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HOW CAN LANDSCAPE ARCHITECTS CREATE URBAN GARDENS AS A
CATALYST FOR LEARNING? AN INVESTIGATION OF URBAN GARDENS
FOR CHILDREN

By

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ABSTRACT OF THE THESIS

How Can Landscape Architects Create Urban Gardens as a Catalyst for Learning?

An Investigation of Urban Gardens for Children

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Urban green space, children's gardens and school gardens play important roles in the effort to introduce children to the natural world. Educational gardens have become a popular trend over the last twenty to thirty years because they introduce children to science and the natural world, in addition to providing places for play or quiet contemplation. Another driver for implementation of gardens is the public health improvements that have been linked to the act of gardening and the accessibility of urban gardens and gardens for children.

This paper explores design opportunities to create naturalistic spaces that fulfill the developmental needs of urban children. It explores the benefits of naturalized spaces and gardens on youth, linking the current educational garden movement to the history of school and community gardens while applying key design principles for gardens to a vacant lot in Trenton, New Jersey for the Boys & Girls Club of Mercer.

Using the themes of nature-deficit disorder and every day nature as a framework for analysis, it considers the design for the Boys & Girls Club Garden within the context of several other gardens for children throughout the country. The analysis relates the observed qualities of the selected gardens to psychological research and desired public health outcomes. The findings convey the applicable features of design that contribute to well-designed spaces for children and express additional efforts that should be undertaken in future designs to improve exposure to everyday nature.

Dedication and Acknowledgements

Dedicated to my loving and supportive husband, Patrick Collins, without whom I would not have taken this journey. His unwavering support has immeasurably contributed to my continued success throughout the program.

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Chapter 1: Introduction

Educational gardens have become a popular trend over the last twenty to thirty years because they introduce children to science and the natural world, while also providing places for play or quiet contemplation. Intellectual stimulation, proper nutrition, and free playtime are important aspects of childhood development that have received greater amounts of attention in the past decade or so. Educational garden programs are being implemented in many schools and child development organizations to enhance curriculum and meet critical developmental needs.

There is a subconscious connection between humans and the natural world that offers therapeutic value and strengthens wellbeing. People need to understand the environment to survive, this is part of our evolution as humans (*Biophilic Design: The Architecture of Life* 2011; Verbeek and de Waal 2002). Research shows that there are benefits from exposure to urban vegetation and green space (“Health Benefits of Urban Vegetation and Green Space: Research Roundup” 2015). The innate human need to interact with our surroundings still exists despite current pressures of longer workdays, technological advances, and trends to stay indoors to play video games or watch television.

The impulse to develop educational gardens is especially pertinent in dense and urbanized environments, where there is little open space to play and even less natural space. Children are rarely sent outside to play alone or call on the neighborhood kids to “come out and play”, like previous generations. Children today spend much more time indoors and disconnected from the natural world. While the terms nature and natural are ambiguous, it is clear in

the research that exposure to vegetation and living things is beneficial to the cognitive development of children and the mental health of adults and there seems to be no better word to describe the vegetation we see every day (“Health Benefits of Urban Vegetation and Green Space: Research Roundup” 2015). The focus of this paper is on ‘everyday nature’ distinct from untouched lands or wilderness and pertaining to the daily lived experience of most urban and suburban dwellers.

Designed environments and urban green spaces can supply the locations for these essential human / nature interactions to be accomplished. They provide the necessary respite and relaxation that is found in green space and open space, and help to achieve the self-confidence found during exploration of untouched lands. Designed spaces also provide safe spaces for physical activity, thus change the public health implications of unhealthy lifestyles and limited exposure to the natural world.

Gardens and naturalized areas can create social spaces for families or communities and they can be places for intellectual stimulation, meditation, relaxation, and spaces for play. Designing gardens for children is an opportunity to create a place where children can, among other things, learn, exercise, and relax. The garden can serve as a place to learn about science, proper nutrition, and health. But it can also be a place to explore one’s self, one’s ability to nurture a plant or a place and to see the affect one’s actions have on a place and living things. The challenge is how to accomplish all these opportunities in one place. How does a garden become a place for both stimulation and relaxation? How can landscape architects design urban gardens as a catalyst for learning?

I have a deep-seated belief that everyone is better off having exposure to gardens and gardening. The pleasure and knowledge that I have gained from gardening and working in gardens has nurtured in me a value for land and the environment that is lacking in many people. I was fortunate enough to grow up on $\frac{3}{4}$ of an acre in a suburb of New York City. The property I lived on had mature trees, lawn, plantings of shrubs, perennials and herbs along with a vegetable garden built for me to experiment and grow food. These things gave me an appreciation for outdoor space and the benefits that come from being outdoors.

Not everyone has the ability to be outdoors in a safe space with vegetation and greenness, especially in dense urban areas. In her book, *The Language of Landscape*, Anne Whiston Spirn talks about her belief “that we are imprinted with the landscape of our early childhood” (Spirn 1998, 5). I agree with Spirn and I want to help to impress upon future generations by creating beneficial landscapes. It’s important that exposure to everyday nature is a right and not a privilege.

This project is in three parts: an applied design, a conceptual framework based in literature on children and everyday nature, and a comparative analysis of children’s gardens. The design of the new garden for the Boys & Girls Club of Mercer on Center St, Trenton, incorporates active and passive zones with educational objects, building on principles of educational gardens, naturalistic design and the idea of everyday nature, while always honoring the mission of the Club. The second part contextualizes children’s gardens in literature using two contrasting, but not conflicting ideas as framework. The third part incorporates the design for the Boys & Girls Club of Trenton within a spectrum of eleven other

gardens. These case studies range from urban to suburban and demonstrate some of the many shapes, sizes, and programming of children's gardens throughout the country. Analyzing these gardens brings together theories from the literature sources and the information gathered by visiting these sites to form conclusions about the form and function of gardens for children.

Chapter 2: Contextualizing and Framing the Boys & Girls Club Garden

Boys & Girls Clubs of America is a national, non-profit organization of local chapters, which provide programs for children and young adults. The organizations vision is to “provide a world-class Club experience that assures success is within reach of every young person who enters our doors, with all members on track to graduate from high school with a plan for the future, demonstrating good character and citizenship, and living a healthy lifestyle” (“BGCA - Our Mission & Story” 2017). With more than 4,200 chapters across the country, in both rural and urban areas, the Club is estimated to serve nearly 4 million young people between the ages of 6 and 18 (“Measuring the Impact of the Boys & Girls Clubs: 2016 National Outcomes Report” 2017). Programs supported by the Boys & Girls Clubs of America fall under six basic themes; sports and recreation, character and leadership, health and wellness, education, career development, and the arts. Each Club caters to the unique needs of its community, therefore not every program is available at every Club location (“BGCA - Programs” 2017).

The mission of the Boys & Girls Clubs of America is “to enable young people, especially those who need us most, to reach their full potential as productive, caring, and responsible citizens”(“Boys & Girls Clubs of America - Our Mission” 2017). Alumni and their individual accomplishments are as important to the optics of the Club as the statistical impacts of positive experiences. Alumni are inducted into the Alumni Hall of Fame and their pictures are used in promotional materials. Notable alumni include actors, athletes, university presidents, and influential business people. Results are important, not

only because much of the funding comes from tax deductible donations which require demonstrable impacts, but because quantifiable impacts demonstrate accomplishment of their mission.

2.1 Understanding the Role of Children's Gardens in Trenton

The capital city of New Jersey, Trenton was originally a Quaker settlement for those who fled persecution in England. It became the capital of New Jersey in 1790 and was incorporated in 1798. Playing an enormous role in the founding of not only the state of New Jersey but our Nation, the city of Trenton has history unparalleled by most other state capitals. The city was the capital of the United States from November to December 1784 and was considered as a location for the permanent capital however the southern states preferred a location south of the Mason-Dixon Line ("About Trenton - City of Trenton" 2017). Trenton's location on the Delaware river has helped it to play major roles in both the American Revolution and the Industrial Revolution. The battles at Trenton helped win our independence and the industries that produced pottery, metals and wire ropes supported development across the country and the world (Hunter 2007).

Over the last century urban areas in the United States and throughout the world have seen changes due to industrialization, suburbanization, and globalization. Many cities and towns that were industrial centers have been left behind by suburbanization and globalization. These places suffer from health issues related to the lingering environmental effects of industry, roadways, food deserts, and lack of access to safe outdoor spaces.

Trenton is no stranger to the effects of changing populations and economic pressures. The movement of people out of and back into cities has forced changes

in the landscape. According to the U.S. Census Bureau, Trenton's population had been declining since the peak population of 130,000 in 1950. Though the population has been almost flat at about 85,000 in the last 20 years, the population is still slowly declining. The decline from 2000 to 2010 was in the hundreds, this can be considered stable. This stabilization is an opportunity for Trenton to use its resources to support the residents who have stayed in Trenton.

