FOOD-PRODUCING LANDSCAPE DESIGN SAFETY CONSIDERATIONS IN THE PERI-URBAN DEVELOPMENT OF EAST VILLAGE MONROE

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(Under the Direction of Judith Wasserman)

ABSTRACT

Food-producing landscapes are appearing in the urban and peri-urban environments because of concerns about food security, lack of social capital in some urban settings, prospect of economic gain, and concerns for public health. As food is recognized once again as an integral agent for more sustainable cities, the landscape architecture profession has emerged capable of leading in the design of an integrated and safe food-producing landscape in the built environment. To assist landscape architects, this thesis posits a design matrix of safety considerations for designers of food-producing landscapes in the peri-urban setting. Developed from an investigation of food-producing landscape typologies, review of literature on the history of food-producing landscapes, and an inventory of existing safety guidelines for landscape architects, the matrix offers a guide for food-producing landscape designers to protect the public from physical harm, and clients and landscape architects from legal liability. A design experiment of how a matrix may be utilized in analyzing safety in food-producing landscape design is demonstrated through an integrated food-producing landscape at a mixed-use development—East Village Monroe, in Monroe, Georgia.

INDEX WORDS: Food-producing landscapes, Public safety, Urban agriculture, Design liability, Design Structure Matrix

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by

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DEDICATION

For my wife, my parents, and the CED.

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THE STORY OF THE FORBIDDEN FRUIT TREE

In 1986 several people in a neighborhood in Hanover, Germany, decided they wanted to plant a cherry tree on their street. They thought such an addition would provide a habitat for songbirds and pleasure for people who might want to eat the cherries, pluck a blossom or two, or simply admire the tree's beauty. It seemed an easy enough decision, with only positive effects. But the tree was not so easily transposed from their imaginations to real life. According to zoning laws in that neighborhood, a new cherry-tree planting would not be legal. What the residents viewed as delightful, the legislature viewed as a risk. People might slip on fallen cherries and cherry blossoms. Fruit trees with dangling fruit might lure children to climb them – a liability if a child fell and got hurt. The cherry tree was simply not efficient enough for the legislators: it was messy, creative, unpredictable. It could not be controlled or anticipated. The system was not set up to handle something of that kind. The neighbors went on, however and eventually they were granted special permission to plant the tree.

from Cradle to Cradle
by William McDonough & Michael Braungart

INTRODUCTION

In the fall of 2011, the Baker Group LLC, in Monroe, Georgia became interested in incorporating a food-producing landscape in their mixed-use development project, East Village Monroe. The development team of East Village Monroe consists of father and son, George Baker II and George Baker III, who are also the owners of the property. At the time I spoke with the Bakers, only one building had been constructed with many others in the works and on various timelines for completion. The one existing buiding is impressive—the 186,000-square-foot Walton County courthouse will serve as the future focal point for visitors to the development.

At the first meeting with the Bakers, they expressed the overall vision for East Village Monroe. They displayed a site plan (Figure 0.1) for the three-hundred-acre site and articulated a desire to have an agricultural component on the property. Though the existing site plan for the development shows neighborhood garden spaces, the new direction for the urban agricultural program at East Village Monroe has led to a more integrated food-producing landscape plan. The new landscape would boast a food landscape that is structurally, culturally, and aesthetically integrated into the site plan—framing the food-producing landscape as an asset and not a liability.

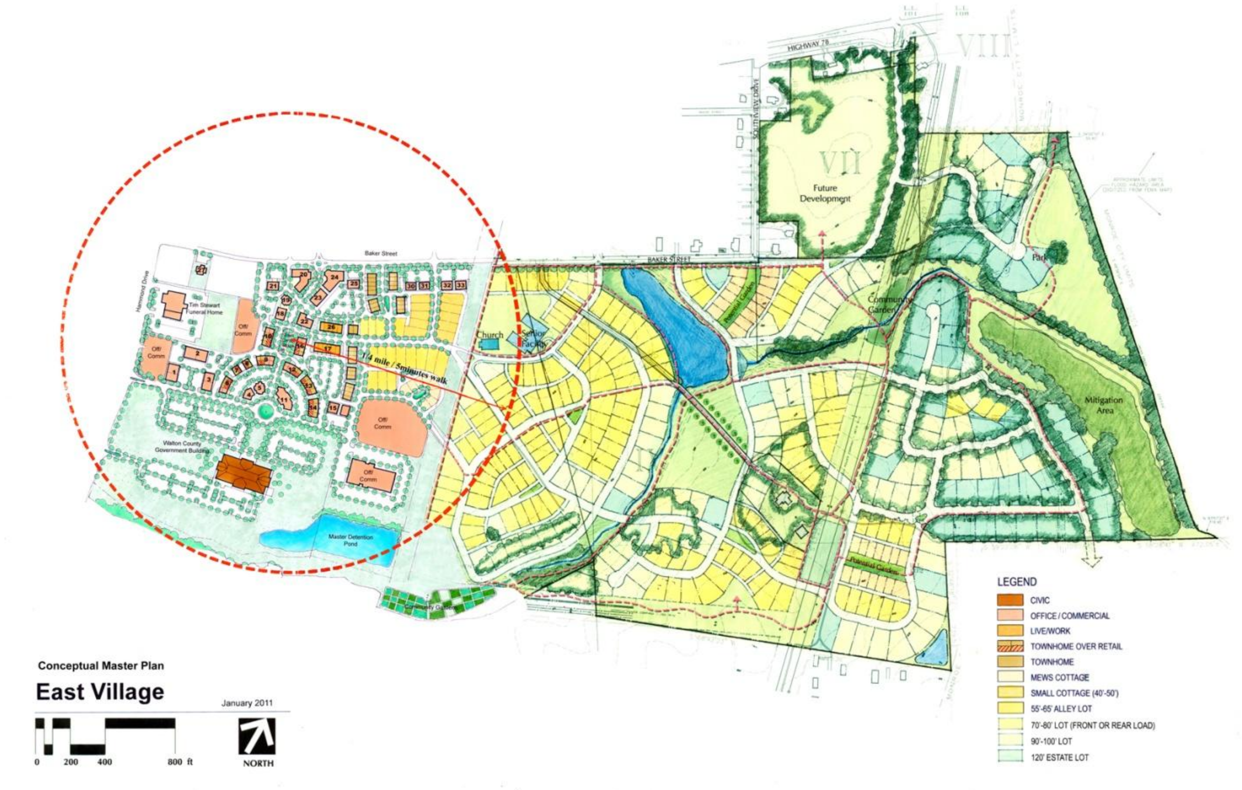


Figure 0.1: East Village Monroe Site Plan (2-22-2011)

During initial discussions, the Bakers described each program element and the possible opportunities and constraints of each, both individually and in relation to one another. Though many of these program elements are comparable to those in other developments, the inclusion of a food-producing landscape in concert with selected program elements raised many questions to consider. Immediately, the owners began to question how safe each program element would be when paired with a food-producing landscape; questions centered on the issues of the owners' legal liabilities. For the pedestrian network, would there be trip and fall hazards with fruits and nuts? For the playground areas, what if a child eats a poisonous plant? For the maintenance of the food landscape, would large machinery pose a safety hazard? For any chemicals used for crop maintenance, what harm might happen to people, animals, and other plants? What were all of the liability issues? To move forward with an integrated food-producing landscape design at East Village Monroe, these questions, among others, needed to be answered.

The project at East Village Monroe has the opportunity to become a successful multifunctional landscape, one that provides sustainable food production, biodiversity conservation, protection of ecosystem services, and poverty alleviation, but only if—like the forbidden cherry tree—these features are not seen as a liability but an asset.

CHAPTER I

METHODOLOGY: PUBLIC SAFETY IN FOOD-PRODUCING LANDSCAPE DESIGN

Food-producing landscapes are appearing in the urban and peri-urban environments because of concerns about food security (FAO 2012), the lack of social capital in urban settings (Bellows et al. 2003), prospect of economic gain (USDA 2008), and public health status (Ackerman 2012, 8). Edible plants in urban landscape environs grace rooftops, apartment terraces, school yards, and abandoned parking lots. Even the front yards of the American suburbs are evolving from grass lawns to incorporating gardens of sustenance (Haeg 2008). Regulatory agencies from a variety of fields, from the public health sector to agriculture to professional planning, are compiling research in support of growing food in the landscape of cities. As food becomes recognized as an integral agent in the design for a more sustainable city, landscape architecture has emerged as a profession capable of taking on the role and responsibility of designing food-producing landscapes in the urban and peri-urban environments. As professionals, landscape architects must design for the safety and the prevention of irreparable harm to the public prescribed by the American Society of Landscape Architects (ASLA) (Schatz 2003, 4); yet representation of food-producing landscape design is not included in the "Knowledge and Skills/Tasks Required of Landscape Architects that Affect the Health, Safety, and Welfare of the Public," as defined by the Council for Landscape Architecture Regulatory Board (CLARB). Further, policy is yet to be articulated by ASLA pertaining to this issue. Thus, as landscape architecture expands its purview of design services to include food-producing landscapes, we must answer the question of: How can landscape architects minimize the unique risks to public safety posed by this type of design?

Scholars and regulatory agencies alike readily note the connection between food in the urban landscape and the health and welfare of the public (Viljoen 2005) (de la Salle 2010) (Duany 2011) (World Health Organization 2013) (American Planning Association 2013). However, there is a current dearth of research regarding the unique conditions and hazards food landscapes possess and design policy to protect the public is minimal. Because of the growing popularity of food-producing landscapes, landscape architects must be informed about the risks to public safety that this type of landscape presents both to protect members of the public and to protect themselves from legal liability. As previously mentioned, however, design policies for traditional landscapes do not contemplate the unique conditions brought about by food-producing landscapes. Due to the level of complexity of food-producing landscapes, the distinct challenges food-producing landscapes present and the lack of guiding design policy, cities and land developers are apprehensive about incorporating such programs. Creating a matrix of safety considerations for such designs will provide landscape architects, the clients they represent, and the public with better ways to identify, manage, and mitigate risk within food-producing landscape design. This study attempts to synthesize three fields of study—landscape architecture, food-producing landscapes, and public safety to construct a matrix of safety considerations for an integrated food-producing landscape in a peri-urban development at East Village Monroe (Figure 1.1).

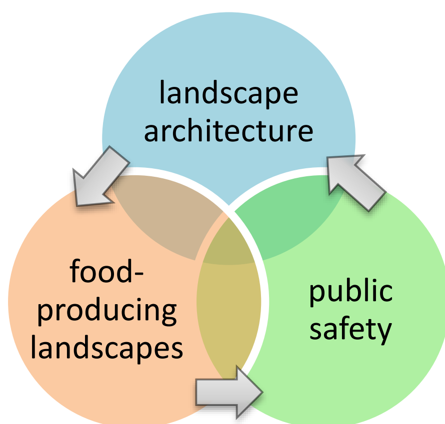


Figure 1.1: Synthesis of three fields

DESIGN STRUCTURE MATRIX

A matrix, by definition, is something within which something else originates or develops. It can also describe a rectangular array of mathematical elements that can be combined to form sums and products with similar arrays having an appropriate number of rows and columns, or it can be something resembling a mathematical matrix—a rectangular arrangement of elements into rows and columns.

Matrices have been used in a variety of ways as an efficient method to perform both the analysis and the management of complex systems. Steward (1981) developed a particular type of matrix, the Design Structure Matrix (DSM) (Figure 1.2), as a tool for identifying the dependencies between tasks and for sequencing the development process. In this type of matrix, tasks are assigned to a row and a corresponding column. Reading down the column reveals which tasks receive information from the task corresponding to the column. Reading across a row reveals all the tasks whose information is required to perform the task corresponding to the row. A DSM (Figure 1.2) could potentially provide an effective low-level design process based on physical design parameter relationships (Browning, 2001).

	A	B	C	D	E	F	G	H	I
A									
B	X								
C	X	X							
D			X						
E	X	X	X						
F			X	X	X				
G	X	X	X			X		X	X
H	X	X				X	X		X
I							X	X	

Figure 1.2: Design Structure Matrix (Carrascosa 1998)

Since Steward's landmark paper in 1981, other professionals have adopted and adapted the DSM to their respective fields. For example, in a joint effort, Crime Prevention Victoria, the Department of Sustainability and Environment, the Heart Foundation, and The Cancer Council Victoria published "Design for Safe and Healthy Communities: The Matrix of Like Design Considerations." Their matrix was developed to assist planners when considering guidelines that would influence the design of the built environment. Similar to this charge, the matrix presented below provides a framework of considerations for landscape architects when designing food-producing landscape in the peri-urban context. The matrix model supports an integrated approach to designing a healthy and safe food-producing landscape and provides a practical guide to landscape architects. This approach helps to synthesize a range of safety considerations specific to food-producing landscape design in peri-urban developments. While the matrix can be used to aid design, it is important to consider every situation in the context of its unique surroundings.

Landscape architects need to consider how their design will impact the health, safety, welfare, and access of people and their environment (Schatz 2003, 4); This thesis presents a DSM model tailored to the analysis of safety design guidelines in food-producing landscapes in a peri-urban environment and explores the efficacy of such a matrix as a management tool for analyzing such risk in food-producing landscape design. The "Matrix of Food-Producing Landscape Design Considerations in the Peri-Urban Landscape" presented in Chapter V, is a practical tool that can be used to render site specific guidelines that can influence the safe design of food-producing landscapes in the public realm of a place.

The challenge for a landscape architect is to design a food-producing landscape that achieves the functional, cultural, and aesthetic goals of the project while ensuring safety for the public. To meet this challenge, this thesis sets out to build an understanding of how a landscape architect can identify, manage, and mitigate situations in a food-producing landscape design that are potentially hazardous to the public. To this end, this thesis relies on the use of two methods familiar to landscape architecture research: classification (or taxonomy) and case study review. Both methods are used to populate the matrix for East Village Monroe and, ultimately, build the contents of the matrix to answer the question of how landscape architects can provide an integrated and safe food-producing landscape.

Chapter II utilizes the first method, presenting three food-producing landscape classification systems. Classifying food-producing landscapes is important because the size, scale, and productivity can have varying impact on safety. Through studying the typologies of food-producing landscapes, a designer will be more apt to recognize the risks associated with each type.

Chapter III employs the second research method—the case study review. This Chapter explores Village Homes and various other examples of historic food-producing landscape movements in the United States. The Village Homes development is an important example because it is a food-producing landscape that is fully integrated into a residential community. Other historical examples show how civilizations have utilized edibles in the built environment for centuries.

Chapter IV maps the legal liabilities and public policies that help to shape the profession of landscape architecture. This Chapter investigates the responsibilities of the landscape architect from the eyes of ASLA, the profession's governing professional organization; legal patterns in U.S. case law related to food-producing landscapes; and policies from municipalities across the United States relating to and regulating food-producing landscapes.

The two methods of landscape architectural research described above are the foundation for populating a DSM of safety considerations to assist in the analysis of the integrated food-producing landscape design at East Village Monroe. Chapter V will reintroduce East Village Monroe, discuss the particulars of the site, disclose the process for creating an integrated food-producing landscape, and present a master plan for the mixed-use development.

As design professionals, understanding the risks and liabilities is paramount to protecting those encountering designed landscapes. Beyond the project at East Village Monroe, an overarching goal of this study is to advance research toward designing safe, integrated food-producing landscapes in the built environment—physically safe for public participants and legally safe for the landscape architects who design them.

