

Creating agrihood communities: Exploring hybrid agriculture-focused residential development.

by

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A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture and Regional & Community Planning
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Approved by:

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Abstract

The general lack of knowledge and understanding of food systems has been a characteristic of urban and semi-urban residents of the United States since industrialization and reduction of the agrarian lifestyle. Less people are living in agricultural landscapes and society has shifted to a dependence on large scale industrial agriculture production. While urban agriculture has been explored widely in recent years, less attention has been paid to residential agriculture communities and a hybrid lifestyle. This study aims to address this issue by examining agriculture-focused residential developments. More specifically, this study investigates how residential agriculture typologies create a connection to food through a hybrid agrarian lifestyle. Precedent analysis were used to collect data from established urban agriculture communities across the United States. The study included analysis of common characteristics and themes within successful communities. Interviews with local realtors and developers then were conducted to understand the market interest for this type of development in Manhattan, Kansas. Our data analyses showed that successful agriculture-focused communities components included social/outreach opportunities, a focus on conservation and use of productive landscapes. We also found with many people wanting to be closer to local food there would be an interest in living in this type of community. These findings offer more insight into the connection between designed residential agriculture communities and our understanding of food systems, and contribute to the existing body of literature by identifying that urban agriculture can be used in this context to strengthen this connection. The broader outcome of this study highlights the role of residential agriculture communities in fostering a deeper understanding and connection to food production systems and the move towards a more hybrid agriculture-focused lifestyle.

CREATING AGRIHOODS:

Exploring Hybrid Agriculture
Focused Residential Development

MADISON WULFKUHLE

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Focused Residential Development

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ABSTRACT

The general lack of knowledge and understanding of food systems has been a characteristic of urban and semi-urban residents of the United States since industrialization and reduction of the agrarian lifestyle. Less people are living in agricultural landscapes and society has shifted to a dependence on large scale industrial agriculture production. While urban agriculture has been explored widely in recent years, less attention has been paid to residential agriculture communities and a hybrid lifestyle. This study aims to address this issue by examining agriculture-focused residential developments. More specifically, this study investigates how residential agriculture typologies create a connection to food through a hybrid agrarian lifestyle. Precedent analysis were used to collect data from established urban agriculture communities across the United States. The study included analysis of common characteristics and themes within successful communities. Interviews with local realtors and developers then were conducted to understand the market interest for this type of development in Manhattan, Kansas. Our data analyses showed that successful agriculture-focused communities components included social/outreach opportunities, a focus on conservation and use of productive landscapes. We also found with many people wanting to be closer to local food there would be an interest in living in this type of community. These findings offer more insight into the connection between designed residential agriculture communities and our understanding of food systems, and contribute to the existing body of literature by identifying that urban agriculture can be used in this context to strengthen this connection. The broader outcome of this study highlights the role of residential agriculture communities in fostering a deeper understanding and connection to food production systems and the move towards a more hybrid agriculture-focused lifestyle.

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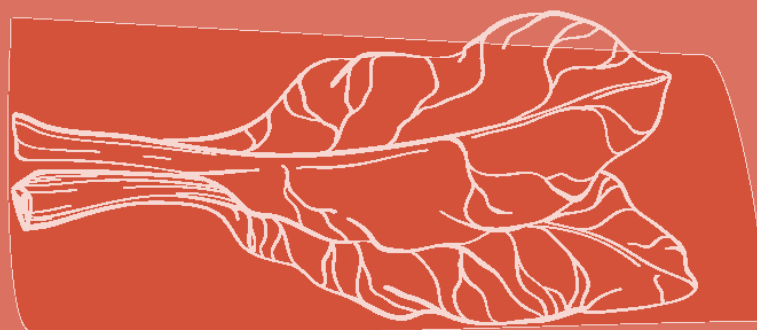
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1 INTRODUCTION



| 1 | INTRODUCTION

Americans are completely disconnected from food production (Deelstra and Girardet 2000, De la Salle and Holland 2010, Karaca 2019, Pietrykowski 2004, Steel 2009). Since the introduction of the railroad system at the end of the industrial revolution and economic boom after WWII, food production has been removed from urban environments, creating a real disconnect between people and what they are consuming (Deelstra and Girardet 2000, Steel 2009). “In the western world since the Second World War, few provisions have been made for space for urban food production. The economic boom of the last 40 years has led to the assumption that city people will buy food, not grow it” (Deelstra and Girardet 2000). Urbanites have now transitioned to a society that is totally dependent on large scale rural farming practices instead of locally produced food systems (Deelstra and Girardet 2000, Steel 2009). The average person could not tell you much about the food they are eating, where it came from, how it is grown, or what goes into producing that product (Steel 2009).

By 2050 it is estimated that there will be twice as many people living in urban areas, doubling the dependence on outside rural food production (Steel 2009). “80 percent of the population lives in cities. This is marked in contrast to 100 years ago when 50 percent of Americans lived on farms or in small rural communities where they fed themselves with locally grown foods. More food is shipped from markets outside the U.S. than at any time in history.” (Brown and Carter 2003, 4). This removal of food production from the urban environment exacerbates the disconnect between urban residents and food, leading to a lack of understanding of what is being consumed. This lack of consumer knowledge and appreciation can lead to a dependence on fast, processed foods and negatively impact consumers health (Jackson 2015, Karaca 2019, and Lautenschlager & Smith 2007). Bringing food production back into the urban

environment is critical in reintroducing consumers to food and reducing the negative health impacts that have arisen from urbanites’ dependence on processed foods.

To study this issue, this research looks at 92 acres of agriculture land on the edge of Manhattan, Kansas. This report looks at the concept of agriculture-focused residential developments as a potential solution to the issues defined in previous paragraphs. Agriculture-focused residential communities are a more hybrid solution to introducing food production back into urban environments. These developments offer residents a hybrid lifestyle where residents have the benefits of living near urban neighborhoods as well as access to local food production.

CENTRAL DILEMMA

Standardized housing patterns and typical zoning in the United States do not allow for a hybrid lifestyle that incorporates cooperative living in peri-urban areas where residents retain the benefits of city-linked employment and amenities, while still enjoying and participating in agrarian activities.

RESEARCH QUESTION:

How can zoned residential development be adapted to facilitate a hybrid lifestyle that combines clustered, cooperative housing, centered around agricultural activities and wide-ranging conservation-oriented practices?

SECONDARY DILEMMA/CONSIDERATIONS

For an agriculturally based clustered residential development, the following secondary dilemmas are often encountered:

- *While the hybrid living concept may initially sound appealing, many residents may not be prepared for the requirements that a cooperative or hybrid lifestyle might entail.*
- *Zoning often does not allow for intermixing clustered residential development with zoned agricultural land use.*
- *Complicated land ownership types (privately owned lots, collectively owned land, etc.), asset management, operational procedures, governance, aesthetics, liability, and other issues can lead to conflicts among residents unless covenants, codes, and restrictions (CCRs) are established.*
- *Unconventional residential development is sometimes hard to appraise and finance from lenders.*
- *Agricultural land uses at peri-urban boundaries can be enveloped by development over time which might pose conflicts depending on the scale and nature of the agricultural operations.*
- *Few of these hybrid developments exist, so many people are unaware of the potential opportunity.*

PROJECT VISION

This research will look into proposing an agriculture-focused residential development in Manhattan, Kansas. This community will be focused on creating a unique neighborhood that offers a hybrid agriculture-focused lifestyle for residents that reintroduces them to food production. The location chosen for this research is 92 acres of agricultural land right outside Manhattan that is located partially within the Wildcat Creek floodplain.

SITE OPPORTUNITY

Many agriculture fields are located in floodplain areas. Urban and residential development is generally restricted from locating within a floodplain, thereby constraining city expansion. For agriculture floodplains located in the peri-urban land around cities, the floodplain could remain agriculture lands/open space while linked development could be located just outside the floodplain. Because much of these floodplain areas need to be preserved, they would be great locations for agriculture-focused residential development where most of the development is focused on land conservation and only minimal space is needed for actual development supporting high-value structures.

NEED FOR AG LIFESTYLE

As cities continue to grow and populations increase, the need for urban food production will also grow. Urban agriculture is positioned to be a great tool for expanding food production into the urban context. With the increase of this type of food production it is crucial to look into how food production can be integrated into urbanites residential lifestyle. Through residential agriculture communities, urbanites can start to see what the concept of an agriculturally based lifestyle would look like, and then begin to visualize themselves living in that type of environment.

ENVISIONED HAMLET

A hamlet is a settlement that is around six to eight houses, composed in a cluster layout. Historically hamlets have a very social component to them. Residents in the community share resources, have social connections with each other, and live together in a community. This type of smaller, socially connected network is the same structure that could be used in

a residential agriculture community. Revisioning the hamlet, will help to create community with a shared farming aspect as well as a social lifestyle component.

ENVISIONED OPERATIONS

Within a residential agriculture community there is a variety of scales of urban agriculture that will be utilized. With these various scales comes certain considerations: equipment, daily operations, agricultural knowledge, maintenance, etc. At the most basic level the operations for this type of community will require someone to be involved that has an understanding of how to run an agricultural operation and maybe even equipment. So, potentially there could be a farmer that lives within the community that can help guide the agriculture operations.

RESEARCH SUB-QUESTIONS

How many people might be potentially interested in this hybrid peri-urban/agrarian lifestyle?

The most important question to consider is the level of interest in living this hybrid lifestyle. Is it great enough to ensure a reasonable financial return and warrant the effort to overcome the obstacles currently entailed? Most people living in urban areas enjoy the benefits that come with it. Additionally, people have become accustomed to the ease of buying products at the store. There is a level of responsibility, both socially and in production, that residents of an agriculture-based community would be expected to partake in. So, determining the appeal and interest in living in a working agriculture community is key to make sure that it is feasible.

What various scales/types of urban agriculture can be used?

The research site is large and has the opportunity for a variety of scales of urban agriculture. The use of various types of agriculture can involve residents in multiple levels of production and potentially help decrease the work load/responsibility. It would be helpful to investigate the potential of smaller plots/animals all the way up to large areas of row crops.

What scale/type of residential development is being proposed?

Understanding what type of residential housing might be offered on the site is also a main consideration: single family, multi-family, row housing, cluster, etc.? Looking at precedents of hybrid agriculture communities in the United States and Europe, both currently and historically, could provide insight into what kind of housing types might be most appropriate to support the vision and be financially viable.

Competition in the area?

Looking into what other facilities exist in the area will provide insight into potential competition that would entice people away from considering this proposed agrarian lifestyle. There are not many larger scale forms of urban agriculture that also provide permanent residence. Specifically, in Manhattan, there are no large spaces that allow residents to participate in urban agriculture and growing other than several community gardens. Small community gardens are a different experience than being immersed in a Community Supported Agriculture (CSA) community. Figure 1 is a map of the current food and agriculture related spaces in Manhattan.

MANHATTAN'S FOOD | CURRENT FOOD NETWORK

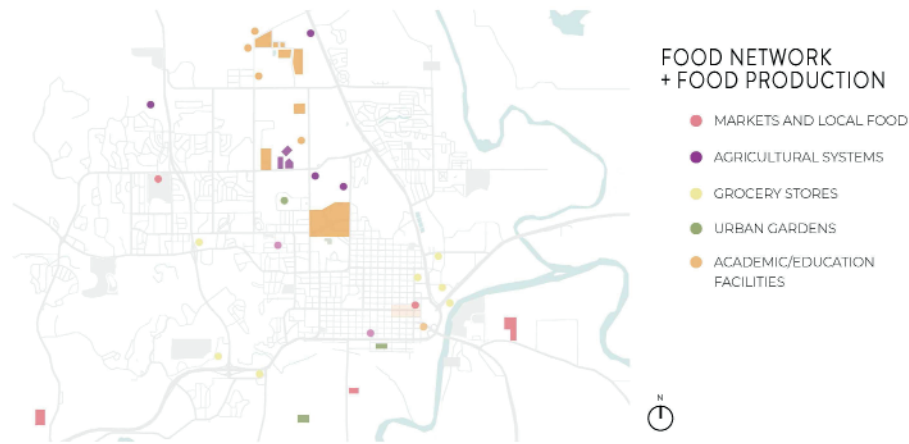


Figure 1.1 Current Food Network in Manhattan (Wulfschle 2020).

Operational requirements?

Both smaller and larger scale urban agriculture requires deliberate, planned, and monitored management and operations to successfully function. Specialized equipment is needed for planting, harvesting and general management, and it needs to be properly stored and maintained. Additionally, this community will need people with some agriculture experience for it to function efficiently. It is therefore crucial to consider having a partnership with a local farmer to help run larger operations. Also, there is a possibility that there could be a resident association to manage the community.

RELEVANCE

This topic is important because we need to bring food production back into the urban environment. Currently, there is a real disconnect between people and what they are consuming (Deelstra and Girardet 2000, Pietrykowski 2004). The average person could not tell you much about the food they are eating, where it came from, how it is

grown, or what goes into producing that product. By 2050 it is estimated that there will be twice as many people living in urban cities, doubling the dependence on large-scale rural food production systems (Steele 2009).

Additionally, this research could potentially be used to create a typology for sustainable agriculture-based communities. The research would explore the potential and interest of a more hybrid lifestyle, where food production is brought back into urban life. There are many locations that are well suited for food production, from vacant lots to river banks (Deelstra and Girardet 2000). The agriculture-based community model people still have the benefits of living in urban areas while also participating in food production and agriculture. These findings could then provide a hybrid residential prototype that is transferable to communities across the United States.

RELATIONSHIPS

PRAIRIEWOOD:

Prairiewood Farms is the proposed site for this study project. The biggest relationship for this research will be with the owners of the Prairiewood site, Kail & Becky Katzenmeier. By continuing to meet and collaborate with Prairiewood, I can work to have the projective design align with their overall goals for their complex. Prairiewood's overall mission and goal is conservation. Specifically, they have nearly 500 acres of native tallgrass prairie ecology that they are focused on preserving. They strive to provide access to this environment to the surrounding community, making it an asset for all to use and learn about.

LOCAL FARMERS:

Another relationship that will be important is local farmers. The operations of this community would require participation from a farmer with experience and interest in being a part of an agriculture community.

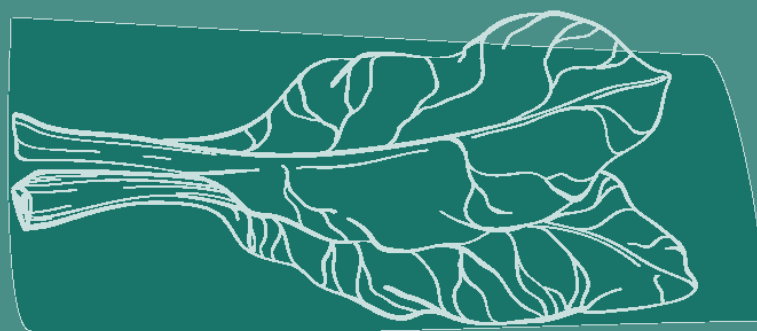
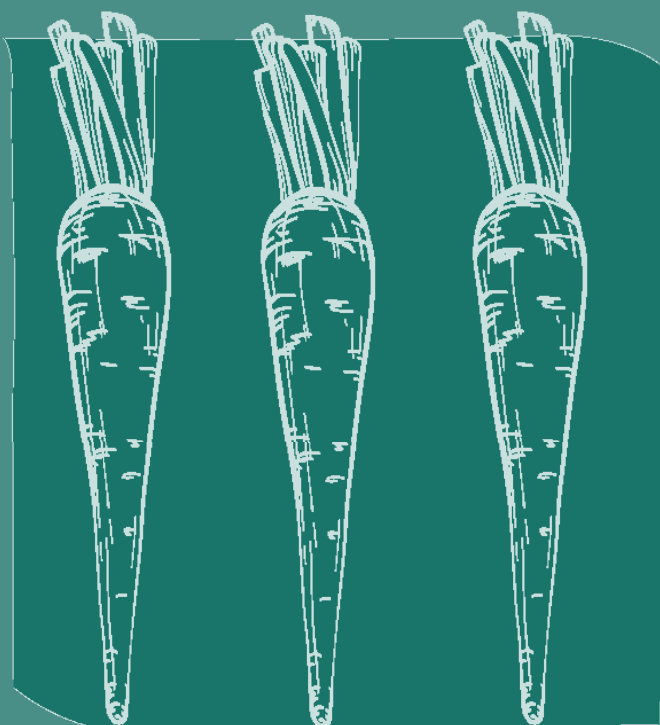
KEY CONSIDERATIONS

- *One key consideration of this project will be interest in the lifestyle. Not everyone has a desire to grow or produce food. There must be some interest in living in this type of community and growing the food you consume. Additionally, there is a social component to this niche lifestyle that must appeal to residents. Outreach and education will be a key factor of this community in sharing their lifestyle and knowledge with the surrounding community and town. While living in the agriculture community is a quieter lifestyle, it is not the same as living out in country.*
- *Another key consideration will be the scale of the projective design. It is important to find the right balance between large agriculture operations and smaller urban agriculture practices. While a mixture of a variety of agriculture scales will probably be applied, attention needs to be paid towards scale to make sure residents do not feel overwhelmed by the operations, but the landscape is still productive.*

OTHER USES

There is potential for the projective design to be used or adapted by the Prairiewood owners. The site is currently being used as rented out farmland so the site context is applicable to the new proposal. Additionally, the current goals of the Prairiewood organization align with the idea of using the space in a more educational and interactive way. Given these potential collaborations there is an opportunity to present the final design proposal to the Prairiewood owners for consideration and even possible variant implementation.

|2| BACKGROUND



| 2 | BACKGROUND

THE PROBLEM | DISCONNECT FROM FOOD PRODUCTION

The problem that this topic addresses is the spatial separation of where people live and where food is grown, which contributes to people's lack of understanding of where their food comes from. Cities were built around spatially disassociated food production. It was the ability of civilizations to create a consistent, but more distant food supply that allowed for the formation of permanent cities (Steele 2009). As cities continued to grow, knowledge or direct exposure to food production waned since it is 'out of sight, and out of mind'. About 100 years ago, 50% of the American population lived in rural communities or on farms. By contrast today, 80% of the population now live in urban areas and more food is shipped in than ever before (Brown and Carter 2003). While the residents of urban environments consume large quantities of food, they are no longer responsible for producing it. "Cities require vast areas of land for their sustenance and have come to depend on large amounts of food being brought in from outside the land area they actually occupy" (Deelstra and Girardet 2000, 44). This separation of food production and consumption has made people under-appreciate the resources, effort, and cost involved with food production, or even take its convenience and availability for granted.