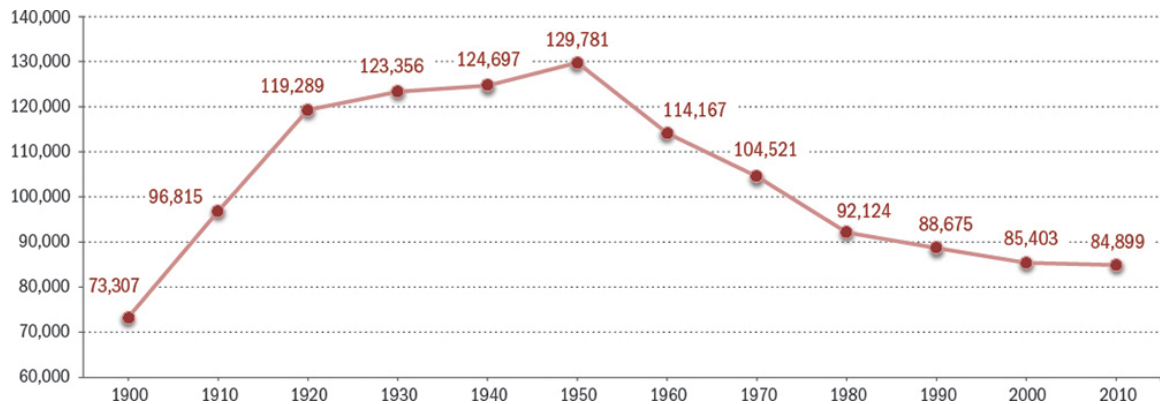


Figure 1: Trenton population since 1900. Image Credit: <http://www.trenton250.org/learn/city-profile/demographics/>

The city's history of industrialization has segmented the landscape with infrastructure; railways, canals and then development of highways. Trenton sees a large daily influx of commuters to work in state and federal government offices. The desire to decrease commute times and reduce traffic congestion led to many roadways being expanded; fracturing neighborhoods by large multi-lane, sometimes elevated, roadways. This segmentation has led to many neighborhoods being cut off from services and neighbors. The segmentation contributes to the disenfranchisement of neighborhoods and has made the landscape difficult to navigate by foot. Thus, creating food deserts, health deficits,

and increased crime in some areas. Despite being the capital of New Jersey and the county seat of Mercer, Trenton is an underserved community.

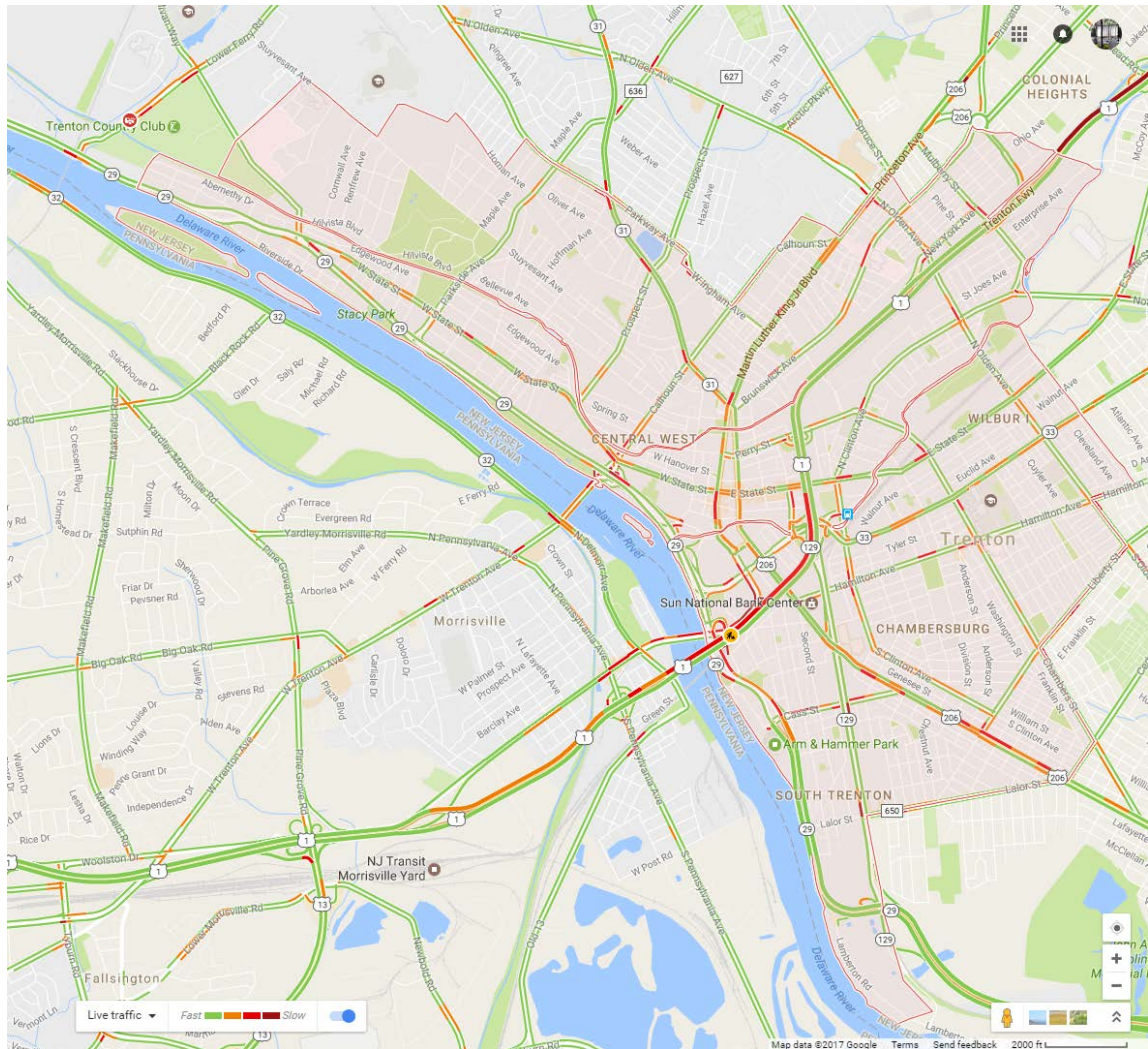


Figure 2: Trenton's increasingly large roadways have divided the city's neighborhoods, creating isolated areas and intensifying the need for personal vehicles. Image Credit: Google maps

Trenton is often referred to as a food desert. A food desert is an area that lacks a local grocery store or supermarket. Food deserts are places (urban, suburban, and rural) where residents are isolated from healthy foods. In most cases the grocery store is too far away to access without transportation or the means to reach a grocery store are inefficient or unavailable. Food deserts are not

defined solely by the inconvenience to access a super market but they are an example of food insecurity and they negatively impact public health (Trimarchi 2008).

The Community Health Needs Assessment Report Trenton, New Jersey from July 2013, prepared by the Trenton Health Team and submitted to New Jersey Health Initiatives and Robert Wood Johnson Foundation, reports the top health concerns as obesity/healthy lifestyles, substance abuse/behavioral health, safety and crime, chronic disease, and health literacy and disparities. *The Community Health Needs Assessment Report* found that in 2013 there were only three true supermarkets in the city, which contributes to food deserts, and limits access to healthy food choices. The report also states that nearly half the schools in Trenton are located in parts of the city with the highest density of convenience stores (Lloyd MPH et al. 2010). This means that children, who typically visit stores within walking distance, are forced to choose from the limited offerings of bodegas. Supermarket usage is associated with better health, African Americans living closer to a supermarket were more likely to meet the national dietary guidelines for fruits and vegetable consumption (Treuhart and Karpyn 2010).

The New Jersey Childhood Obesity Survey published by Rutgers Center for State Health Policy and funded by the Robert Wood Johnson Foundation, found that 1 in 2 children from ages 3 to 18 in Trenton public schools are overweight and 1 in 4 are obese. Compared to the national averages Trenton children are heavier than children in all categories. The most striking of which is the youngest children in Trenton ages 3 – 5 are 49% overweight or obese vs. 21%

nationally. An additional key finding of this study was that parents do not perceive their children as being overweight (Lloyd MPH et al. 2010).

The link between access to healthy food and overweight populations is well documented. There are many suggestions for ways to lessen the distance to healthy food when supermarkets cannot be implemented. Community gardens, voucher programs for farmers markets, and outreach programs that include nutrition education and wellness activities are three among many recommendations (Bell, MPA et al. 2013).

The benefits of gardening are also well documented (Dadvand et al. 2015; “Health Benefits of Urban Vegetation and Green Space: Research Roundup” 2015). The garden offers an opportunity for the community to gather and provides a safe place for children to begin to experience the natural world. Benefits of gardens include the opportunity to learn about proper nutrition and grow vegetables and fruits as well as outdoor experiences and exercise. *The New Jersey Obesity Prevention Action Plan of 2006* predates the 2010 Rutgers study, among other proposals it included, funding opportunities and legislation for community gardens, school gardens and farmers markets (“The New Jersey Obesity Prevention Action Plan” 2006). Many action plans and Blueprints have been created by and for Trenton since before 2010, urban gardens are almost always part of these plans and have been widely embraced. There are many partners including Isles, Inc., New Jersey Health Initiatives, The Y, The Food Trust, and Trenton Healthy Communities Initiative working to execute recommendations laid out in the many action plans. The *Trenton 250 Master Plan* is also recommending expansion to include more partners in the gardening

initiatives (New Jersey Health Initiative and Capital City Impact Team 2015; “Trenton250 Issues and Opportunities Report” 2015).