DELIMITATIONS

From the aspect of safety, in general, microbial food safety protocols is outside the lens of the study. Food-producing landscape maintenance programs including protocols microbial contamination are issued by individual state agricultural departments. For example, the California Division of Agriculture and Resources publishes a thorough manual on the subject, "Key Points of Control & Management for Microbial Food Safety: Edible Landscape Plants and Home Garden Produce." Public health departments also have resources available for restaurant designers and restaurateurs to mitigate health risks.

DEFINITIONS

The intent of this section is to establish a common design language for food-producing landscapes. The reason to inventory the widely varied nomenclature of food-producing landscapes is to synthesize a design language that will help to establish the vocabulary, syntax, and media for recording, devising, assessing, and expressing design ideas for food-producing landscapes. (Archer 2005, 8).

In an effort to provide an understanding of design services to the public, contemporary designers are forging new definitions. There are a multitude of definitions for the term, "food-producing landscape." For this thesis, food-producing landscape refers to a piece of land or property designed for human interaction and cultivated for human consumption. The term food-producing landscape encompasses all three: urban agriculture, peri-urban agriculture, and rural agriculture.

Landscape functions provide specific services, often referred to as "ecosystem services" (Lovell and Johnston 2009). These can be defined as "benefits human populations derive, directly or indirectly, from ecosystem functions" (Costanza et al. 1997). Food-producing landscapes, in regard to this thesis are a type of ecosystem service and classified in a sub-category as a provisioning services. Providing food or fodder, are two examples.

Due to its widespread use in contemporary vernacular, the term "urban agriculture" is presented. The phrase urban agriculture is a bit of a misnomer. It can be seen outside the urban landscape – in more of a suburban setting. Additionally, urban agriculture can encompass more than just agriculture. Though there are many variations of the definition of urban agriculture, a central thread is woven into all of them: food-produced in a built environment. Presented here is a comparison of three sample definitions of the term.

The first sample views urban agriculture as an "industry that produces, processes and markets food and fuel, largely in response to the daily demand of consumers within a town, city, or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban waste to yield a diversity of crops and livestock" (Mougeot). This definition from Mougeot differs from the Council on Agriculture, Science and Technology (CAST) which more thoroughly includes the purpose of urban agriculture.

Second, CAST defines urban agriculture, "as a complex system encompassing a spectrum of interests, from a traditional core of activities associated with the production, processing, marketing, distribution, and consumption, to a multiplicity of other benefits and services that are less widely acknowledged and documented. These include recreation and leisure; economic vitality and business entrepreneurship, individual health and well-being; community health and well being; landscape beautification; and environmental restoration and remediation" (Council on Agriculture, Science and Technology 2013).

In the third definition, the Urban Ag Council of Georgia takes a different approach and does not explicitly mention food at all, but incorporates the sustenance benefit to humans as part of a natural system. “Urban agriculture is the creation, growth, introduction, and management of constructed landscapes designed to support and enhance natural environmental systems and a sustainable quality of life through mitigation of land altering activity” (Urban Ag Council of Georgia 2013).

It is important to disclose the multiple definitions of the term urban agriculture to understand the breadth of its use. Much of the general public will refer to the food-producing landscapes in the urban and peri-urban settings as urban agriculture, however, for determining safety risks, the two types of landscapes are differentiated.

CHAPTER II

CLASSIFICATION OF CONTEMPORARY FOOD-PRODUCING LANDSCAPES

Across academic discourse, food-producing landscapes are given many classifications—urban agriculture, agricultural urbanism, and agrarian urbanism to name a few. Each designation is a response to its urban context or its social, political, or environmental ideology. In the following discussion, two existing classification systems are presented and insights are suggested as to why they are oriented they way they are. A third classification system is then proposed for potential capability for overcoming the deficiencies of the two established systems. Examples of food-producing landscapes for each classification are provided. Each type of food-producing landscape is derived from the urban planner, designer, or theorist who coined the word.

Tables 2.1 and 2.2 set forth spectrums of food-producing landscapes from two different perspectives. The first is organized from the pedestrian-scale; the second is from an urbanism perspective. As the graphs suggest, there are no clear boundaries between food-producing landscape types within each classification system as types are often suitable for multiple categories. Just as food-producing landscape classifications blur the boundaries between city and country, the issues addressed by food-producing landscapes overlap and interconnect (Mougeot 2006). The Chapter culminates in the call for a new classification: performance-oriented. The intention of creating a new classification is to address the faults of the two existing theories and to form one which possesses greater considerations for public safety.

PEDESTRIAN-ORIENTED CLASSIFICATION

Pedestrian-oriented food producing landscapes or "Agricultural Urbanism" as Porter refers to it, "parallels the urban transect through a planning and design approach" (Table 2.1) (Porter, 116). Through a "context-appropriate design strategy," Agricultural Urbanism (AU) attempts to organize agricultural landscapes based on program (function) and scale (form). Porter states, "By design, Agricultural Urbanism is organized around more pedestrian-scaled systems in the exploration of similar relative scales, comparing hierarchies of urban design with human-scaled agricultural production units." The human scales range from the "yard" for the kitchen garden to the "pedestrian-shed unit" or "section" encompassing large-scale agricultural operations. Food production for spaces along the spectrum is based on "two fundamental dimensions: the size of the human body (comfortable working positions) and the 100-foot, 30-meter, row" (Porter, 117). Porter explains the essence of a pedestrian-oriented scheme as, "the layering of systems and programming, based on a fundamentally human-scaled relationship with productive landscapes, affords Agricultural Urbanism tremendous opportunities for placemaking, perhaps the most tangible and enduring form of sustainable design" (Porter, 118).

As the name suggests, a pedestrian-oriented classification puts great emphasis on the pedestrian. Herein lies a problem: not every pedestrian is the same. Each pedestrian is different with a unique range of mobility. Additionally, considerations for safety must also reach those bound to wheelchairs. With the increasing number of personal mobility devices, such as electric scooters, a person's pedestrian shed may fluctuate throughout a person's lifetime. Therefore, safety in the food-producing landscape using a pedestrian-oriented approach must be evaluated by each individual it is intended to serve.

Urban Program, Unit, & Scale						Agricultural Program, Unit, & Scale
Complete range of urban services: live, work & play: access to regional transportation network & park system	**Pedestrian-shed**	**from regional planning to placemaking>>**	**160+ acres**	**from the human body to the place >>>>**	**Section**	Complete range of crops, including production at scale of grains, legumes, livestock & dairy; forestry viable
Pedestrian-friendly mix of land uses & services, including neighborhood scale commercial, social gathering spaces	**Neighborhood**		**40+ acres**		**Quarter Section**	Small scale grain & livestock production; specialty forestry products; fully diversified "homestead"
Mix of housing types; pedestrian circulation to access larger neighborhood services/amenities	**Block**		**5+ acres**		**Farm**	Commercial orchard operation; scale affords wholesale market potential of variety of crops
Designated land use, defining neighborhood "function," open space	**Site / Parcel**		**1+ acres**		**Large Garden**	Mixed produce & small fruit production; small scale orchard; typical "farm unit"
Residential / Commercial unit(s); access	**Lot**		**1/8+ acres**		**Garden Plot**	Micro-share CSA; specialty crops
Open space / Recreation	**Yard**		**400+ sq. ft.**		**Row**	Kitchen gardens

Table 2.1: Edward Robbins Porter "Urban & Agricultural Programs by Unit and Scale"

URBANISM-ORIENTED CLASSIFICATION

Andres Duany and the firm Duany Plater-Zybeck published “Garden Cities” in 2011 which takes an urbanist approach. The book proposes combining natural and social diversity through various development-to-open space ratios along a rural-to-urban transect (Duany 2011). The “Agrarian Transect,” introduced in the book, serves as an analytical tool and a method for organizing the built environment that can be administered similar to zoning (Duany 2011). Like Porter, Duany refers to the effort of food-production in the landscape as Agricultural Urbanism (AU). Though Duany’s AU describes a different landscape than Porter’s AU. By Duany’s definition, AU refers to settlements equipped with a working farm. “The agriculture is economically associated with the communities’ residents and businesses, but it is not physically or socially integrated” (Duany 2011, 8). One of the key differences in Duany’s theory of AU, is the “transect of food production" which correlates to the level of mitigation demanded by the amount of land consumed (Duany 2011). Examples include two developments discussed in the next Chapter, Ebenezer Howard's Garden City and Village Homes.

Duany's transect closely follows Von Thunen's theory of bid-rent curves from the urban core which helps to define and delineate land use (Boone and Modarres 2006, 55). Von Thunen's theory suggests the most productive activities will thus compete for the closest land to the market and activities not productive enough will locate further away (Fujita and Thisse 2002, 43). However, as Boone and Modarres point out, "While an elegant theory, the reality is different as the bid-rent curve is interrupted by natural features such as rivers or undeveloped land or a collective decision to protect land for specific uses, such as paths." One example of land use that causes "interruption" in the urban-oriented classification system is the greenway. This point is illustrated with stories of exotic wildlife that follow greenways to the very doorstep of the urban core and, in some instances, live within it.

Urban Program, Unit, & Scale						Agricultural Program, Unit, & Scale
Wilderness condition & unsuitable for development	T-1 Natural	from unmanaged to intensely managed>>	LEAST DENSE	from urban to rural >>>>	Rural Ag	Foraging
Sparely settled; uses: woodland, farmland, irrigable desert. Typical buildings: agricultural buildings	T-2 Rural		LESS DENSE		Rural Ag	Tractor farms; Hand tended farms & orchards
Low-Density residential areas, some retail.	T-3 Sub-urban		MED. DENSITY		Periurban Ag	Hand tended farms & orchards; front yard gardens; rear yard gardens; community and allotment gardens
Mixed-use, primarily residential. Many building types: shops, houses, rowhouses, small apartment buildings	T-4 General Urban		DENSE		Intraurban Ag	Front yard gardens; rear yard gardens; community and allotment gardens; Roof Gardens, Balcony Gardens, Window Gardens
Higher-density, mixed-use buildings with shops, offices, rowhouses, and apartments.	T-5 Urban Center		MORE DENSE		Intraurban Ag	rear yard gardens; community and allotment gardens; Roof Gardens, Balcony Gardens, Window Gardens
Mixed-use with greatest density and building height. Only large towns & cities have Urban Core Zones.	T-6 Urban Core		MOST CORE		Intraurban Ag	Roof Gardens, Balcony Gardens, Window Gardens

Table 2.2: Andres Duany & DPZ "Food Along the Transect"

PERFORMANCE-ORIENTED CLASSIFICATION

Developers and municipalities alike are increasingly requesting landscape architects to design food-producing landscapes, most notably marketed under the moniker “urban agriculture.” However, the term does not paint the entire picture of food-producing landscapes in urban environs. Industries on opposite ends of the economic spectrum are branding their offerings as urban agriculture. On one end of the spectrum are the commercial landscape industries. Three major associations of landscape and irrigation contractors in Georgia, the Metro Atlanta Landscape and Turf Association, the Georgia Sod Producers Association, and Georgia Turfgrass Association, have consolidated under one name, the Urban Ag Council. On the other end of the spectrum are locally based guerilla gardening units, popular in London and New York, which sometimes illegally, and usually by the cover of night, transform blighted urban areas into edible oases.

Because of the unique considerations each presents, this thesis places food-producing landscapes in a performance-oriented classification system into three categories: urban agriculture, peri-urban agriculture, and rural agriculture.

Defining urban agriculture is complicated by the fuzzy and imprecise definition of “urban” and the difficultly of determining where “urban” begins and ends. The interrelatedness of urban agriculture with the ecology, and fiscal and social economies of cities forges a distinct but complementary role to peri-urban agriculture and rural agriculture.

According Mougeot urban agriculture is the cultivation of landscapes to produce food for human consumption and fodder for animal consumption within the urban context (Mougeot 2006). Urban agriculture can entail the growing, processing, and distribution of food and non-food plant and tree crops as well as the raising of livestock, directly for the urban market within the urban area. This definition deviates from Mougeot’s original definition of urban agriculture by not including peri-urban areas. Application of urban agriculture includes crop and animal production in backyards, farming on rooftops, in window boxes, on roadsides, beside railroads, beneath high tension lines, within utility rights of way, in vacant lots of industrial estates, and on the grounds of schools, hospitals, prisons, and other institutions, as well as aquaculture in tanks, ponds, and pens in rivers (Mougeot 2006).

Peri-urban agriculture is found in suburban areas at the urban-agricultural edge. This "edge" occurs in areas where the distinction between town-like and farm-like is less defined. Historically, peri-urban areas were sources of fresh fruits, vegetables, and dairy and meat products as these areas around many large American cities have the soil to produce a broad array of food products (Lyson 2004). As cities expand, they frequently engulf nearby small towns and farms and, in these peri-urban areas, some residents continue to farm whatever land is left. In some instances, urban dwellers seek refuge in small plots of land on this urban fringe, either shuttling out weekly or spending an extended period of time there to tend the crops during the growing season. Howard's Town-Country, the Schrebergarten plots in Germany, Duany's Agricultural Urbanism, and Village Homes in Davis, California are examples of a peri-urban agriculture. Some contemporary neotraditional neighborhood developments such as Serenbe in Chattahoochee Hills, Georgia or Farmstead, just outside the urban fringe of Montgomery, Alabama blend traditional amenity packages with agriculturally related activities in an attempt to lure potential home buyers. Similarly, the developers of EVM are exploring a food-producing landscape program central to their offering, as exhibited in the design study example in Chapter V. Unlike agro-centric communities like Serenbe and Farmstead where agriculturally related activities are sequestered to a portion of the development, EVM's food-producing landscape is fully integrated into the entire landscape of the site.

Many definitions of urban agriculture in the nomenclature of food-producing landscapes include peri-urban areas. However, Boone and Modarres challenge these definitions, suggesting that there should be a distinction between urban agriculture and peri-urban agriculture. "If urban agriculture is to be treated as something extraordinary, or as different from typical farming, it should refer to farming activity within the built-up areas of cities, in places where one would not expect farming to occur" (Boone and Modarres 2006, 89).

CLASSIFICATION SUMMARY

Classification of food-producing landscapes in regard to where, how big, and who is involved, is becoming increasingly complex as new theories and classifications have recently been posited by leading urban design academics and theorists.

Urban-oriented food-producing landscapes as a classification strategy is difficult because defining a level of urbanism is difficult. An urbanism-oriented scheme seems to identify issues with scale and intensity of farming but does not respond well to a city's movement becoming more closely tied to the ecological system. By definition and its classification system, an urban-oriented scheme ignores the necessity of greenways and ecological corridors in penetrating the urban core. Pedestrian-oriented design, on the other hand, addresses issues of basic human needs such as the importance of the human experience and place-making; however, it fails to recognize that pedestrian sheds are different for everyone.

Filling the gaps in both the pedestrian-oriented and the urbanism-oriented classification of food-producing landscapes, the introduction of a new theory of a classification, one following a model of productivity, seems like a logical evolution. If in pedestrian-oriented classification the size of the farm dictates what is grown and in an urbanism-oriented classification, density and urban form dictates what is grown then in a performance-oriented classification, what *amount* can be grown dictates *how* it can be grown. A performance-oriented classification of food producing may prove to be a classification that can respond to public safety concerns while enabling the benefits of food-producing landscapes in any environment.

