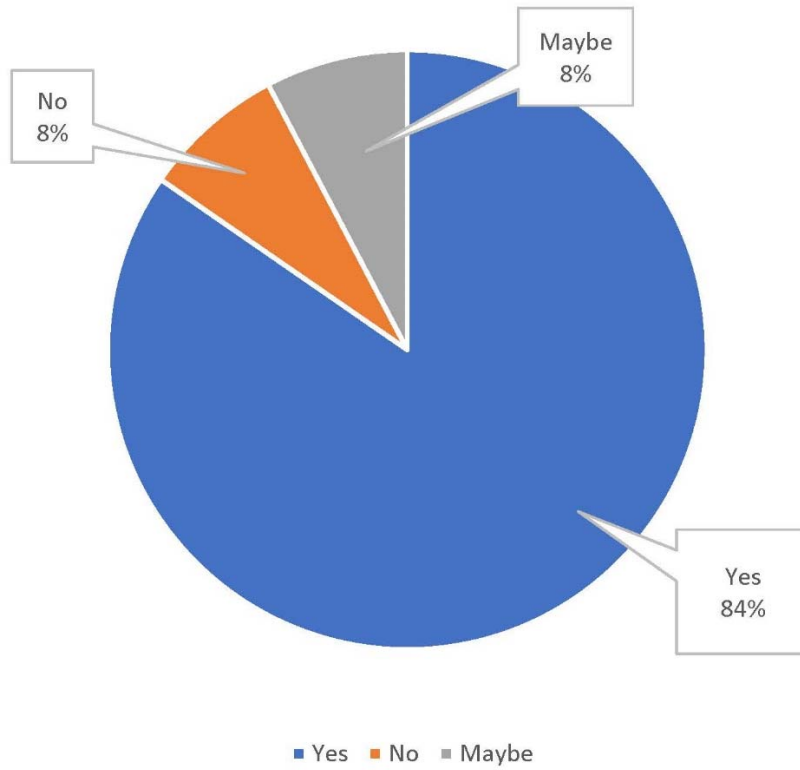


Figure 27: Community interest in having a community garden

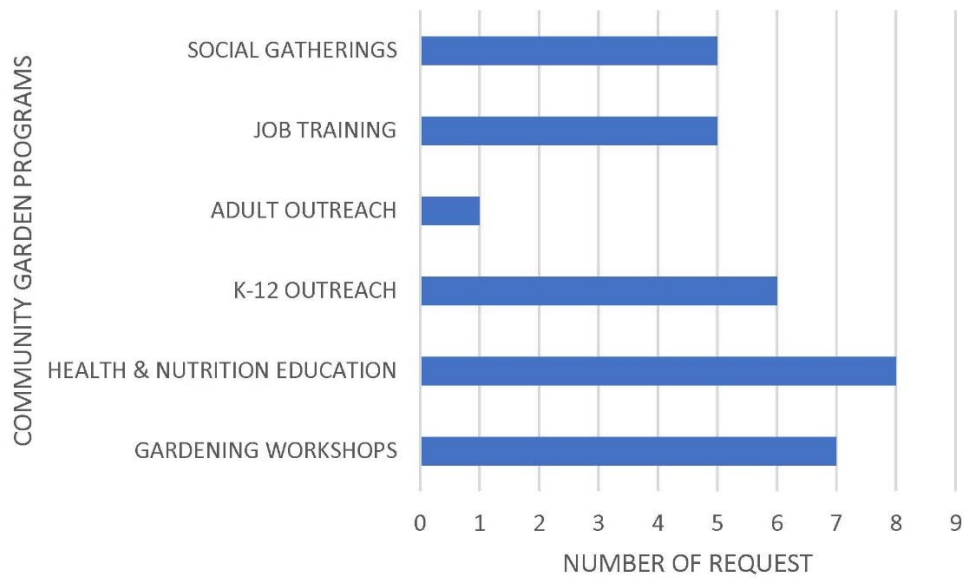


Figure 28: Requested programs to be incorporated into the community garden

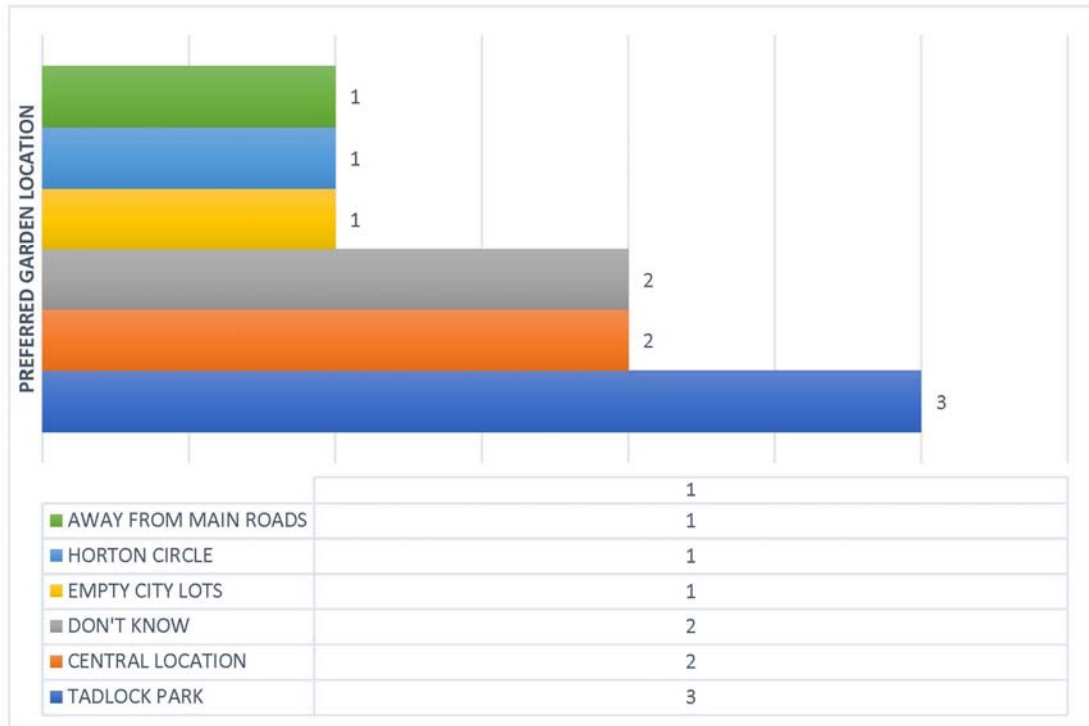


Figure 29: Preferred location for a community garden