While most of the reports are calling for urban gardens, community gardens, and increased urban agriculture, children’s gardens can play an important role in early intervention and prevention of unhealthy lifestyles. Contained within The Trenton 250 Issues and Opportunities Report are seven primary reasons for unhealthy lifestyles in Trenton, including lack of exercise related to personal safety and poor condition of sidewalks and parks (“Trenton250 Issues and Opportunities Report” 2015, 69–70). School gardens and gardens for children can encourage healthy eating and they can be designed to, deter crime, increase physical safety, and induce physical activity.

2.2 School Gardens and Children’s Gardens in Context

School gardens have a long history, the first American urban school garden was established in 1891 at the George Putnam School in Roxbury, Massachusetts (Trelstad 1997). Though there is evidence that children’s gardens actually began in 1691 when George Fox willed a tract of land near Philadelphia for children to play and grow plants (Lawson 2005, 51). The most documented and prominent foundation for school gardens was the thirty year period from about 1890 to 1920 when school gardens became a national movement (Trelstad 1997; Lawson 2005).

School gardens were originally established in the eastern United States but by 1915 they had spread across the country with a majority of city administrations claiming support for some form of gardening (Trelstad 1997). Gardens began with a variety of desired outcomes both sentimental and practical. Some were

started to bring country life to the city, some to keep rural children on the farm, or to instill a love of nature in children, and others to assimilate immigrant children into American society. Eventually gardens were seen as a way to train children in the production of vegetables, support entrepreneurial efforts and to supplement income for boys' families (Lawson 2005; Trelstad 1997). One additional goal of the movement was to encourage children to practice gardening at school in order to gain "an aesthetic appreciation of how a garden improves the home and neighborhood." (Lawson 2005, 85)

Many gardens sprouted up with the assistance of private funds and volunteer help. For years' gardens subsisted on the donations of private donors. The spread of gardens across the country was assisted by the organization of new civic associations, in addition to many new books and pamphlets published to further cultivate the movement amongst both rural towns and urban cities. The success of these gardens and the subsequent requests from gardens and schools to receive local government funding, eventually brought support from the federal government and the U.S. Department of Agriculture. Records show that in 1904 the Bureau of Plant Industry, a part of the Department of Agriculture, began providing a national clearinghouse for information, seeds packets to teachers, and helped create school gardens in the District of Columbia (Trelstad 1997, 169).

The establishment of the Division of Home and School Gardening in 1914, as part of the Bureau of Education, formalized the promotion of school gardens as an education initiative. The school gardens initiative predates the kindergarten program within the Bureau of Education, though kindergarten has outlasted the school garden movement within the Department of Education. The school garden

initiative gained funding from 1914 to 1920. However, the Office of Home and School Gardening was closed after the loss of federal funding from the Woodrow Wilson administration in 1921 (Trelstad 1997). The failure of the movement to gain long term standing in the federal system was caused in part by the loss of advocacy and part the result of post-war attitudes toward capitalism, though some attribute the suburbanization of America as a contributing factor (Lawson 2005; Trelstad 1997). The movements lack of focused pedagogical benefits may have furthered the unwillingness of governments and schools to continue support.

Today the school garden movement has again become a focus of American educators. The most well know resurgence of school gardening was started in Berkeley, California as a collaboration between Chef Alice Waters and the King Middle School called the Edible Schoolyard. The correspondence of the national obesity epidemic and the school garden movement has encouraged organizations to legitimize the work done in these gardens with rigorous academic evidence. Public and private programs like The Edible Schoolyard Project, the U.S. Department of Agriculture Food and Nutrition Service's Farm to School program, and FoodCorps have nationwide support systems that offer grants, planning tools, online forums, training, and curriculum guides. These programs seem to have learned from the challenges of the early twentieth century movement by both offering support through funding and other resources, in addition they understand the movement to be both sentimental and practical. This may be related to the twenty-first century view of mental health as a part of wellbeing or the view that proper nutritional education is a necessary part of school

curriculum or the need for young people to follow careers in agriculture instead of more popular business careers. One thing is clear there is ample support for schools to integrate gardens into the curriculum.



Figure 3: The chicken coop at Princeton Day School offers the opportunity for the students to experience livestock maintenance. In addition to eating insects the chickens eat leftover produce too.

Photo by author.

2.3 The Boys & Girls Club Then and Now

The Boys Club of Trenton originated in 1937 by a group of businessmen who wanted to provide services to the children and young people of Trenton. The Boys Club came to Centre Street in 1943 to occupy the Skelton School. After various funding campaigns and property acquisitions the Boys & Girls Club of Mercer built their current facility in 1969, then expanded it in 1975 (“About Us - Our History - Boys & Girls Clubs of Mercer County, NJ” 2017). In 1990, the Boys

Clubs of America amended their charter and became the Boys & Girls Club of America in order to recognize that girls are an equal part of the cause.

The Boys & Girls Club of Mercer has two locations, Trenton and Lawrence. The Boys & Girls Club of Mercer is not a school, they partner with eleven schools to provide after-school programs for children in kindergarten to 8th grade, that includes busing from each respective partner school. School year programs at the Trenton Clubhouse include after-school computers, cooking, basketball, gymnastics, and choir. During the school year holiday camps, field trips and Saturday programs are provided. In addition, The Boys & Girls Club runs summer camps for children entering kindergarten to grade 8 and teens. Camp runs during the weeks that school is not in session. The camps include a variety of options including kids camp, teen travel camp and sports camp. Kids Camp offers a variety of activities including educational undertakings to prevent summer learning loss, cooking, and physical fitness. The Boys & Girls Club of Mercer locations share resources and in the summer kids from Lawrence come to Trenton, by bus to use the swimming pool and other amenities.

2.4 Garden Project Overview

The Boys & Girls Club reached out to the Rutgers Department of Landscape Architecture after the fall 2015 semester. They were looking for help to design a proposed community garden across the street from their Trenton Clubhouse. Originally the Club wanted to purchase the property, however they were informed that the property was in a redevelopment zone so they were offered a 5-year lease. In April 2016, the city agreed to the lease for the triple lot across the street from the Center Street Clubhouse.

In our initial meeting with the Boys & Girls Club, senior director of development and marketing Kelly Watts and executive director Reggie Coleman discussed wanting a vegetable garden and a playground. We talked about a playground being very expensive and requiring insurance. It would also take up a lot of space on the lot. With the option of a 5-year lease, there is no sense in spending potentially hundreds of thousands of dollars to build a playground if the city can take back the property in a few years. Subsequently, the goal of the garden became an educational space and a play space.

The Boys & Girls Club envision a place where the members of the club and the community can interact. This community garden will have places to explore vegetable and fruit gardening, ecological principles, and implement curriculum that meets the needs of the Club. Though the Boys & Girls Club is not itself a school, they run a comprehensive summer camp and after school programs for children. The Summer Camp is an ideal time to use the garden. The year-round involvement of the club's members allows for optimal production in the raised bed garden and enjoyment of the fruits and vegetables that will be produced.

There are many public and private organizations looking to strengthen our connection to the natural world, urban green space, and educational services by offering grants for gardens or other resources to teachers. Resources include classes to learn about gardening and integration of school gardening into curriculum, manuals for starting gardens, and online support systems for maintaining projects. These organizations include The Edible Schoolyard, Whole Kids Foundation by Whole Foods, Jersey Fresh Farm to School, Keep Iowa Beautiful Teachers Going Green, Grow to Learn NYC, National Farm to School

Network, and countless other organizations nationwide. These resources are available to the Boys & Girls Club when they are looking for new ideas regarding curriculum and activities, as well as support when something doesn't go as planned.

The use of the term community garden came from the Boys & Girls Club, though their definition of community garden is different than the traditional term. A community garden is traditionally a garden that is divided into plots and members of the community rent these plots to grow vegetables or flowers for their own personal use. The use of the term by the Boys & Girls Club is to demonstrate that they are creating a space to improve the community. The eventual goal is to have non-member neighbors of the Club also use the garden. However, during project development the gates on the garden will be locked and the space restricted to club member use only.

After we agreed that the garden would better serve the Boys & Girls Club as play and educational space, I worked on several schemes and developed a conceptual design. The conceptual design, which was shown to Trenton as evidence of a plan for development, contained a vegetable garden, an outdoor classroom and a play field. In June of 2016, Trenton approved the conceptual design and the planning process started moving forward.

During the design phase I sketched and visited other gardens for inspiration. I read, listened and watched information about children's gardens, ecological gardening, vegetable gardens, ecosystems, curriculum, and anything else that related to the project. I also volunteered at Kids Camp, where I helped in cooking class, and observed the kids being kids on a typical summer day.

Chapter 3: Designing the Trenton Boys & Girls Club Garden

3.1 Garden Site Inventory and Analysis

The Boys and Girls Club of Trenton is located at 212 Centre Street. Centre Street is a wide road that carries two-way traffic and accommodates parallel parking on both sides of the street. The building is a large brick and concrete block building. The architecture is contemporary style housing a large gymnasium, several classrooms arranged around a central arcade, and a sunny second-floor area housing offices for the staff. These offices are located above retail space built into the buildings Centre Street frontage. The retail space is separate from the club and is currently occupied by a barber shop. The club also has a swimming pool nestled at the back of the property between the exterior wall of the gymnasium, the parking lot and the alley.