CHAPTER III

U.S. HISTORY OF FOOD-PRODUCING LANDSCAPES URBAN AND PERI-URBAN ENVIRONMENT

Interest in food-producing landscapes is not a new phenomenon, however, the idea that much of the human population grows fruits and vegetables near their dwellings might seem foreign to modern American society. For many developing countries, urban agriculture is more of matter of economic value or daily nutritional necessity than of recreational benefit or aesthetic preference (Viljoen 2012, 97) (Lewcock, 1996). For example, in Chinese cities as a whole, 85 percent of vegetables consumed by residents are produced within the limits of those cities. Some Chinese cities, including the populous cities of Shanghai and Bejing are fully self-sufficient in vegetable production (Viljoen 2012, 97) (Hough, 1995).

In literature, food-producing landscapes can see throughout human history. In the book of Genesis, the Garden of Eden is described as the place where God placed beautiful trees that produced delicious fruit. Examples of food production in important seats of power include early formal gardens which adopted the “shape” of Eden as described in the Bible. In France, just outside of Paris at Versailles, Louis the XIV held many illustrative festivals and parties for his garden’s visitors. During events fruit trees were placed in large vases in the great *allées* of the garden. One walk lined with Portugese oranges, another with cherry trees, a third with apricots and peaches, a fourth with currant bushes from Holland, and the last with various sorts of pears (Thompson 2006, 147). Fruit-laden trees were temporarily placed along major circulation routes for the events then moved to more suitable locations after the parties concluded.

Long before “sustainability” became part of the contemporary design vernacular, most cities established themselves on extremely fertile ground. In major cities of pre-Industrial Revolution America, livestock could be seen roaming and grazing in common areas deep within the urban core. Boston Commons in Boston, Massachusetts was designed to be a common area for grazing cattle. In Athens, Georgia the black, cast iron steel fence which divides the University Georgia campus and the city is a reminder of a time when cattle were once seen as a threat to the green grass of the north campus's quadrangle.

In the U.S. prior to the nineteenth century Industrial Revolution, without the aid of high capacity transportation vehicles or preservation techniques such as refrigeration, food had to be consumed near where it was grown (Viljoen 2012, 97). In Savannah, Georgia, city founder James Oglethorpe's Plan for Savannah understood the basic need for a civilization to have access to food when he planned the city in 1733. Oglethorpe established a hierarchy of green commons within a pedestrian shed—from the backyard herb garden to the common square's community garden to the district park to the rural hinterland. The spatial hierarchical arrangement connected all dwellers through accessibility. Each open space was multi-purposeful—responding to social, military, environmental, and philosophical needs (Reiter 2004). A coexistence of homes, markets, public buildings, and sacred places were interspersed with kitchen gardens, farms, and common grazing land that delivered food for the settlement's population. Oglethorpe's plan remains one of the most studied urban designs in the world and he continues to be an influential figure for many planners and designers. Ebenezer Howard, a city planner and innovator, whose work is presented later in the Chapter, also incorporated notions of agricultural planning in his urban designs.

The nineteenth century Industrial Revolution in the West marks a period of great population shift to urban centers, and since this time food movements in the urban landscape can be seen in a cyclical pattern. These movements are commonly tied to a particular event or events, political climate, or economic condition. In this Chapter, examples of historical food movements are examined, including the surrounding conditions that may have created them, the designers or organizers behind them, and the theorists who advocate their existence in the built environment.

Post-Industrial-Revolution America has seen agricultural practices creep back into the confines of urban environments at certain moments in history. These moments are represented by movements that captivate a generation of people growing food in the urban landscape. Reasons for needing productive gardens vary with the socio-political, economic, and environmental conditions surrounding each movement (Figure 3.1). More often than not, the biggest stimulus for urban food production has been war (Viljoen 2005). The following Chapter is a brief introduction to a few movements in America and abroad including indications to the crux of their creation.

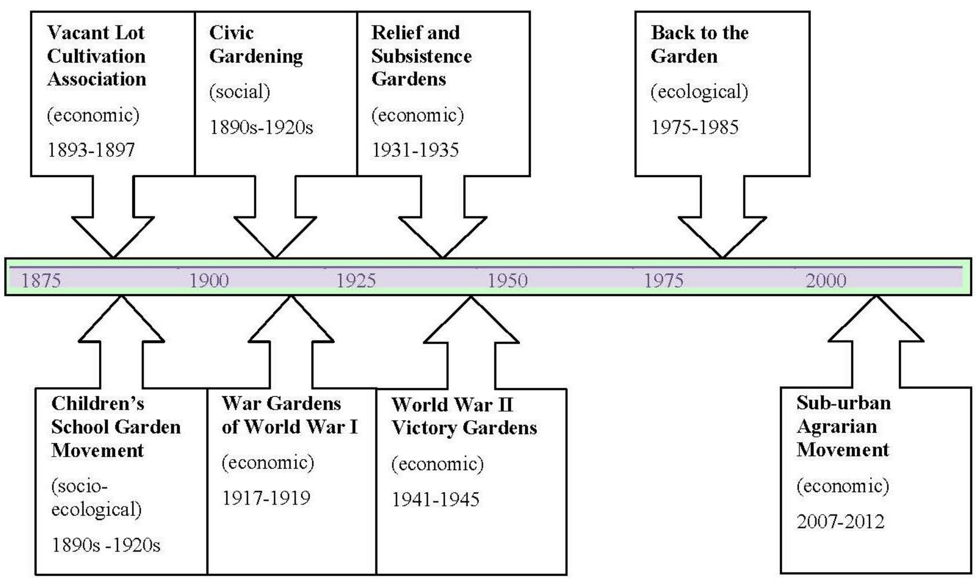


Figure 3.1: Timeline of Urban Garden Movements in America

GARDEN CITY MOVEMENT

"At last, the industrial town's indifference to darkness and dirt was exposed for what it was, a monstrous barbarism" (Mumford 1961, 476). With nineteenth-century industrial achievements and the increased density in towns and cities came repeated outbreaks of malaria, cholera, typhoid, and distemper. The city became dark, smoky, and dirty. Families slept next to the sounds of the larger manufacturing machines and communities became fragmented in the wake of capitalism. "Thus the city, from the beginning of the nineteenth century on, was treated not as a public institution, but a private commercial venture to be carved up in any fashion that might increase the turnover and further the rise in land values." (Mumford 1961, 426). It was not long before city dwellers demanded a higher grade of hygiene, municipal responsibility, and protection of the rapidly declining natural resources. "To bring back fresh air, pure water, green open space, and sunlight to the city became the first object of sound planning…" (Mumford 1961, 476).

Concerned with the social ills of London, former English court reporter Ebenezer Howard set out to change the wrongs of the industrial metropolis. In 1892, Howard proposed his ideas for solving the urban blight to the public where he was heavily criticized. It was not until 1898 when a friend from America gave him the financing to publish his book "To-Morrow: A Peaceful Path to Real Reform." A year later he was contacted by a prominent lawyer in London who introduced him to George Cadbury and W.H. Lever (Schaffer 1982, 17). Cadbury and Lever, two philanthropic capitalists, understood the plight for housing reform and proposed utopian villages as a solution. Both were willing to give Howard the capital he needed to finance his vision. In 1902, after significant revisions, the book was reprinted with the title "Garden Cities of To-morrow."

Before Howard's ideas came to fruition, there were two alternatives–town life or country life. You were either a farmer in the agricultural fields or a factory worker trapped in the confines of the smoke, odor, and dust of the city. The Garden City, however, became "a third alternative, in which all the advantages of the most energetic and active town life, with all the beauty and delight of the country…the spontaneous movement of the people from our crowded cities to the bosom of our kindly mother earth" (Howard 1965, 49)**.** Howard carried with him a diagram to explain his concept that he entitled "The Three Magnets," consisting of Town, Country, and the newly created Town-Country (which was to be the location of his Garden City.) The Town galvanized economic capital, the Country possessed an intrinsic bucolic beauty, while the advantages of the Town-Country are seen to be free from the disadvantages of either" (Howard 1965, 47)**.**

In his book "Garden Cities of To-morrow," Howard describes the physical nature of the Town-Country. The book codified the size of land needed for a Garden City and the proportion of lands set aside for industry, commerce, and residents. Howard also prescribed transportation plans. "Six magnificent boulevards–each 120 feet wide–traverse the city from the centre to circumference dividing it into six equal parts or wards" (Howard 1965, 51)**.** On the edge of town one would find the "Grand Avenue," a 420-foot-wide green belt that would house public schools, playgrounds, gardens, and churches of all denominations. Target population numbers were also provided: "about 30,000 in the city itself, and 2,000 in the agricultural estate" (Howard 1965, 54)**.** Howard spoke of an outer ring, a place where the industrial efforts were concentrated. He suggested that the separation of uses created an arrangement that would increase production efficiencies and a reduction of traffic congestion. He would continue to offer his solutions to urban problems by applying "the best systems adapted for various purposes" (Howard 1965, 55)**.**

In 1903, 35 miles north of London in North Hertfordshire, England, a small investment company broke ground on what was to become the world's first Garden City. Architects Barry Parker and Harry Unwin were commissioned to create the master plan for the new community–Letchworth Garden City was to combat the social ills and urban deterioration created by the Industrial Revolution. The new Garden City was meant to be run by a nonprofit public body and reinvest all taxes and fees generated through the 5,500 acre estate for the further development of the city. Their mission was, "To create, maintain and promote a vibrant, quality 'environment', for all those who live in, work and visit the world's first Garden City" (Letchworth Garden City Heritage Foundation).

Howard's efforts were not without critics. His belief that science and technology could assist the social progress of the age caused Jane Jacobs to doubt the methodology. "Howard attacked the problem of town planning much as if he were a nineteenth-century physical scientist analyzing a two-variable problem of simplicity. The two major variables in the Garden City concept of planning the quantity of housing (or population) and the number of jobs" (Jacobs 1961, 435). Jacobs goes on to describe this as a closed system unable to cope with the mass number of variables that are created by people's needs.

As Hall and Ward point out in the 2003 edition of "Garden Cities for To-Morrow," Howard intended the Garden City to be far more than a town; to him it was the physical iteration of a "third socio-economic system" which was superior to both industrial capitalism and communism in that it would be a true exercise in Krotophkin's idea of anarchist cooperation in which local self-government would assume fiscal control of the community instead of remitting taxes to a central government (Howard, 2003) (Walker, 81).

Although only one other community was constructed strictly following Howard's "Garden City" outline, his concept left an indelible mark on American regional planning. Though physical safety within the food-producing components of Howard's Garden Cities are not specifically mentioned, it is noteworthy to recognize his contributions to forging ideas of how agriculturally related activities could be integrated into residential developments in the peri-urban realm.

SCHREBERGARTEN

Schrebergarten plots were community gardens developed as a social program in nineteenth-century Berlin by Dr. Daniel Gottlieb Mortiz Schreber. The garden plots were intended to provide a place for active recreation for youth and to serve as an educational tool for the basics of gardening. Residents were allotted plots in a green belt along the periphery of the city. In the wake of World Wars I and II, many Germans sought refuge in these small garden cottages and relocated there permanently (Haeg 2008, 19). Since 1983, the Bundeskleingartengestz, or Federal Small Garden Law, policy has served to regulate the size, operations, and aesthetic qualities (e.g., color and style) of garden shelters one is allowed to keep on a plot. Maintenance programs like mowing and tilling with large machinery is also regulated by this policy. Today, there are still about 1.4 million allotment gardens in Germany covering an area of 470 square kilometers.

ST. ANNS ALLOTMENTS

Though the exact date of the establishment of St. Anns Allotment gardens in Nottingham, England is unknown, the first documented enclosure of the land at Hungerhills is recorded in 1604 when 30 burgesses rented plots of two to three acres for a rent of £15 a year. Due to the high cost of fencing and the propensity of crop-devouring deer, the rent was reduced to £13 the following year. The St. Anns Allotments and 670 individual gardens connected by three sites—Hungerhill Gardens, Stonepit Coppice Gardens and Gorsey Close Gardens are the largest detached town garden in Britain and possibly the oldest existing allotment gardens in the world (Allotments, 2012).

By the 1830s, the individual allotments provided space and opportunity for those who lived in the city to grow their own food and escape the confines of the urban life. They were used and enjoyed by working class urban dwellers without space to grow gardens. Many people had vacation houses on their garden plots and the plots were places of leisure. Through times of economic depression and war the allotment gardens were used more out of necessity than pleasure as families would spend more time growing their own fruits and vegetables (Allotments, 2012).

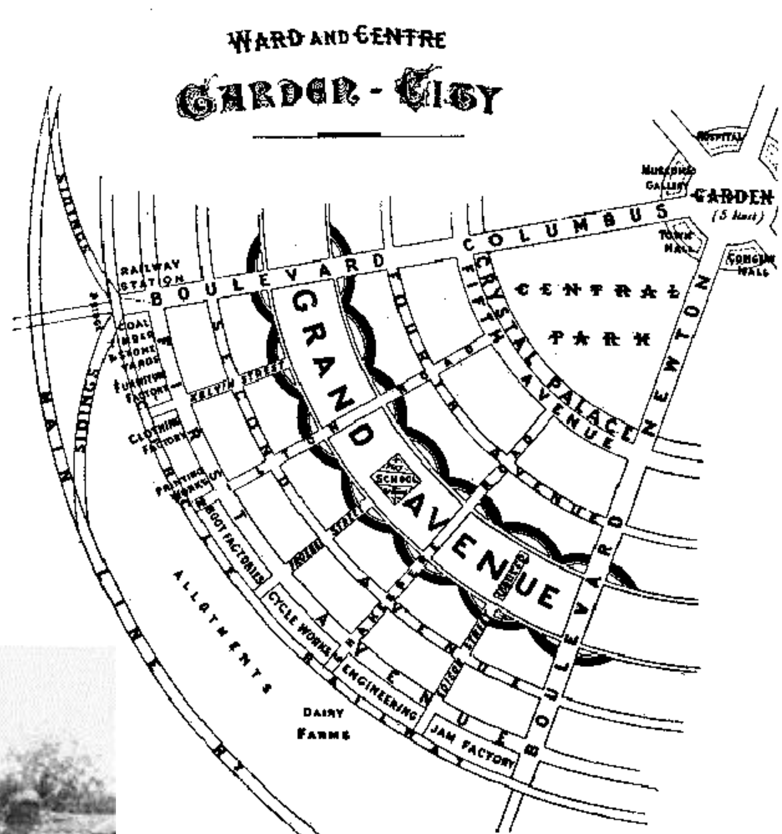
VICTORY GARDENS

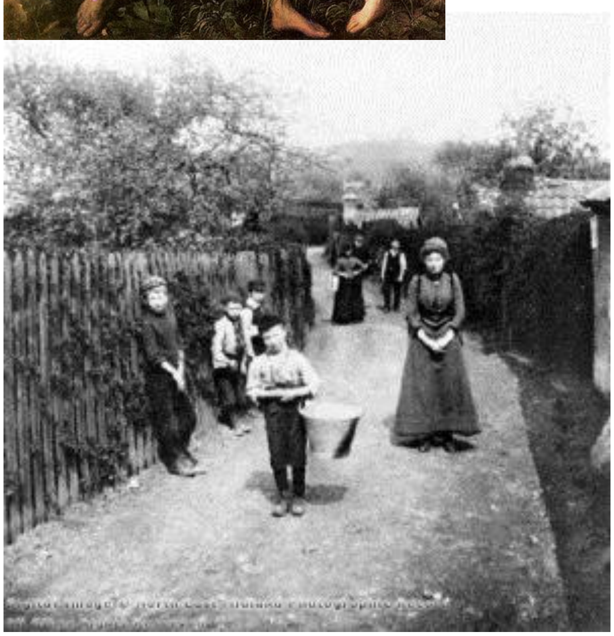
Like all wars, the demands of World War II placed a heavy burden on American resources, especially food resources. Farmers were drafted to serve in the military thereby reducing food production for citizens. The remaining farmers produced food for the military and little was left for civilian families. President Franklin Roosevelt mounted a campaign to encourage Americans to grow food on their own properties in suburban and urban communities. By the end of World War II, over 80% of American households were growing foods of their own (Haeg 2008, 18).