Approximately 31% of the subjects are currently growing some of their food (figure 30). Furthermore, the subjects expressed some interest in growing food on their property or on a separate plot of land (figure 31 & 32).

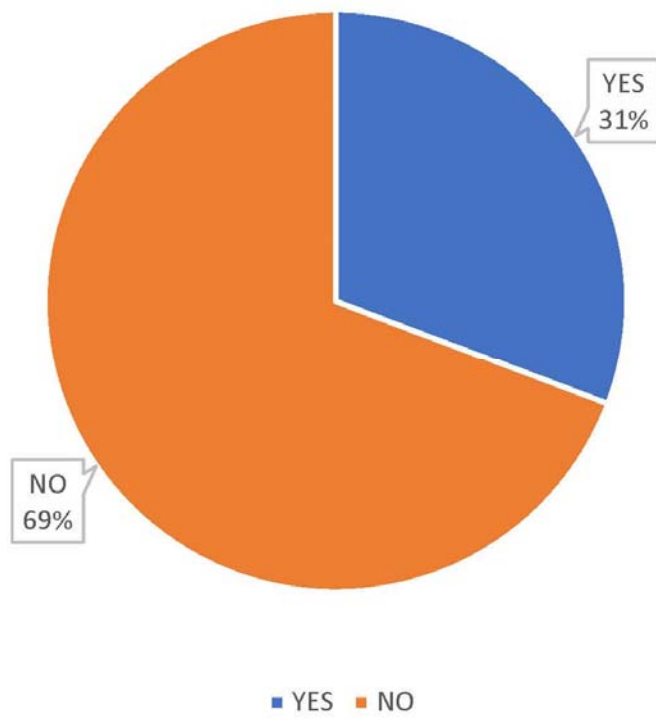


Figure 30: Percentage of subjects who are currently growing food on their property