Figure 4: Boys & Girls Club building with double parked cars in front during pickup time from summer camp. Photo by author

After a funding campaign, the pool was renovated and reopened in July 2012 (“Club Celebrates Grand Opening of New Pool - Boys & Girls Clubs of Mercer County, NJ” 2017). The pool is an asset for the Trenton Club, most kids do not get the opportunity to swim every day in the summer. It exposes them to another way to expend their energy. Having the pool ensures that each child attending summer camp learns to swim and it demonstrates career opportunities to the members. They see that they can become life guards, swimmers, swim instructors or swimming coaches.



Figure 5: Current organization of the Boys & Girls Club facilities with vacant lot across the street.

Image by author over Google Map aerial

The Boys & Girls Club of Mercer acquired four vacant parcels of land across the street from the Club. The proposed community garden site is comprised of 4 parcels; three long, skinny lots abut Centre Street, and the fourth is a small lot on Hills Alley. The continuous lots measure approximately 73' x 135' and slopes toward Hills Place. The two immediately adjacent properties are two

and a half story private homes. There is also a large dilapidated garage on Hills Place that sits on the shared property line.



Figure 6: The property in the summer of 2016. Photo by author

The property is grass with a vegetated edge. The property lines have a lot of overgrowth and invasive plants. The vegetation will have to be removed in some places to make way for a new perimeter fence. The property slopes from Centre Street down to Hills Place. Slope percentages range between 3.5% close to center street, about 5% in the center area, and 1% or less in the lower area closest to Hills Place.

There is good sun exposure as the short side of the lot has an east/west orientation so the sun shines directly over the property. The only current

blockage of sun is a large *Paulownia tomentosa* tree that is overgrown with poison ivy. The ivy has taken over the tree so badly that it is hard to tell the species and the condition of the tree. However, it is huge so it casts a good shadow on the property that will provide shade for play or relaxation. Because the lots extend from Center Street to Hills Place this allows for passage through the site to Juan Martinez Memorial Park. Juan Martinez Memorial Park sits cattycornered to the site between Hills Place and Lamberton Street. There is a gate into the Juan Martinez Memorial Park from Hills Place which could make an ideal connection for the club to an existing park with playground.

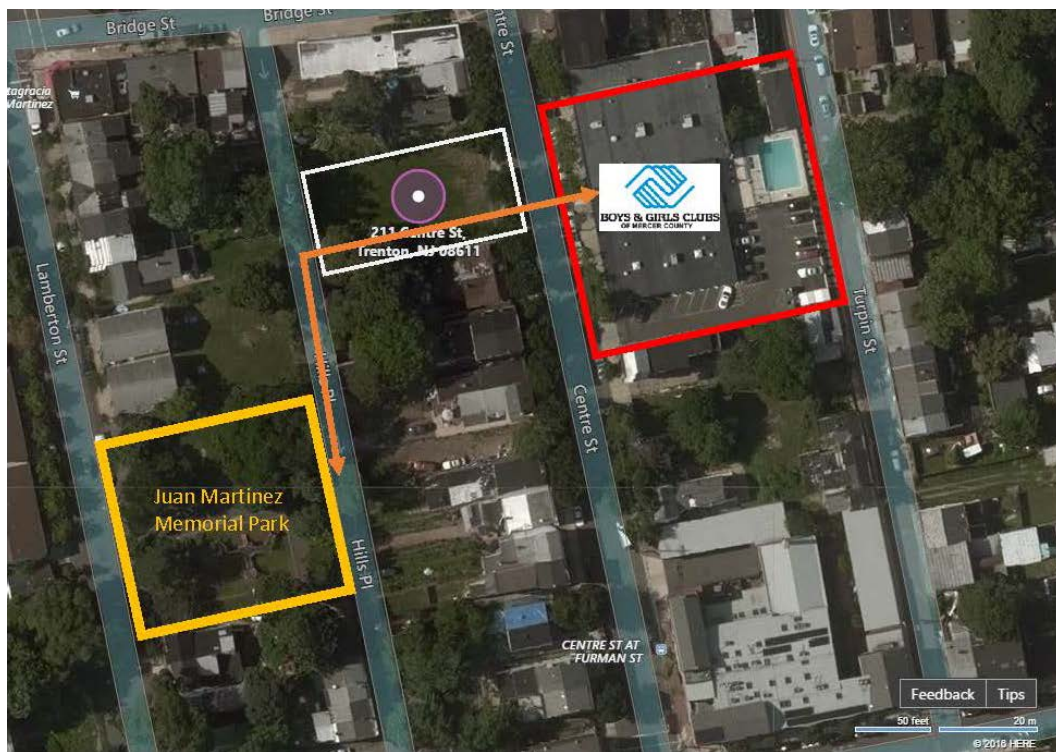


Figure 7: Hills Place is an ideal connection between the club and the Juan Martinez Memorial Park. The new garden facilitates safe passage to the playground. Image: Bing Maps. Diagram by author

3.2 Preliminary Design Process

After the first meeting, I did some visual research on raised beds, compost areas, and other school gardens. This inspired me to design a space that allows the children to grow food, learn about plants and ecological services and just run around in the grass and play. The initial concept addressed the need for the club to have learning and play space.

The initial design product was provided to the city to obtain a lease for the property. It was a simple conceptual diagram that showed the space with three major zones. It included, an area of raised beds for growing veggies, a shade structure for outdoor classroom space, and a free-play / open field that would allow for running around and playing tag or kicking a ball. It also included a little library, composting area, and storage shed along the perimeter.

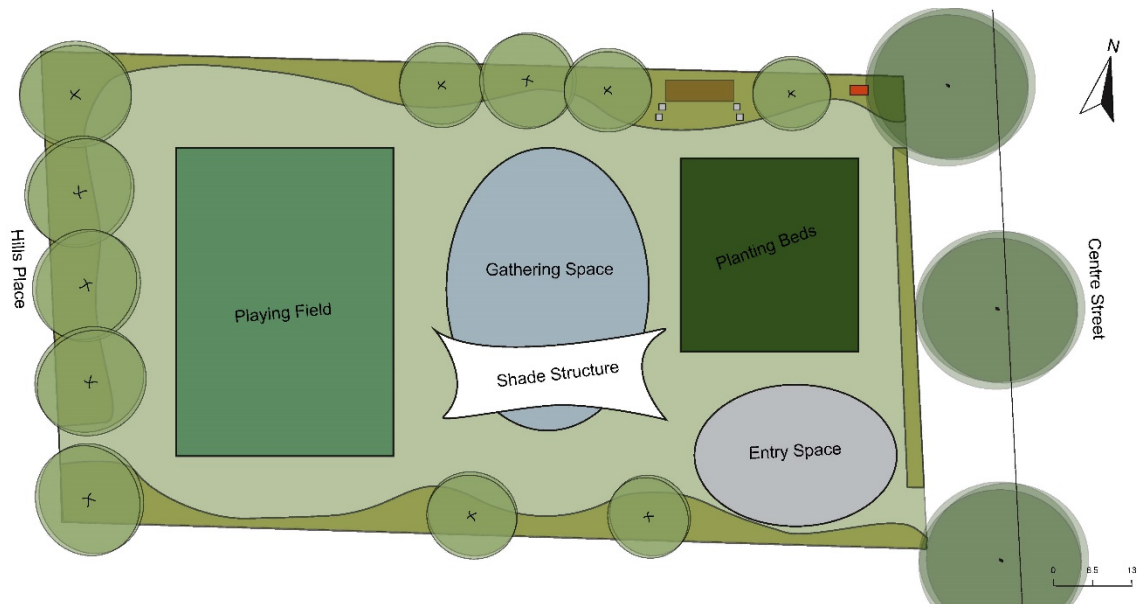


Figure 8: Conceptual design as proposed to the city. Image by author

In April of 2016 I sent a presentation containing two alternative concept diagrams and inspiration photographs to the Boys & Girls Club. This presentation

was used to appeal to the City of Trenton to lease the land to the Club for a term of 5 years. The city approved the concept and signed the lease with the Club in August of 2016. Once this initial paperwork was complete the design process commenced and iterations of the plan were created.

3.3 Final Design

The garden at the Boys & Girls Club is designed to provide the club members and the community at large with a safe place to play, grow vegetables, and learn about the food system and proper nutrition. The design incorporates active and passive zones with educational objects, building on principles of educational gardens, naturalistic design and the idea of everyday nature, while always honoring the mission of the Club. The arrangement of the garden is inspired by the topography of the property and major design influence is the feeling of walking through a vegetated path. The plant lined path calms the body and soul as the individual walks through the plantings. The garden is meant to inspire club members to play in a naturalized setting.

The entrance of the garden is marked by a pergola draped in woodbine clematis, a fast growing and late blooming vine, and leads the visitor into the garden. A stone path lined with blueberry bushes directs visitors to the north, ending at the formal vegetable garden. The formal vegetable garden includes three rows of four raised beds. The raised beds culminate at a trellis of berry vines. These vines create a separation between the garden and the neighboring property. Planted with varieties of raspberries, black raspberries, and blackberries, this living wall allows the children to gather the fruit as well as share it with the neighbors.