BACK TO THE GARDEN MOVEMENT

In the 1970s in America, new interest in community gardening grew as an expression of urban activism, a new environmental ethic, and in response to social unrest. Garden programs emerged, such as New York's Green Guerillas and Boston Urban Gardeners (BUG) (Boston Urban Gardner: Recorders, 1976-1989, 2012). In 1976, the USDA sponsored the Urban Gardening Program that established urban offices to promote vegetable gardening and community gardens in 16, and later 23, cities (Lawson, 2000). BUG began in 1976 as a voluntary association of community leaders and garden organizers from the South End, Roxbury, and Jamaica Plain, and quickly grew into a staffed organization with a number of funding sources. The belief that "urban gardening contributes significantly to good mental health and nutrition, urban neighborhood vitality, aesthetics, and environmental enhancement" led BUG to serve as a resource for and to work on a variety of projects with people in low-income communities throughout Boston. BUG also worked with the Boston Housing Authority, Massachusetts Department of Food and Agriculture, and other government and community organizations (Boston Urban Gardeners: Recorders, 1976-1989, 2012). One of the organization's initiatives related to public safety in a food-producing landscape is its involvement in educating people about how to reduce the risks of heavy metals in the urban landscape. In 1978, the National Center for Appropriate Technology (NCAT) granted funding to BUG to write a handbook on heavy metals. BUG created a Toxicity Task Force in 1977 and joined the Ad Hoc Task Force on Heavy Metals with the Suffolk County Extension Service, the Massachusetts Department of Food and Agriculture, and other groups (Boston Urban Gardeners: Recorders, 1976-1989, 2012). The task force and BUG worked on a soil testing project and prepared instructions for soil testing and safe gardening.

Post-WWII Detroit has benefitted from the support of a variety of federal and local programs supporting food grown in the urban context. These programs include the USDA's Expanded Food and Nutrition Education Program of the 1970s and 1980s and the Community Food Projects Competitive Grants Program that was formed in 2006. The Farm-A-Lot program, started in 1975, was run by the city's recreation department until budget cuts terminated the program at the turn of the century. The Program offered tilling assistance, seeds and transplants, and gardening advice to local gardners. Other grassroots groups spawned in Detroit to support urban agriculture including: the Garden Angels, which organized the intergenerational transfer of skills and knowledge; the Detroit Agricultural Network, which organized networks for sharing resources; and more recently, the Garden Resource Program Collaborative, the D-Town Farm, and a myriad of other organizations created to develop gardens, offer training and resources, and organize gardeners to build their capacity through innovative agricultural methods and market gardens.





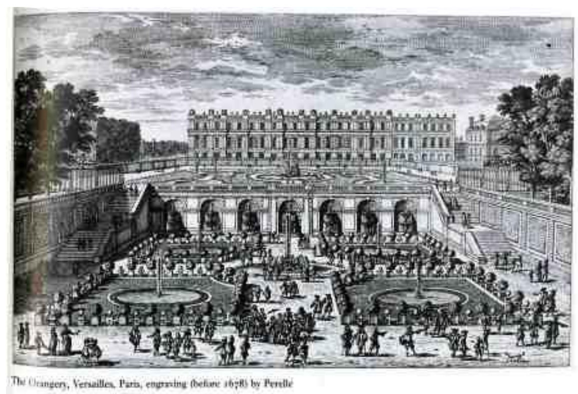


Figure 3.2: (Clockwise from top left): The Garden of Eden, Figure 3.3: E. Howard's Garden City with allotments integrated into the urban fabric, Figure 3.4: Court of Oranges at Versailles, France, St., Figure 3.5: Anns Allotment gardens.

VILLAGE HOMES

Rooted in the "nurture in nature" era is the project of Village Homes, a 242-unit development in Davis, California, 15 miles from Sacramento. Constructed from 1974-1976, Village Homes is the brain child of landscape architect and town planner Mike Corbett and his wife, Judy. Stemming from the environmental movement of the early 1970s, innovative concepts went into the Corbetts' planned unit development. The program for Village Homes is a catalog of best practices in environmental planning and design, not just for 1970, but for today. The plan includes passive solar home orientation, large common spaces, an open decision-making process for residents, storm water drainage channels, and a food-producing landscape.

Village Homes has been critically acclaimed by the press and academics. Literature abounds on the various aspects of Village Homes including, but not limited to, the physical design, the social dynamics, and economic status of the development. In 2001, Village Homes was one of three prototype case studies for the Landscape Architects Foundation's newly founded Land and Community Design Case Study Initiative series. This series was designed to promote an in-depth, multi-dimensional approach to case studies and to provide for uniformity in format and method. The approach combines observational, attitudinal, archival, historical, and quantitative methods in a concise report, easily accessible for students and professionals.

Witten by Mark Francis, "Village Homes: A Case Study In Community Design" accomplishes three objectives: it is a synthesis of existing information and literature on Village Homes; it shows the project's significance for landscape architecture and urban design showing the importance so it can be replicated in the future; and it provides a critical review of the project so that future researchers can learn from both the project's successes and failures.

One limitation of the design of Village Homes is the blurred boundary between public and private realms (Francis 2003, 36). Several types of open space are provided in Village Homes, including private gardens, common areas, agricultural lands, turf areas for sports, and landscaped areas. These spaces are described in the official publications of Village Homes produced by the Village Homeowners Association as "household commons," "greenbelt commons," and "agricultural lands." Residents hold common interest in all three types of land. Common lands are specified by the Village Homeowners

Association to be used for three purposes—enjoyment, flowers and food, and profit. The 300-tree almond orchard typifies the three-pronged approach serving as passive recreation areas, providing scenic beauty, and, almonds for sale which the residents of the community financially benefit from.

The farm-like landscape serves as a powerful symbol for the community. Without the vineyards, orchards, and community gardens, Village Homes would appear much more like a conventional development. It demonstrates that there is a value to incorporating small scale agricultural uses within existing developments, rather than the notion that farms must exist apart from where people live (Francis 2003, 37).

Much of the plant material in Village Homes is edible and includes oranges, almonds, apricots, pears, grapes, persimmons, peaches, cherries, and plums. "An important advantage of neighborhood agriculture is that it allows for a healthy ecological balance that cannot be maintained in large-scale, single-crop plantings. Because the plantings of any one species are small and separate, they do not encourage pests and diseases to spread. This makes it possible to avoid costly and environmentally destructive pesticides and to use natural controls instead" (Corbett 2000, 167).

Most assessments of Village Homes commend the sustainable design aspects. For its many successes and its pioneering design and planning features, Village Homes has not been without its problems. Many are minor design flaws, yet several raise significant issues for designing similar food-producing landscapes. As reported in Francis' Case Study:

> "One limitation with the design of Village Homes is blurred boundary between public and private realms. While this is responsible for much of its distinct character, with no fences between private yards and more public common areas, it has created some problems. For example, it is unclear to whom the bountiful fruit in the common area belongs. Is it the private residents? The collection of houses? The entire community? The public? Visitors and even some residents are often confused by this."

Though the right to harvest the landscape is ambiguous, the Homeowners Association's rules are clear. "Only residents of Village Homes are allowed to pick produce from the common areas. You're encouraged to introduce yourself and anyone you see picking if she or he is a resident…and you should politely explain to nonresidents that Village Homes is private property." (Village Homeowners Association 1995, 13). Without any demarcation, like fences, walls, or hedgerows defining where the private residents' property lines start and common areas begin, residents and visitors do not clearly understand it is permissible to enjoy the fruits of the landscape. The Village Homeowners Association does discourage residents from harvesting from other residents' common areas with signage: "Please do not pick fruit from household commons unless you see a sign inviting you to pick, and always honor signs requesting you not to pick" (Village Homeowners Association 1995, 13). Residents of Village Homes are encouraged to place signage in their yards, letting other residents and visitors know if they are welcome to pick the fruits of their private landscape or not.

Though Village Homes is seen by many as a model of a sustainable landscape, Robert Thayer, a USC Davis professor and twelve-year resident suggests otherwise, "Village Homes is not an ideal sustainable landscape...Considerable food is grown in local agricultural greenbelts and gardens, but not nearly enough to sustain the community" (Hamrin 1980 as reported in Francis 2003, 104). Francis goes on to report that the food-producing landscape of Village Homes reduces residents' food bills by approximately 25% each month.

FOOD FOREST

In 2011, the community of Beacon Hill in Seattle, Washington received a Small and Simple Neighborhood Matching Fund award to hire a design professional to engage the community in a design process and craft a community maintenance plan for the creation of a "Food Forest." (Beacon Food Forest). Registered landscape architect Margarett Harrison of Harrison Design was retained by the community to serve as the architect of record for the project. The project program includes an edible arboretum, a berry patch for canning, a nut grove, a community garden and a kids area.

Harrison's plan will address slope, the movement and capture of water on site, and regeneration of the soil. "The concept means we consider the soils, companion plants, insects, bugs—everything will be mutually beneficial to each other," says Harrison (Leschin-Hoar 2012). Elements in the plan will also include plant guides and interpretive educational signage. The first phase of the construction was completed in the fall of 2012. A post-occupancy review may bring to light new safety considerations for the designs of future food forests.

SUMMARY

Peaks and troughs in the interest of food-producing landscapes can be seen through time with each movement having a particular catalyst sparking its inception. From a social perspective, high concentrations of pollution for city dwellers in the nineteenth century rendered an unpleasant experience and had a damaging effect on the quality of life. To combat the social ills of the age, Fredrick Law Olmsted, Ebenezer Howard, Daniel Shreber, and others saw the need for preserving green and open spaces where people could escape the smog, dirt, and pressures of the city; places that were natural and nourished body and spirit. From an economic perspective, all people in cities need to eat and all cities need farms to feed their inhabitants. The demand for foods in urban cores is tied to the supply of resources granting access to the hinterlands, where land and food production are. When resources to grow and transport food from the outlying areas to the downtown are insufficient, local food activity is spawned. Further, as in the Victory Garden movement, the mass mobilization of small gardens freed valuable resources for the World War II effort.

From an ecological perspective, catalysts for a food-producing landscape can change with the season as well as the generation. For example, the Schrebergartens have served generations of Germans for different reasons. What once started as a social movement became a matter of survival in the wake of World War II and is now seen as an ecological corridor for migratory birds and part of the green infrastructure of the Germany's urban environments.

Not all of the case studies presented will directly add to the bank of considerations that the matrix utilizes. However, historical references to planned food-producing landscapes within the fold of the urban environment show how important these types of landscapes have been for each of the populations they served to society and therefore the case could be made that someday in the future a need may make the inclusion of food in the landscape of the urban or peri-urban environment important again.

In particular, Village Homes and the Seattle's Food Forest project provide valuable case studies to build a matrix of food-producing landscape design. These case studies provide examples of how the landscape architect can design boundaries that definitively express the realm of owernship without diminishing the aesthetic quality of the open space. The back to the garden movement and its organzied associations like BUG in Boston show the concerted effort of gathering and distributing information about the safety of growing food in potentially contaminated site. Considerations like these are used to populate the matrix.

CHAPTER IV

SAFETY CONSIDERATIONS IN FOOD-PRODUCING LANDSCAPE DESIGN

Landscape architects must design for the safety and prevention of irreparable harm for the public (ASLA), yet representation of food-producing landscape design is not included in the knowledge and skills and tasks required of landscape architects that affect the health, safety, and welfare of the public as defined by the Council for Landscape Architecture Regulatory Board (CLARB). Further, policy is yet to be articulated by ASLA pertaining to this issue. As landscape architecture expands the purview of its services, how might an ASLA-sponsored design protocol mitigate harm and serve public safety with regard to food-producing landscapes?

Landscape architects design spaces that can profoundly affect the physical environment. In the case of Matter of Geiffert v. Mealey, the court characterized landscape architecture as “a profession embracing a field of highly technical and specialized knowledge and activities between the professions of architecture and engineering” (Matter of Geiffert v. Mealey, as quoted in Schatz 2003, 6). When performed by negligent, incompetent, or unethical practitioners, landscape architects have the potential to cause serious personal and environmental injuries (Schatz 2003, 4).

As landscape architects begin to market design services for food-centric landscapes it is important to understand how the policies governing the profession will apply to the food-producing landscape. Select cases cited in ASLA’s findings for the appropriateness of national regulation for the profession of landscape architecture are presented in this section. Though some of the cases presented do not specifically involve food-producing landscapes, the implications are the same, warranting further studies to understand and identify related risks in food-producing landscapes. The presentation of these examples of design negligence and how they might apply to a classification of food-producing landscapes aid in the construction of the matrix's framework for analyzing safety for a food-producing landscape of EVM**.**

This Chapter specifically focuses on incidents of injury that could have been prevented through the consideration of potential harm by the landscape architect. These case studies and vignettes illustrate the necessity and process of generating safety considerations for the matrix.

INVENTORY

Designing for safety in the food-producing landscape begins with site inventory. Site inventory is important for all landscapes, at all scales. During the due diligence period of the design process it is important for a landscape architect to identify the potential risks of disturbing existing conditions. Landscape architects have been liable in cases of disrupting underground utilities, geological and mining hazards, and soil contamination. "Failure to adequately investigate hazardous existing conditions has been linked to serious injury in past cases" (Schatz 2003, 39).

When planning for a food-producing landscape on a brownfield site, the EPA recommends conducting a Phase I Environmental Site Assessment. This process includes a number of steps, including a review of historical uses of the site, interviews with neighbors, and a visual inspection of the property. A Phase I Environmental Site Assessment guides the designer in determining if a site is contaminated. A further step, Phase II, continues the environmental site assessment and includes additional site review, sampling, and analysis (EPA – Brownfields 2013).

SOIL

Soil contamination can be a major risk for all food-producing landscapes, but especially in urban agricultural settings where soils vary greatly and may contain contaminants such as heavy metals and unsafe bacteria (de la Salle 2010). Before food is grown in existing soils, soils should be tested for heavy metals such as lead, cadmium, mercury, nickel, arsenic, zinc, and copper. The type of heavy metal present depends on the source: paint, gas, oil, waste incineration, lead pipes, etc. Dangers include direct absorption of toxics through ingestion (breathing and swallowing, the latter especially by children) and indirect consumption through foods grown on the land has absorbed toxins (Bellows et al. 2003).

Bellows has published a six-step strategy for mitigating the threat of toxic soils in a food-producing landscape:

1) Improving soil stability through crop planting and mulches, thereby reducing wind-born dust and the tracking of contaminated soils into homes by human feet and household pets.
2) Emphasizing the cultivation of fruiting plants (including vegetables like peppers and eggplants) rather than green leafy vegetables and tubers because the latter absorb heavy metals about ten times faster than do fruiting plants.
3) Adding compost and/or calcium to the soil to lower soil acidity and thus reducing the potential of metal "uptake" by plants.
4) Growing ornamental (for beauty, exercise, healthy cities) and not edibles.
5) Using phytoremediation; whereby using highly absorptive plant material to extract toxic elements from the soil. Such practices may prove problematic in terms of disposal of contaminated plants.