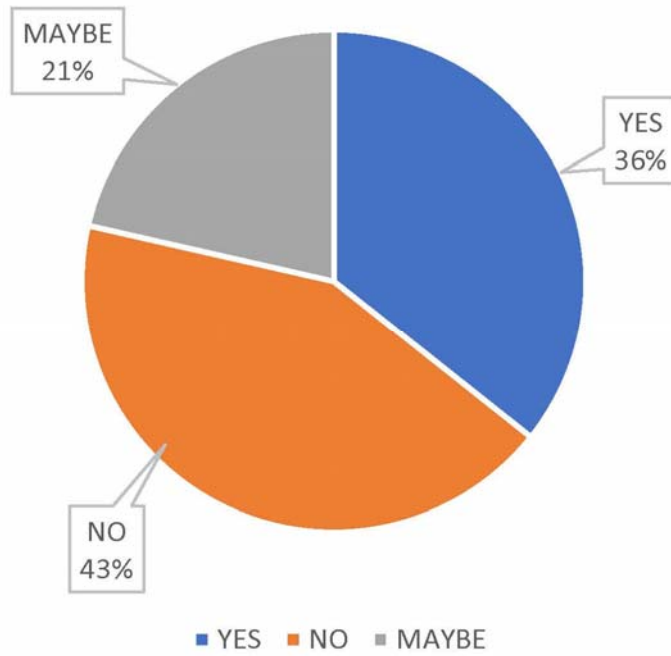


Figure 31: Percentage of subjects interested in growing food on their property

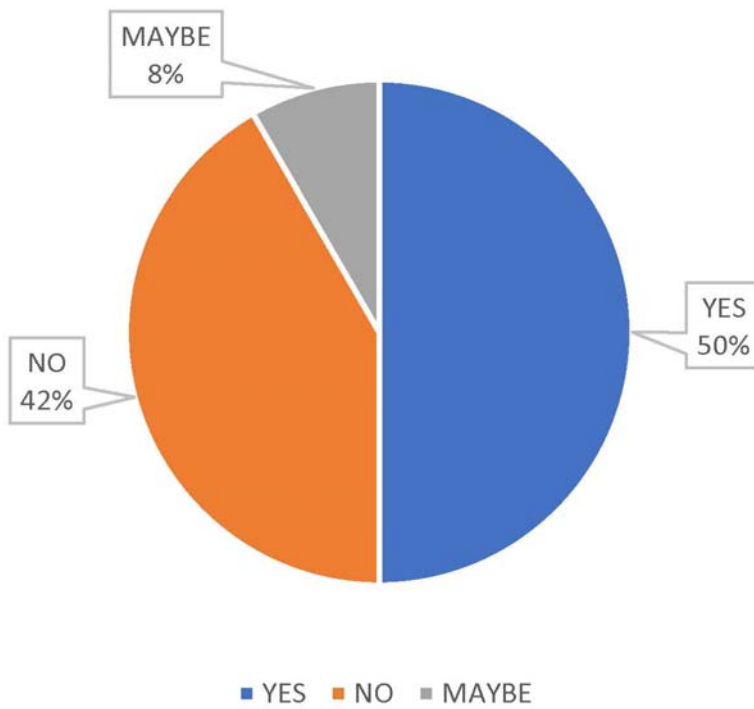


Figure 32: Percentage of subjects interested in growing food on a separate plot of land

Most of the subjects expressed interest in having a farmer’s market nearby. Additionally, over half of the subjects believe that increasing access to healthy foods will result in a healthier diet (figure 33).

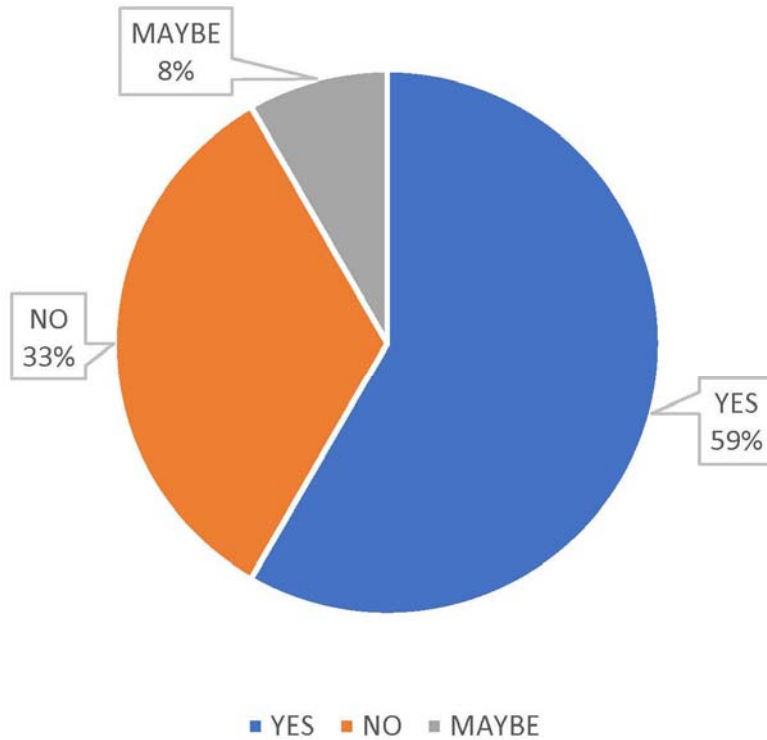


Figure 33: Percentage of subjects who believe that increasing access to healthy foods is directly linked to having a healthier diet

In summary, the surveys provided vital information from the community leadership. The results highlight an overall interest in incorporating a community garden in the neighborhood, identified preferred programs to be incorporated into the function of the garden, and identified Tadlock Park as the preferred location for the placement of a community garden in the Glencrest neighborhood.

CHAPTER 5. DESIGN PROPOSAL

The design for the community garden was modeled from the data collected from extensive research, analysis, interviews and surveys. This data was used to compose a matrix that served as a guide throughout the design process. This matrix was adapted from the National Park and Recreation Association Community Garden Handbook, and includes categories for site selection criteria, garden design elements, and programmatic elements (figure 34).

5.1 Site Selection

The criteria for the site selection of the garden predominately comprised of practical and budgetary issues. This included such concerns such as proximity to parking lots, water sources, and existing park buildings or picnic shelters. Additionally, the garden should be in a sunny area with direct access for service/maintenance, on level ground, and close to a shady area for gardeners to rest. Another major concern is for the garden to be located in an area where it does not compromise existing park activities and programs.

5.1.1 Garden Design Elements

The garden design elements include the technical details of the design such as plot sizes, row spacing, fencing recommendations, ADA accessibility, seating, and surfacing material selections. These elements are crucial in designing a space that is practical, functional, secure, and easily maintainable.

5.1.2. Programmatic Elements

The programmatic elements are essentially the most important features of the garden. These elements support the daily functions of the garden that directly address the factors that contribute to food desert issues. This includes an education center, a green house, theme/demonstration gardens, food preparation stations, food bank garden plots, and interpretive signage. These programmatic elements are the nucleus of the garden and its purpose.