HISTORY OF FOOD SYSTEMS AND CITY DEVELOPMENT

History

In the past cities had a much closer connection to food and farming. Agriculture and urban settlement were born together 12,000 years ago in the Fertile Crescent, but since then there has been a separation of the two (Steel 2009 and Sumner 2010). Historically, settlements could not survive without agriculture to sustain them. From the Fertile

Crescent to early 17th-century London, the production and transportation of food within the city directly related to the physical formation of cities (Steel 2009). City streets and squares used to be the hub of food production, produce was grown in gardens and live animals were sold within the city square. Urbanites could clearly see where their food was coming from and see what they were consuming from beginning to end (Steel 2009). Around 1840, the food system was changed in that food, especially meat, was being brought into cities, already processed, by rail, moving food from being the social center of cities to something that you could go drive and get quickly at any box store (Steel 2009). Furthermore, since World War II the new perception among urban residents is that food is something that you go buy not something that you produce yourself (Deelstra and Girardet 2000).

RESIDENTIAL DEVELOPMENT PATTERNS OVER TIME (THE HAMLET TO SUBURBIA)

Some of the first developments were rural settlements and agriculture communities; farms, hamlets, or villages. The terminology for farms, villages and hamlets have historically been used similarly, making it hard to distinguish between these settlements. The difference lies less in the terminology but more in the size and social structure of the developments themselves (Øye 2000). Hamlets are a type of cluster residential development made up of 5-25 single family homes, typically centered around green space and have open spaces around the development. Within the hamlet there is a very tight social structure and there are not normally any commercial businesses, with most residents working outside the community (Jentzch 2017 and Sutro 1990). Villages are larger denser settlements that contain around 100-300 housing units and tend to have more amenities (Sutro 1990). Both villages and hamlets

have a focus on the lands surrounding the development being agricultural lands and open spaces (Sutro 1990). Initially villages and towns occurred and developed more organically in small clustered lots, organized around central common green space. This clustered organization meant the community could share amenities and infrastructure, which in turn preserved large areas of land around for agriculture and open space (Kearny 2006). With the rise of the automobile era came the development idea of suburbia. Suburban development spread out housing density without much shared space (Kearny 2006). In the United States, suburban development has become the standard; however, with it has come sprawl, reliance on cars and loss of natural spaces (Kearny 2006).

CURRENT RELATIONSHIP WITH FOOD

Many people take for granted that food will always just be there. When people eat at a restaurant or go shopping at the grocery store, the expectation is that food will automatically be there and available (Steel 2009). For urbanites of today it is not about producing their own food, but how commercial producers can quickly and easily transport the food to them (Deelstra and Girardet 2000). Producers are now transporting food 25% further than they did in the 1980s with most food traveling 1,500 to 2,500 miles to get to its final destination (Brown and Carter 2003). In the United States, food is undervalued, as around half of the food produced is thrown out (Steel 2009). Additionally, urban residents are not only physically distanced from food, but people no longer know how food is produced (Pietrykowski 2004). Urbanites have become consumers that have no contact whatsoever with the production or producers of food and therefore have lost touch with their food system (Karaca 2019). The majority of urban residents do not have an understanding of the basic biological systems of food production such as how plants are grown, produce seasonality, what grows regionally, or even where food is coming from (De la Salle and Holland 2010, and Pietrykowski 2004).

IMPACTS ON HEALTH

A lack of understanding about food production not only creates a disconnect between people and food, but has negative health impacts as well. Consumers' lack of knowledge and understanding about food influences their consumption habits and food choices (Jackson 2015 and Lautenschlager & Smith 2007). Most urbanites are multiple generations removed from food production:

"...too often children today (rural and urban alike) are at least 1 generation removed from how food is grown. If children make any reference to farming or gardening, it is usually attributed to their grandparents, not their parents. This means that it is not just our children who are disconnected from their food; most adults are as well. In addition to having lost the skills to grow our own food, we also lack food preparation skills, which leads to an over-reliance on processed and ready-to eat foods" (Jackson 2015).

This lack of food knowledge results in a lack of understanding about food nutrition. Many urbanites, especially children, do not understand why they should be eating healthy fresh food because they do not understand the nutritional benefits of food (Jackson 2015, and Lautenschlager & Smith 2007). Without understanding the value of fresh foods, they turn to processed and ready-to-eat foods which tend to be the most accessible and are often heavily marketed (Jackson 2015, Karaca 2019, and Lautenschlager & Smith 2007). These industry processed foods greatly increase users' consumption of fats, sugars, and salts (Jackson 2015 and Karaca 2019).

People need to start once again thinking about their food systems. It is important to understand food, its production, be able to identify it and know how it got to the consumer. This knowledge will result in a network of people who are once again interested in food (Steel 2009). Urban agriculture landscapes can reintroduce people to food and spark an interest with reconnecting to the process of food production (Karaca 2019 and Sumner 2010). Participants in urban agriculture expressed not only a greater appreciation for their food, but also an increased interest in learning about food production (Byker et al. 2010 and Sumner

2010). Children are especially disconnected from the food system. However, children are also more willing to learn about food production (Jackson 2015). When they are a part of growing food, they not only appreciate food more but understand the process better (DiClaudio et al. 2013, Jackson 2015, and Lautenschlager and Smith 2007). Youth that participated in urban agriculture gardening programs had a better knowledge of food systems, plant seasonality, nutritional values and core biological concepts. (Lautenschlager and Smith 2007). While not all urban residents are going to want to grow their own food, the presence of urban agriculture encourages a deeper appreciation of the overall food production process and brings consumers and producers closer together. (Deelstra and Girardet 2000, Lautenschlager and Smith 2007).

RESPONSE | WAYS TO CONNECT

For non-rural people who desire to know more about food production, or desire to be more actively involved in growing food, several options exist as described below. Level of commitment can range from occasional visitation to food growing sites, being a gardener at various scales, to re-orienting residential living arrangements, investments, and lifestyle which incorporate various aspects of agricultural production.

URBAN AGRICULTURE

What is Urban Agriculture

Urban agriculture can be simply defined as the production of food in cities. However, there is much more to urban agriculture than just food production. Urban agriculture encompasses “the production of food and non-food plants, as well as animal husbandry, in urban and peri-urban spaces” (Santo et al. 2016, 1). These food and products are produced for various purposes such as the personal grower’s consumption, education opportunities, for donation, and/or to sell (Hodgson, et al. 2011). Still urban agriculture is more

than what is just produced. Urban agriculture also includes the supporting systems around it. The distribution of the products, as well as the organizations and programs that allow for urban production are just as crucial in the urban agriculture process (Hodgson et al. 2011 and Golden 2013).

History

Historically agriculture has been embedded into the urban fabric of American cities, even in the industrialized cities of the 19th century, where food continued to be present (Hodgson et al. 2011). However, urban planning worked to push agriculture out of the cities which eventually created a disconnect between food production and urban residents. Yet, people still turn to urban agriculture, despite being pushed out of the ideal vision of the urban context. Throughout history urban agriculture has always come back into cities in times of need. Public markets and grocery shopping pushed out the need for farming. Over time it has come back to deal with the hardships of depression, war, and poverty (Hodgson et al. 2011). Examples of urban agriculture are the victory gardens during World War II and Detroit’s garden program following the depression of 1893 (Hodgson et al. 2011). Historically, in times of need people look towards urban agriculture, almost as if they are looking back to their roots and the way cities used to be. Conversely, during periods of economic success and urban growth people turn away from farming and urban agriculture.

Benefit of Urban Agriculture and Food Production

The modern urban resident has lost the need to grow food and in turn now takes food for granted. Urban life has gotten busier and people have grown impatient, resulting in people turning to the quickest and easiest way to get food (Colassanti et al. 2013). Despite this disconnect, people can learn to appreciate food more through urban agriculture. Many people who participate in growing their own produce value food more and gain an understanding of the food growing process (Porter 2018 and Wise 2014). Through the act of growing and harvesting, participants develop

increased agricultural literacy and better comprehension of food (Golden 2013, Phillips 2013, Santo et. al. 2016). People must be a part of the process, so they can begin to appreciate what goes into food production (Santo et al. 2016). Urban agriculture turns the urban resident from a consumer into a producer. This new relationship to food gives people a newfound respect and appreciation for what they have grown (Phillips 2013 and Porter 2018).

VISITATION TO AGRICULTURE DEMONSTRATION SITES

Education is one of the potential ways that people can learn more about food systems. This can be done by independently visiting or being part of an educational group that tours demonstration or commercial food gardens, orchards, or agricultural fields (Hodgson, Campbell, and Bailkey 2011). These educational sites provide opportunities for people to learn about horticulture, agricultural practices, and plant growth processes. “A garden can provide an opportunity for students to participate in hands-on learning that teaches not only the intended subject but also responsibility, teamwork, and respect for nature, others, and themselves” (DiClaudio, Hughes, and Savoca 2013). Gardening and participating in skill-oriented activity inspires curiosity in children and makes them want to explore (DiClaudio, Hughes, and Savoca 2013).

SPECIALIZED COMMUNITY EVENTS

Another method for getting people more involved in food systems is by participating in local community events, such as farmers markets, food festivals, and seasonal celebrations (Sumberg 2009). These specialized events celebrate food, by making food systems and the people involved more highly visible to the public through food-related programs and activities (De la Salle and Holland 2010). “It is important to plan events throughout the year in a community to explicitly celebrate moments in the agricultural year and remind us of what is fresh and local” (De la Salle and Holland 2010).

FOOD GARDENS (INDIVIDUAL/COMMUNITY)

One of the most popular forms of urban agriculture practiced by urbanites is food gardens where residents grow food on their own property or in neighborhood (Santo, Kim, and Palmer 2016 and Wise 2014). A study done in Australia showed that 74% of people that grew food chose to do so in a small garden in their front or backyard. The other 12% grew in verge gardens, the strip of property between the road and property, and the other 13% grew food on balconies or in containers (Wise 2014). While the scale of individual gardens is generally small, collective forms of urbanized agriculture increase production scale and efficiency. One popular form of urban agriculture at a larger scale is the community garden. Community gardens can be located on public or private land. Community gardens are collectively maintained by the surrounding community and have a strong connection to social benefits within a neighborhood, providing community engagement and pride (Hodgson, Campbell, and Bailkey 2011).

COOPERATIVE LIVING/AGRICULTURE HYBRID DEVELOPMENT

A more hybrid solution for bringing people back to food production is an agricultural/residential cooperative. This type of urban agriculture could be a mixture of urban farms, peri-urban farms, or hybrid urban agricultural forms (Hodgson, Campbell, and Bailkey 2011). With a growing U.S. population there is a need for clustered housing and development layouts that provide housing but also preserve land for collective uses through zoning practices that still ensure land use compatibility (McMahon 2010). This type of development is known as conservation development, which is “the process of planning, designing, building, and managing communities that preserve landscapes or other community resources that are considered valuable for their aesthetic, environmental, cultural, agricultural, and/or historic values” (McMahon 2010, 7). An example of this type of community is Prairie Crossing in Illinois where residents live in a community that is also working farmland (McMahon

2010). Residential agriculture communities are a form of this conservation development that could be utilized to not only bring people back to being producers but conserve land around or within cities. Agriculture-focused cooperative living will be explored more deeply later in this research.

RESIDENT FARMERS

One of the best ways to understand and appreciate the food system and food production is to be the producer. Farmers have hands-on personal experience with the entire growing and harvesting process from beginning to end. “Growing food where one wants to eat it, or consuming food where it has just grown, establishes a healthy and sustainable balance of production and consumption” (Karaca 2019).

AGRICULTURE-FOCUSED COOPERATIVE LIVING

Of the various forms of urban agriculture previously presented, this project and report focuses on the Cooperative Living/Agriculture Hybrid Residential model. There are many precedent examples of this model and it offers many benefits, but it is not a widely accepted peri-urban development type in the United States due to several factors subsequently discussed. This project will attempt to address some of these factors and hopefully contribute to increased popularity of this urban agricultural form.

WHERE DO THESE DEVELOPMENTS FREQUENTLY OCCUR?

Precedent agriculture-focused developments are commonly located on lands that were previously existing farms and agriculture lands (Franko et al. 2007, Kane 2003, Lickwar and Thoren 2020, and McMahon 2010). These lands frequently have both high agricultural and development value, and in many cases are threatened by urban sprawl

(Franko et al. 2007, Lickwar and Thoren 2020, and McMahon 2010). For example, in the case of the well-known development, Prairie Crossing in Illinois, the site in the 1980s was intended for some controversial high-density suburban development. This project was litigated and the final outcome was a hybrid community that conserves the landscape (Kane 2003 and Martin 1995). Agriculture-focused communities are often on land that would otherwise be threatened by typical suburban development, meeting the needs for residential development while conserving rural land values (Franko et al. 2007, Kane 2003, Lickwar and Thoren 2020, Martin 1995, and McMahon 2010).

WHO LIVES IN THESE DEVELOPMENTS?

Current Trends Towards Food Production and Agrarian Life

While food production has largely been removed from cities and people have become distanced from what they eat, people have a desire to become closer to local food (Jackson 2015). Nationally there has been a significant increase in the amount of local food that is being purchased, and consumers are interested in getting their food locally instead of having it shipped in (Jackson 2015). This renewed interest in food has sparked several trending movements that aim to bring people back to food, such as, the local food movement and the Slow Food Movement (De la Salle and Holland 2010, Dumitru 2016, Jackson 2015, Pietrykowski 2004, and Sumberg 2009). The Slow Food Movement was a cause that started in Italy and seeks to bring people back to fresh local products (De la Salle and Holland 2010, Dumitru 2016, Pietrykowski 2004, and Sumberg, 2009). Slow Food works to reintroduce consumers and producers together and put food at the center of communities, so it is no longer seen as just a commodity (Dumitru 2016, Sumberg 2009). The Slow Food Movement encourages people to slow down and reconnect with local food versus the fast food and processed grocery store products that have taken over our food systems (De la Salle and Holland 2010).

Type of People that Live in Agriculture-focused Development

Agriculture-focused communities offer a particular lifestyle for their residents that is different than the typical residential community aesthetic. There is a certain type of resident that lives within these developments and choose this lifestyle.

Residents of agriculture-focused communities have an interest and desire to be in closer proximity to food growing land and open spaces. Often these people want to live in areas with more open space and they are willing to pay for this lifestyle choice (Kane 2003 and McMahon 2010). This type of resident can be referred to as a green consumer, people who are conservation and suitability oriented and want to live this way (Kane 2003 and McMahon 2010). “Green consumers may look for communities in which they are less dependent on their automobiles or that grow their own food” (McMahon 2010, 58). Along with typical community residents, farmers and farmhands are often also located within these agriculture communities. Agriculture production takes a certain commitment and skill-set that requires a full-time farmer to be involved in the community (Norris 2018).

DEVELOPMENT FUNCTION (HOW THE DEVELOPMENT WORKS)

The goal of agriculture-focused development is to conserve open space and agriculture lands while also providing residential development. Within this development type, a majority of the land should be open space and farm land with a minimal amount being devoted to residential development (Kane 2003, Martin 1995, McMahon, and Norris 2018). This is accomplished by having denser clustered housing in a particular portion of the development, which creates the density needed to sustain the community but allows for minimal intrusion on the land (Kane 2003, Martin 1995, McMahon 2010, and Norris 2018). These communities are also centered around a working farm operation. Residents do not directly manage this farm; it is operated by a resident farmer and potentially additional farmhands (Norris 2018).

This not only helps with the productivity and efficiency of the farming operation, but employs someone who is interested in agriculture production as their fulltime operation (Norris 2018). The Urban Land Institute has defined some examples of typical functions/features in agriculture-focused developments as:

- *Conservation area*
- *Protected farmland*
- *Food-production space*
- *Farm service corridor*
- *Event space*
- *Clustered homes*
- *Farm stand and market area*
- *Grid pattern and connections to streets outside of development*
- *Active transportation features*
- *Trails*
- *Edible landscaping*
- *Clubhouse or community center*
- *Shops and restaurants*
- *Proximity to schools and other important community features”*

(Norris 2018).

BENEFITS OFFERED

As mentioned previously, certain people choose to stay within agriculture-focused living because they are drawn to the ideals of these communities. In addition to not only the concept of greener communities these types of development offer certain benefits that residents can specifically access. There are a variety of benefits for residents within agriculture-based communities such as:

- *Access to open space and nature*
- *Unique lifestyle*
- *Community experience*

- *Social opportunities*
- *Access to fresh and local food*
- *Opportunity to interact with food production and grow their own food*
- *Educational experiences*
- *Seasonal community events*

(Kane 2003, Martin 1995, McMahon 2010, and Norris 2018).

Additionally, all of these potential benefits have been directly tied to improved physical and mental health as well (Norris 2018). By living within agriculture-based cooperatives, residents are not only more directly connected to food production but also, they are surrounded by a social network that also values this same type of lifestyle (McMahon 2010 and Norris 2018).

COMMON ISSUES ENCOUNTERED

Zoning

Zoning can provide restrictions or opportunities within an area for agriculture-focused communities. “Local zoning laws may limit nonagricultural uses or emphasize planned unit development that preserves open space, floodplains, or other natural areas” (McMahon 2010). The zoning regulations are what determines various specific uses for an area (McMahon 2010). Some typical types of zoning that are used within conservation development are:

- *Planned Unit Development (PUD)*
- *Open-Space or Cluster Zoning*
- *Conservation Zoning*

(McMahon 2010).

Sometimes agricultural zoning is used in protecting farmlands, however this type of zoning limits certain density and can restrict land uses (McMahon 2010).

Working Lifestyle/Residents Involvement

Although agriculture-focused developments are centered around working farms, this does not mean that residents are expected to run productive farmlands. The farms within these developments are typically run by a fulltime farmer and staff and residents just have access to the production (Kane 2003, Martin 1995, and Norris 2018). For example, for the well-known community of Prairie Crossing, residents have the opportunity to purchase a subscription to the farm which means they receive weekly produce, or they can purchase products from the farm’s market. Additionally, the residents have the choice to rent community garden plots to grow their own food (Kane 2003 and Martin 1995). While these developments are based around agriculture, that is not the only focus of this lifestyle. Within agriculture-focused neighborhoods there is also a social component, sharing their lifestyle and the food production is important to educate the surrounding community. Residents can take charge of this outreach and social opportunities within the community by participating in organizing events and volunteering for activities around the neighborhood (Norris 2018).

Peri-urban Land and City Development

One of the popular locations for agriculture-focused developments is on peri-urban land outside city. Peri-urban land is the, “peripheral areas where urban or suburban meets rural” (Hodgson et al. 2011, 4). This land is also referred to as the urban fringe because it is located right on the edge of urban development (Johnston and Bryant 1987). Peri-urban land is often used for agriculture production and is the transition into rural spaces. However, this land is often threatened by development and urban sprawl as cities grow (Johnston and Bryant 1987). Agriculture-focused communities with clustered housing provides development within these areas while also preserving more land (Kearny 2006 and Norris 2018).

Developing this peri-urban zone in a way that conserves the agricultural attributes, such as agriculture-based conservation development, can provide the adjoined urban areas with access to local produce while maintaining the rural agriculture lands (Johnston and Bryant 1987 and McMahon 2010).

Economic Risk (Financing, Appraising, Insuring, etc.)