In small amounts, many trace elements like boron, zinc, copper, and nickel are essential for plant growth. However, in high concentrations they pose a serious risk to the health and safety of those who may come in contact with them. It is essential to the success of food-producing landscapes to ensure that soil is safe to grow plants for human consumption.

WATER

Water is a vital component of any landscape. It is important not only to use water wisely but also to ensure contaminants generated from food-producing landscapes do not hinder the water quality for those downstream. Historically, agricultural practices have often been abusive to water quality. The 2000 National Water Quality inventory reports that agricultural nonpoint source pollution was the leading source of water quality impacts on surveyed rivers and lakes, the second largest source of impairments to wetlands, and a major contributor to contaminations of surveyed estuaries and ground water (Water – EPA).

The mapping of water movement throughout the site's watershed will help to determine if water coming into the site could be threat to a designed food-producing landscape or affect a downstream water in a way. Urban, peri-urban, and rural farms can each generate both liquid and solid waste that may pose high risks for water sources. One way landscape architects can mitigate these risks to water sources, landscape architects can incorporate riparian buffer zones (RBZ) to improve water quality (Correll 1997, 7). Groundwater passing through an RBZ may be cleansed of suspended particulates, dissolved nutrients, pesticides, and inorganic toxins (Correll 1997, 7). Depending on the pathway of delivery of water to an RBZ, groundwater or surface water, the landscape architect can determine the appropriate size and structure of an RBZ to prevent water contamination. Riparian plant communities and the soils in which they grow play a significant role in the capacity of the RBZ to filter containments (Correll 1997, 7).

FLORA & FAUNA

Another important component of site inventory is the recording of existing flora and fauna. A rigorous plant inventory of the site reveals if poisonous or endangered plants exist. Failure to identify, locate, and remove the poisonous plants in a food-producing landscape could compromise the safety to the public and pose a liability for the landscape architect.

A food-producing landscape for humans must also seen as a food-producing landscape for wildlife. While increased viewing of wildlife can be an attractive amenity of a food-producing landscape, it can also interfere with human activity. For landscape architects designing food-producing landscapes, it is important to note that complications with nuisance wildlife can occur. Collisions between animals and vehicles are also a concern for motorist safety and wildlife. The University of Georgia's Wildlife Resources Division and the Department of Natural Resources of Georgia are valuable resources for identifying and mitigating nuisance wildlife. Though nuisance wildlife can occur at all scales of food-producing landscapes, it is of special interest to landscape architects to take steps to alert traversing motorists where wildlife crossings are most likely to occur. Typically these locations are where roads and the continuous ecological corridors along creeks and rivers intersect.

SITE PLAN & PROGRAM

Following the site inventory phase, the special considerations for programming and site planning must be evaluated from the perspective of food production. In a food-producing landscape a site plan can include structures to facilitate the growing, harvesting, and distributing of related structures such as tool sheds, potting stations, root sheds, compost facilities, processing facilities, and irrigation systems (de la Salle 2010, 53). A negligent layout of such site features, such as the failure to adequately restrict incompatible activities in direct contact with each other, creates risks to public safety (Schatz 2003, 23).

Plant material can pose a risk to public health and safety when site plans place human activities in close proximity to thorns, weak branches, poisonous plants, and excessive tree litter (Schatz 2003, 21). In many cases, the landscape architect will mitigate harm by locating activities a safe distance from hazardous vegetation (Schatz 2003, 21). By directing plant selection and placement, the landscape architect can mitigate the potential risk in a food-producing landscape.

Homeowners associations like Village Homeowners Association at Village Homes (Chapter III) have a choice to prohibit or permit homeowners from selecting their own landscape material to be installed on their private property. Like at Village Homes, some HOAs mandate that all landscaping modifications must be approved by the HOA. This process is typically accomplished through a design review committee either appointed or elected by the HOA. When a residential development chooses an edible landscape, it is of particular interest to the HOA to mandate that private residents maintain a relevant design standard. For example, providing information regarding the edible and inedible plants in such a landscape is important because it may be confusing to both residents and visitors.

LIVESTOCK

Due to an array of fears including the spread of disease, noise, odor, and other animal-related annoyances that affect neighbors, raising livestock in the urban and suburban context is a hotly debated component of urban agricultural policies. Livestock, in the food-producing landscape, is defined differently depending on the municipality. For the purposes of the design study at EVM, livestock is defined as animals that may be raised for their agricultural products.

Public health concerns about keeping livestock in developed areas center around the transition of harmful bacteria (World Health Organization, *Health Topics: Zoonoses* 2011). When not properly managed, animal excrement decomposes producing an odor, and increases the number of potentially harmful bacteria and flies. Further, the improper management of stormwater runoff from livestock areas can pollute surrounding water sources and attract disease causing vectors, such as mosquitoes.

BUFFERS

Currently, the dominant model of the interface between city and agricultural areas is one of buffers (de la Salle 2010, 53). Large-scale agro-business relies on heavy machinery which produces noise and dust, and uses noxious pesticides which can be harmful to those exposed. Additionally, large-scale manure-management systems can create unpleasant odors and health hazards to the public. Historically, Euclidean zoning, or the separation of how land is use (i.e. commercial, residential, industrial) creates a land buffer between agricultural use and residential use and is aimed at curbing the aforementioned issues. Euclidean buffers can be seen at the planner's macro scale. Under the landscape architect's lens, the meso scale, physical buffers look more like fences, berms, ha-ha walls, hedgerows, or simply a spatial distance that provides protection. Spatial distances can be used as buffer zones to eliminate exposure from pesticide spray drift, unwanted odors and smells, and uses like apiaries.   In addition to separating uses, buffers can visually screen, prohibit entry or exit, and provide general protection to homes, people, and ecologically sensitive areas.

Landscape architects also analyze food production features in proximity to inhabited structures for possible risks that can be mitigated. For example, as a landscape architect testified in a Michigan case, certain recreational areas and power lines should not be located in close proximity. In that case, Schulte v. The Detroit Edison Co., 213 N.W.2d 311 (Mich. App. 1973), three boys were electrocuted playing under power lines in a park. As a result, one boy was killed, another had a leg amputated, and the third was seriously injured. A matrix used to render considerations and possible conflicts between land-uses such as electrical transmission lines and other program elements might have prevented these incidents.

OPERATIONS

The use of pesticides is also a concern due to the drift that occurs both during and after application. Sprayed pesticides can drift onto nearby property resulting in unintended exposure for adjacent areas. The U.S. Environmental Protection Agency establishes policy for pesticide spray and dust drift recognizing that "pecticide applications can expose people, wildlife, and the environment to pesticide residue that can cause health and environmental effects and property damage" (US EPA 2009). In Georgia, the proposed House Bill 1317 requires posting signs when an applicator applies restricted-use pesticides in public buildings (Beyond Pesticides 2003). Another proposed bill, Georgia School Pesticide Act: HB 1042, requires a buffer zone around schools. To protect against drift, buffer zones are set at a 2-mile radius around a school's property. Aerial applications should have a larger buffer zone of 3 miles encircling the school (Beyond Pesticides 2003). Currently, Georgia law prohibits pesticide application if students are present, however there are no statewide requirements for restricted spray zones around school property (Beyond Pesticides 2003).

SIGNAGE

Landscape architects are required to be conscious of potential hazards and to make use of signage where it may mitigate the risk of injury. For example, landscape architects have been found negligent for failure to incorporate warning signage for potential hazards including areas where work is under construction (Schatz 2003, 41).

Signage in the food-producing landscape can be a useful tool for demarcating ownership realms, identifying edible and inedible plants, and granting permission for or prohibiting harvesting. The following is a brief list of how signage can play a pivotal role in keeping participants aware and informed of safety risks. The list is an expansion of one found in Janine de la Salle 2010s *Types of Signage Required in Agricultural Areas in or Near Cities*.

- *Interpretive signage* – To provide clear messages describing the differences between edible and poisonous plants and indicate when fruits and vegetables are suitable for consumption. May also provide information to the processes needed to render the edible safe for consumption.
- *Regulatory signs* – The demarcation of public and private spaces is especially important when a landscape is designed to give the impression of openness. Signage can mitigate confusion by informing people where private property begins and ends.
- *Warning and risk signs* – For example, if black bears have been spotted in an area, signage should alert visitors about what to do if a sighting occurs. Warning signage can also alert visitors when fruits have been sprayed with pesticides. A waiting period should be indicated before consumption is deemed safe which can be indicated by temporary signage.
- *Event notification and other temporary signs* – When any type of machine is in use (tractors, mowers, etc.) temporary signage should provide a warning to visitors to exercise caution or limit access as appropriate.
- *Wayfinding, directional signs or markers and site maps* – Allergens in the food-producing landscape could affect those vulnerable to reactions. Directional signage could provide users to plan a route that avoids possible hazards to their personal safety.
- *Kiosks at major points of entry* — Kiosks located at major points of entry to a food-producing landscape can be a useful tool to convey helpful information to the public. Kiosks should be easily understood by all participants, especially those with less experience with food-producing landscapes.

ATTRACTIVE NUISANCE

An attractive nuisance can be created by not securing agricultural-related facilities. For example, machinery and equipment, ponds, animals, and work projects in progress can all present potential hazards for visitors. It is important that visitors are excluded from certain areas by fences or other barriers, and that they are informed of the risks that they face by wandering into these restricted or hazardous areas. Structures should be secure when located in sites accessible to the public.

CHAPTER V

MATRIX IMPLEMENTATION: EAST VILLAGE MONROE

Based on a designed food-producing landscape composition at EVM, the spatial arrangement, configuration, and management of features in a peri-urban setting can be analyzed for safety considerations. The design study at EVM provides an opportunity to analyze a food-producing landscape for potential hazards to public participants. Although this design study was developed in Monroe, Georgia, zone 8a, the design matrix rendered from this design study may benefit food-producing landscapes in other locales and zones as well.

Each community development program element in conjunction with a food-producing program element brings an array of possible conflicts to review for safety measures. Considerations are reviewed with three lenses: notification through information and signage, design which includes plant selection and placement, and operations. By using the matrix, the process of identifying potential hazards is imbedded in the design process. The design process in this example begins with the inventory, then proceeds to the analysis, and culminates in the producing of a master plan which indicates the location of community development program items as well as food-producing program elements. During the master plan process, the matrix is constructed and used as a tool to evaluate the relationship between community development and food-producing program elements. As the design vignettes were produced, considerations from the matrix were used to analyze the particular situation they pertained to. These considerations rendered from the matrix were applied to the vignettes and the design then responded to each consideration. For instance, the distance of structural wiring in the vineyard from the circulation route will differ based on the speed of traffic at a given point on the circulation route. A wire structure may need to be further away from the trail if bikes are permissible on the path, however, if no wheeled vehicles are permissible, then the distance between the wire structure and the path may be shortened.

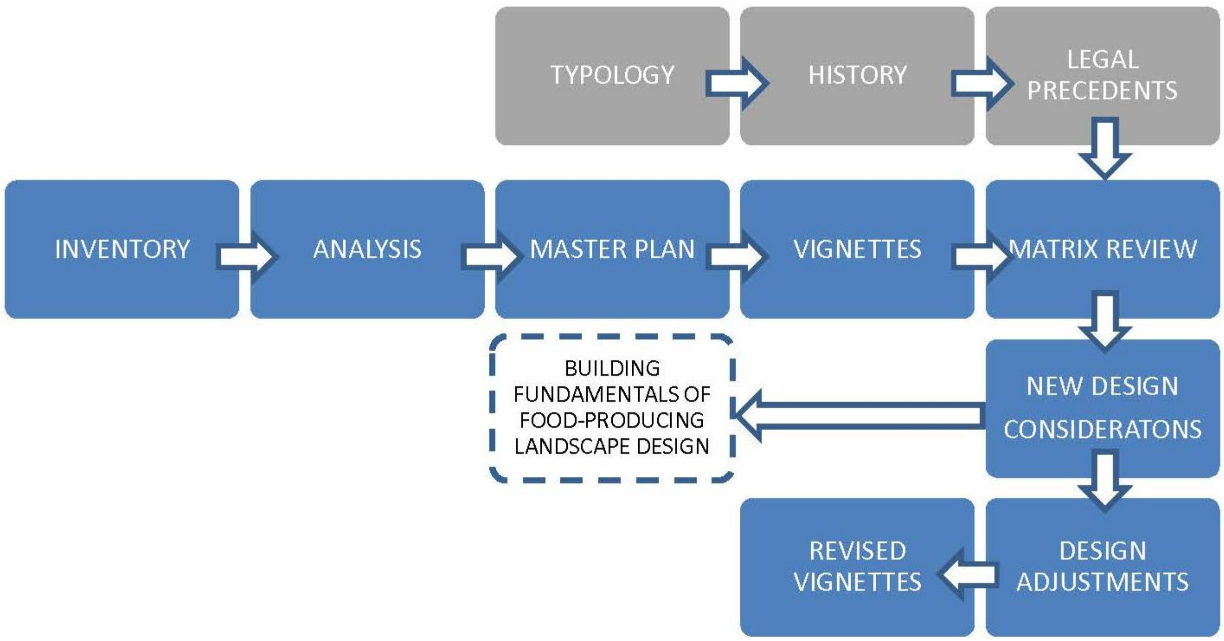


Figure 5.1: Design Process with Matrix Implementation

Significant site and contextual conditions that will shape, inform, and determine the development of a food-producing landscape plan is presented as the "inventory." Design determinants can include intrinsic (on-site) factors and, due to the scope of EVM, extrinsic (off-site) factors. These factors are assembled and referred to as the inventory. Each inventory determinant is coupled with an analysis or possible implications for public safety in food-producing landscape design. The following inventory and analysis for the food-producing landscape at EVM is divided into three lenses of focus. The first lens will examine the physicality of the site, the second lens will focus on the biological elements of the site and its surroundings, and the third lens will investigate cultural factors and influence on the existing landscape. The inventory and analysis will help to guide the design of the food-producing master plan. To vet the master plan and assess risk for the site plan, the matrix is utilized.

CULTURAL INVENTORY

The peri-urban landscape is the place where the conflict between the rapid sprawl of residential, commercial, and industrial development collides with land used for agricultural gains. This conflict is well represented at EVM where development pressure from Atlanta has reached the small agricultural community of Monroe. As the Bakers look to develop EVM with an eye toward blending the two development patterns, therefore becoming less obtrusive to the cultural heritage of the place, the development must make a concerted effort to provide a reasonable level of safety for those who live, work, play, and eat from the landscape at the development.