The programmatic elements that were included in the design of the community garden derived from the data gathered from the literature review, precedent studies, and survey and interviews. For instance, the precedent studies included various programmatic elements that served to empower the communities that they served. These elements included educational programs on nutrition, health, gardening, and job training. However, these programs require dedicated spaces for hosting these activities. Therefore, various features such as an education center, a green house, shade structures, a tool shed, and food preparation stations were included in the design of the community garden for the Glencrest neighborhood. In addition, numerous growing spaces throughout the park are primarily dedicated for educational purposes, such as demonstration/theme gardens, orchards, and compost bins. These features facilitate the empowerment of the community through education, outreach, and providing growing spaces for residents.

| | | | | | | | | | | | | |
|--------------------------------|---|---|----------------------------------|---|---|------------------------------|---|--------------------------|--|--|--|--|
| Site Selection Criteria | Does not compromise existing park activities and programs | Place near park building or picnic shelter | Place near a shaded area | Place near existing restrooms or area ideal for placement of portable restrooms | Easy accessibility for park staff and the community | Direct maintenance access | Barrier-free routes to allow access to all park visitors | Level site | Area that receives full direct sun (6-8hrs) | Close proximity to water source | Well-drained area. Avoid low spots | Keep distance to the parking lot at a minimum |
| Programmatic Elements | Tool sheds | Shade structures / educational areas | Food bank garden | Artwork reflecting the culture of the community | Interpretive signage | Compost area | Edible landscaping | Greenhouse / high tunnel | Area for a farmers market | Demonstration gardens | Childrens garden | Food preparation station |
| Garden Design Elements | Raised beds preferred: 8" - 12" above ground level | Varried plot sizes: 10'x12' for higher production, 4'x12' for children and people w/ limited mobility | Spacing between plots: 3 ft. min | Fence in the area for rented plots | Inclusivity: design layout to allow for all people to garden side by side | Design for ADA accessibility | Accessible route should originate from park building, parking lot, drop-off or bus stop | Route: 4'-5' minimum | Surface material(s) for walkways should be firm, stable and smooth | Edges and Contrast: 70% contrast between walkways and surroundings is helpful for people w/ low vision | Include table-height gardens and vertical gardens. Ideal for children and people w/ disabilities | Locate seating areas along the accessible routes and throughout the garden |

Figure 34: Design Criteria Matrix

5.2 Design Concept

The concept for the garden design materialized from the site analysis and the design guidelines outlined in figure 34. Figure 35 shows the concept diagram for the community garden design. Most of the design interventions occur on the northern half of Tadlock Park. This primarily results from the location of open green space that receives enough sunlight for ideal gardening conditions. Additionally, the northern half of the park is rarely utilized, therefore, the implementation of a community garden will not compromise existing park activities.