Figure 9: Final illustrative plan for the garden. Scale: NTS. Image by author

Moving west the butterfly roof shade structure functions not only as an educational space but also as an area for socialization, quiet reading or contemplation. Adjacent to the shade structure is a little library, a protected shelf with storybooks, cooking, and gardening books as well as small board games for the children to use in the space. The structure is placed on the steepest slope of the property. The shade structure's butterfly roof collects rain water into a central gutter and carries it down a rain chain into a rain garden below. Included in the rain garden are sun loving New Jersey native plants to soak up the water and demonstrate one example of green infrastructure. A stepping stone path, made of boulders ranging in height to span the elevation change, leads through the rain garden connecting the shade structure with the play field and allowing for children to enter the garden to see and interact with the water, plants and stones.

The playfield is a large lawn area bordered with native grasses, trees and shrubs. These hearty native grasses can withstand some impact from balls or little feet that have lost their way, while creating a successful barrier to separate the plantings and the play space. Crossing the lawn to the south boundary of the property, the vegetated border is softer, with larger curves to carve out small areas along the edge so that children can sit and enjoy the shade. Moving east along the southern border the visitor is enticed to a vegetated woodchip path. The native plant forest is a lush planting of native trees and bushes, short growing to envelope but not scare the guest. The width is between three and four so that the space is comfortable and the intimacy of a walk in the woods can be felt. The path ends almost right where it all started, back to the stone entry path with a choice to go back into the main garden spaces to the left or back out to the street.



Figure 10: Section A -
NTS. Image by author

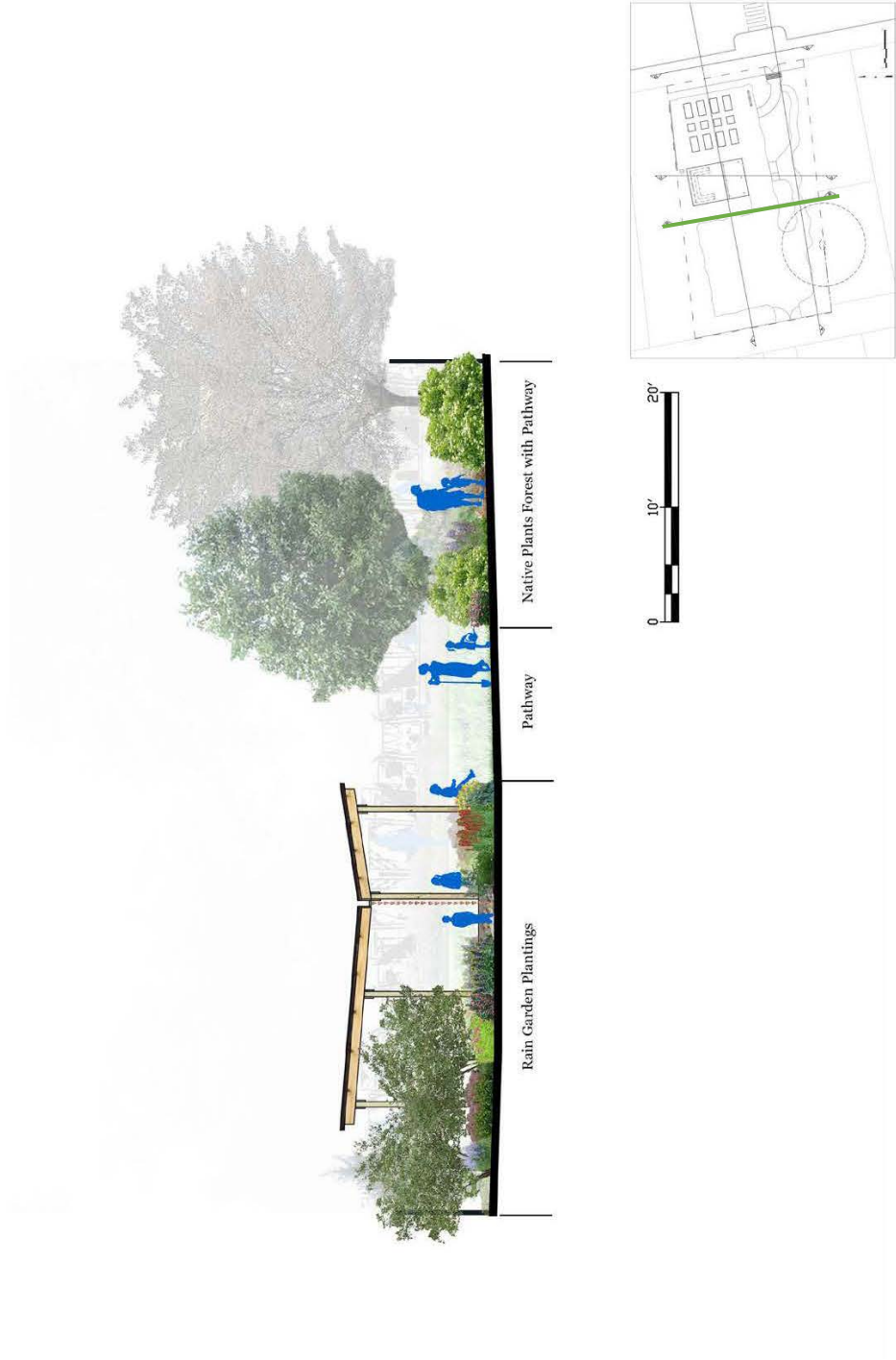


Figure 11: Section B -
NTS. Image by author



Figure 12: Section C -
NTS. Image by author

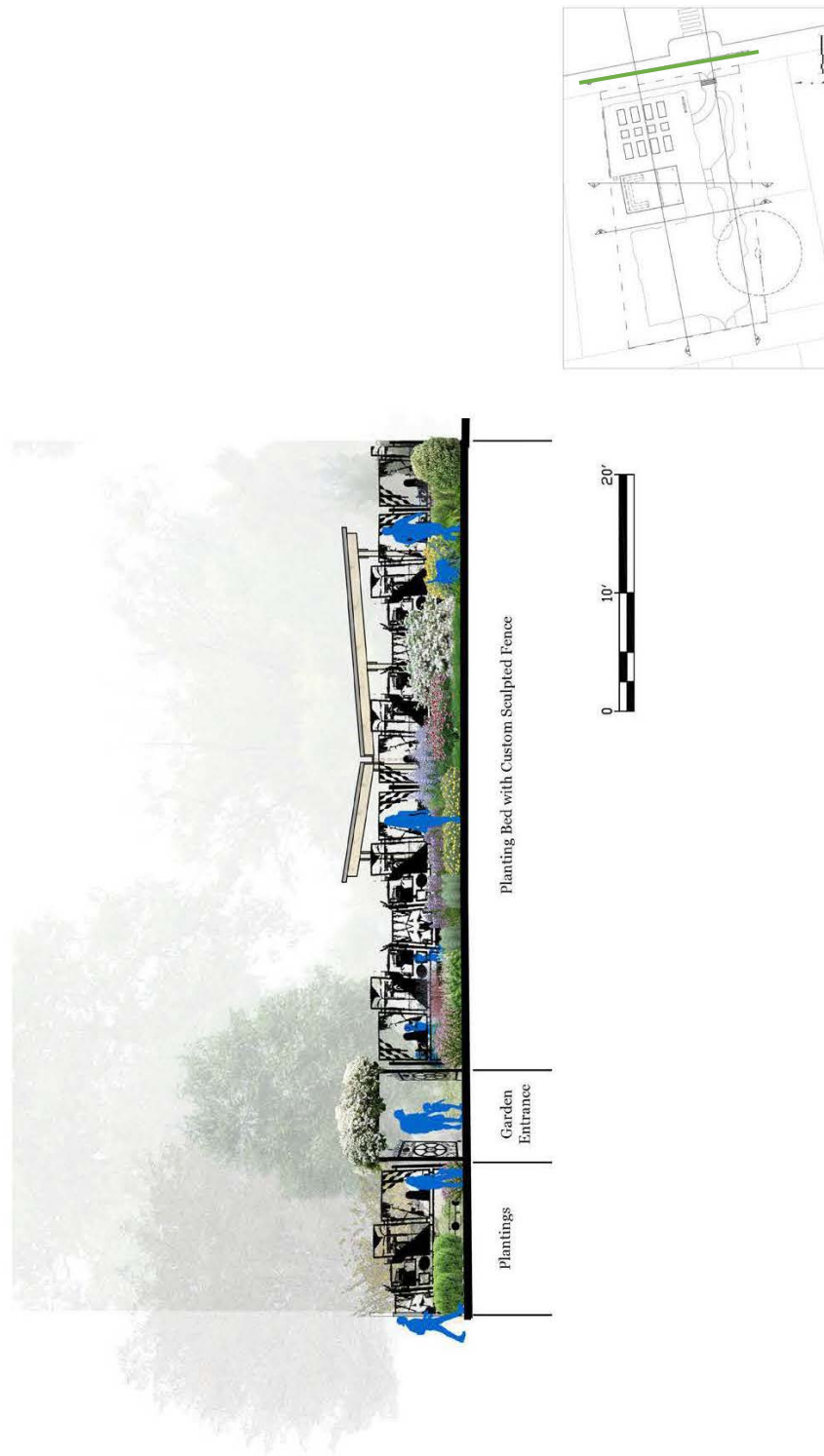


Figure 13: Section D -
NTS. Image by author

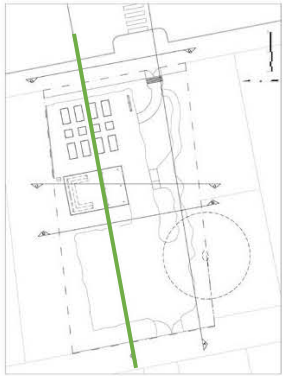


Figure 14: Section E -
NTS. Image by author

3.4 Building the Garden

When the Boys & Girls Club sought help from the Rutgers University Department of Landscape Architecture, they were looking for guidance in getting the community garden project off the ground. Kelly Watts, Senior Director of Development and Marketing sought materials and help in planning the garden and fundraising for the Club. She contacted the Landscape Architecture Department because she has worked at Rutgers University before and was trying to gather materials to support funding opportunities. She didn't expect that the entire garden would be designed by a graduate student.