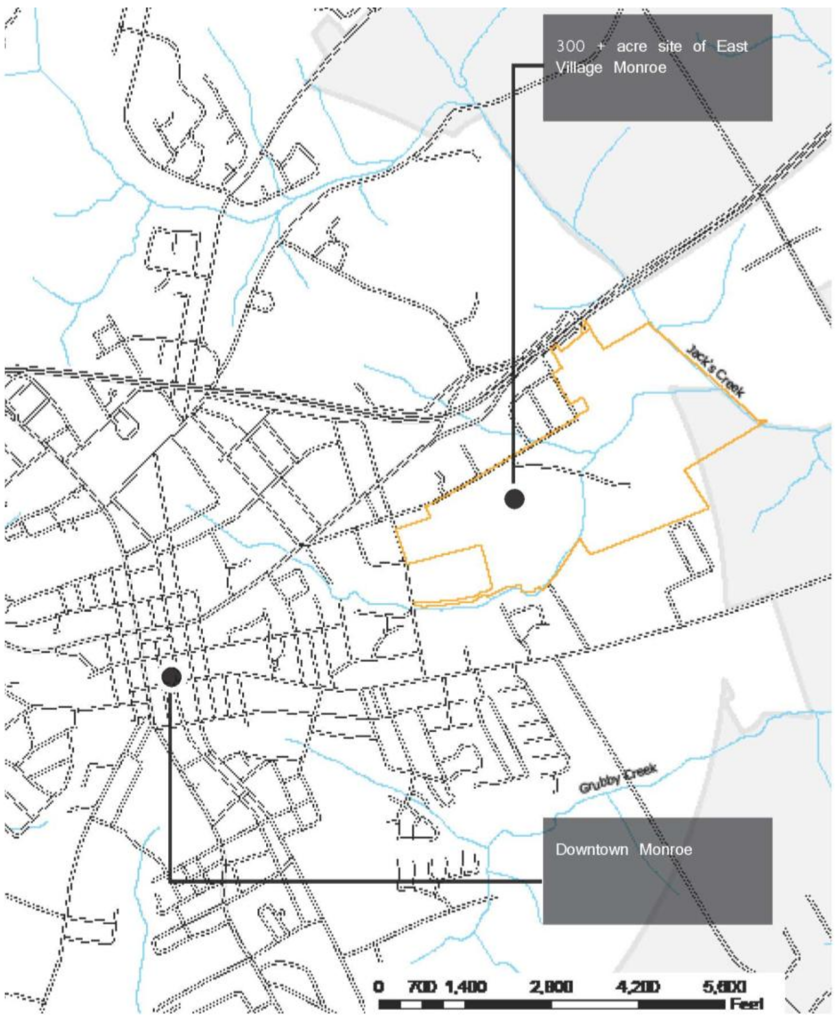


Figure 5.2: EVM Inventory: Context

The western half of EVM neighbors a two-acre municipal park, a typical quarter-acre lot, cul-de-sac subdivision containing approximately 250 homes to the south, and a light industrial district consisting of storage facilities and an auto-mechanic shop to the north. The development's eastern neighbor is an older, one-acre lot residential subdivision and Highway 78, the main vehicular corridor providing connection to Atlanta to the west and Athens to the east. A pine-hardwood mixed forest lies to the south and east of the property line. A large portion of the property to the east borders a Walmart distribution facility.

The previous land use on a site can play an important role in the health, safety, and viability of the food-producing plants installed on a site. Soil reports can help to understand the makeup of the soil characteristics on a site, but soil testing can be cost prohibitive. Targeting specific areas where known activity occurred increases the likelihood that the extent of contaminated soils can be delineated and possibly remediated. On the EVM site, there are no known contaminated soils that would prohibit the use of a food-producing landscape.

SOILS
PHYSICAL

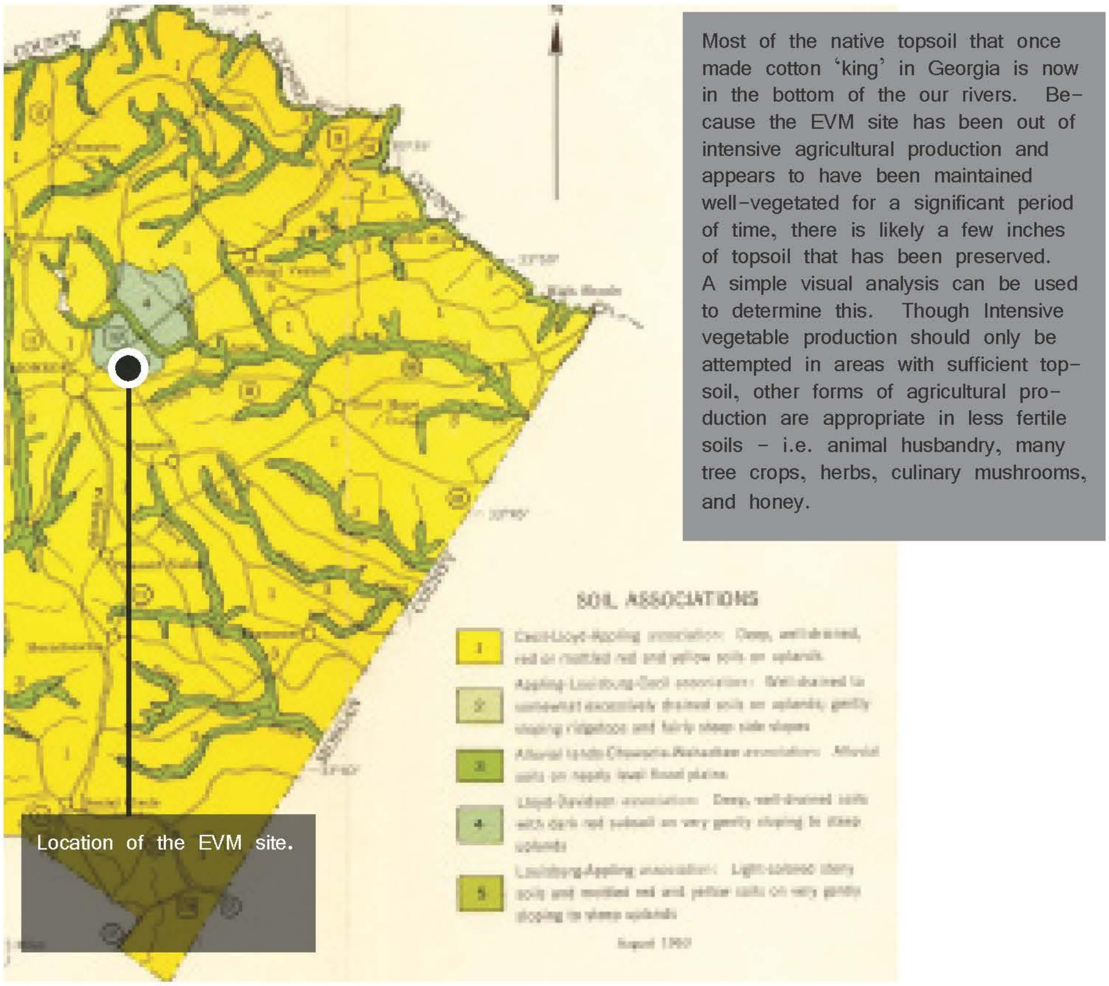


Figure 5.3: EVM Inventory: Soils

Not only will the food-producing landscape be integrated into the site, a complementary goal for EVM is for the project to become fully integrated into its surrounding neighborhood. By doing so, EVM may be seen as part of the whole rather than as a secluded or a private development. For example, pedestrian routes will be integrated into the surrounding residential neighborhood. This integration, however, poses some issues with liability. In addition, some adjacent property owners and future residents of EVM will become subject to noise, smoke, odor, and dust generated from activities on the greenway. The design of vegetative buffers and fences as physical barriers could limit some of the ill effects and liabilities of the food-producing landscape.

PHYSICAL INVENTORY

A physical inventory and analysis examines the microclimates of the site and information on temperature, humidity, wind, solar aspect, and solar access. A geologic and hydrologic evaluation, to identify drainage capacity, groundwater flow, soil characteristics, and any existing contamination on the site, is also recorded. A soil report, containing physical and chemical soil characteristics, bearing capacity, compaction, and infiltration rates, as well as identification of all areas prone to erosion, should also be performed.

Determining microclimates is critical to successful site planning of a food-producing landscape. Slope aspect influences the microclimate by affecting the level of solar radiation that strikes the site. A south-facing slope will have considerably more direct solar radiation than a slope facing the shade side or northern orientation (Mollison 1988, 56). Slopes facing the north may delay thaw and thus increase frost effects in the vegetation. However, delayed thaw may be beneficial to plants typically found in more northerly planting zones.

Site elevation can affect both drainage patterns and visibility. Variation of elevation and surrounding landscape determines the size and spatial configuration of viewsheds on the site. The site’s rolling terrain sets the stage for capturing beautiful vistas and bucolic valleys. The topography map (Figure 5.4) is an effective way to visualize the topographic relief and look for opportunities to capture scenic vistas.

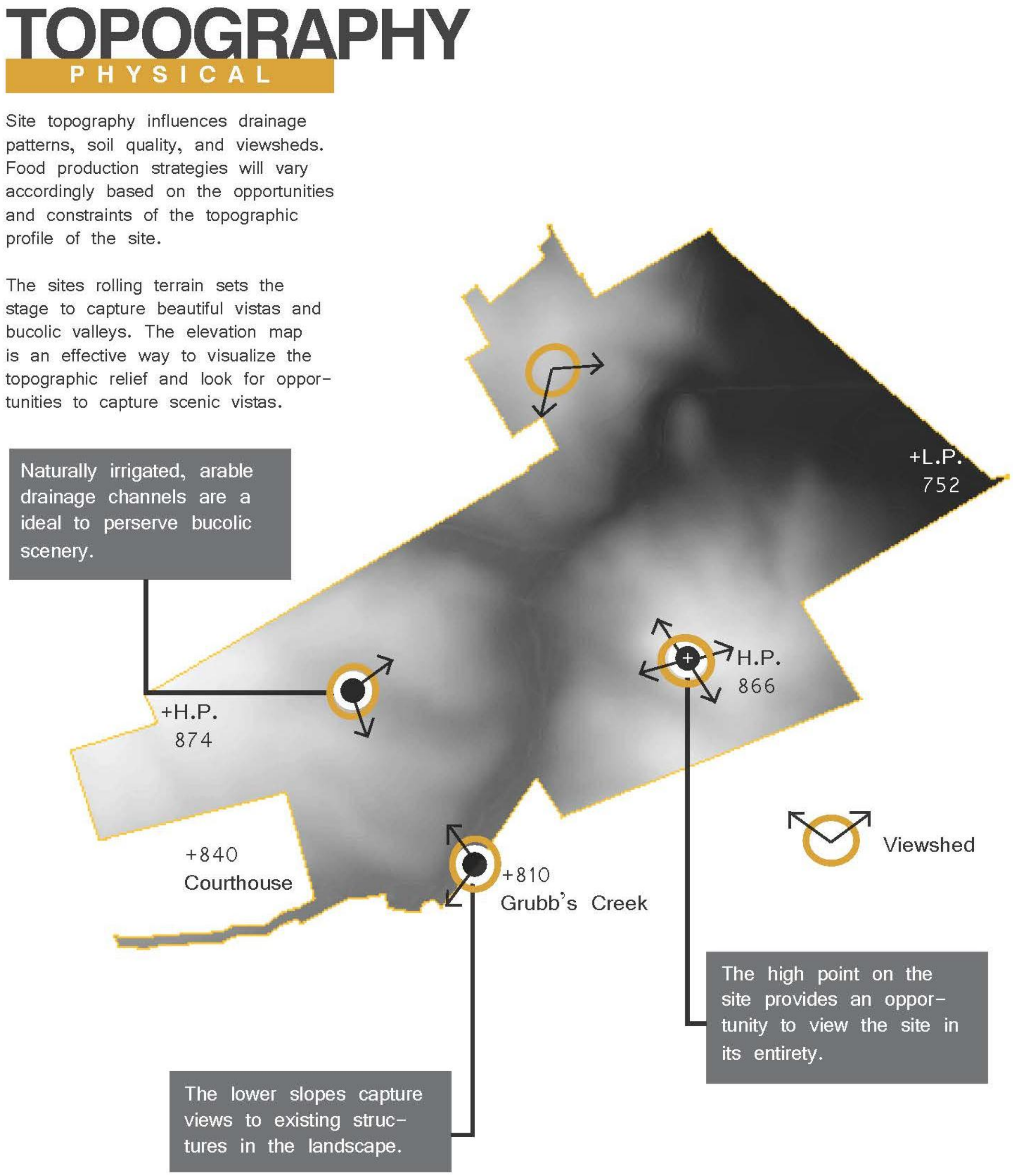


Figure 5.4: EVM Inventory: Topography

An understanding of, and respect for, natural drainage patterns of the site and region is essential to protecting existing hydrologic processes. To accomplish this, the watershed affecting the site and upstream development impacts should be analyzed. Final site designs should incorporate existing drainage patterns and minimize grading and slope modifications.

Running through the middle of the development are two shallow but persistent creeks; their confluence is located near center of the site. The creek continues in an easterly direction to meet up with Jack's Creek. As they are part of the Alcovy River watershed, the creeks in the basin are managed through the Alcovy Watershed Protection Project. The land along the tributary network on the site is extremely fertile. Like many of the farms in the area, cotton was farmed at the turn of the 20th century, when the top soil was most likely decimated and denuded of its original depth and ecological value. Since 1944 when the Baker family bought the land, until the 1970s a dairy operation and row crop farm occupied the land. For the past 40 years the land has been occasionally used for the pasture grazing of animals or hay production.

Grubb's Creek, a tributary to Jack's Creek, and another unnamed tributary to Jack's Creek have shaped the valley running through the center of the EVM site. The light blue line on the Hydrology map (Figure 5.5) represents the 100-year floodplain. This line is subject to change with increased impervious pavements. Major drainage channels located on the map are subtle and can be incorporated into utilities for irrigating landscape features.

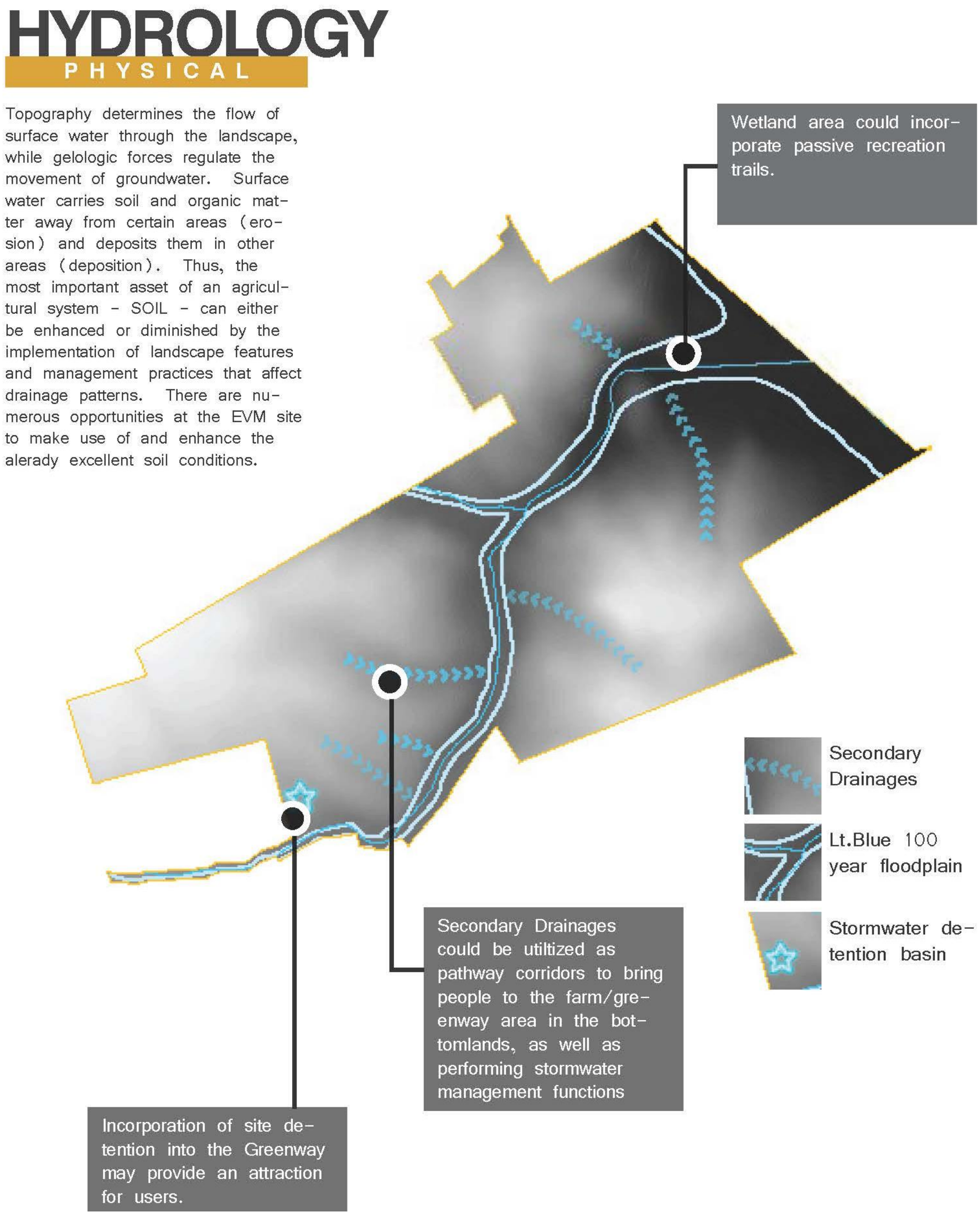


Figure 5.5: EVM Inventory: Hydrology

Slope determines the unpowered flow of water from source point (Mollison 1988, 55). Careful consideration of suitability requirements are needed to ensure soil stability and plant suitability. The slope map (Figure 5.6) shows the color-coded slope considerations layered over an aerial photograph of the site. The color ranges from green to orange to red, representing shallow to medium to steep slopes respectively.