Many developers might fear creating an agriculture-based development compared to the typical residential neighborhoods because of the potential economic risks that come with creating something different than the standard. However, due to the rising market for conservation development there are several precedents that show the possibilities and potential economic benefits for developers who take this risk (Martin 1995, McMahon 2010, Norris 2018, and Urban Land Institute 2016). Case studies of residential developments that include food production in the development have shown that the farms can not only provide access to fresh produce for residents but their project marketability is enhanced (McMahon 2010, Norris 2018, and Urban Land Institute 2016). “Agrihoods can support an attractive return on investment. Many studies find as much as a 15 to 30 percent increase in the value of properties adjacent to parks and open space, which can include working farms” (Norris 2018, 3).

Most financiers might be hesitant to finance these developments because they are not typical, however, now that there are more precedents of these communities there are examples of how they can be successful (McMahon 2010). Food centered amenities and functions are seen as highly desirable by consumers as the market for healthier local food continues to grow (McMahon 2010, Norris 2018, and Urban Land Institute 2016). Additionally, the clustered housing development within these communities requires less infrastructure than a typical development which means less cost for developers as well as less infrastructure for cities to maintain. Overall,

clustered housing can greatly reduce development costs (McMahon 2010 and Urban Land Institute 2016). Smaller scale farms are beginning to make a comeback and this is where agriculture-focused developments can fit into this local food movement.

Ownership

When a neighborhood is integrated with a working farm, the ownership structure varies more compared to a typical development. Homeowners have title to their own house and property; however with farmlands and open spaces, the ownership is shared or alternatively structured for these amenities (Kane 2003, McMahon 2010, Norris 2018, and Urban Land Institute 2016). Based on the benefits provided to the community, farms are often set up as a non-profit entity which can be eligible for funding through grants, cooperate sponsorships, donations, and other types of funding (Norris 2018). However, there are different ways to structure this ownership throughout the stage of the project such as:

- “Developer owned and operated;
- Land trust ownership with nonprofit or for-profit farm management entity;
- Land trust ownership with lease or management agreement with farmer or farmers;
- Homeowners’ association–owned and operated by nonprofit or for-profit farm management entity;
- Public ownership and operated by nonprofit or for-profit farm management entity;
- Publicly owned and operated;
- Farmer-owned with operating agreement and ability to sell or transfer ownership or lease;
- Nonprofit owned or leased with operating agreement and ability to sell or transfer ownership or lease”

(Norris 2018, 15).

Formation of Cooperative Living Development

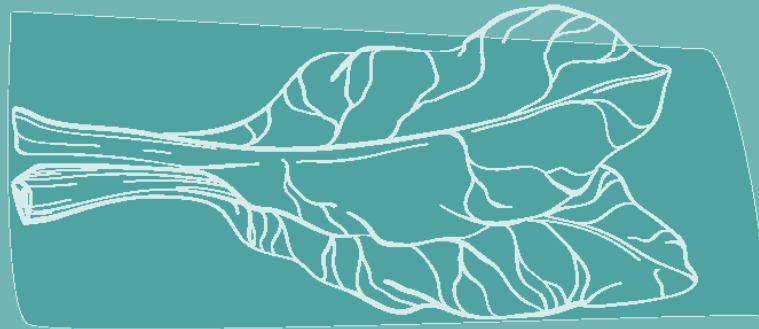
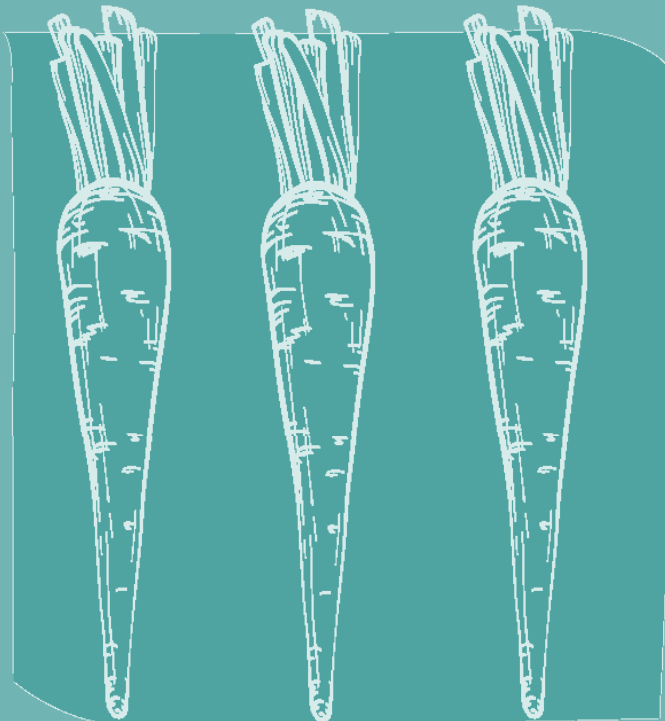
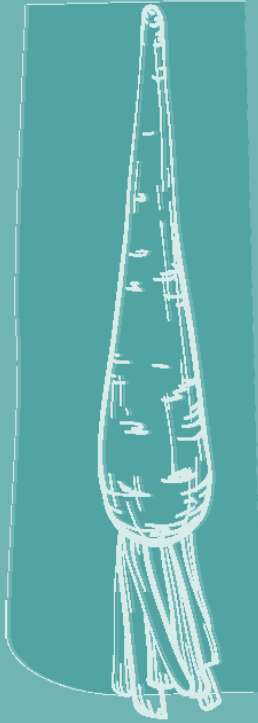
One of the first steps in creating a development focused around conserving natural and farm lands is identifying valuable or sensitive areas which will be unbuildable (McMahon 2010). Otherwise, the planning of agriculture-focused communities doesn't differ too much from a typical development. However, these developments have a special advantage of being a unique lifestyle experience (Norris 2018).

“To build agrihoods, developers are forming innovative partnerships with landowners, farmers, nonprofit organizations, schools, public sector agencies, and other stakeholders, with positive implications for people and communities, as well as the bottom line for the development. In many ways, planning, developing, and operating agrihoods is similar to planning, developing, and operating projects that are not built around food-production spaces. Agrihoods generally include a mix of homes, resident-focused amenities, and commercial spaces. Agrihoods are also underwritten by traditional lenders and rely on debt and equity financing—just like other projects” (Norris 2018, 8).

CONCLUSION

Modern cities have distanced themselves from food, and as a result, urban residents have lost touch with the food production that shaped urban environments (Steele 2009). Incorporating urban agriculture into cities brings food back into the urban realm and reintroduces urbanites back to their food source (Porter, 2018). Participation in urban agriculture and food production connects people back to their food systems, provides knowledge of how food is produced and gives an overall greater appreciation for food (Byker et. al. 2010, Sumner 2010, DiClaudio et. al. 2013, Jackson 2015, and Lautenschlager & Smith 2007). Agriculture-focused development is a form of residential development that is centered around working farms and food production (Kane 2003, Martin 1995, McMahon 2010, Norris 2018, and Urban Land Institute 2016). Creating residential forms of agriculture-focused communities could result in productive residential landscapes that provide communities with access to fresh and local food (Kane 2003, Martin 1995, McMahon 2010, Norris 2018, and Urban Land Institute 2016). “We live in a world shaped by food, and if we realize that, we can use food as a really powerful tool, a conceptual tool, design tool, to shape the world differently” (Steel, 2009). Agriculture-focused communities have the potential to be a powerful tool that brings food production closer to cities, reconnecting people back to their food.

| 3 | METHODOLOGY



3 | METHODOLOGY

The methodology used to answer the research question will include: Precedent Studies, Case Studies, and Interviews. The findings from the previously mentioned methods will be used to inform a projective design of a site in Manhattan, Kansas.

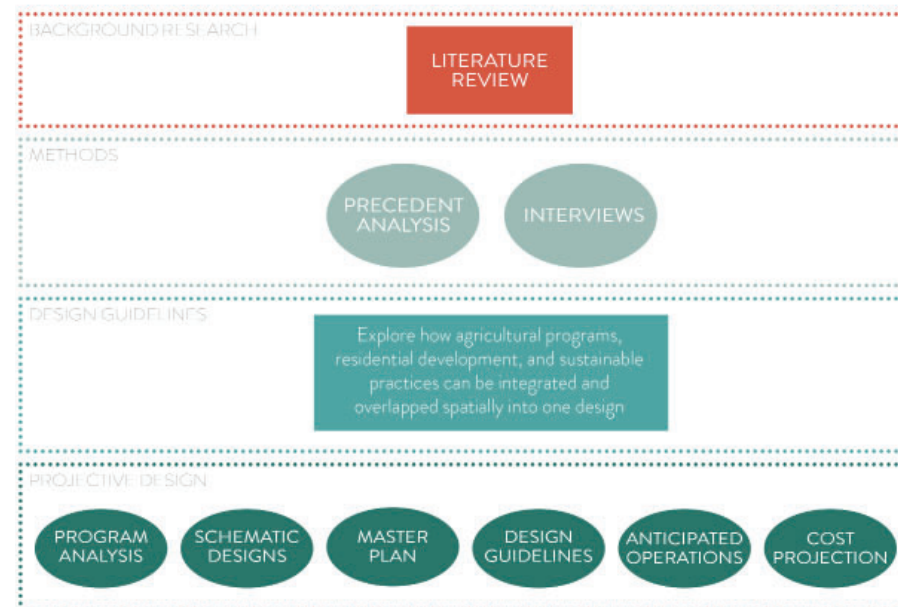
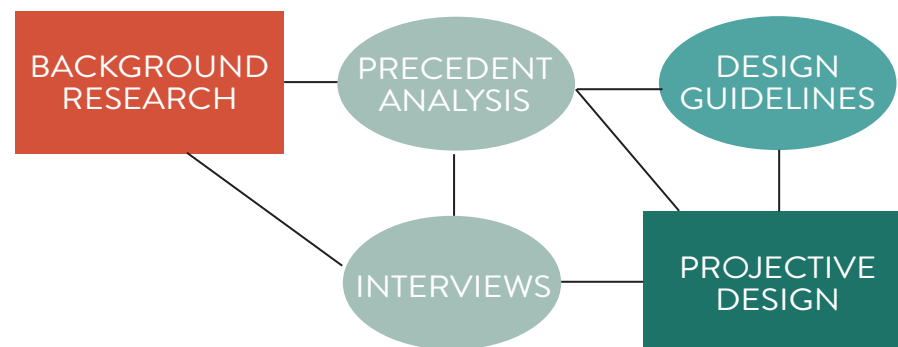


Figure 3.1 Methodology Process (by author).

PRECEDENT ANALYSIS

Based on background research and literature readings, select precedent studies were chosen for further analysis. The various precedents are paradigms or exemplars in the field and were chosen to highlight a variety of practices. First a brief analysis of the precedent example will be conducted. Following the initial analysis, the precedents will be synthesized into comparative matrices. The first comparative matrix has been broken down into three categories: 1) Productive Landscapes/Agricultural Components, 2) Preservation/Conservation Practices, and 3) Outreach/Community Education. The second matrix will compare the components of the precedents. The goal of these studies is to understand and assess how agriculture communities are currently functioning.

LIST OF PRECEDENTS

1. *Prairie Crossing*
(Grayslake, Illinois)
2. *Serenbe*
(Fulton County, Georgia)
3. *South Village*
(South Burlington, Vermont)
4. *Chickahominy Falls*
(Hanover County, Virginia)
5. *Harvest*
(Argyle, Texas)
6. *Village Farm*
(Austin, Texas)
7. *Tryon Farms*
(Michigan City, Indiana)

The typical precedent analysis layout will cover the following information:

(Precedent)

- *Background*
 1. *Location*
 2. *Location in Relation to City*
 3. *Size*
 4. *Food Production*
- *Residential information*
 5. *Number of Units*
 6. *Housing Type(s)*
 7. *Average Price*
 8. *Housing Arrangement*
 9. *Zoning*
 10. *Average Home Sq. Footage*
- *Potential Applications*
- *Selection Rationale*

INTERVIEWS

Interviews were conducted through email and phone interview with experts. The interview list includes a local realtor and a local developer. The goal of the interviews is to gain insight into the different components that go into residential agriculture design, from the movement as a whole to market interest. A IRB application was submitted and approved for these interviews.

First, I interviewed a local Realtor from Manhattan with an emphasis in rural properties to learn more about the market interest of residents in Manhattan. The next interview was with a local developer from Manhattan to learn more of the business details that go into an agriculture-based development.

PROJECTIVE DESIGN

The information gathered from precedents, case studies and the interviews were used to inform a projective design of a residential agriculture community. This projective design explored how agricultural programs, residential development, and sustainable practices can be integrated and overlapped spatially into one design. For this research a site located in Manhattan, Kansas was identified for a projective design. The chosen site is a 92.18-acre parceled owned by the local Manhattan group, Prairiewood Holdings.

The first step in the projective design process constituted a site analysis of the Prairiewood site. This site analysis informed and guided the next steps of the design process which included:

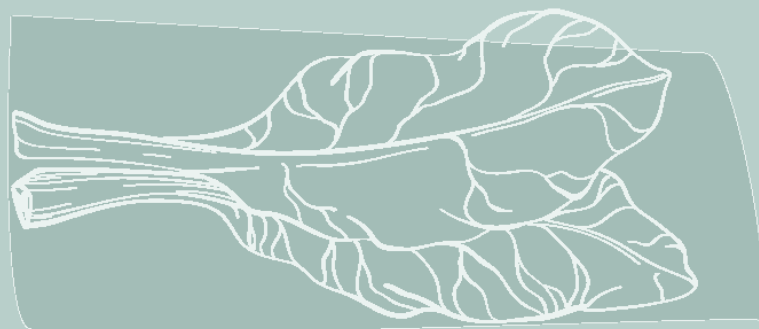
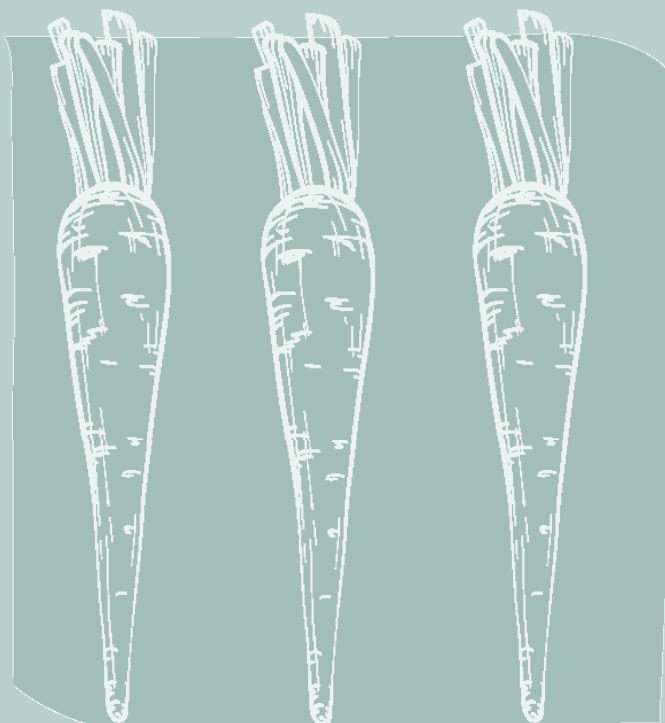
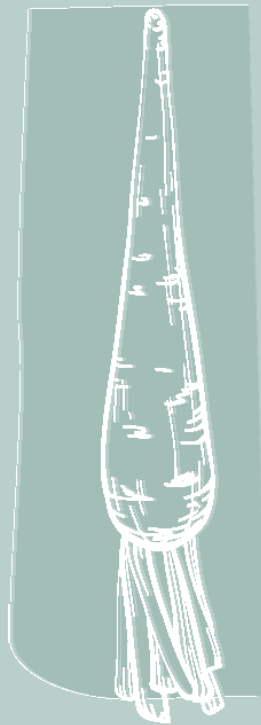
- *Site Visits*
- *Design Process*
 1. *Site Analysis*
 2. *Schematic Designs*
 3. *Master Plan*
 4. *Design Expression/Guidelines*

The following will be explored more:

Building massing/clustering
Architectural style
Fencing
Utility/service areas
Community gardens
Agriculture Fields
Hamlet amenities
Visual vocabulary

- *Establish Anticipated Operations for Community*
- *Develop Cost/Financial Projections*

|4| PRECEDENTS



| 4 | PRECEDENT ANALYSIS

In this chapter chosen precedents are examined to further understand characteristics of a variety of successful agriculture developments. Precedents and their attributes were outlined and projects spatially analyzed for common programming elements of residential, farming, education/ outreach, and open spaces.

The various projects are paradigms or exemplars in the field and were chosen to highlight a variety of practices. The precedents were analyzed by compiling comparative matrices. The goal of the analysis is to understand and assess how agriculture communities are currently functioning.

PRECEDENT LIST:

1. **Chickahominy Falls**
(Hanover County, Virginia)
2. **Harvest**
(Argyle, Texas)
3. **Prairie Crossing**
(Grayslake, Illinois)
4. **Serenbe**
(Fulton County, Georgia)
5. **South Village**
(South Burlington, Vermont)
6. **Tryon Farms**
(Michigan City, Indiana)
7. **Village Farm**
(Austin, Texas)

CRITERIA FOR SELECTING PRECEDENTS:

The criteria for selecting precedents included:

1. **Location:**
Can be located anywhere across the United States to provide a variety of types of agriculture communities
2. **Size:**
Must be anywhere between 5 to 1,500 acres to show a range of production and facilities
3. **Food Production:**
The site must have a working farm/food production within the community
4. **Residential:**
Must have associated residential development

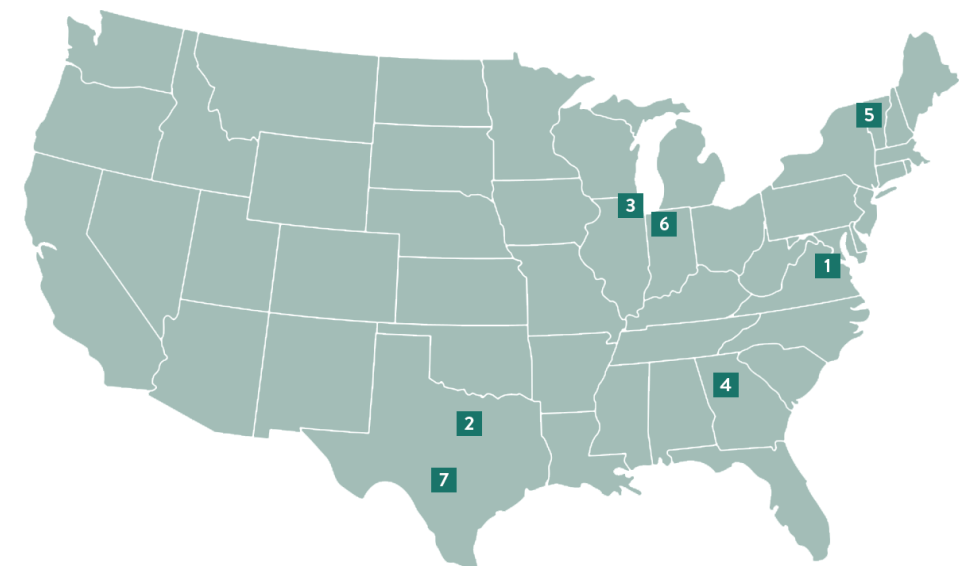


Figure 4.1 Precedent Locations Map (by author).