The design for the garden was produced pro-bono so that I could learn from the process. The plans for the garden (Appendix 1) have been submitted to the Boys & Girls Club. They have contracted a local Landscape Architect, Randy Baum, to act as project manager for the job of building the garden. The design and images produced will help Ms. Watts and the Boys & Girls Club raise money from foundations and corporations to build the project.

The 5-year lease on the lot, is structure such that every year the lease can be extended for five additional years. We are hoping that having a comprehensive and cohesive plan will convince the city to extend the lease to a longer period. This will also help to gain traction with funders. Most donors want to see their investments go into something that will exist in perpetuity not just something that could be moved or changed in a short time frame.

Chapter 4: Conceptual Framework for Children's Gardens

I focused on the themes of “nature-deficit” and “everyday nature” in order to provide a conceptual grounding for my understanding of children's gardens. These resources have been targeted to this project, each helps to explain challenges that arise when creating educational gardens and gardens for children. Richard Louv's *Last Child in the Woods* helps to explain the change in childhood play for the current generation and what makes the experience so different from previous ones. *With People in Mind* takes stock of human comfort in the landscape and looks to provide solutions to psychological discomfort.

4.1 Benefits of Free-Play and Nature

Last Child in the Woods by Richard Louv aims to convince the reader that there are fundamental connections between human development and nature. We are at a critical moment when the bond between human and nature during physiological and psychological development is being broken, just as significant advances in science are proving these connections exists and are a vital part of cognitive development. Nurturing these connections helps to develop a mind free of attention deficit disorders and with the confidence to be alone and to navigate oneself through any challenge. He has termed this disconnection as nature-deficit disorder.

Through fear, paranoia, legislation, and technological advances the movement away from outdoor free play for children has handicapped children's abilities to entertain themselves, learn about the natural world and take ownership for the places around them and the environment at large. These deficits in the maturation of American society has left a changed, many would say

diminished, childhood experience as compared with previous generations. Stewardship of natural lands has decreased. The involvement of children in nature or park play without the intervention of adults or programmed apparatus has become almost nonexistent. Organized recreation has taken over once unprogrammed places and children have every moment of their existence planned. The over-programming of parks, urban developments, community rules and the continuous development of natural lands, even in parks that were meant for passive enjoyment, are showing our children that manicured playing fields are the only form of officially sanctioned play. Louv argues that organized sports are not working. The correlation of the childhood obesity epidemic and the rise in organized sports seems to point to the failure of organized sports like soccer and little league to address the issue of children's health. In addition, he argues that organized sports are more dangerous for kids. The increased tension and expectation to perform and compete leads to more injuries and emotional distress for children than free play in natural settings.

According to Louv, free play helps children to develop independence and empowers them to make decisions for themselves. "The "Gaining Ground" and "Grounds for Action" studies in Canada showed that the more varied green play spaces suited a wider array of students and promoted social inclusion, regardless of gender, race, class, or intellectual ability: and they were safer.' (Louv 2008, 219-20) The ability for children to safely explore their environment and receive education based on their environment has led to gains in student performance in social studies, science, language arts and math. Programs in Florida, California, Colorado, Texas, North Carolina, and Pennsylvania have seen positive results

from increasing exposure to local nature or place-based education. These gains include improved standardized testing scores, grade point averages, and better developed skills in problem-solving, critical thinking, and decision-making (Louv 2008, 206–7).

Overall, *Last Child in the Woods* asserts that there is a disconnect between the environment and children today, deemed nature-deficit disorder. It shows that the systems of organized play based on schedules and playfields do not suitably address the health needs of children today. To better tend to the needs of childhood development several suggestions are made to improve access to nature, including changing laws and rules to allow for more play, cultivating programs in education and relationships with not-for-profits and stewardship organizations, and creating new spaces that allow for free-play and choice for children to experience different environments for play.

4.2 Designing Everyday Nature

In a perfect world, everyone would have access to natural spaces and be able to roam freely. However, that is not the case. Urban areas are being increasingly developed and natural space replaced with housing, commercial space, or a combination of the two. Some urban areas are unsafe in respect to physical violence and some in respect to physical health and well-being. In addition, many people are fearful of unfamiliar spaces. In the urban confines, we need to use design to create places that are naturalistic and emulate the feelings and benefits of nature. These new designed places can support the positive outcomes of exposure to nature and greenness.

The concept of “Everyday Nature” and “Nearby Nature” are discussed in the book *With People in Mind* by Rachel Kaplan, Stephen Kaplan and Robert L. Ryan. The authors set out to determine if people prefer natural environments and to find patterns to explain preferences. This research helps designers to build into parks and public spaces the preferred elements of everyday nature. These findings help landscape architects to design more successful places for both people and the environment.

The research reveals universal patterns, within four themes, that lead people to feel uncomfortable in their environment. Each theme is described in the next few paragraphs and possible design solutions are included. Design interventions are suggested to comfort the visitor and create more enjoyable places. Many of the solutions to these problems are applicable to more than one of the characteristics of uncomfortable spaces. Design solutions to these themes have been built into successful spaces for people and urban spaces are no exception (Kaplan, Kaplan, and Ryan 1998, 149).

The first theme is people feel uncomfortable in environments that hinder or block their understanding of the setting. “Certain environmental qualities increase people’s sense of comfort and trust, especially under circumstances when they might be fearful” (Kaplan, Kaplan, and Ryan 1998, 152). Feeling fearful or overwhelmed in the natural environment is common, especially when experience is limited, to help a visitor feel confident in a natural place designers should use hints and familiar elements in spaces. People feel comfortable and gain a deeper understanding of their surroundings when regions and spaces are tied together using discernable gateways to create easily identifiable pathways.

Pathways and trails created in the design should contain distinctive landmarks that are used for wayfinding. Wayfinding is additionally enhanced by using clear paths, signs and labels. Materials used in the design should be natural, helping to explain the presence of humans which is reassuring to visitors (Kaplan, Kaplan, and Ryan 1998).

When the environment lacks opportunities for exploration people feel constrained. A sense of depth should be created when designing spaces, using layers, path width, curves, and gateways. Creating opportunities for exploration is appealing to people when they are in naturalistic places. Areas for exploration need to have clear gateways with views along the pathway. The pathway also needs to provide views outward so that there are opportunities to stop, rest, and observe. Designing captivating views provides information about what lies ahead and insures the visitor is interested in continuing their journey. Sinuous paths provide mystery and the promise of discovery. A visitor's exploration is additionally enhanced by offering cues and hints for alternative options, wandering, and imagining (Kaplan, Kaplan, and Ryan 1998).

When the environment fails to foster experiences that are restful and enjoyable people feel distressed. Restful and enjoyable spaces are achieved by using plants, water, stones and other natural elements to create a sense of intimacy. Trees help make a place special. Enclosure in smaller spaces is preferred when these spaces are well designed, this means that the space has extent and contains natural elements. Well-designed spaces also separate the visitor from distractions and avoid feelings of danger initiated by large open spaces. Overgrown or eroded stream banks also create a feeling of danger, the use

of plantings can help to ease the discomfort. Even if a person is not in a natural setting, a view through a window of vegetation and greenspace can have a positive effect on a person's attitude and health (Kaplan, Kaplan, and Ryan 1998).



Figure 15: A defined path leads through the North Carolina Arboretum in Asheville, NC. The meandering pathway is easily identifiable, yet mysterious. Photo by author.

The fourth theme is that people feel their participation is not welcome in a place, therefore making them feel unwelcome. When people are asked to participate in a place they are much more likely to understand and appreciate the place. The inclusion of “people in the design and management in their nearby natural world” (Kaplan, Kaplan, and Ryan 1998, 158) helps to provide opportunities for meaningful participation in their spaces. This participation can be garnered by inviting feedback, providing alternative schemes, and including locals in ongoing management efforts. These interactions help to gain respect from users and visitors for the place and for the designs that are being implemented and maintained (Kaplan, Kaplan, and Ryan 1998).

The last point in *With People in Mind*, which relates to all themes portrayed in the book, is that the simple act of small experimentation can induce the greatest response from people. The use of experiments to problem solve in a place, whether it be prevention of loitering and vandalism or testing out new types of plantings, is a unique opportunity to expose people to something different in a small yet significant way.

These simple and insightful aspects of human behavior can help the landscape architect to create comfortable and impactful naturalistic places in the confines of urban framework. The knowledge that small spaces can have restorative and restful influences on people is a tool that helps designers. It also demonstrates that designed places can function for humans in the same way as open, untouched lands. The need for exposure to everyday nature is becoming a more recognized deficit in the plan of cities. Understanding the benefits of everyday nature and implementing solutions to increase greenness is increasingly important in relation to designed urban environments.