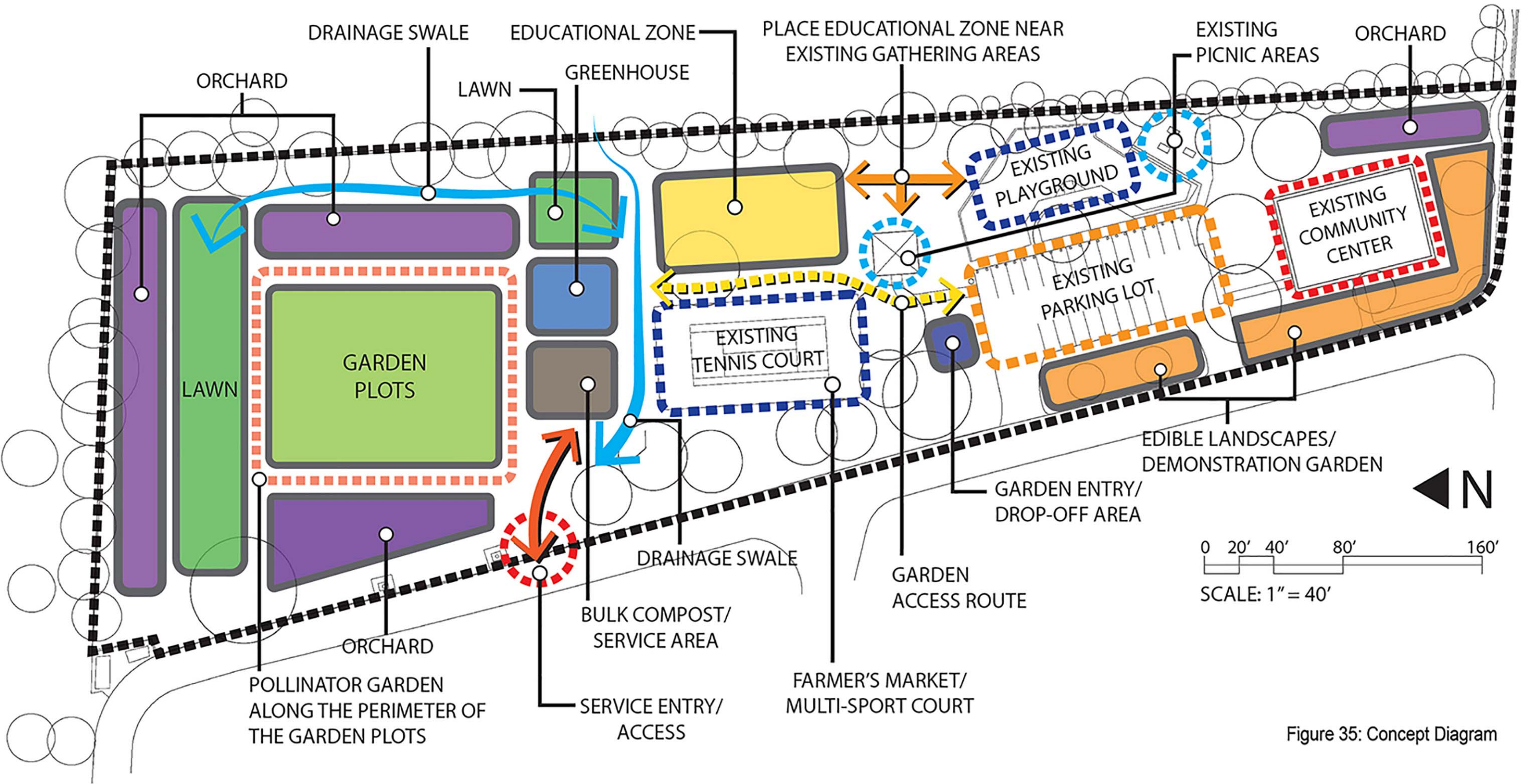


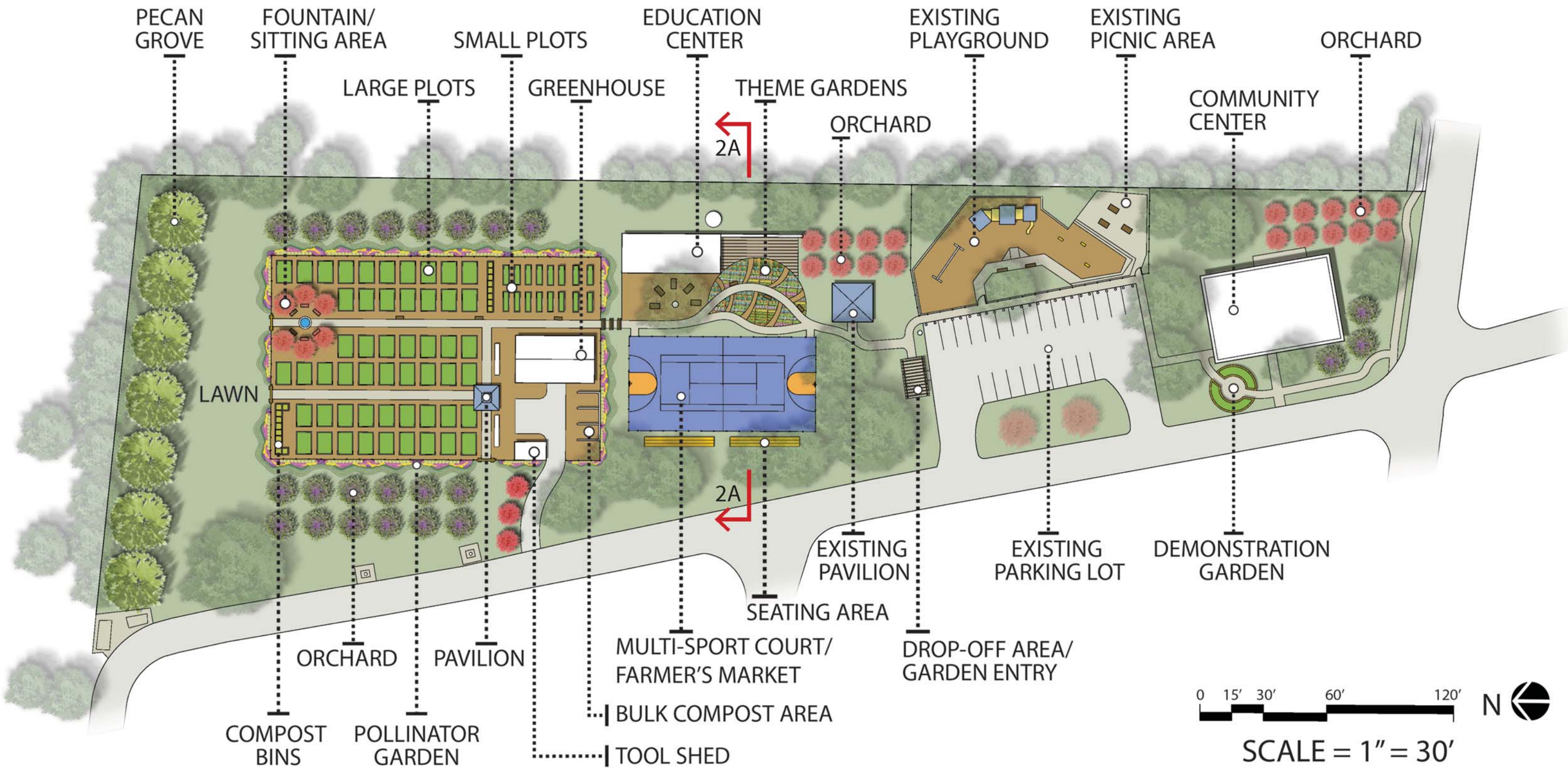
Figure 35: Concept Diagram

5.3 Design Proposal

The community garden begins just north of the existing parking lot (figure 36). A shade structure will be added to serve as a drop-off/staging area as well as the main garden entry (figure 44). This entry will lead to the education center and the leaf-shaped demonstration theme gardens. This area is strategically placed near the area of the park that is currently the most utilized. This increases the opportunities for park users to engage with and learn from the community garden through increased exposure and participation. These demonstration gardens will host a multitude of theme gardens for educational purposes (figure 37 & 38). The themes will include an:

- herb garden
- medicinal garden
- children's garden
- edible flowers garden
- cut flowers garden
- perennial garden
- edible landscape garden
- fruit tree orchard
- and other seasonal theme gardens

Figure 36: Community Garden Master Plan

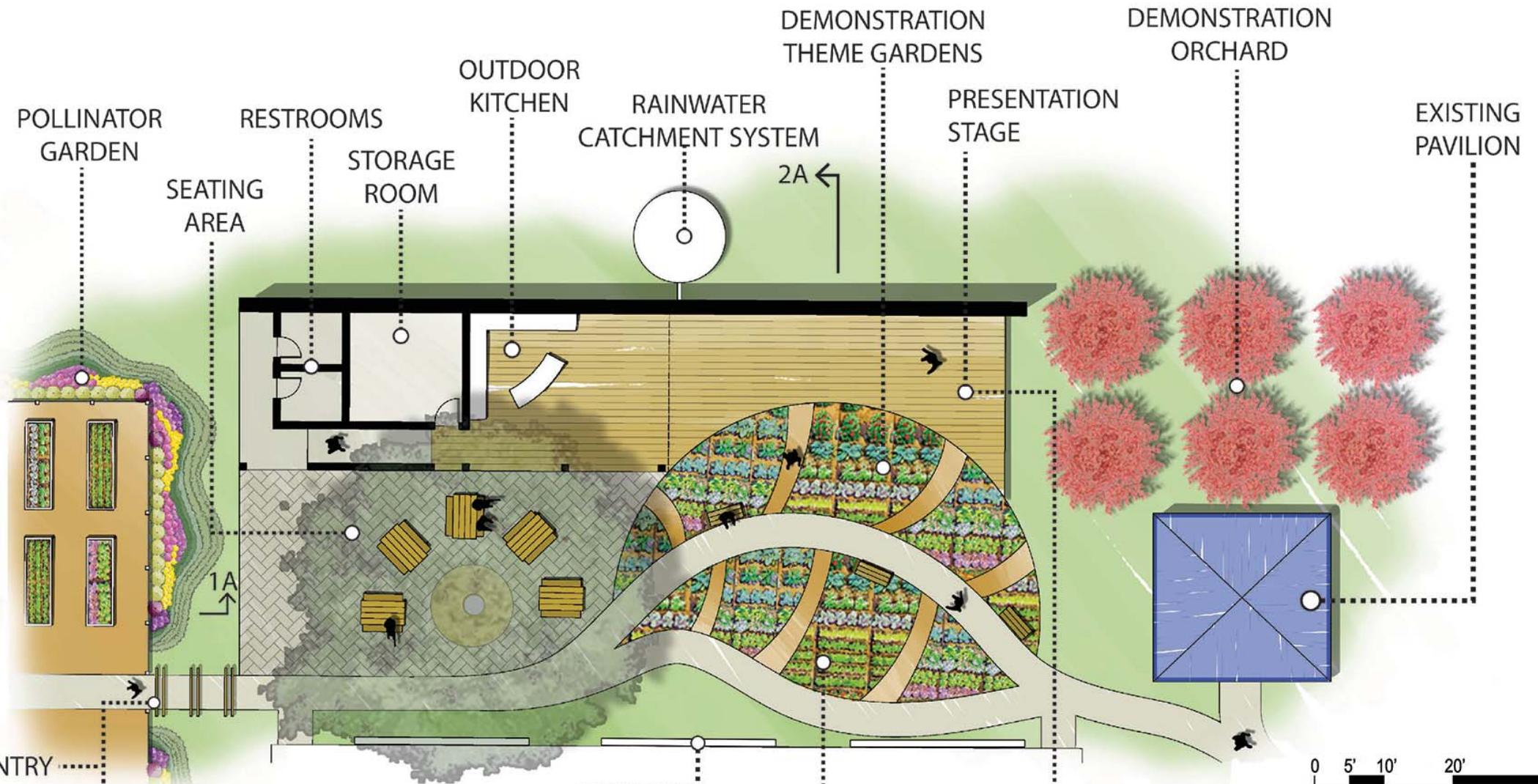


GLENCREST COMMUNITY GARDEN MASTER PLAN

EDUCATION CENTER

SECTION - 1A

SCALE = 1/8" = 1'-0"



GARDEN ENTRY

0 5' 10' 20' 40'

SCALE: 1/8" = 1'-0"



SECTION - 2A

FARMER'S MARKET

COMMUNITY ART



SCALE = 1/8" = 1'-0"



Figure 38: Demonstration Gardens and Orchard

The education center will include an outdoor kitchen for culinary and nutritional workshops. Adjacent to the kitchen area will be a stage that can serve a multitude of uses to include educational classes, youth performances, and a gathering space for other social events. Additionally, the center will have a storage room for gardening tools, supplies, and tables and chairs. Restroom facilities will also be located on the north-end of the building (figure 37 & 46).