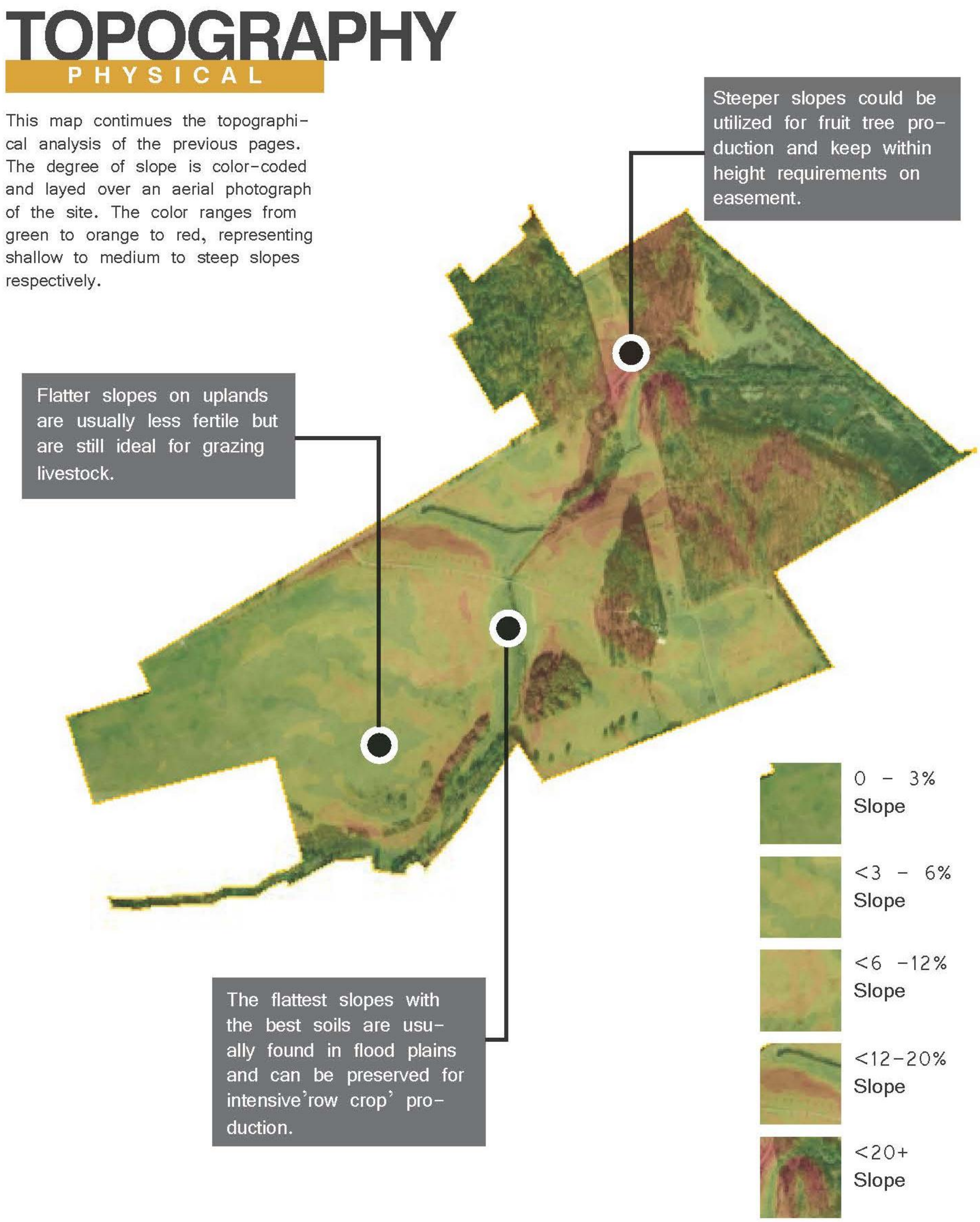


Figure 5.6: EVM Inventory: Slopes

Utility corridors (Figure 5.7) can double as ecological corridors as high concentrations of diverse flora and fauna are found on their edges. Connectivity of utility corridors to greenway corridors also increases species diversity and quality of habitat. Utility corridors may also be able to house drainage channels limiting the need for buried stormwater infrastructure. The EVM site currently has three utility corridors on site. One of these corridors is low-voltage transmission line corridor; the other two are high-voltage.

Whereas all transmission lines could be utilitized for pedestrian circulation, the type of voltage line will prescribe what type of plantings could be installed in transmission easements. Only passive food-producing landscapes should be located in high-voltage lines easements. Most species of shrubs, vegetables and grasses are allowed as long as they do not prevent access or use of the right-of-way. Trees, however, are limited to those species that do not exceed a height of 15 feet at maturity (Georgia Transmission Commission).

UTILITIES

CULTURAL

Utility cooridors double as ecological corridors as high concentrations of diverse flora and funa can be found on their edges. Connectivity of utility cooridors to greenway cooridors increases species diversity and quality of habitat.

Figure 5.7: EVM Inventory: Utilities

Wind may also play a factor on safety of the site but probably more so for the health and viability of the plants. Sensitive plants require a screen against high winds, and enhanced irrigation needs to be considered because wind speeds up the evaporation of moisture in soil.

BIOLOGICAL INVENTORY

The biological inventory consists of a listing of vegetation found on the site, including location, genus, species, and condition of all significant and edible trees and shrubs; the identification of wildlife habitats, migration routes, and flyways, along with potential measures to preserve and protect them and any existing environmental impact statements or other environmental quality reports produced for the site, which should be carefully reviewed by appropriate project participants.

The southeastern vegetation for riparian ecosystems is diverse and determined by hydrologic and soil conditions for bottomland ecosystems. Though much of the riparian areas along Grubbs Creek within the property boundary have been cleared, a typical hardwood bottomland would return with succession. Hardwood bottomlands includes forested wetland types such as red maple (*Acer rubrum var drummondii*), Atlantic cedar bogs (*Chamaecyparis thyoides*), bald cypress (*Taxodium distichum*) and tupelo (*Nyssa aquatica* and/or *N. sylvatica var. biflora*).

A large number of edible plants are currently found on the site. In many ways a food-producing landscape already exists. Blackberries grow at the edges of utility easements. A lone apple trees stands in the middle of the most easterly utility easement and sumac is found in the low lying areas along the river's riparian zone. Wheat grass and thatch, used as fodder for cattle, dominates much the cleared pasture at East Village Monroe. Currently no signage exists to identify the edible plants in the landscape.

EVM is located within hydrologic unit (HUC) 8 of the Ocmulgee River, Upper watershed and home to seven species federally protected, 32 state protected, 17 animals, 40 plants, and six natural communities. A full list of known occurrences of special concern plants, animals and natural communities Ocmulgee River, Upper Watershed – HUC8 Watershed Code: 03070103 can be found in the appendix. Common Piedmont fauna represented in the area include gray fox, striped skunk, bear, beaver, bobcat, raccoon, coyote, whitetail deer, eastern cottontail and squirrels (Georgia DNR).

The creeks found on the EVM site are located within the Alcovy River watershed. The Alcovy River is a 292 square-mile (~187,000 ac) watershed located east of Atlanta, Georgia within the Upper Ocmulgee Basin. The watershed spans four counties from its headwaters downstream to Lake Jackson, and supplies water to surrounding areas from four drinking water intakes. The Alcovy River Watershed Protection Project serves as a case study for a regional approach to watershed assessment and management. Findings from the health assessment of the watershed and best practices for water quality practices can be found at UGA's River Basin Center website.

Each layer of information in the inventory is first studied in isolation for the East Village Monroe site as a whole, to reveal distinct characteristics that could shape cultivation of food crops. Then the layers are then combined to show interationships and an analysis is produced, including possible opportunities or constraints on the site. Recommendations are then made for particular food cultivation strategies appropriate to each area of the site.

CIRCULATION

A successful master plan takes advantage of both the site's opportunities and constraints to offer a unified, cohesive, and safe design. For the master plan at East Village Monroe the pedestrian circulation network programs are represented on the plan as well as both the Community Development Program and Food-Producing Landscape Program. These elements are then merged with the existing community development plan from the site planner. The existing site plan indicates road layout, community development program and food-producing landscape programs.

EVM will host a variety of thoroughfares to facilitate circulation for residents. As designed there are four types of thoroughfares; vehicular, bike/cart path, sidewalk/foot path, and trail. The vehicular roads are designed for vehicular and bicycle use with an average design speed of twenty-five miles per hour. Bike and cart paths are dedicated routes limited to electric vehicles and bicycles. These routes have a design speed of 10-15 miles per hour. Sidewalks and foot paths are hard surfaced, ADA accessible routes for pedestrians only. Trail routes are not paved and are open to both pedestrians and carts and bicycles.

Circulation Infrastructure:

- Foot Path – hardscape surface 4-5’ wide
- Bike/Cart Path – hardscape surface 7-8’ wide
- Vehicular Routes – hardscape surface 22’-24’ wide (only crossing through greenway)

COMMUNITY DEVELOPMENT PROGRAM

Structures:

- Information kiosk
- Structure for Roadside Store/Market
- Compost facility
- Picnic areas
- Food processing area
- Barn
- Community gathering place
- Interpretive trail
- Amphitheatre

FOOD – PRODUCING LANDSCAPE PROGRAM

The food-producing landscape program is a list of activities offered on the site:

- Vineyards – berries, grapes, muscadine grapes
- Orchards – peach, pear, apples, persimmons
- Low-yield Annuals – cool season and warm season annuals. Operated with small tool equipment
- High-yield Annuals – cool season and warm season annuals. Operated with heavy machine equipment. Fodder and small animal husbandry which may include goats, pigs, chicken, and bees may be used in these areas as well.
- Community/Market Garden – mix of food-producing plants. Operated with small tool equipment
- Neighborhood Garden – mix of food-producing plants. Operated with small tool equipment

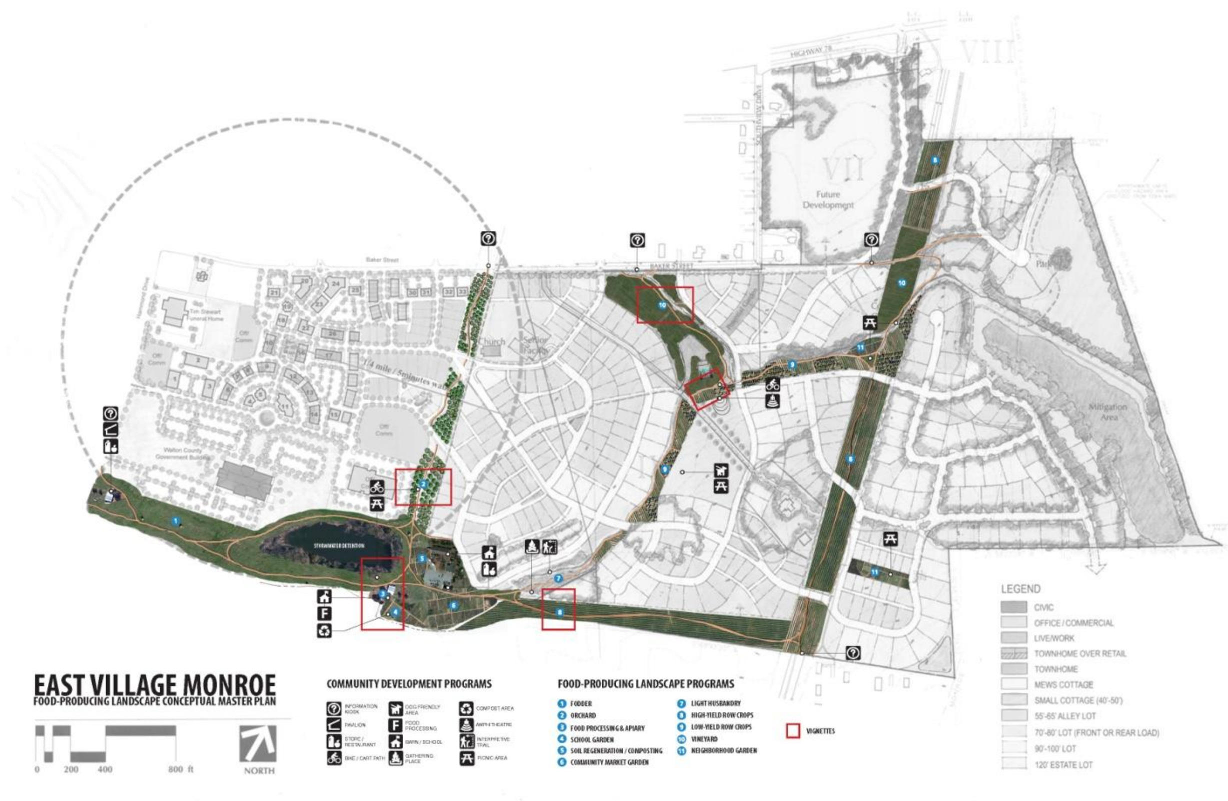


Figure 5.8: EVM Master Plan

MATRIX OF SAFETY CONSIDERATIONS FOR FOOD-PRODUCING LANDSCAPES

From the analysis of classifications posited in Chapter II the EVM project has been identified as a peri-urban development and possesses the ability to produce food on both large scale and small scale. Considerations rendered from a review of historical precedents and case studies in Chapter III and safety protocols and legal summaries from Chapter IV fill the Matrix (see Table 5.1). The Matrix consists of potential issues and considerations in three categories; design, mitigation, and operations. The intersection of program element in conjunction with a food-producing landscape element is color coded to indicate a rating from least concern to greater concern. The color code ranges from light orange to dark orange, respectfully.