Pathways are highly integrated into urban spaces. Is that because we are trying to make places easier to navigate. Have designers and place-makers used pathways to create exactly the comfort that *With People in Mind* recommends? Pathways are a design tool used to create cohesive areas and opportunities for exploration. Paths enhance the visitor's ability to explore, make choices, and use their imagination when in natural area. Pathways are a device to break through the overwhelming feelings and fears experienced by unfamiliar users when visiting a place. Do we have to make them so prevalent? *With People in Mind* demonstrates many ways to make pathways more comfortable, more interesting,

or just the right level of mysterious, however the writers are not approaching the subject as practicing designers. Every effort has been made to synthesize the psychological research into a handbook for designers, and this is a useful instrument for designers to use when they are designing. However, creating comfortable spaces is not as easy as checking off boxes on a list. All designs are site specific and cannot be designed solely by accessing every inch of a space via pathway. We need to find a way to design children's gardens that places more effort on the space created and less effort on comprehensive circulation.

The design for the Boys & Girls Club Garden divides the property into four sections; each area is a different experience. The early designs only called for three sections, the vegetable garden, the outdoor classroom, and the play field. However, after many iterations, the entrance to the garden felt too open, it didn't feel special. I was reading, watching, and listening to information about vegetation's benefits, and a key point I remembered is that walking through vegetation changed the way a person felt. The native plant forest was added to the design so that visitors would have to walk through vegetation to get into the garden. It is a cue that they are in a different place than the everyday.

There is also an opportunity for discovery and a choice to be made near the front entrance. A visitor can choose to move along the path, through the blueberry bushes to go to the vegetable garden, or they can choose to walk through the native plants forest and have a longer walk to the play field. The entrance to the native plants forest is just inside the entrance to the garden, it is not emphasized as a primary pathway, so it doesn't confuse new visitors.

However, well versed visitors can use the path as a different way to enter the garden. It is a discovery to be made and a choice once the path is revealed.

The material of the ground plane was also chosen to be a cue to the visitor. The paving at the entrance and through the blueberry bushes is different from the woodchips in the native plant forest, and the boulder path through the rain garden, and different from the grass throughout the site. The differences in the ground plane help to illustrate the different areas of the garden and the availability for the children to act differently in each area.

The inclusion of these different areas allows for the children to choose their surroundings. They get to decide if they want to be surrounded by plants or if they want to be in a field, or on the edge. Different types of space in the garden also provide instructors with the opportunity to teach in different ways, helping the children to learn new things about the world and themselves. These small gestures contribute to the fostering of independence and confidence that Louv asserts is a result of wandering and playing outdoors.

Chapter 5: Comparison of Children's Gardens

In order to contextualize the design at the Boys & Girls Club, I visited gardens that qualify for three types of settings. These three settings are community gardens and parks, botanic and private gardens, and school gardens. These settings are different in their scale, location, budget and purpose. However, they are all gardens and they are each designed spaces that offer insight into elements that are beneficial for children and communities.

The documentation of these spaces was loosely based on the *Landscape Architecture Foundations Case Study Method*. Following the method as prescribed produced information that was not entirely relevant to my research. When I created a few of the gardens in an early writeup the analysis of the garden became tangential and extremely long. I decided that reducing the amount of information included in this section would not only benefit the reader but would help me to be more succinct in my analysis.

The community gardens and parks that I visited are Pogo Park in Richmond, California, West Oakland Farm Park & City Slicker Farms in Oakland, California, and several gardens in Trenton, New Jersey managed by Isles, Inc. Botanic gardens include the Denver Botanic Garden, Rutgers Gardens, and Longwood Gardens in Kennett Square, Pennsylvania. School gardens include The Edible Schoolyard in Berkeley, California, Princeton Day School in Princeton New Jersey, and the Oak View Elementary School in Bloomfield, New Jersey. Each provided inspiration and practical implementation, as well as limitations that have informed details for the design at The Boys & Girls Club garden.

5.1 Community Parks and Gardens

Community parks and gardens helped me to see the possibilities that communities can achieve. The parks and gardens included in this category are all located in urban areas. Surrounded by homes and businesses, they exist within the framework of their city. Each is different but they all have been influenced by their neighbors and have impacted the community in positive ways. Their layouts are usually simple and the materials used to create the gardens are typically unpretentious, and sometimes entirely recycled. These gardens and parks range in size, but all contain areas for gathering or play and areas for growing vegetables and herbs.

Pogo Park – Elm Playlot

Location: 8th St, Richmond, CA 94801

Size: 1/2 acre

Client: Neighborhood / City of Richmond

Designers: Elm Playlot Action Committee - Pogo Park and community members

Funding: \$1.94 million capital grant from the State of California Parks

Department to rebuild Elm Playlot based on Elm Playlot Action Committee's design

Goals: Take back a dangerous park that had become overrun with illicit activity. Provide a safe and clean play space for neighborhood kids and families. Empower the community to "reclaim, plan, build and manage their parks" ("Pogo Park, Strategies" 2017).

Maintenance/management: Maintained and managed by Pogo Park employees and the City of Richmond, CA



Figure 16: Pogo Park's Elm Playlot Original Design Image credit: pogopark.org/2013/07/21/elm-park-scale-model/#more-22

Key Design concepts: Play space for children that is safe. The walking path weaves through the property which is anchored by 5 mature London Plane Trees (*Platanus × acerifolia*) the trunks of which are surrounded by custom built benches. The park includes a large lawn area surrounded by swings, a zip-line, custom made play structures called “the igloo” and “the log cabin”, two sandboxes, a concrete wall for ball play, raised beds for herbs and vegetables, a house that has been converted to community space, with a kitchen, large event

room, ADA accessible bathrooms, and ample storage. The location of each of the play elements around the park is based on a full-scale model system. The design is “proofed” using full-scale plywood model pieces of the infrastructure or installations. Once the objects have been refined and approved they are built by the Pogo Park employees and volunteers with help from professional practitioners. There are two entrances to the park, both through a custom-made fence with pickets containing the name of the park and facial silhouettes of children that use the park. One entrance brings visitors into the picnic area and one to the space in front of the house. The perimeter is surrounded by sparse but appropriate plantings to soften the edges of the property.



Figure 17: Plantings soften the edge of the park but do not interfere with play spaces. Photo by author

Key Design Inspiration: Mature trees help to create a canopy over the park giving shade and coolness to a park that is in a dense residential area. Plants, some

native, soften the edge of the park, but do not interfere with play spaces. The Pogo Park community came together to create a safe place for children and families. They included many elements into the space and though it is heavily programmed it does not feel crowded.



Figure 18: View into Pogo Park Elm Playlot from the southeast corner. Photo by author

West Oakland Farm Park & City Slicker Farms

Location: 3301-3399 Peralta St, Oakland, CA 94608

Size: 1.4 acres

Client: City Slicker Farms

Designers: CMG landscape architect Carrie Rybcynski and community leaders

Funding: \$4 million grant from California's Proposition 84

Goals: Permanent home for City Slicker Farms, an urban farm that had been insecure due to lease agreements and development in West Oakland. Grant funding required a public park space in addition to the farm production areas.

Maintenance/management: City Slicker Farms employees and volunteers.

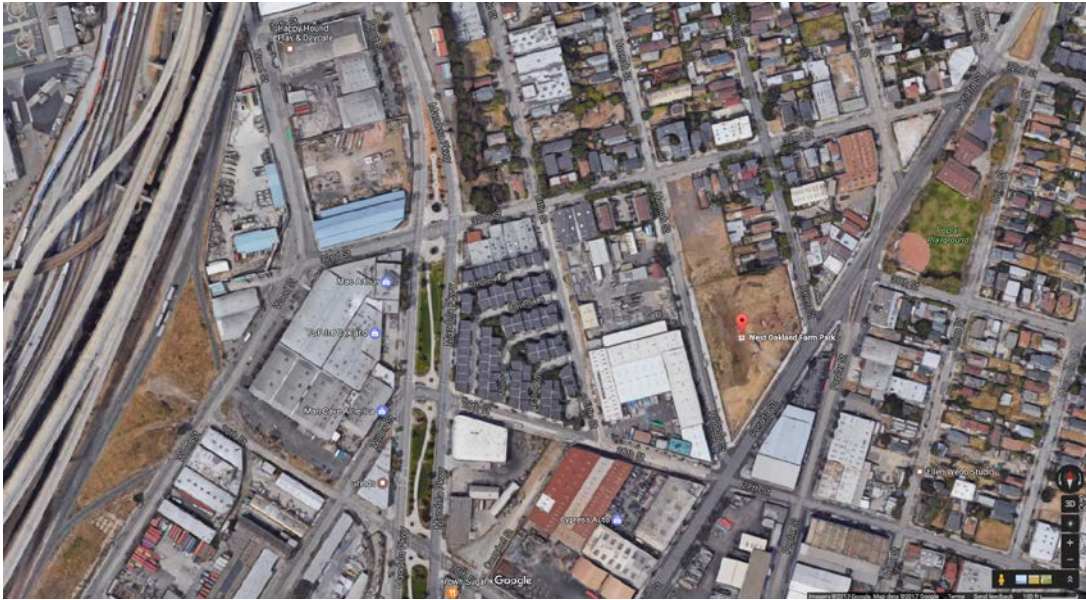


Figure 19: West Oakland Farm Park context map. Image Credit: Google Maps

Key Design concepts: The property for the West Oakland Farm Park is oddly shaped, like a long rectangle with a corner cut off and pushed off the edge from which it was cut. The farm and community garden spaces are in the large rectangular area and are rectilinear in form. Clearly designed to maximize the potential for sun exposure and food production, but requiring street access for gardeners and trucks, they are placed in the longest portion of the property. The public playground is placed in the triangular area and is far from the farm, this is part a function of the parcel but also affords a distance between play and more serious agricultural work. The property has many built elements including several shade structures, a chicken coop, ADA accessible restroom facilities and

lots of fencing. The entire property is fenced and then each area of use is fenced separately. The fences were varied in style but each was appealing and the heights appropriate.