1. Chickahominy Falls, 2. Harvest, 3. Prairie Crossing, 4. Serenbe, 5. South Village, 6. Tryon Farms, 7. Village Farm

CHICKAHOMINY FALLS

“Hugging the Chickahominy River, Chickahominy Falls is redefining 55+ communities through a commitment to healthy living and special amenities that balance play with purpose” (The Crescent Group 2022).

BACKGROUND:

Location: Hanover County, Virginia

Location in Relation to City: Located about 15 miles north of Richmond along the Chickahominy River and conveniently only 1 mile from Interstate 95.

Size: 180-acres

Food Production: 10-acres professionally managed as four season farm and demonstration kitchen.

RESIDENTIAL INFORMATION:

Number of Units: 391 Units

Housing Type(s): 2-5 Bedroom Carriage Style Homes, Villa Style Homes, Town-homes, Cottage Homes.

Average Price: Range between \$396,900-\$500,000's

Housing Arrangement: Clustered 'Neighborhoods' with different housing types in each.

Zoning: Suburban General
(1.5-3 Dwelling Units Per Acre)

Average Home Sq. Footage: 1,547-3,650

REFLECTION

Potential Applications:

Chickahominy Falls has several 'neighborhoods' that each have a different type of housing style so that every 'neighborhood' has a specific feel and smaller community within the development as a whole.

Selection Rationale:

This community focuses on using their farm, green space and amenities to focus on a healthy living lifestyle and is a good example of creating a specific lifestyle for their community.

53% RESIDENTIAL
7% AGRICULTURE
40% OPEN SPACES

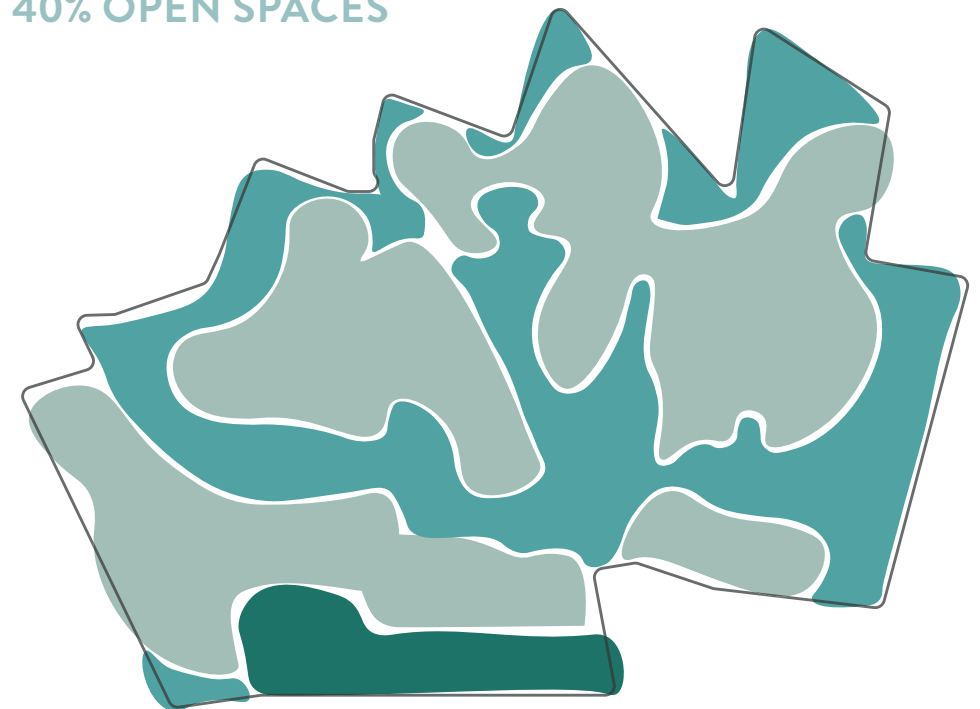


Figure 4.2 Chickahominy Falls Spatial Analysis (by author).

PRECEDENT IMAGERY



Figure 4.4 Chickahominy Falls: Site Aerial (The Crescent Group 2022).



Figure 4.5 Chickahominy Falls: Architectural Character (The Crescent Group 2022).



Figure 4.6 Chickahominy Falls: Farm (The Crescent Group 2022).

REGIONAL CONTEXT



Figure 4.7 Chickahominy Falls: Regional Context (by author).

BUILDING MASSING FIGURE GROUND



Figure 4.8 Chickahominy Falls: Site Massing (by author).

HARVEST

“Harvest is a charming fusion of hometown nostalgia and future-focused planning... with sustainable gardening practices... within the convenient framework of a modern, walkable environment” (Hillwood Development Company 2022)

BACKGROUND:

Location: Argyle, Texas

Location in Relation to City: Located about 30-minutes north from the Dallas-Fort Worth Metropolitan Area and the DFW international airport.

Size: 1,200-acre

Food Production: Several working farm plots managed by a farmer as well as additional private community gardens plots and community demonstration gardens.

RESIDENTIAL INFORMATION:

Number of Units: 3,900 Units

Housing Type(s): 2-6 Bedroom single family homes.

Average Price: Range between \$200,000-\$700,000

Housing Arrangement: Typical Residential Neighborhood Housing Arrangement

Zoning: Extraterritorial Jurisdiction (ETJ)

Average Home Sq. Footage: 1,597-3,899 sq. ft.

REFLECTION

Potential Applications:

Having a small working commercial farm at the heart of the community run by a professional farmer who also helps any interested residents and families.

Selection Rationale:

Harvest is a larger scale community that offers a variety of experience and amenities to residents while continuing to keep farming at the center through a small commercial farm and resident gardens.

70% RESIDENTIAL
2% AGRICULTURE
28% OPEN SPACES



Figure 4.8 Harvest Spatial Analysis (by author).

PRECEDENT IMAGERY



Figure 4.9 Harvest: Farm (TBG 2019).



Figure 4.10 Harvest: Site Aerial (TBG 2019).



Figure 4.11 Harvest: Community Space (TBG 2019).

REGIONAL CONTEXT

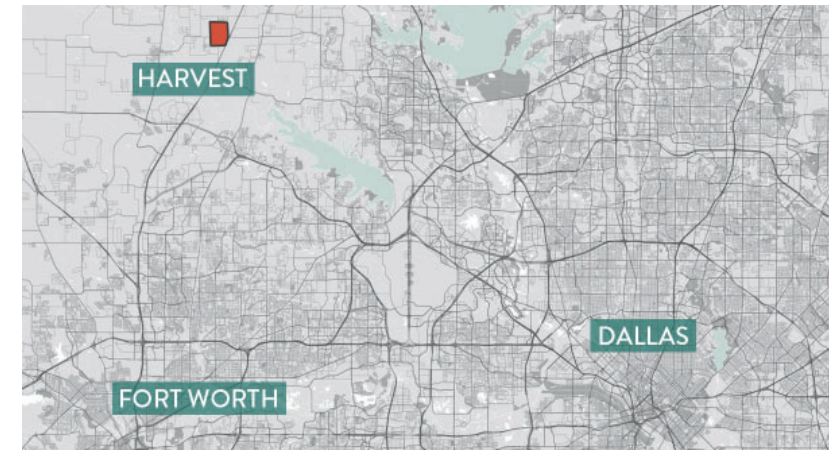


Figure 4.12 Harvest: Regional Context (by author).

BUILDING MASSING FIGURE GROUND



Figure 4.13 Harvest: Site Massing (by author).

PRAIRIE CROSSING

“Prairie Crossing is a widely acclaimed conservation community... It is a national example of how to plan our communities to enhance the environment and support a better way of life” (Prairie Crossing 2022).

BACKGROUND:

Location: Grayslake, Illinois

Location in Relation to City: Located just 40-miles north from downtown Chicago, near a rail stop with easy access into the city.

Size: 678-acre

Food Production: 100-acre working organic farm, edible landscapes and orchard with over 80 trees and bushes.

RESIDENTIAL INFORMATION:

Number of Units: 365 Units

Housing Type(s): Single family homes and condominiums.

Average Price: Range between \$189,00-\$650,000

Housing Arrangement: Clustered housing in New Urbanist-style village neighborhoods.

Zoning: Planned Unit Development (PUD)

Average Home Sq. Footage: 2,000-2,300 sq. ft.

REFLECTION

Potential Applications:

Combines land preservation and residential development in a way that does not interfere with access to the city and urban amenities. Preserves over 70% of the site for open space minimizing the developments impact on the site. Some areas minimize manicured residential lawns with prairie

Selection Rationale:

Built in 2007 Prairie Crossing was one of the first conservation communities in the United States and provides an example of a successful development.



Figure 4.14 Prairie Crossing: Spatial Analysis (by author).

PRECEDENT IMAGERY



Figure 4.15 Prairie Crossing: Pond (Hahn 2009).



Figure 4.16 Prairie Crossing: Community Barn (Hahn 2009).



Figure 4.17 Prairie Crossing: Architectural Character (Hahn 2009).

REGIONAL CONTEXT



Figure 4.18 Prairie Crossing: Regional Context (by author).

BUILDING MASSING FIGURE GROUND



Figure 4.19 Prairie Crossing: Site Massing (by author).

SERENBE

“Serenbe is an award winning biophilic community that connects people to nature and each other. Each of Serenbe’s hamlets have complementary commercial centers focused on the elements of a well-lived life” (Serenbe 2022).

BACKGROUND:

Location: Fulton County, Georgia

Location in Relation to City: Located 40-minutes southwest outside downtown Atlanta, surrounded by forests and agricultural lands.

Size: 1,000-acre

Food Production: 25-acre organic farm, farmer’s market, a CSA program, three farm to table restaurants and edible landscaping throughout the community.

RESIDENTIAL INFORMATION:

Number of Units: 200 Units

Housing Type(s): 1-4 Bedroom single family, multifamily, and live/work units; townhouses, cottages, estate homes, and condos, along with rentals.

Average Price: Homes range from \$529,900-\$999,900 and Rentals range from \$2,200-\$3,600.

Housing Arrangement: Clustered hamlet communities focused on certain types of living experiences.

Zoning: Mixed Use Hamlet

Average Home Sq. Footage: 900-4,000 sq. ft.

REFLECTION

Potential Applications:

Adding zoning overlays to help allow for both residential and agriculture development in the area. Additionally, having an on site restaurant that featuring farm-to-table food that shares the development’s lifestyle with the community.

Selection Rationale:

Serenbe is a larger scale development that uses historic hamlet/village style housing arrangements to create a diverse community that highlights nature and agriculture, creating a rural living experience without giving up amenities.

10% RESIDENTIAL
4% AGRICULTURE
70% OPEN SPACES

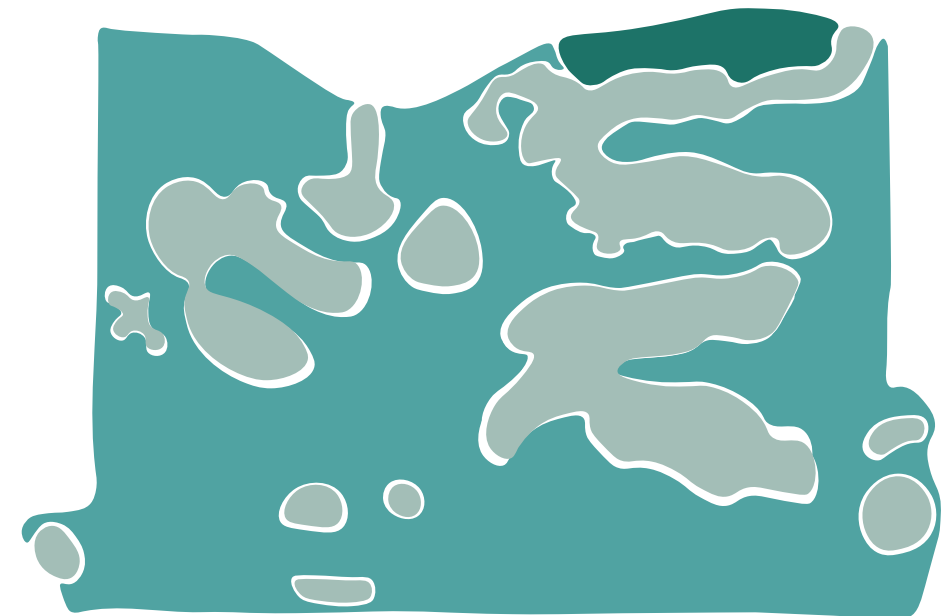


Figure 4.20 Serenbe: Spatial Analysis (by author).

PRECEDENT IMAGERY



Figure 4.21 Serenbe: The Inn (P 2009).



Figure 4.22 Serenbe: Architectural Character (P 2009).



Figure 4.23 Serenbe: Farm (P 2009).

REGIONAL CONTEXT



Figure 4.24 Serenbe: Regional Context (by author).

BUILDING MASSING FIGURE GROUND



Figure 4.25 Serenbe: Site Massing (by author).

SOUTH VILLAGE

“South Village was designed from the ground up to bring together two of Vermont’s most cherished traditions: open space and village living” (South Village 2020).

BACKGROUND:

Location: South Burlington, Vermont

Location in Relation to City: Located 5-miles south of Burlington and Burlington International Airport and 1.5-miles west of Shelburne Bay beach.

Size: Approx. 240-acres

Food Production: 12-acres organic farm with farm programs such as a ‘Farm Stand’, curbside food pickup, and volunteer opportunities.

RESIDENTIAL INFORMATION:

Number of Units: 231 Units

Housing Type(s): 2-3 Bedroom single family home, town-homes and condominiums for sale and rent.

Average Price: Homes range from \$671,900-\$675,900 and Condos range from \$558,500-\$699,000.

Housing Arrangement: Clustered housing in a pedestrian friendly TND, Traditional Housing Design, neighborhood.

Zoning: (Housing) Neighborhood Residential (Open Space) Natural Resource Protection

Average Home Sq. Footage: 1,600-2,400 sq. ft.

REFLECTION

Potential Applications:

130 acres of the space is common land that is held in conservation which protects it from future development and there are many options of getting involved with the farm.

Selection Rationale:

South Village is an established community offering residents various living experiences along with different types of interaction with the farm.

20% RESIDENTIAL
5% AGRICULTURE
63% OPEN SPACES

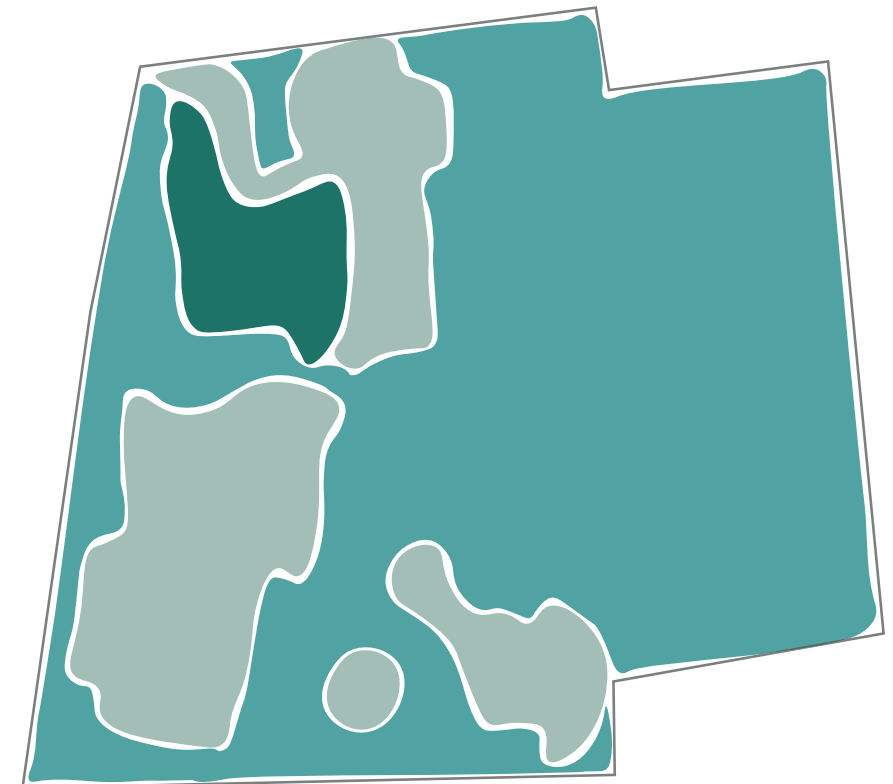


Figure 4.26 South Village: Spatial Analysis (by author).

PRECEDENT IMAGERY



Figure 4.27 South Village: Barn and Farm (Sheppard Custom Homes n.d.).



Figure 4.28 South Village: Housing Aerial (Sheppard Custom Homes n.d.).



Figure 4.29 South Village: Residential Character (Sheppard Custom Homes n.d.).

REGIONAL CONTEXT



Figure 4.30 South Village: Regional Context (by author).

BUILDING MASSING FIGURE GROUND



Figure 4.31 South Village: Site Massing (by author).

TRYON FARM

“Tryon Farm is a sprawling historic landscape that has been transformed into a modern country escape for folks who want to live in wide-open spaces, while staying connected to Chicago, Lake Michigan and the beach” (Tryon Farm Partners 2019).

BACKGROUND:

Location: Michigan City, Indiana

Location in Relation to City: Located 60-minutes from Chicago and 1-1/2 miles from the beach, providing connection to city life while offering rural living.

Size: 170 acres

Food Production: 120 acres of open space of hayfields, pasture, meadows, forest, and more.

RESIDENTIAL INFORMATION:

Number of Units: 98 Units

Housing Type(s): 1-3 Bedroom single family homes.

Average Price: Range between \$125,000-\$465,000

Housing Arrangement: Clustered housing communities that are isolated into seven ‘settlements’ and work with the surrounding landscape.

Zoning: Planned Unit Development (PUD)

Average Home Sq. Footage: 400-2,500 sq. ft.

REFLECTION

Potential Applications:

Maintaining more of the rural land appeal through clustered housing units and more open space

Selection Rationale:

Tryon Farms is one of the earlier established conservation communities that offers a very rural lifestyle with the amenities of a development.

20% RESIDENTIAL
17% AGRICULTURE
63% OPEN SPACES



Figure 4.32 Tryon Farm: Spatial Analysis (by author).

PRECEDENT IMAGERY



Figure 4.33 Tryon Farm: Community Space (Beyerl n.d.).



Figure 4.34 Tryon Farm: Open Pastures (Beyerl n.d.).



Figure 4.35 Tryon Farm: Residential Character (Beyerl n.d.).

REGIONAL CONTEXT



Figure 4.36 Tryon Farm: Regional Context (by author).