West of the proposed education center is an existing underutilized tennis court. In order to help activate this area, the design proposes to repurpose it as a multi-sport court. This will include enclosing the court with a tall chain-link fence, resurfacing the concrete slab, adding basketball and soccer goals, and bleachers along the west-end of the court. The additional fencing will also serve as a display area for cultural artwork as well as advertising space for educational workshops and other community garden events (figure 38). In addition, the court will serve as an area for weekly farmer's market (section 2A, figure 37).

North of the education center will be the entry to the garden plots. The entry is highlighted by a set of three circle trellises (figure 39). The community garden includes:

- ten 4'x12' raised beds - ideal for children and gardeners with limited mobility
- six 4'x12' wheelchair accessible raised beds (figure 39)
- fifty-two 10'x15' raised beds

- a 1,500 square foot green house
- multiple small compost bins
- a pavilion (figure 40)
- a sitting area with a fountain and various fruit trees (figure 41)
- a large tool shed
- multiple preparation and washing stations
- multiple benches throughout the garden
- a material storage area for bulk compost, mulch, and crushed granite (figure 40)
- a service/maintenance entry

The garden plot area is fenced off for security purposes. In addition, there will be a pollinator garden that runs along the entire fence line of the garden (figure 44). This pollinator garden will serve to attract pollinators to the garden, improve the aesthetics of the garden, and provide an additional barrier around the garden.

There will be two orchards that run along the west and east perimeter of the garden. These orchards will consist of a variety of well adapted fruit trees (figure 42). Dwarf varieties are recommended because of their short stature, spacing requirements, and because they begin producing fruit within a couple of years of planting. Many full-size fruit trees begin producing fruit seven years after planting.

North of the garden will be an open lawn area. This area can be utilized for gardening events and for everyday recreational uses. A pecan grove will be planted along the northern perimeter of the park. These trees will provide nuts as well as shade near the open lawn area. A service road will connect the west end of the garden to Eastline Drive, which will provide access for the delivery of bulk materials such as compost, mulch, and crushed granite.

The southern half of Tadlock Park will include a few educational elements as well as improvement to the existing park features. The existing C.R. Bradley Community Center is located at the far end of the park. The community center is used for monthly neighborhood association meetings and other community gatherings. Therefore, a demonstration garden was added just outside of the main entry and a fruit tree orchard wraps around the southern end of the community center (figure 43). This will help bring awareness to the visitors and provide examples of edible landscape features that residents can incorporate at their residence.

The existing playgrounds direct adjacency to the parking lot creates an unsafe environment for the children. Therefore, a fence will be added to create a safety barrier between the playground and the parking lot. In addition, a sidewalk will be added to the southern end of the parking lot, opening space for two additional parking spots.

5.4 Design Analysis

The community garden design incorporates programmatic elements that are essential for empowering communities to address the factors that contribute to food desert issues. Figure 45 highlights the features based on their purpose. Most of the garden features are multi-functional spaces; however, they have primary functions such as education, food production, and promoting social interaction. Furthermore, the design also improves the existing features to include the addition of a safety fence around the playground, repurposing the existing tennis court, and adding sidewalks around the parking lot and community center.

5.5 Design Summary

As participatory landscapes, community gardens require active leadership and on-going participation from the community. Therefore, it is recommended that a neighborhood committee be formed for the day-to-day operation of the garden. The Glencrest Civic League can assist in the formation of this committee and serve as board members. In addition, a partnership with the City Fort Worth Parks and Recreation Department is recommended for the on-going maintenance of the garden.

There are a total sixty-six garden plots that can be rented by either individuals or small groups. Out of the sixty-six plots, fifty provide 150 square feet of growing space and seven of those plots will be reserved for growing produce for the local food bank. The remaining 16 plots are smaller in size, which

are ideal for residents with limited mobility and for children. Specific details regarding the rental of the plots can be decided by the leadership of the garden. However, based on the information gathered from the literature, it is recommended that each plot be rented out on an annual basis. A waiting list can be created once all the plots are rented. In addition, it is recommended to require each gardener to volunteer a few hours each growing season for maintenance and improvements to the garden. This requirement helps establish ownership of the garden from the community and reduces the maintenance cost for the city.

The community garden design includes the programmatic elements necessary to empower people to gain control of their food systems and address the factors that contribute to food desert issues. This includes an education center, garden plots, orchards, a green house, and an area for a farmer's market. In addition, the design utilizes the existing park infrastructures and features to support the functions of the community garden, while not compromising the existing park activities and programs.



Figure 39: Entry to Garden Plots



Figure 40: Pavilion and Service Area



Figure 41: Fountain and Circle Orchard



Figure 42: West Fruit Tree Orchard



Figure 43: Demonstration Garden





Figure 44: Garden Aerial View and Vignettes





Figure 46: Education Center Aerial View and Vignettes



CHAPTER 6. CONCLUSION

The high rate of population growth in urban areas over the past century has contributed to the creation of food deserts, which have been linked to food insecurity and diet related health issues such as obesity, diabetes, and cardiovascular disease. Moreover, it is estimated that approximately 23.5 million Americans live in food deserts, often occurring in historically disadvantaged neighborhoods.