		Neighborhood garden: Family plots, Herbs, Medicinals, and Annuals	**Low-yield Row Crops:** Small Market Garden, Community Crops	**High-yield Row Crops:** Large Market Garden, Regional Crops	**Apiary:** Bee Hives	**Orchard:**
Grade School and Playground	*Selection and placement:*	A clear boundary should be delinated. Only edibles should be installed.	Plantings commonly associated with allegries should not be included; peanuts,	Not compatable uses. Enough distance between the two programs to provide a buffer either by distance or vegetation to screen noise, ordor, and dust from maintenace and operations.	Aparies should not be sited in playground areas.	Fruit and nut trees should be sited in playground areas unless celebrated as a specimen
	Notification:	Signage should used to identify edible plants, what part of the plant are edible, and if closed for public consumption	Clear demarcation of ownership and permission to consume edibles			
	Operations:	Small tool maintenance should occur with adult supervision.	Small tool maintenance only. Performed after hours.			
Swimming Pool	*Selection and placement:*	A clear boundary should be delinated. Only edibles should be installed.	A clear boundary should be delinated. Only edibles should be installed outside of the swimming pool program area.	Not compatable uses. Enough distance between the two programs to provide a buffer either by distance or vegetation to screen noise, ordor, and dust from maintenace and operations.	Not compatable uses. Aparies should not be sited near swimming pools. The larger the pool the farther the distance one should be placed. Bees will seek out water especially in summer heat waves.	Dripline of trees should not exceed hardscape surfaces. Fruit trees producing sweet fruit should be limited due to their ability to attact bees.
	Notification:	Signage should used to identify edible plants, what part of the plant are edible, and if closed for public consumption	Clear demarcation of ownership and permission to consume edibles			
	Operations:	Small tool maintenance should occur with adult supervision.	Small tool maintenance should occur with adult supervision.			
Greenway Trail: Bike & Foot Trail	*Selection and placement:*	A clear boundary should be delinated. Only edibles should be installed.		Planting shoud be buffered from trail depending on machinery use. Trail not to be damaged by machinery use.	Apiary openings should not face the path of trail.	Fruit and nut trees should be sited so the mature canopy does not extend into trail right-of-way which could extend five-ten feet from the edge of trail.
	Notification:	Signage should used to identify edible plants, what part of the plant are edible, and if closed for public consumption	Clear demarcation of ownership and permission to consume edibles	Signage should display operations schedule, harvest times, days of high pollen counts, and pesticide	Notification of aparies in areas should be indicated on trailheads or map kiosks	Clear demarcation of ownership and permission to consume edibles
	Operations:	Small tool maintenance should occur with adult supervision.	Small tool maintenance only. Performed after hours.	Temporary signage should indicate maintenance times and possible detours if necessary.	Maintenance should be performed after hours.	Maintenance should be performed after hours.
Residences	*Selection and placement:*	A clear boundary should be delinated. Only edibles should be installed.	Plantings commonly associated with allegries should not be included.	Enough distance between the two programs to provide a buffer either by distance or vegetation to screen noise, ordor, and dust from maintenace and operations.	0 Apiary openings should be buffered from neighboring residences.	
	Notification:	Signage should used to identify edible plants, what part of the plant are edible, and if closed for public consumption	Clear demarcation of ownership and permission to consume edibles	Signage should identify maintenance and operations schedule.		
	Operations:	Small tool maintenance should occur with adult supervision.	Small tool maintenance only. Performed after hours.	Large tool maintenance and operations should occur with sufficient notice to public that may be affected.		
Gathering Spaces: Picnic Areas, Amphiteatre, Pavilions	*Selection and placement:*	A clear boundary should be delinated. Only edibles should be installed.	Plantings commonly associated with allegries should not be included.	Enough distance between the two programs to provide a buffer either by distance or vegetation to screen noise, ordor, and dust from maintenace and operations.	Apiary openings should not face gathering spaces.	Fruit and nut should be sited so the canopy does not extend into seating or walking areas.
	Notification:	Signage should used to identify edible plants, what part of the plant are edible, and if closed for public consumption	Clear demarcation of ownership and permission to consume edibles	Signage should identify maintenance and operations schedule.		
	Operations:	Small tool maintenance should occur with adult supervision.	Small tool maintenance only. Performed after hours.	Large tool maintenance and operations should occur with sufficient notice to public that may be affected.		
Utility Easements: High voltage, low voltage	*Selection and placement:*	Use should discouraged in these areas.	Plantings commonly associated with allegries should not be included.	Enough distance between the two programs to provide a buffer either by distance or vegetation to screen noise, ordor, and dust from maintenace and operations.	Apiary openings should not face residences or program elements.	Fruit and nut should be selected not to interfere with powerlines. Georgia Power requires trees to under 15' in height for high voltage transmission lines.
	Notification:	Signage should used to explain possible dangers to electromatic field (EMF).	Clear demarcation of ownership and permission to consume edibles	Signage should identify maintenance and operations schedule.	Locations should be notified on map kiosks.	Signage should identify maintenance and operations schedule.
	Operations:		Small tool maintenance only. Performed after hours.	Large tool maintenance and operations should occur with sufficient notice to public that may be affected.		Maintenance should not performed in incliment weather.

Table 5.1: Matrix of Safety Considerations in the food-producing landscape design at East Village Monroe

Each consideration then informs design as recommendations. These recommendations are illustrated on the graphic vignettes. The recommendations adjust design intent rather than prescriptively prohibit design as the case within most Euclidean zoning practices.

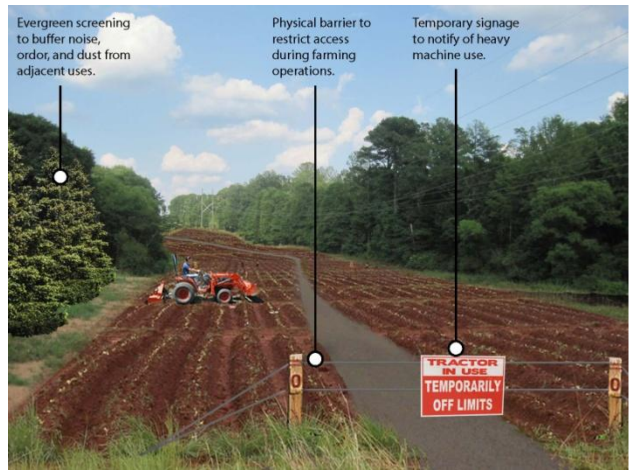


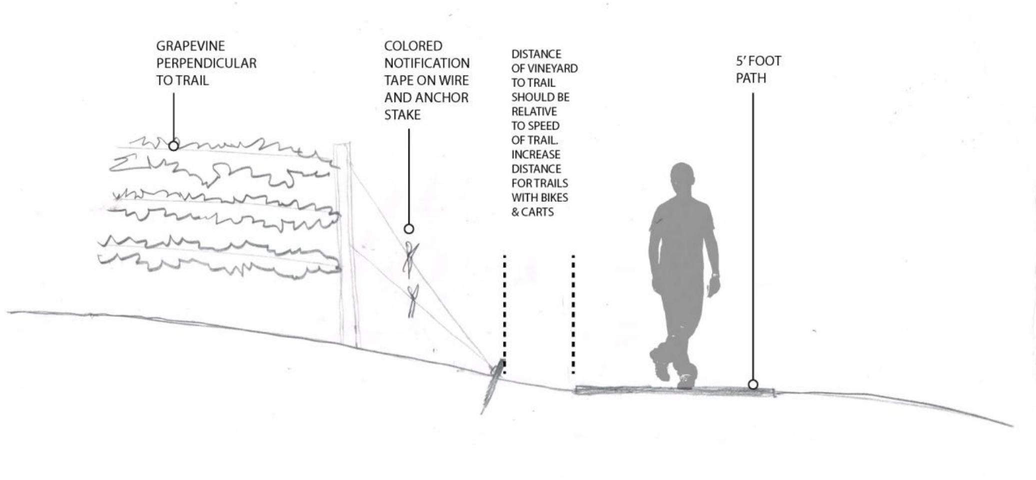
Figure 5.9: EVM Vignettes: High-yield production with foot & bike trail

Figure 5.10: EVM Vignettes: Orchard with food & bike trail

Figure 5.11: EVM Vignettes: Low-yield production with food & bike trail

As design professionals, understanding the risks and liabilities is paramount to protect those encountering designed landscapes. Beyond the limits of the project at East Village Monroe, the overarching goal of this study is to further research towards designing safe, integrated food-producing landscapes in the built environment – physically safe for public participants and legally safe landscape architects who design them.

To expand the potential effectiveness of the 'Matrix', an interesting exercise would be to deliver food-producing landscape master plans to various stakeholders within the EVM project to reveal new safety considerations outside of those documented in this thesis. Stakeholders can range in expertise – from the wildlife ecologist to a pool maintenance mechanic – each one carrying a perspective that might enhance the breadth of safety considerations and implications for food-producing landscape design.



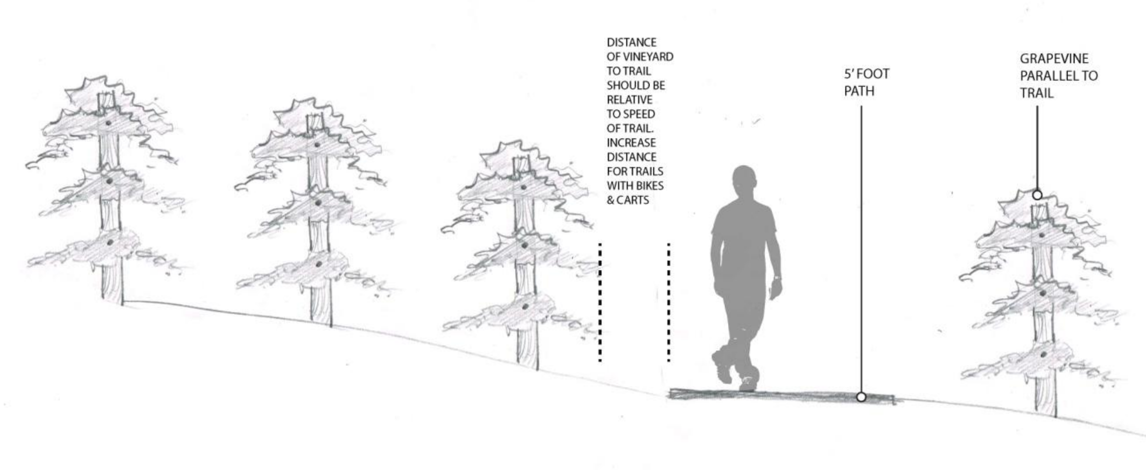


Figure 5.12: EVM Vignettes: Vineyard with food & bike trail

CHAPTER VI

CONCLUSION

Reflecting on the story of the forbidden tree, McDonough uses this metaphor to illustrate a culture of control, for the barriers erected and maintained – whether physical or ideological – between nature and human industry. Yes, this thesis may push for yet another policy, yet another physical or ideological barrier. However, if we are to move forward and continuously improve how we design and construct the built environment we must carry lessons from the past and contend with unforeseen challenges of the future, such as unknown climate change and ever-evolving human needs.

If the perceptions of lack of safety in the food-producing landscapes are preventing them from being incorporated in our environment, as professionals, landscape architects need to break through false perceptions with research and tools to argue for the inclusion of edibles in modern landscape design in public spaces. A matrix for identifying safety considerations in food-producing landscapes is a valuable tool to assist the safe integrated landscape design. Additionally, a matrix can be a vehicle for multiple professions to identify possible conflicts and minimize risks for any design.

The need is increasing for professionals to expand the academic discourse of food-producing landscapes as the global effort for sustainable development continues to grow. Cultivating policy to enable edibles in public landscape design brings these goals closer. This thesis supports Thomas Lyson's notion that providing design policies and programs that support the development of fresh, local, organic foods will foster a more viable system of production and consumption.

The 21st century brings unprecedented challenges for landscape architects to maneuver the legal landscape of policies, rules, and regulations guarding public safety. Professional landscape architects and clients they represent face a myriad of potentially damaging conditions when the public interacts with their designed spaces. To protect and prepare themselves professional organizations like the American Society of Landscape Architects have explicitly defined the roles and responsibilities of its professionals. Unfortunately, many of the guidelines in the discipline have been shaped by lawsuits brought against professional landscape architects and/or the owners they represent. The individual case judgments have served to shape the professional landscape architect's role and responsibility in designing spaces for the public. Public policies pertaining to the regulation of urban agricultural provide some resemblance of guidelines but fail to provide a tool for risk assessment.

For food-producing landscape design, rapid gains in popularity may signify its permanent place in the fold of the landscape architecture profession. If this is true, the response of the professional organizations of landscape architecture should be to educate landscape architects on the unique nuances of food-producing landscape design to ensure physical safety of the public, and the legal safety of landscape architect and the clients they represent.

This paper argues landscape architects fortified with tools like the 'Matrix' are equipped to design safe, integrated food-producing landscapes. After all it's about design; something landscape architects know a great deal about. To a designer, a constraint is an opportunity. As designers in the built environment, landscape architects are equipped with design power – the ability to communicate universally through graphical communication, move water, shield the sun, shape the earth, and design landscapes that grow food – safely.

APPENDIX

SEATTLE'S URBAN FARM BILL

In response to growing pressure to develop policy governing the demands for food-producing landscapes the City of Seattle issued Bill and later adopted an ordinance that provides a public policy for growing food in the city safely. In June of 2010, Seattle, Washington approved an ordinance to official recognize "urban farms" and "community gardens" in all development zones, with some limited opportunities in industrial zones (Coppersmith 2012, Council News Release). Included in Council Bill 116907 are requirements for establishing "urban farms" and "community gardens" within development zones. The Bill furnishes mandatory provisions as to the mechanical equipment that can be used, times of public sales, deliveries, signage, location in proximity within a site, and structures (23.42.051 Urban Farms, Seattle Council Bill 116907). For "urban farms" that require an administrative conditional use, meeting additional provisions of a management plan, submitting a "Potential impacts and Mitigation" report, and an additional section of "Conditions of Approval" also applies for a permit. The "Potential impacts and Mitigation report" must include impacts to water quality and soil, traffic and parking, visual impacts and screening requirements, impacts to noise and odor, use of agricultural chemicals, and impacts generated by mechanical equipment (SMC 23.42.051 Urban Farms).

The "Management Plan" for urban farms and community gardens must include a site plan, description of equipment necessary, frequency and duration of use of equipment, disclosure of any intent to spray chemicals or pesticides, frequency and duration of use of anticipated spraying, disclosure of site land disturbance square footage, a proposed sediment and erosion control plan (23.42.051.1 Urban farms, Council Bill 116907). The "Potential Impacts and Mitigation" report includes impact reports on the following; water quality and soil, traffic, visual impacts and screening, noise and odor, agricultural chemicals, and mechanical equipment. The “Conditions of Approval” can customize some of the aforementioned provisions, mostly to curb noise, odor, dust, and unsightliness. The Bill continues to present provisions to “community gardens” and to “husbandry” as well, including limits and spatial barriers on specific livestock.

Seattle’s aggressive support of the growing local food movement provides a valuable case study as municipalities across the country look to explore provisions for keeping food-producing landscapes in urban settings safe for consumers. The “Potential Impacts and Mitigation” report is an example of how a municipality is guiding food-producing landscape design. Though a useful reference the report lacks the ability to disseminate major risks from minor risk, which can be very helpful to the food-producing landscape designer.

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