BUILDING MASSING FIGURE GROUND

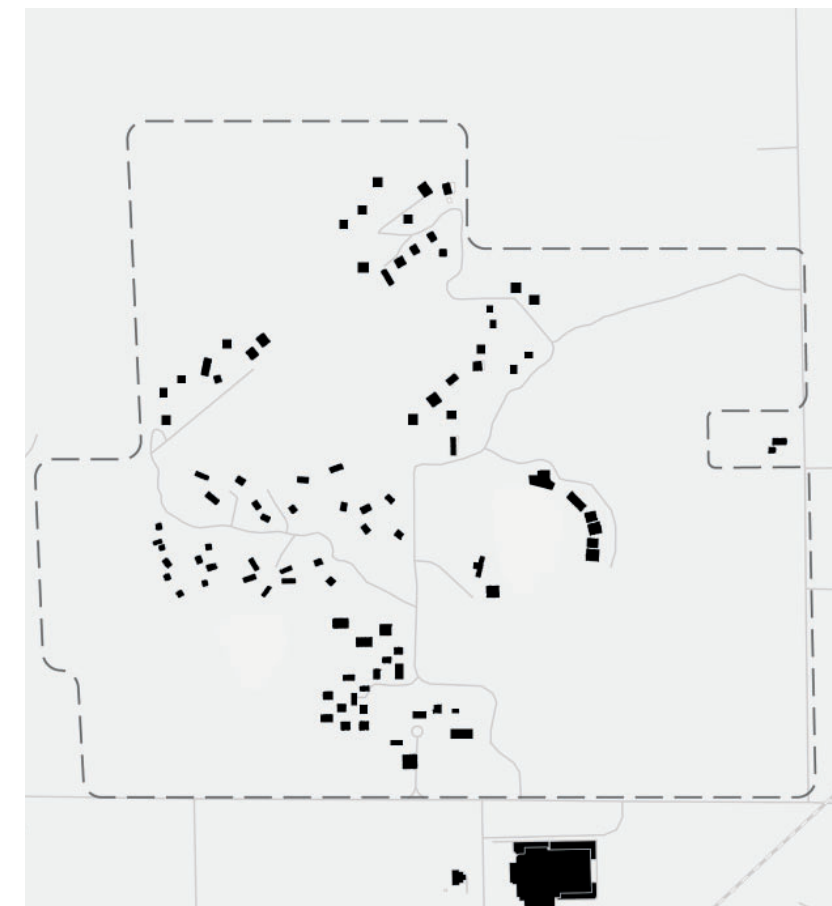


Figure 4.37 Tryon Farm: Site Massing (by author).

VILLAGE FARM

“Village Farm is a dynamic tiny home community based in East Austin... designed to enhance the lives of residents with a mission to simplify life and foster a sense of community” (Village Farm Austin 2021).

BACKGROUND:

Location: Austin, Texas

Location in Relation to City: Located just 8 miles east of urban core of downtown Austin.

Size: Approx. 26-acres

Food Production: 1-acre historic community farm that offers CSA, farm stands, cooking classes and volunteer opportunities to the community.

RESIDENTIAL INFORMATION:

Number of Units: 167 Units

Housing Type(s): All homes are a choice of 7 types of 1-3 bedroom single-family Park Model Recreational Vehicle (PMRV) tiny home models.

Average Price: Range between \$145,000 to \$170,000

Housing Arrangement: Homes are arranged in clustered groups of tiny homes.

Zoning: Extraterritorial Jurisdiction (ETJ)

Average Home Sq. Footage: 399 sq. ft.

REFLECTION

Potential Applications:

The community offers a wide variety of community events such as along with amenities such as trails, community gardens and pocket parks located throughout the development.

Selection Rationale:

Village Farm is a unique community that offers a very engaged active neighborhood lifestyle while also focusing on sustainability.

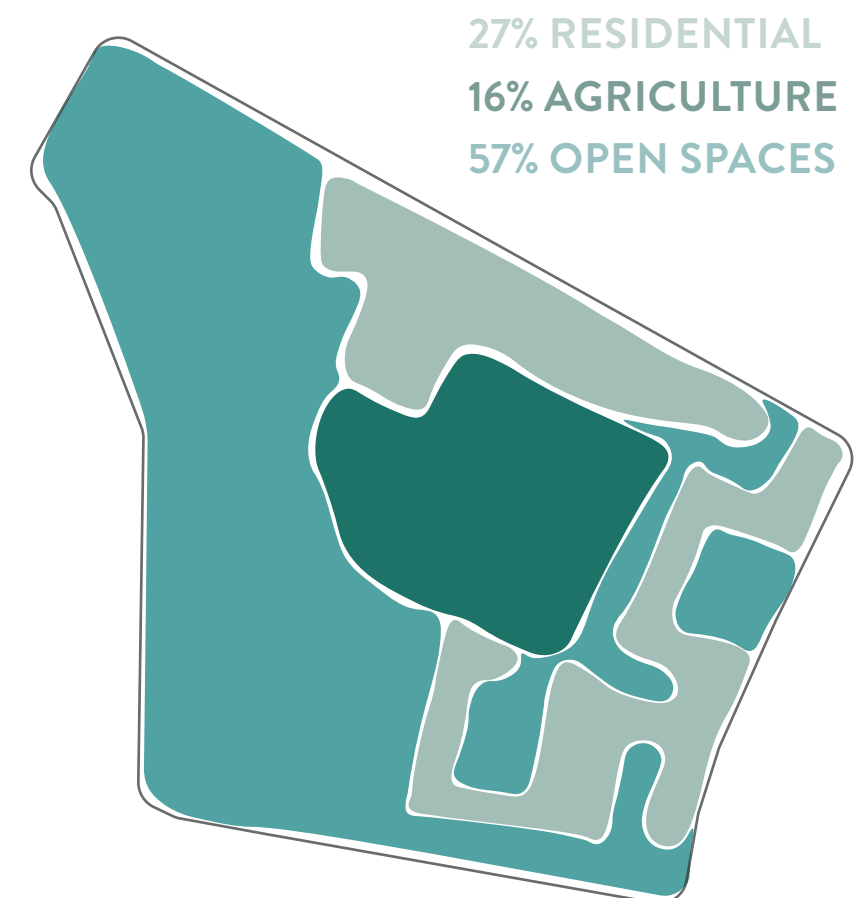


Figure 4.38 Village Farm: Spatial Analysis (by author).

PRECEDENT IMAGERY



Figure 4.39 Village Farm: Agriculture (Village Farm Austin 2021).



Figure 4.40 Village Farm: Architectural Character (Village Farm Austin 2021).



Figure 4.41 Village Farm: Community Space (Village Farm Austin 2021).

REGIONAL CONTEXT

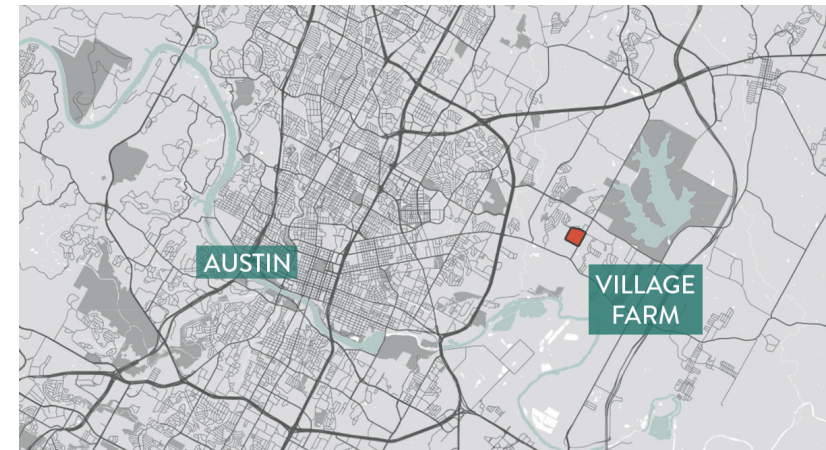


Figure 4.42 Village Farm: Regional Context (by author).

BUILDING MASSING FIGURE GROUND



Figure 4.43 Village Farm: Site Massing (by author).

COMPARATIVE MATRIX

The precedent reviews were compiled into a comparative matrix. Select components from each project were extracted and put into columns for side-by-side study. The compiled information includes: Site Size, Location in Relation to City, Number of Units, Types of Urban Agriculture Used, and Spatial Analysis.

	<i>Chickahominy Farms</i>	<i>Harvest</i>	<i>Prairie Crossing</i>
SITE SIZE	180-acres	1,200-acre	678-acre
LOCATION IN RELATION TO CITY	Lcoated 15 miles north of Richmond, along the Chickahominy River	Located about 30-minutes north from the Dallas-Fort Worth Metropolitan Area	Located just 40-miles north from downtown Chicago
NUMBER OF UNITS & PRICE RANGE	391 Units (\$396,900-\$500,000's)	3,900 Units (\$200,000-\$700,000)	365 Units (\$189,00-\$650,000)
TYPES OF URBAN AGRICULTURE USED	10 acres four season farm	Working farm plots managed by a farmer, private community gardens plots, and community demonstration gardens	100-acre working organic farm, edible landscapes and orchard
SPATIAL ANALYSIS	20% Residential 6% Agriculture 63% Open Space	70% Residential 2% Agriculture 28% Open Space	28% Residential 33% Agriculture 39% Open Space

<i>Serenbe</i>	<i>South Village</i>	<i>Tyron Farms</i>	<i>Village Farms</i>
1,000-acre	Approx. 240-acres	170 acres	Approx. 26-acres
Located 40-minutes southwest outside downtown Atlanta	Located 5-miles south of Burlington and 1.5-miles west of Shelburne Bay beach	Located 60-minutes from Chicago and 1-1/2 miles from the beach	Located just 8 miles east of urban core of downtown Austin
200 Units (\$529,900-\$999,900)	231 Units (\$671,900-\$675,900)	98 Units (\$125,000-\$465,000)	167 Units (\$145,000-\$170,000)
25-acre organic farm, farmer's market, a CSA program, farm to table restaurants and edible landscaping	12-acres organic farm and programs including a 'Farm Stand', curbside food pickup, and volunteer opportunities	120 acres of open space of hayfields, pasture, meadows, forest, and more	1-acre historic community farm, CSA, farm stands, cooking classes and volunteer opportunities
10% Residential 4% Agriculture 70% Open Space	20% Residential 5% Agriculture 63% Open Space	20% Residential 17% Agriculture 63% Open Space	27% Residential 16% Agriculture 57% Open Space

Figure 4.44 Comparative Analysis Summary Matrix (by author).

COMPARATIVE MATRIX CHARTS

The previous precedents were further analyzed for certain characteristics and attributes in three comparative matrices. These matrices has been broken down into three categories: 1) Productive Landscapes/Agricultural Components, 2) Preservation/Conservation Practices, and 3) Outreach/Community Education.

SUMMARY AND REFLECTION

An overarching theme from the comparative matrices is the focus on agriculture and natural space. All the projects seek to optimize productivity of the site through effective food production techniques. In addition to the presence of food production on the site, the projects also provide opportunities for resident and visitors to either interact with communal food production or grow things on their own.

Additionally, all of the precedents emphasize the importance of agriculture and open space by minimizing the residential footprint and having more agriculture lands and open space. Preserving and providing natural spaces to residents is not only an amenity but also a big reason that people choose to live in these communities.

Overall, creating a community focused within the development is what makes these sites such iconic homes. Residents get amenities and agrarian experiences that they would never get within the city.

PRODUCTIVE LANDSCAPES/
AGRICULTURAL COMPONENTS

	Optimizes farm productivity and distribution	Provides opportunities that engage residents with farm production	Align food production with health goals	Food production opportunities for residents
Chickahominy Farms	X	X	X	
Harvest	X	X	X	X
Prairie Crossing	X	X	X	
Serenbe	X	X	X	
South Village	X	X	X	X
Tyron Farms	X			X
Village Farm	X	X		X

Figure 4.45 Productive Landscapes/Agricultural Matrix (by author).

PRESERVATION/
CONSERVATION PRACTICES

	Preserves natural land and/or existing farmland	Utilizes sustainable practices and goals	More natural land and/or agriculture lands than residential development
Chickahominy Farms			X
Harvest		X	
Prairie Crossing	X	X	X
Serenbe	X	X	X
South Village	X	X	X
Tyron Farms	X	X	X
Village Farm	X	X	X

Figure 4.46 Preservation/Conservation Matrix (by author).

OUTREACH/COMMUNITY EDUCATION

	Farm is community social hub	Contains settings for community events	On-site programs for residents	Educational programs for residents and visitors
Chickahominy Farms	X	X	X	X
Harvest	X	X	X	X
Prairie Crossing		X		X
Serenbe		X	X	
South Village	X	X	X	X
Tyron Farms	X	X	X	X
Village Farm	X	X	X	X

Figure 4.47 Outreach/Community Education Matrix (by author).

DESIGN GUIDELINES

Following the precedent analysis and comparative matrices, design guidelines were developed. These guidelines take the components identified in the previous steps and synthesize them together. These guidelines are examples of successful components identified from the previous precedent projects.

SOCIAL/OUTREACH

The social and outreach components create a sense of community within the site as well as providing a connection to the surrounding area.

- *Provide amenities and opportunities for residents and visitors alike to come together, creating a sense of community within the development.*
- *Create moments across the site for social interaction between neighbors.*
- *Work to encourage educational opportunities across the site for residents and visitors.*

CONSERVATION

Conservation is a key component that not only protects open space and agriculture lands but also preserves the rural natural aesthetic for residents.

- *Work to preserve and highlight existing natural spaces and agriculture lands when possible.*
- *Locate site within an area that has natural rural attributes or scenery.*
- *Highlight the natural setting by creating moments for residents and visitors to appreciate natural open spaces.*

PRODUCTIVITY

Highlighting the agriculture production components brings attention to the importance of local food production.

- *Bring focus to food production on site by creating access and interaction opportunities between residents and guests. However, make sure that this interaction does not interfere with production.*
- *Provide chances for residents to be involved in their own food production*
- *Have a management plan for farm production operations so residents are not required to have extensive agriculture responsibilities.*

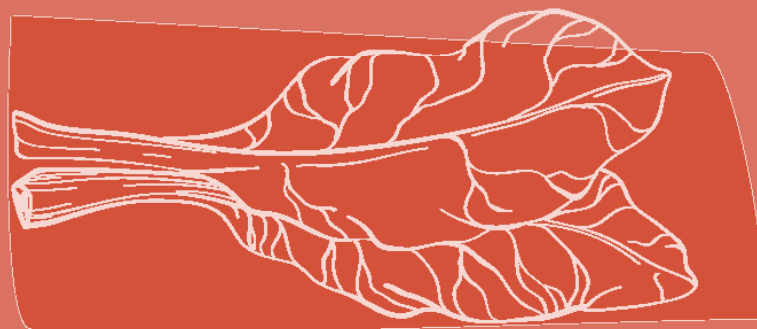
| 1 | SOCIAL

| 2 | PRODUCTIVITY

| 3 | CONSERVATION

Figure 4.48 Design Guidelines (by author).

| 5 | INTERVIEWS



| 5 | INTERVIEWS

Local professionals were invited to participate in separate interviews. Invited interview subjects included local realtors and local developers from Manhattan, Kansas. Interview subjects were chosen because of their expertise and first-hand experience relating to Manhattan's residential real estate market and development.

These interviews are centered on the concept of agriculture-focused residential developments, potential local market interest, and residential development considerations. Some interview questions are factually based related on area of expertise or experience. Other questions relate to opinion regarding perceived local interest, development finances, and agriculture-focused residential developments.

This interview was developed in accordance with the protocols associated with Research Involving Human Subjects and was reviewed and approved by the Institutional Review Board (IRB) at Kansas State University. Prior to the interview, participants received a Project Participation Information sheet and the list of questions to be asked during the interview.

Results of this project and report will be presented to the land owner as a future potential option for how the land could be developed for residential and continued agricultural uses. If interested in this development option, a market study would need to be commissioned. More broadly, publication of the project and report will extend the body of knowledge concerning alternative residential development scenarios.

INTERVIEW QUESTIONS

QUESTIONS FOR LOCAL REALTORS

1. *What do you think the potential interest would be for an agricultural-based residential development in Manhattan?*
2. *Do you think having access to fresh local food and communal amenities would make the development especially attractive to potential buyers?*
3. *Who do you see being the target market for this type of development?*
4. *What do you foresee being potential competition to this type of development?*
5. *What cost range per unit do you think would be acceptable to potential buyers?*
6. *What potential problems do you foresee with an agricultural-based residential development in Manhattan?*
7. *Do you think that a clustered, semi-communal development would be marketable?*
8. *Do you think that the residential structures would need to be single-family detached to be marketable?*
9. *Do you think that county (and potential future Manhattan zoning) might accommodate this development type?*
10. *Do you think that financing/lending institutions would support this type of development?*

QUESTIONS FOR LOCAL DEVELOPERS

Questions 1-10 are the same as above.

1. *By clustering the residences and other buildings do you think the cost of providing utility infrastructure would be substantially lower compared to traditional single-family development?*
2. *From a development standpoint, what potential problems do you foresee with this development proposal?*

LOCAL REALTORS

Interview were conducted with local relators to provide more insight into the market perspective of creating a development specifically in the Manhattan, Kansas.

INTERVIEW #1

The following interview was done with a local residential real estate agent who has been working in the Manhattan area and market for over 25 years.

1. *Do you think having access to fresh local food and communal amenities would make the development especially attractive to potential buyers?*

“I believe this would have a good amount of interest given comments from past buyers looking for similar features but did not have a name for it.”

2. *Do you think having access to fresh local food and communal amenities would make the development especially attractive to potential buyers?*

“Yes, there have been more buyers wanting properties that are walking distance to the Farmer’s Market, and local shops.”

3. *Who do you see being the target market for this type of development?*

“Those buyers who are community oriented, health conscious, and possibly from coastal areas moving to Manhattan.”

4. *What do you foresee being potential competition to this type of development?*

“I cannot answer this question.”

5. *What cost range per unit do you think would be acceptable to potential buyers?*

“Upper \$100K’s to lower \$300K’s depending on size”

6. *What potential problems do you foresee with an agricultural-based residential development in Manhattan?*

“Where can this development be located that has suitable soil and is not in the flood plain.”

7. *Do you think that a clustered, semi-communal development would be marketable?*

“Possibly to those who already participate in similar programs.”

8. *Do you think that the residential structures would need to be single-family detached to be marketable?*

“Mixed housing sizes is wise. Duplexes Townhouses clustered, with green space separation from single detached properties.”

9. *Do you think that county (and potential future Manhattan zoning) might accommodate this development type?*

“Huge variable is the Zoning Board and Planners. It is difficult for the Humane Society to find land for a kennel with the present Zoning Ordinances. There are overhauls to the zoning process now.”

10. *Do you think that financing/lending institutions would support this type of development?*

“Depending on who actually owns the land, the homeowner or is it leased to the homeowner? Will an Appraiser see the value, that is also the question. No Berm Houses, No Association with Land ownership above Common Areas.”