The five main factors that contribute to food desert issues are access to healthy food, mobility, education, income, and overall health. The research concludes that these factors must be addressed holistically in order to effectively remediate food desert issues. Furthermore, the research identified that the most effective way of addressing these factors is through community empowerment. Through empowerment, people are encouraged to take control of their food systems and consequently their health.

The purpose of this thesis was to examine the potential of urban agriculture to empower communities to holistically address the factors that contribute to food desert issues. This research identified opportunities for the implementation of urban agricultural practices in the Glencrest neighborhood of Fort Worth, Texas. In addition, community gardens were suggested by the literature as the most effective urban agricultural practice in empowering

communities to address the factors that contribute to food desert issues. Finally, a design proposal was developed for the implementation of a community garden in the Glencrest neighborhood of Fort Worth, Texas. Based on the data gathered throughout this study, the community garden was designed to incorporate the programmatic elements that will help to empower communities to take control of their food systems and their health.

Future Research

The goal of this research is to implement the proposed community garden at Tadlock Park and to track the long-term impact that the garden has on food desert issues in the Glencrest community. The next step of this research will be to present the design proposal for the community garden to the Glencrest Civic League and ultimately the City of Fort Worth. Subsequently, additional community input will be collected through neighborhood meetings, design charrettes, and surveys in order to improve the overall design and identify additional features and programs to incorporate in the function of the garden.

Concurrently with the implementation of the community garden, a baseline condition of the community will need to be identified. This baseline condition will serve as a starting point for measuring the long-term impact of the community garden on food desert issues in the Glencrest community. Moreover, this thesis can serve as a platform for future research to be conducted on food desert issues as well as other research related to community gardens. The

information presented in this thesis, as well as data gathered from future research, can help inform landscape architects, architects, urban planners, municipalities, and policy makers on the use of urban agriculture as a tool for addressing food desert issues in low-access communities.

Appendix A: Survey Questions

Survey Questions

1. How often do you go grocery shopping (e.g. once a month, twice a month, once a week, twice a week, etc.)?
2. Where do you normally buy your groceries?
3. How far do you normally travel for groceries (e.g. ¼ mile, ½ mile, 1 mile, 2 miles, etc.)?
4. What form of transportation (e.g. automobile, bus, bicycle, walking, etc.) do you regularly use when traveling for your groceries?
5. When grocery shopping, what percentage of your selections are fruits and/or vegetables?
6. Do you currently buy organic fruits and vegetables? Why or why not?
7. Do you ever shop at farmer's markets? If so, how often?
8. If you had a farmer's market near your residence, would you shop there?
9. Do you grow any of your own food?
10. Would you be interested in growing food on your current property (i.e. your backyard, front yard, side yard, etc.)?
11. If you had access to a plot of land (e.g. a community garden), would you be interested in growing your own food?
12. If you had better access to affordable healthy food options, do you believe it would contribute to a healthier diet?
13. Do you know the source of your food (i.e. the name and location of the farm that grows the food)?

14. Would you be interested in having a community garden built in the Glencrest neighborhood? Why or why not?
15. If a community garden were to be built in the Glencrest neighborhood, what concerns do you have that you would like to be addressed?
16. What kind of programs would you like to see as part of the community garden (i.e. gardening workshops, health and nutrition education, K-12 outreach, job training, potlucks and other social gatherings, etc.)?
17. If a community garden were to be built in the Glencrest neighborhood, where do you think will be the best location for it?
18. How often do you see people utilizing the open green space along the northside of Tadlock Park (past the tennis court)? When it is being used, what percentage of that open green space is being regularly utilized at any given time?

For the following five questions, on a scale of 1 – 5 (with 1 being the least important and 5 being the most important) please rate the following:

1. Please rate how important it is to know where your food comes from.
1 2 3 4 5
2. Please rate how important it is to have a relationship with the farmer(s) that grow the food that you eat.
1 2 3 4 5
3. Please rate how important are fruit and vegetable options are when grocery shopping.
1 2 3 4 5
4. Please rate how important is having organic food options when grocery shopping.
1 2 3 4 5

5. Please rate how important of an issue is transportation options for grocery shopping?

1 2 3 4 5

6. On a scale of 1 = Most Important to 3 = Least Important, please rank in order of importance (i.e. 1, 2, 3) the following factors when grocery shopping.

___ Price/Affordability

___ Healthy Options

___ Familiarity with the produce (i.e. knowing how to cook or prepare that food item)

Appendix B: NRCS Soil Description

Tarrant County, Texas

58—Ponder-Urban land complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: dhj3
Elevation: 0 to 4,000 feet
Mean annual precipitation: 8 to 60 inches
Mean annual air temperature: 54 to 73 degrees F
Frost-free period: 180 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Ponder and similar soils: 52 percent
Urban land: 32 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ponder

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 7 inches: clay loam
H2 - 7 to 53 inches: clay
H3 - 53 to 80 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 60 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: Claypan (R085XY003TX)
Hydric soil rating: No

Description of Urban Land

Typical profile

H1 - 0 to 40 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydrologic Soil Group: D

Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 16 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: Tarrant County, Texas

Survey Area Data: Version 16, Sep 16, 2018

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