INTERVIEW #2

The following interview was conducted with a Flint Hills area real estate agent and marketing specialist with a focus on ‘client-first’ and people-oriented real estate approach.

1. *Do you think having access to fresh local food and communal amenities would make the development especially attractive to potential buyers?*

“I believe there would be moderate to high potential interest in this type of development in Manhattan. KSU has numerous farm locations in/around Manhattan and many residents have an agriculture background. It makes sense to pair the two.”

2. *Do you think having access to fresh local food and communal amenities would make the development especially attractive to potential buyers?*

“Absolutely – during the pandemic we saw local farms open up their harvests to supply local food demand and they were met with lines of cars waiting for boxes. A&H Farm, south of Manhattan, is one such example.”

3. *Who do you see being the target market for this type of development?*

“People that are health and environment conscious for sure. Possibly people with agriculture backgrounds wanting to stay in Manhattan.”

4. *What do you foresee being potential competition to this type of development?*

“This is a tough question as it is a unique idea we have yet to see implemented. Maybe farmers and landowners?”

5. *What cost range per unit do you think would be acceptable to potential buyers?*

“They would be more desired/open to a bigger market in the \$200k-300k range. Smaller homes with an emphasis on land rather than home space could range in the \$100k-200k range but then the homes should be of considerable size over that amount.”

6. *What potential problems do you foresee with an agricultural-based residential development in Manhattan?*

“Where would these properties/development be located? It is an interesting thought that definitely needs to be explored as Manhattan is pretty land-locked to the North, South, and West.”

7. *Do you think that a clustered, semi-communal development would be marketable?*

“There is a possibility for these properties to be marketable if there is a desire for them in other places. There seems to be a shift in our society to think that communal life would be better – are there other examples of developments like this?”

8. *Do you think that the residential structures would need to be single-family detached to be marketable?*

“Not necessarily. We’ve seen communal townhouse living and duplex living be successful. You can build more with attached structures than detached structures, but the neighborhood covenants might be more restricting on the type/materials.”

9. *Do you think that county (and potential future Manhattan zoning) might accommodate this development type?*

“The Manhattan Zoning Board would be the main challenge as they decide the city zoning ordinances. It might be more possible in Pottawatomie County with there being less flood land and more opportunity for development.”

10. *Do you think that financing/lending institutions would support this type of development?*

“This varies a lot and would need to be advised by a financial lender(s). Every bank/lender is different and many do try to accommodate but there are many variances that could determine this answer. Will an appraisal be included to maintain property values? Will the homeowners own the land itself or will it be leased? Things to consider that lenders want to know.”

LOCAL DEVELOPERS

Interview were conducted with local developers to provide more insight into the development perspective into creating a development specifically in the Manhattan, Kansas.

INTERVIEW #1

This interview was with a developer who established a residential construction and land development company in Manhattan, Kansas that specializes in custom residential construction, commercial and residential land development.

1. *What do you think the potential interest would be for an agricultural-based residential development in Manhattan?*

“We’re in a rural state with a lot of ag econ-based graduates so I’m sure that something like that would work... I think that there would probably be some interest there.”

2. *Do you think having access to fresh local food and communal amenities would make the development especially attractive to potential buyers?*

“With that type of development, you have a bunch of people who want their space and their privacy so I think the idea is to get it out of an urban area. That would be my only concern with that.”

3. *Who do you see being the target market for this type of development?*

“The target market is people that want to be close to a bigger community but still want their space and their land and those types of things.”

4. *What do you foresee being potential competition to this type of development?*

“There’s a lot of development out there right now trying to market 5-15 acres lots near the lake [Tuttle Lake, a nearby lake in Manhattan KS] so I think that type of product would be competitive with it where they have public utilities and those types of things so I think that would be the competition.”

5. *What cost range per unit do you think would be acceptable to potential buyers?*

“I think it’s less about what they’re willing to pay and more about what it costs. We’re not building anything for under \$200 a sq. ft. right now and so that really gets your price point over \$500,000 for most new construction, so I think that’s going to be a challenge and then you have land cost and things on top of that. I think with that for a single-family house you’re looking at a million-dollar price tag on a big lot.”

6. *What potential problems do you foresee with an agricultural-based residential development in Manhattan?*

“Infrastructure. You’ve got to get infrastructure out there and that would be one potential problem. Just overall cost of new construction right now is going to be a big problem, doing anything new. To combat the cost, we usually have to do higher density, what you’re looking at is lower density so that would be my concern. You’ve got less people to spread the cost of infrastructure around to.”

7. *Do you think that a clustered, semi-communal development would be marketable?*

“Maybe. I think you probably have a lot of young guys coming out of K-State [Kansas State University] that want to do some farming but maybe don’t have the capacity to go off and buy their own land so maybe if there is some type of joint venture or something like that I could see that maybe hitting home with some people.”

8. *Do you think that the residential structures would need to be single-family detached to be marketable?*

“I think it has to be single-family. Townhome type style are going to be those people that want to be in the city. Out there is going to be people that want to have a little bit of the privacy so I would say single family.”

9. *Do you think that county (and potential future Manhattan zoning) might accommodate this development type?*

“Yes, I think the county and undeveloped areas are going to be very accommodating to help get more people and newer ideas to the area. The other thing you can look at is there is all sorts of programs at the state level, one in particular I’m thinking about is the RHID which is the Rural Housing Incentive District. Basically, it’s state funds that go into paying for all that infrastructure. I think if someone was going to develop this type of product [agriculture-based development] they would have to utilize some those state programs to make it cost effective for somebody to do that. Programs like this would work really well.”

10. *Do you think that financing/lending institutions would support this type of development?*

“Yes, I do think that they would.”

11. *By clustering the residences and other buildings do you think the cost of providing utility infrastructure would be substantially lower compared to traditional single-family development?*

Unable to answer question

12. *From a development standpoint, what potential problems do you foresee with this development proposal?*

Unable to answer question

KEY TAKEAWAYS

After the interviews, answers were analyzed to identify consistent themes or suggestions from professionals. These key takeaways will be used to inform the projective design.

RESPONSE TAKEAWAYS

Some of the main takeaways within the interviews responses are as follows.

- *People want to live near and/or by local fresh food, many Manhattan residents already have an interest in and use the current local food amenities available*
- *Think about location in relation to Manhattan (Floodplain, location to city, etc.)*
- *Manhattan has an agriculture background/history so this development would be a good match*
- *Target market would probably be community oriented, health/environment conscious, and agriculture focused groups*
- *Housing options are flexible; could be single family housing to more of a mixed housing options*
- *Infrastructure, zoning, and location might be potential issues with the development*
- *There are programs out there that could help with development cost; such as RHID (Rural Housing Incentive District)*
- *There is a range of potential costs for units in this development and cost of the development will impact this.*

INTERVIEW FINDINGS



• LOCAL FOOD:

More people want to be located closer to or better have access to fresh local food. Local markets are already in high interest.



• MARKET:

Existing agriculture ties make this a good market for agriculture-focused development. Along with current residents who are community driven and health focused.



• COST:

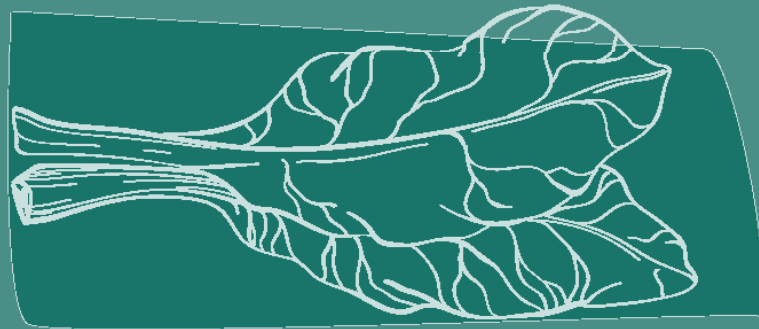
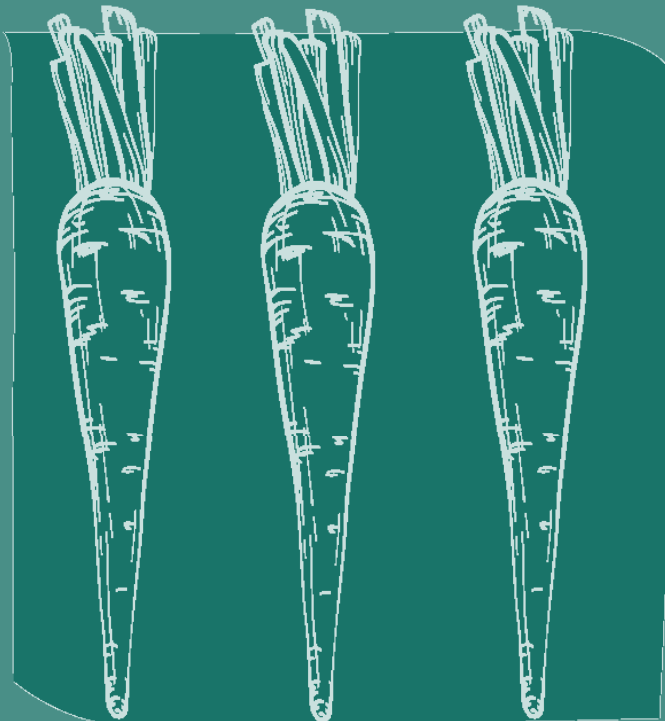
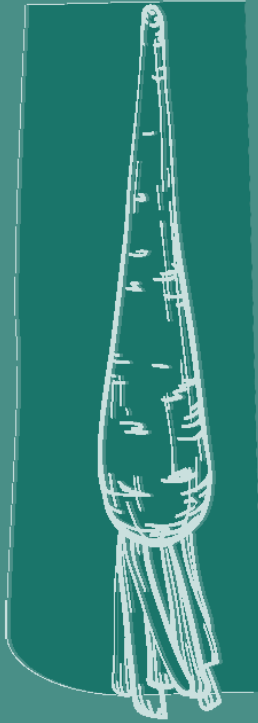
Price ranges for this development fluctuate based on costs such as infrastructure. However, there are potential programs to assist in this area and people see value in paying more for this type of community.



• LOCATION:

Being close to city amenities is important, as well as thinking about site conditions such as floodplains and potential infrastructure.

| 6 | PROJECTIVE DESIGN



| 6 | PROJECTIVE DESIGN

This projective design takes the findings from the previous chapters; background, precedent analysis, and interviews, and combines them into an example of a agriculture-focused residential development in Manhattan, Kansas.

PROJECT BOUNDARIES

This research looks to utilize 92 acres of existing agricultural land located in Riley County, Kansas just outside the western city limits of Manhattan, shown below in Figure 6.1. The land parcel resides north of Wildcat Creek and south of Anderson Avenue (Highway 412) about ½ mile west of Scenic Drive. This land belongs to the owners of a local group called Prairiewood Holdings. Currently the site is used as “Prairiewood Farms”, and the land is rented out to a local farmer by the owners. Currently there is no relation between the farmed land and Prairiewood activities. Wildcat Creek meanders around the southern portion of the site with a wooded riparian buffer along the creek bed. The northern parcel is bounded by Anderson Avenue, a paved road with connection to the site through an access road. There are also sewer and water connections along Anderson Avenue. The chosen site is comprised of two parcels totaling 92.18 acres.

Northern Parcel Owners: River Bend Land Company LLC

Southern Parcel Owners: Katzenmeier, Kail M & R J

Additionally, across Wildcat Creek to the southwest is the Prairiewood “Bird, Bee, & Butterfly Sanctuary” area which includes Walnut Pond (Prairiewood Master Plan n.d.). There is potential synergy with this adjacent site.



Figure 6.1 Projective Design Site Location (by author).

SURROUNDING HOUSING

Surrounding housing is primarily located directly east of the site within Manhattan’s city limits. The majority of the housing consists of town-homes and single family homes arranged in the typical suburban neighborhood layout. Prices for these residences range from around 300K-800K.

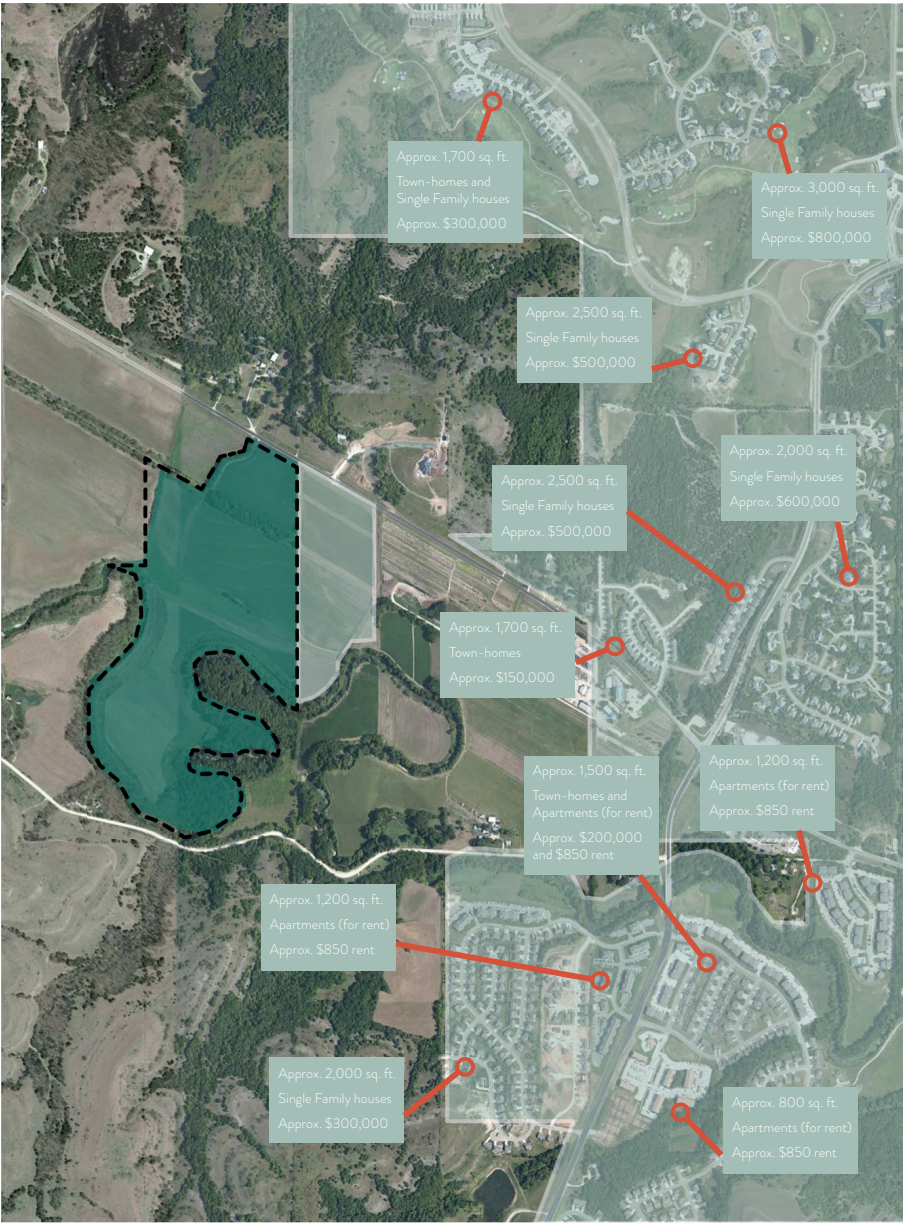


Figure 6.2 Surrounding Housing Information (by author).

SITE ADJACENCIES

The site is located in a rural setting, surrounded mainly by farmland and Wildcat Creek’s riparian edge. Other surrounding adjacencies include scattered residential homes, St. Luke’s Lutheran Church, and Prairiewood’s preserved prairie and retreat homes.

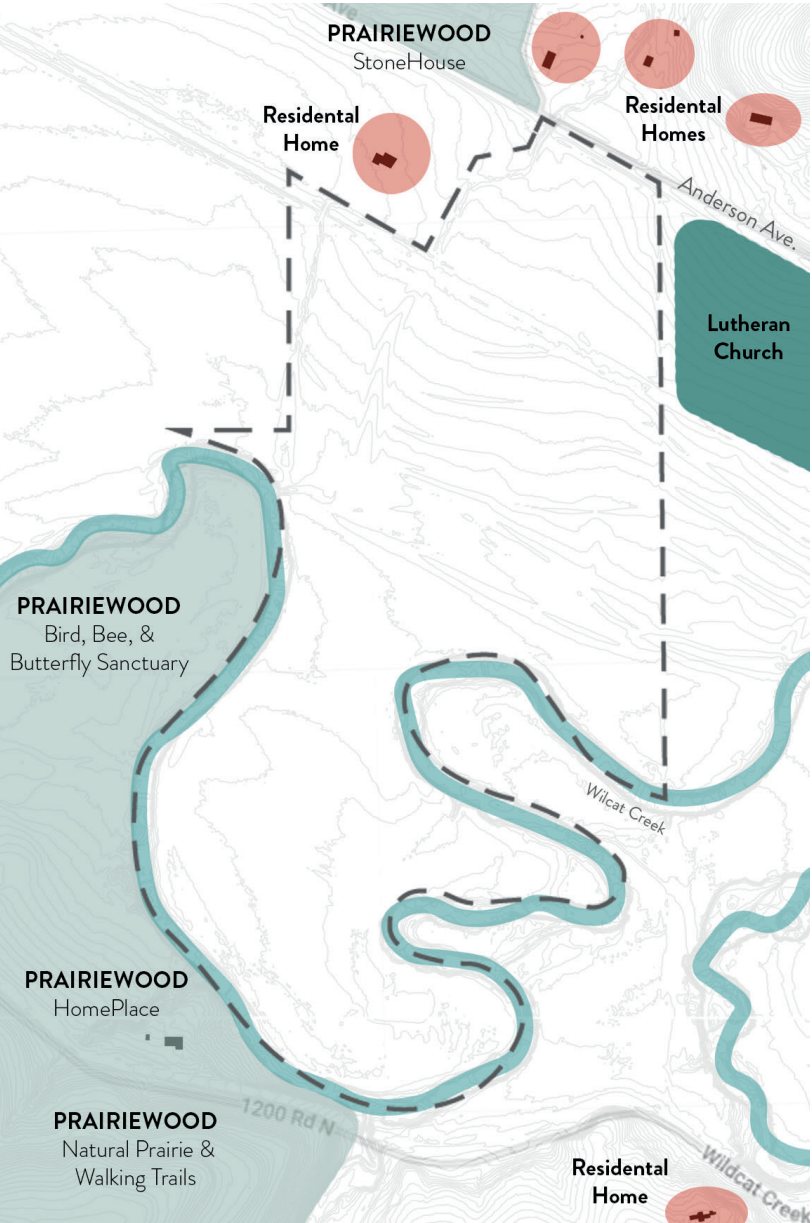


Figure 6.3 Site Adjacencies (by author).

SITE VISIT

The land is currently being used as agricultural fields. There is vehicular access onto the site at the farthest northwestern corner off the paved main road, which leads into a dirt road along the west edge of the property. There are four sections of agricultural fields through the site separated by vegetated clusters or grassy patches. The front portion of the property is more exposed along the edges to the surrounding properties while the southern portion is more secluded by the river and the existing riparian edge. At the most southern edge of the site along Wildcat creek there is an existing vegetated riparian corridor against the creek with a mown walking trail that runs along it.



Figure 6.4 Site & Ground Photo Viewpoints (by author).



Figure 6.5 Existing Fields and Views NE out of Site (by author).



Figure 6.6 Mown Walking Trail Along Wildcat Creek (by author).



Figure 6.7 Southern Agriculture Field & Riparian Buffer (by author).

SITE INVENTORY

Inventory and analysis of the site was conducted through a combination of aerial imagery, site visits, GIS mapping, NRCS Soil Survey Data (NRCS 2022), Riley County Zoning Data (Riley County 2022), and field documentation. Factors analyzed included: soils, floodplain limits, circulation patterns, existing hydrology, existing vegetation, slope, and zoning. These factors informed site design projections.

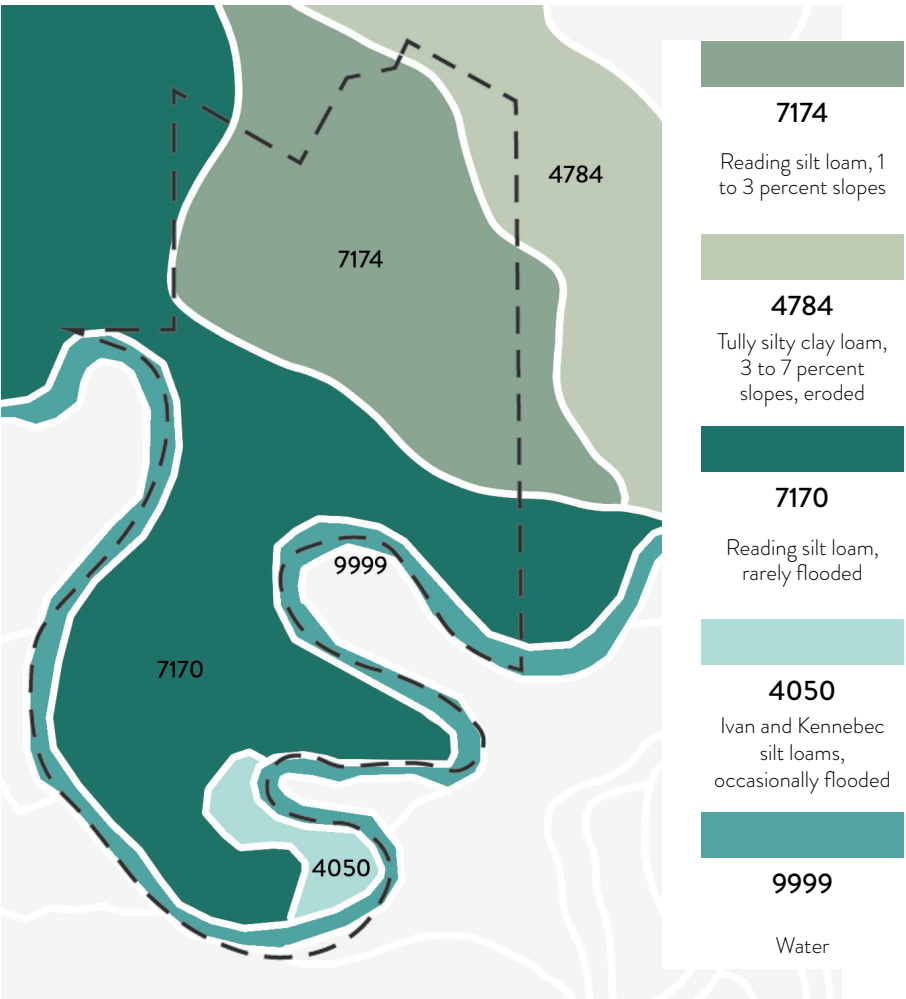


Figure 6.8 Soils Map (by author).

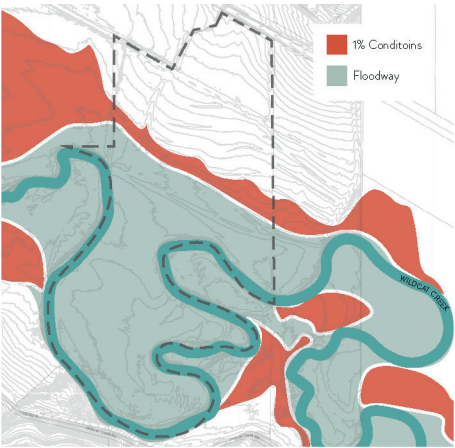


Figure 6.9 Floodplain (by author).



Figure 6.10 Circulation Patterns (by author).

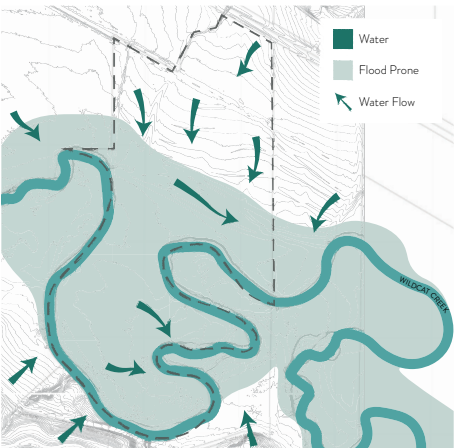


Figure 6.11 Hydrology Pattern (by author).



Figure 6.12 Existing Vegetation (by author).

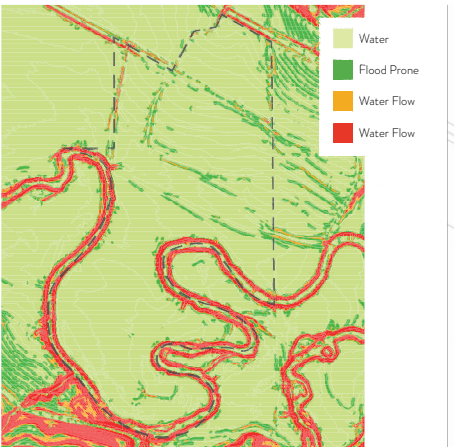


Figure 6.13 Slope Map (by author).



Figure 6.14 Zoning (by author).

SITE OPPORTUNITIES & CONSTRAINTS

CONSTRAINTS

The biggest constraint of the site is that a majority of the site is located within the floodplain. This floodplain limits the buildable area of the site to the northern portion. Another constraint is the lack of barrier between a new church located to the east, which goes against the secluded rural setting desired.



Figure 6.15 Site Constraints Map (by author).

OPPORTUNITIES

While the site has constraints, some constraints can also be viewed as potential opportunities. For example the floodplain also protects the farmland from development. Additionally, there are water and sewer connections for the development in northern areas along with access to a main paved road.

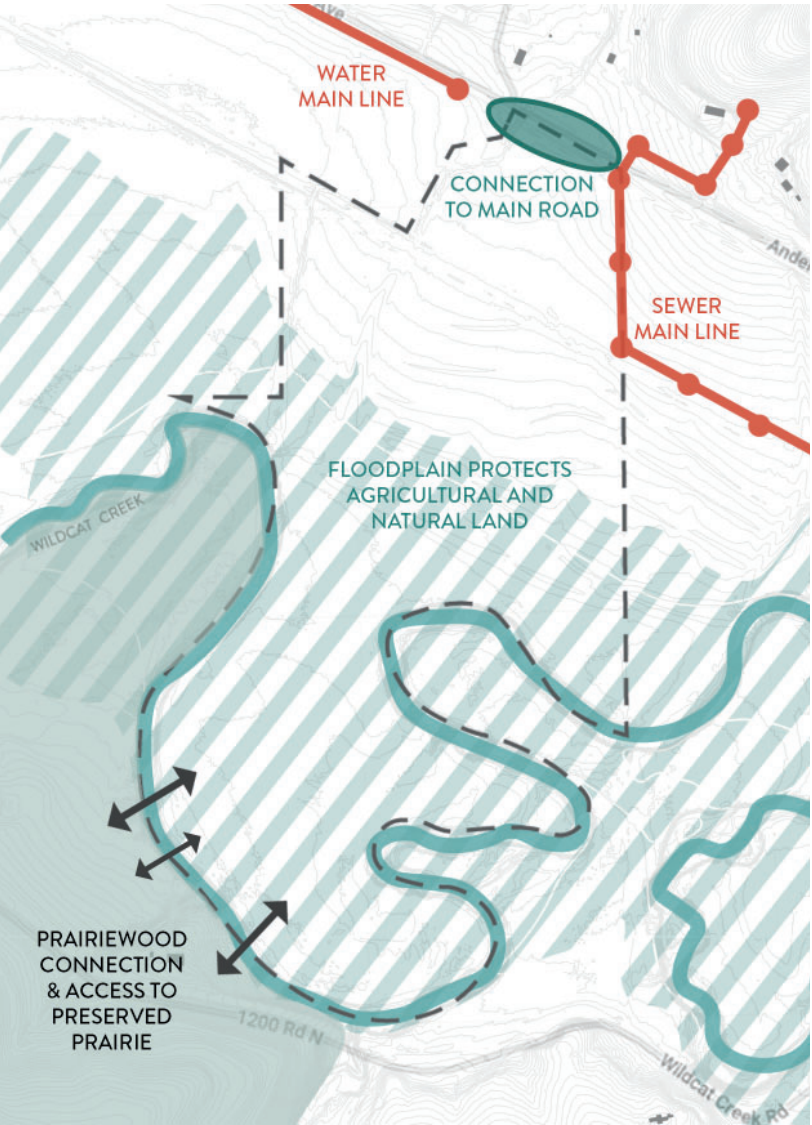


Figure 6.16 Site Opportunities Map (by author).

SCHEMATIC DESIGNS

Following the site analysis and inventory, potential design solutions were explored through schematic design. This process was based on the previous research done through precedent studies, local professionals interviews, design guidelines, site visits, and site analysis.

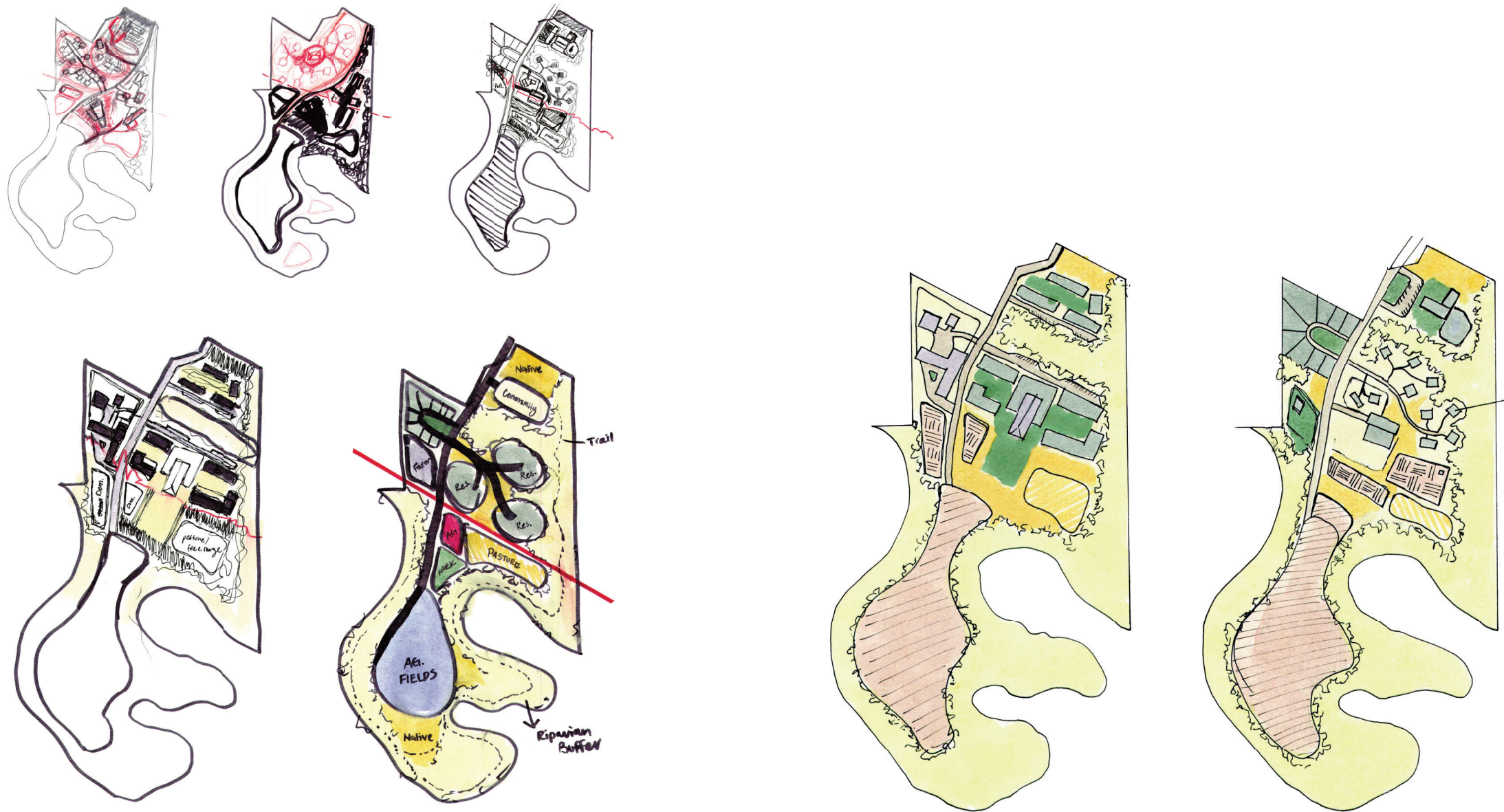


Figure 6.17 Schematic Design Process Work (by author).

MASTER PLAN

Goals of the projective design were to combine residential development and agriculture production to feature local food production and conservation.

Key features within the comprehensive plan include a 20 acre working farm with farmers residence and free range pasture, single family and town-home residences, community gardens, walking trails, on-site market and farm to table restaurant, park and community amenities.

LEGEND

- 1 Farmers Market & Farm to Table Restaurant
- 2 Community Building w/ Amenities
- 3 Town-homes w/ Central Green Space
- 4 Single-Family Clustered Cottage Homes
- 5 Park and Gathering Space
- 6 Community Garden
- 7 Demonstration Agriculture Fields
- 8 Farmhouse and Barn
- 9 Farm Outbuildings and the Yard
- 10 Free-Range Pasture
- 11 Existing Riparian Barrier
- 12 20-acre Working Agriculture Fields
- 13 Walking Trail
- 14 Access Road to Potential Leased Parcels



Figure 6.18 Projective Design Master Plan (by author).

SPATIAL ORGANIZATION

The spatial organization for the development was modeled after the spatial analysis done for the precedent projects, with the development focus being dedicated to natural space and agriculture. The use of clustered housing arrangements kept the residential footprint minimal and out of the floodplain. This allowed 92% of the site to be preserved agriculture and natural open spaces.



Figure 6.19 Projective Design Spatial Analysis (by author).

DESIGN COMPONENTS

In response to the previously designated design guidelines, the design components focused on social/outreach opportunities, conservation of natural space, and productivity of the site. The following responses were used to accomplish this goal.

Social/Outreach

- Walking trails across the site provide for educational opportunities, while featuring nodes for social and nature interaction.
- Community gathering spaces throughout the neighborhood facilitate moments of interaction.
- Amenities like the market and restaurant encourage outreach outside the intimate community.

Conservation

- Preservation of the existing riparian buffer offers access to and highlights Wildcat Creek.
- Surrounding rural context and adjacent preserved prairie provides residents with a natural setting while only being one mile outside the city limits.
- As an agriculturally focused community, 92% of the land is conserved as farmland and open space.

Productivity

- Food production is highlighted across the site through not only a large working farm and free range pasture but also small demonstration plots.
- Community gardens provide opportunities for residents to be involved in agricultural production themselves.
- Communal farm operations allow access to local food production without bearing sole responsibility.

DESIGN EXPRESSION

An important aspect of designing an agriculture-focused development is creating a unique community experience that is focused not only at the master plan scale but also the human scale. The design expression used throughout the development helps create and define this experience. Having a specific expression within the community also adds to marketability of such a non-traditional neighborhood.

The following characteristics represent the design expressions used across the site:

- 1 Natural Ground-plane Materials
- 2 Minimalistic Rustic Decorative Fencing
- 3 Surrounding Rural Landscapes
- 4 Accessible Productive Landscapes
- 5 On-Site Amenities
- 6 Rustic Architectural Style
- 7 Highlighting Surrounding Rural Views
- 8 Community Amenities for Residents
- 9 Social Spaces for Community Gathering



Figure 6.20 Community Garden (by author).



Figure 6.21 Community Area (by author).

ARCHITECTURAL CHARACTER: COTTAGE HOMES



Figure 6.22 Country Cottage Home in Wooded Area (Norman n.d.).



Figure 6.23 Modern Farmhouse Cottage Home (Woodcock 2017).



Figure 6.24 Rustic Country Style Cottage Home (The HousePlanShop 2022).

ARCHITECTURAL CHARACTER: TOWN-HOMES



Figure 6.25 Farmhouse Town-home Neighborhood (Silk Properties 2014).



Figure 6.26 Modern Town-home Unit (Mountain Standard Homes n.d.).



Figure 6.27 Modern Farmhouse Style Town-home Unit (Wulfschle 2022).

ANTICIPATED OPERATIONS

AGRICULTURE PRODUCTION

A critical consideration for an agriculture-focused development is the management and operations of the agricultural components. Below, the various operations for the projective agriculture-focused development are explored and explained further.

Farm Operations

The agricultural land for the projective development is 20 acres of working farm and 0.6 acre of educational agriculture. A productive farm of this size tends to have high degree of engagement with the community and residents, while having smaller-scale intensive production with an emphasis on farm education, experience and events (Norris 2018). Staff required for a 20 acre farm can range between 5-20 staff, including the resident farmer, depending on the season.

The development includes a 4 acres farmstead with permanent residents for an on-site farmer along with a barn and outbuildings/farm facilities. This allows for a resident farmer to live in the community and manage the farm operations.

On-Site Livestock

Within the farm operations of the development is a 4 acre free range pasture for a small number of livestock. Livestock included in this operation range in size and provide various potential economic benefits but also educational opportunities. The on-site livestock is envisioned as approximately 25-30 chickens, 10 goats, 5 alpacas, and 2 bee hives.

Crop Production

Current agriculture production for the site is typical Kansas row crops, such as corn, soybeans, wheat, etc.

However, with only 20 acres of the site being agriculture production, row crops are not the most economically beneficial use of the site. Instead, focusing more on smaller scale vegetables and fruit production provides fresh produce that can be sold to development residents and the surrounding Manhattan community.

Potential crop types and their yields include:

CROP VARIETY	EXPECTED YIELDS IN TONS PER ACRE		
	Average	Good	Excellent
Asparagus	1	1.5	2
Bean, snap	2	3	4
Cabbage	13	15	20
Cantaloupe	10	15	19
Cucumber (slicing)	9	12	15
Cucumber (pickling, hand harvest)	6	10	12
Onion	13	18	23
Pepper, green	14	17	20
Potato (fall)	10	15	20
Pumpkin	10	15	25
Spinach	6	8	10
Summer Squash	10	13	16
Sweet corn	4.5	8	10
Sweet Potato	7	12	15
Tomato (fresh market)	11	13	15
Tomato (processing)	25	29	33
Watermelon	15	20	25

Figure 6.28 Crop Varieties and Potential Yields (by author). Data obtained from Phillips, 2021. “Vegetable Production Guide for Commercial Growers 2022”.

Future Operations

As the agricultural production grows and becomes established there is potential for expansion. If the current 20 acres becomes too small to sustain the farming operations and business there is potential site adjacencies that could support additional farm production. The site is surrounded by existing agricultural lands, within the floodplain.

SITE AMENITIES

The appeal of a unique agriculture-focused development, is the site amenities and the lifestyle offered. Specialized opportunities and amenities provide a distinctive experience which creates a sense of community for residents. Additionally, these amenities can increase the market value. Potential residents are willing to pay more for homes in unique developments which offer specialized amenities, such as having access to fresh food and open spaces.

The site amenities offered within the projective design are a community building, large outdoor common spaces, a community park, an on-site market, farm to table restaurant, walking trails, and a community garden. Specific site opportunities residents have access to within this community include access to fresh local food, physical access and educational opportunities related to food production, proximity to a variety of natural open spaces, and a rural living experience.



Figure 6.29 Site Amenities Map (by author).

LAND MANAGEMENT

Below is a layout of the organization of the land management for the development.

● **Prairiewood Holdings | Prairiewood Conservation Group**

- Owns the agriculture and open natural space.

Resident Farmer

- Leases the land from Prairiewood Group and manages farm operations.
- Provided rent-free housing.
- Owns farming equipment

● **H.O.A. Association**

- Owns and manages the community spaces; community garden, park/community green spaces, and community buildings.
- Carries insurance.

● **Development Residents**

- Owns individual residential plots/houses.



Figure 6.30 Land Management Sectors (by author).

COST PROJECTIONS

Following the design of the community's comprehensive master plan, estimated costs for the development were explored. Understanding the potential financial investment of an agriculture-focused development of this scale shows the financial feasibility of the projective design.

FINANCIAL FACTORS

There are several key factors that play into the financial cost of this development. These cost considerations are:

- *Development Infrastructure Costs*

This includes infrastructure cost such as roads, parking lots, utilities, and general landscaping.

- *Building Costs*

Building costs include the construction of buildings, and site amenities.

- *Agriculture Operations Costs*

Agriculture costs incorporate a range of variables including equipment, facilities, employees, livestock, and farm supplies.

POTENTIAL ASSISTANCE

Potential financial assistance for an agriculture-focused community includes local or national incentive programs (Norris 2018). Many rural communities are looking to attract residents and have programs to help introduce new ideas and people. "Seek local and national incentives—such as conservation easements, stormwater credits, state open-space tax credits, and funding from the U.S. Department of Agriculture and the National Resources Conservation Service Farm and Ranch Land Protection Program" (Norris 2018).

One potential program that could be used for the proposed development, that was suggested by a local developer, is the Rural Housing Incentive District, RHID.

"RHID is a program designed to aid developers in building housing within rural communities by assisting in the financing of public improvements. RHID captures the incremental increase in real property taxes created by a housing development project for up to 25 years" (Kansas Department of Commerce 2022).

A program such as RHID would be able to assist in offsetting development infrastructure cost such as:

- *"Certain land acquisition cost*
- *Payment of relocation assistance*
- *Site preparation*
- *Sanitary and storm sewers and lift stations*
- *Drainage conduits, channels, and levees*
- *Street grading, paving, curbs, and gutters*
- *Street lighting*
- *Underground public and limited private utilities*
- *Sidewalks*
- *Water mains and extensions"*

(Kansas Department of Commerce 2022).

Additionally the U.S. Department of Agriculture provides a variety of grants, loans, and incentives. For example, they offer multiple types of Rural Development Loan and Grant Assistance. "USDA Rural Development forges partnerships with rural communities, funding projects that bring housing, community facilities, business guarantees, utilities and other services to rural America. USDA provides technical assistance and financial backing for rural businesses and cooperatives to create quality jobs in rural areas" (U.S. Department of Agriculture n.d.).

DEVELOPMENT COST PROJECTIONS

DEVELOPMENT BUDGET	
COST ITEM	COST (APPROX.)
Residential Buildings	\$4,880,000
Single - Family Homes (16)	\$2,880,000
2,240 sq. ft.	\$180,000 ea. home
Town - homes (4 complexes)	\$2,000,000
1,800 sq. ft. units (4 units per complex)	\$125,000 ea. unit
Community Buildings	\$1,550,000
Local Market	\$200,000
Farm - to - Table Restaurant	\$500,000
Community Amenity Building	\$850,000
Site Infrastructure: Paving	\$611,000-1,403,000
Parking Lots (Paved, concrete)	\$133,000 -233,000
Roads (Paved, concrete)	\$370,000 -900,000
Roads (Gravel)	\$108,000 -270,000
Park Expenses	\$183,000
Community Shelter	\$50,000
Playground	\$80,000
Multi - Court/Basketball Court	\$20,000
Open Space	\$33,000
Community Garden Expenses	\$18,000-27,000
Storage Shed	\$6,000 -15,000
Planter Boxes	\$10,000
General Tools/Equipment	\$2,000
Site Infrastructure: Utilities	\$625,000
Sewer (approx. \$100 per ft.)	\$250,000
8" Water Distribution	\$50 per L.F.
Water	\$375,000
8" Sanitary Sewer	\$75 per L.F.
Architecture Structural & MEP Fees	\$643,000
Engineering Fees	\$440,000
Entitlement Fees (approx. 15%)	\$330,000
TOTAL COST (APPROX.)	
Total Expenses	\$9,280,000-10,081,000
Cost per Unit	\$290,000-315,031

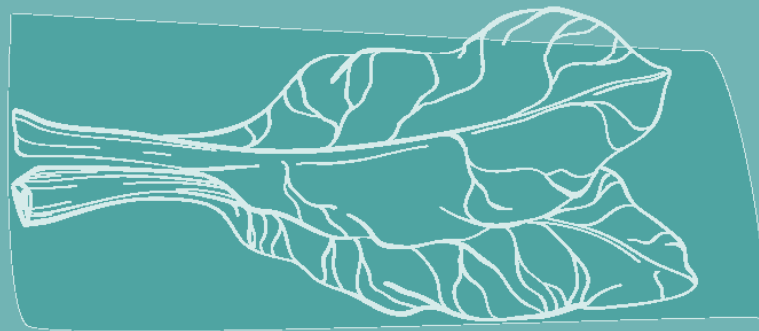
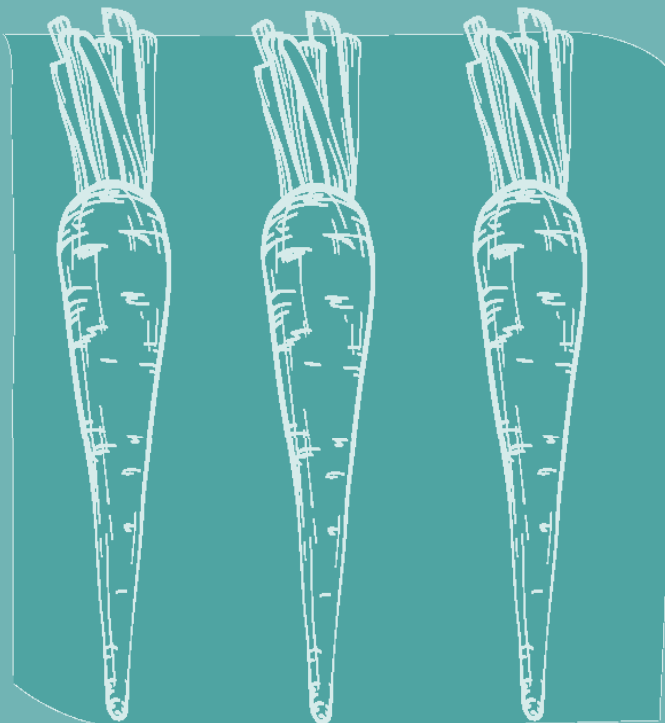
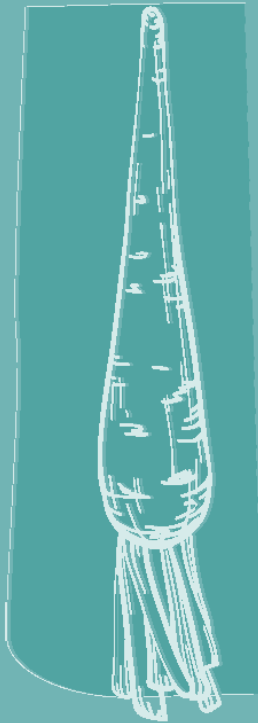
Figure 6.31 Development Cost Projection Chart (by author).

AGRICULTURE COST PROJECTIONS

START UP BUDGET	
COST ITEM	COST (APPROX.)
Barn and Outbuildings	\$280,000-310,000
Large Barn	\$200,000
Enclosed Outbuilding	\$50,000 -70,000
Open - air Outbuilding	\$30,000 -40,000
Machinery & Equipment	\$69,000-89,000
Tractor with 3 - point hitch, PTO, toolbar	\$45,000 -65,000
Disc Plow	\$2,000
Planter	\$3,000
Cultivator	\$2,000
Rotary Tiller (5 - 6 ft.)	\$4,000
Sprayer (100 gal.)	\$3,000
Miscellaneous	\$10,000
Livestock	\$3,375-3,390
Chickens (25 -30)	\$75 -90
Goats (10)	\$1,000
Alpaca (5)	\$2,000
Bees (2 hives)	\$300
Livestock Operations	\$7,600
Fencing	\$2,700
Chicken Coop	\$700
Beehives (2) and Beekeeping Gear	\$600
Vet Fees (annually)	\$600
Feed (annually)	\$3,000
Fertilizer (annually)	\$2,100
Labor (annually) <i>not including resident farmer</i>	\$54,336-84,180
Full - time Employee (\$20 -23 per hour)	\$49,920 -71,760
(1 employee on 40 -50 hr. weeks)	\$3,200 -4,600 ea. monthly
Employment Cost (30%)	\$960 -1,380 ea. monthly
Seasonal Employees (\$12 -15 per hour)	\$4,416 -12,420
(4 -6 employees on 20 -30 hr. weeks, 4 -6 months)	\$960 -1,800 ea. monthly
Employment Cost (15%)	\$144 -270 ea. monthly
TOTAL COST (APPROX.)	
Total First Year Expenses	\$416,411-496,270
Continual Yearly Expenses	\$60,036 -89,880

Figure 6.32 Agriculture Cost Projection Chart (by author).

|7| CONCLUSIONS



| 7 | CONCLUSIONS

REPORT SUMMARY

The aim of this work was to look into the dilemma of consumers disconnect from food production. Specifically this research focused on urban food production integrated with residential development in a concept community.

The removal of food production from urban environments has disconnected consumers from food, creating a dependency on large scale rural farming, and reliance on processed foods with negative health impacts. Agriculture-focused residential development offers an opportunity to live a hybrid lifestyle where local food production is reintroduced into the urban context and people have better access to local food production.

This report attempted to answer the question, how can zoned- residential development be adapted to facilitate a hybrid lifestyle that combines clustered, cooperative housing, centered around agricultural activities and wide-ranging conservation practices? Through precedent analysis of established agriculture-focused communities, successful development components and characteristics were identified for food production in a residential setting. Additionally, interviews with local realtors and developers provided insight into market interest and potential development components. Findings from the precedent analysis and interviews were then applied to a conceptual projective design that demonstrated an agriculture-focused residential development master plan in Manhattan, Kansas.

Overall the process hinted at consumer interest in bringing food production back into the urban realm. This research processes showed how this can be done through a agriculture-focused residential development model.

LIMITATIONS

This report focused on established agriculture-focused development precedents within the United States. However, more research into international solutions and examples could broaden the research.

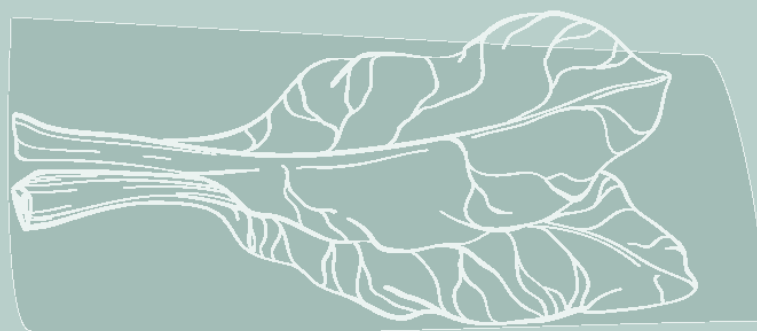
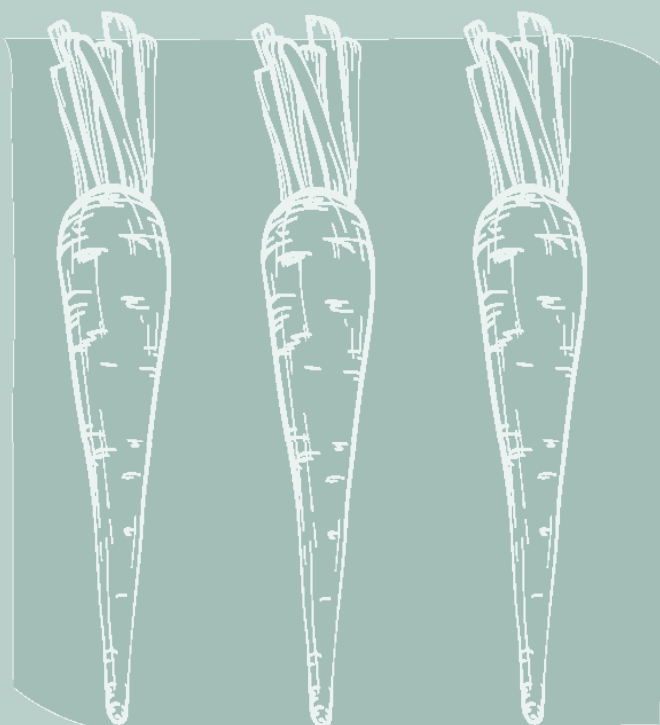
The interviews were limited to local realtors and developers. Potential interest in this type of residential development could have been more firmly established by established by surveying potential home buyers.

FUTURE RESEARCH

Future research for this project could include creating a typology that could be used for sustainable agriculture-focused developments. As established in this report there is a growing interest in being located closer to local fresh food and more people want to know where their food is coming from. Additional research would look further into bringing food production back into the urban environment.

Many cities struggle with urban vacancy and what to do with the vacant lots scatter throughout the urban core. Food production could work well in these vacant lots by creating a typology that could be used in various cases. There are many urban sites, such as river banks and vacant lots, that are well suited for and could support urban food production (Deelstra and Girardet 2000). An agriculture-focused development offers the benefits of urban life while still keeping people connected to food production. Findings from this future research could potentially inform the design of a hybrid residential prototype that could be used in various cities across the United States.

| 8 | APPENDICES



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APPENDIX A

References

APPENDIX B

Glossary

APPENDIX C

Figure Citations

APPENDIX D

Image Permission

APPENDIX E

IRB Approval for Human Subject Usage
Approved Interview Questions

APPENDIX A

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APPENDIX B

GLOSSARY

AGRIHOOD

“Single-family, multifamily, or mixed-use communities built with a working farm or community garden as a focus” (Norris 2018, 3).

HYBRID LIFESTYLE

Lifestyle that offers resident benefits from both the urban and rural environments.

HAMLET

Type of cluster residential development made up of 5-25 single family homes, typically centered around green space and have open spaces around the development, with a tight social structure. (Jentzch 2017 and Sutro 1990).

PERI-URBAN LAND

“Peripheral areas where urban or suburban meets rural” (Hodgson, et al. 2011, 4).

CONSERVATION DEVELOPMENT

“Process of planning, designing, building, and managing communities that preserve landscapes or other community resources that are considered valuable for their aesthetic, environmental, cultural, agricultural, and/or historic values” (McMahon 2010, 7).

URBAN AGRICULTURE

“The production of food and non-food plants, as well as animal husbandry, in urban and peri-urban spaces” (Santo, et al. 2016, 1).

APPENDIX C

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IMAGE PERMISSION

Email from Amy Arnold (digital marketing manager at Roberts Communities & Resorts) on February, 2022 for the permission to use Village Farm images.

Email from the Crescent Group on March, 2022 for permission of Chickahominy Falls images.

Email from Gary Beyerl (partner at BBA Architects) on March, 2022 for permission to use images of Tryon Farms.

Email from Garrett Pfluger (marketing coordinator at TBG Partners) on March, 2022 for permission to use Harvest images.

Email from Sheppard Custom Homes on March, 2022 for permission of South Village images.

All other images are taken personally, used with permission or are covered under creative commons.

APPENDIX E

IRB APPROVAL



TO: Howard Hahn
Landscape Archit & Comm Plan
Manhattan, KS 66506

Proposal Number: IRB-10982

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 01/13/2022

RE: Proposal Entitled, "Creating Agrihood Communities: Exploring Hybrid Agriculture Focused Residential Development."

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §104(d), category:Exempt Category 2 Subsection ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Electronically signed by Rick Scheidt on 01/14/2022 11:36 AM ET

INTERVIEW QUESTIONS

QUESTIONS FOR LOCAL REALTORS

1. *What do you think the potential interest would be for an agricultural-based residential development in Manhattan?*
2. *Do you think having access to fresh local food and communal amenities would make the development especially attractive to potential buyers?*
3. *Who do you see being the target market for this type of development?*
4. *What do you foresee being potential competition to this type of development?*
5. *What cost range per unit do you think would be acceptable to potential buyers?*
6. *What potential problems do you foresee with an agricultural-based residential development in Manhattan?*
7. *Do you think that a clustered, semi-communal development would be marketable?*
8. *Do you think that the residential structures would need to be single-family detached to be marketable?*
9. *Do you think that county (and potential future Manhattan zoning) might accommodate this development type?*
10. *Do you think that financing/lending institutions would support this type of development?*

QUESTIONS FOR LOCAL DEVELOPERS

Questions 1-10 are the same as above.

1. *By clustering the residences and other buildings do you think the cost of providing utility infrastructure would be substantially lower compared to traditional single-family development?*
2. *From a development standpoint, what potential problems do you foresee with this development proposal?*