Figure 20: West Oakland Farm Park Oblique rendering of the proposed farm and playground.

Image Credit: www.cityslickerfarms.org/the_farm_park.php

Key Design inspiration: Built objects at West Oakland Farm Park are all made of combinations of wood and metal. Each contributes well to the beauty of the site and because of the material choices all are relative. The clean lines of the rectilinear form of the community garden, in beautiful raised beds made of wood with metal corners that sit on a base of crushed granite creates a separate but related space. All elements correspond with the custom-made picnic tables and

benches installed throughout the site and are sometimes sheltered under shade structures made of wood with metal rooves.



Figure 21: Large shade structure at West Oakland Farm Park Serves as a gathering space, farmers market, wayfinding post, wash station and restrooms. Photo by author



Figure 22: Custom picnic tables at West Oakland Farm Park contribute to the unity of the spaces even though they are separated by distance and fencing. Photo by author



Figure 23: Raised beds at the Farm Park are made of wood planks secured with steel corners and mid-beams. The composition of the wood steel and gravel was an inspiration. Photo by author

Isles, Inc.

Location: Trenton, NJ

Size, Client, Designers: Varies by space, Isles, Inc. supports over 60 gardens

Goals: Provide support, technical, and organizational assistance to local residents and community organizations. Improve health, save families money, strengthen the community, clean the environment, beautify communities.

Funding: Grants, private donations and volunteers

Maintenance/management: Individual gardens are maintained by the stewards of that space, there are four types of gardens, gardens managed by Isles, Inc. institutional gardens, community gardens and school gardens. The gardens at Tucker St and Wood St are managed by Isles, Inc. but the Garden at Crisis Ministry is an institutional garden therefore it is managed by Crisis Ministry. The

garden at Academy Street is a community garden so the members manage it and the garden at Columbus Elementary is managed by Columbus Elementary teachers, students, and volunteers.

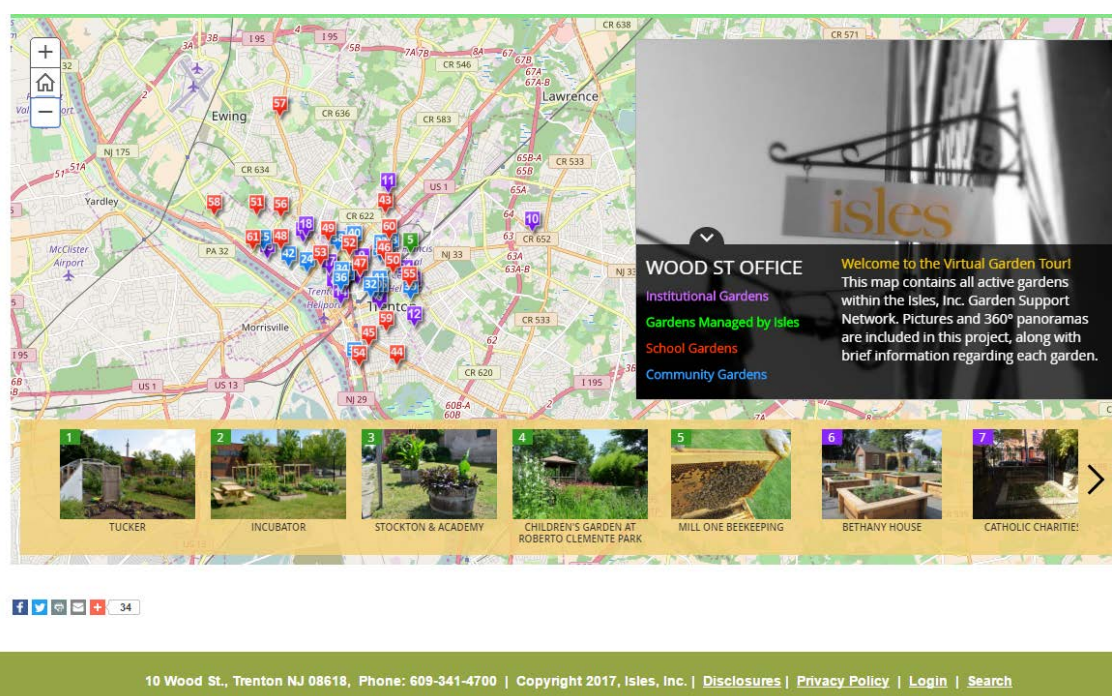


Figure 24: Figure 24: Isles, Inc. supports over 60 community, school, and institutional gardens throughout Trenton. Image Credit: https://isles.org/services/urban-agriculture/map#.WlUjn_krJhE

Key Design concepts: “Since the organization’s inception in 1981, Isles has provided technical and organizational support for Trenton residents to transform neglected parcels of urban land into gardens that address hunger relief, food production and nutrition education, as well as urban beautification and open space preservation throughout the city of Trenton. Today, Isles supports community and school gardens by providing technical assistance and education, raised bed materials, seeds and plants, volunteer assistance, and access to tools and equipment.” (“Isles, Learn About” 2012)

The gardens are designed to be productive in the space given. They each contain raised beds and gathering spaces. The exception to that is Academy I, which is a community garden where the plants are planted in the ground. Almost everywhere else the plants are in raised beds.



Figure 25: Learners garden beds at the Tucker St Garden. Photo by author

Key Design inspiration: The largest design influence is the need for security and maintenance of the spaces. Each of the six gardens visited during the Isles tour had a fence around the entire property and each was locked. The need for security was underscored by evidence of vandalism, trash, and the cut chain link fences at gardens visited during the tour. The need for maintenance became very evident on the tour also. Gandhi Garden, next to the Sage Coalition had been abandoned for about a year because the Coalition was evicted from their building. Walking through the overgrown paths, you could not see your destination but you could hear voices, this was a bit uncomfortable. Additional inspiration came from the Tucker St Garden where the learners garden beds are located. These beds were

simply constructed but the added climbing trellis for tomatoes and beans were impressive.



Figure 26: Overgrown Gandhi Garden with mural. Photo by author



Figure 27: Hidden gathering space at the Gandhi Garden. Photo by author



Figure 28: Crisis Ministry garden view from just inside the locked gates. Photo by author

5.2 Botanic and Public Gardens

Botanic and Public Gardens are all institutions funded with large budgets and supported by employees and docents whose function is to entertain visitors and maintain an interesting and inventive display for visitors. These gardens are located on large acreages with designated areas for children's and educational gardens. These locations function as public institutions that are constantly changing. They include many expensive amenities that community gardens and school gardens cannot afford. However, they entertain and one of the goals of the garden for the Boys & Girls Club of Trenton is to be a place for play and amusement. The garden at Boys & Girls Club Trenton may not be able to occupy

as much space or provide expensive amenities, it can provide places of wonder and amusement just like these large-scale gardens.

Denver Botanic Gardens - Mordecai Children's Garden

Location: 1007 York St, Denver, CO 80206

Size: 3 acres

Client: Denver Botanic Garden

Designers: Mundus Bishop Design, Inc.

Budget: \$4 million – initial budget

Goals: A family and children's garden that brings to life the Colorado ecosystems using fun and interactive displays. Intended as a green roof installation and storm water management the extensive garden contains many educational opportunities.

Maintenance/management: Botanic Garden employees and volunteers.

Key Design concepts: The Mordecai Children's Garden is a series of smaller gardens starting at the upper level of the parking garage, the alpine garden, and winding down through grasslands, streams, and finally into a pond at ground level. The ground level contains a small amphitheater, an event space, Chipotle sponsored vegetable garden, and the Discovery Center.

Key Design inspiration: The parts of the Mordecai Children's Garden that were most inspiring were the small details. The small spaces created for kids to play were very inspiring. Moveable furniture and large building block sets made from natural materials were inspiration that contributed to details in the design at Boys & Girls Club on Centre Street.



Figure 29: Designers plan for the Denver Botanic Gardens - Mordecai Children's Garden. Entrance to the garden is located on the right and the garden slopes to the left. Image Credit: <http://www.aslcolorado.org/2011-awards-archive/>

The Chipotle Vegetable Garden, (labeled home harvest garden on the plan) located at the very bottom of the garden was beautifully planted. The contrast of jewel toned flowers with the green vegetable plants was very striking and the collections of plants into the raised beds made them look as though they were flower arrangements to be gazed at, not food to be eaten and earth to be worked. This effect has positive and negative consequences, but the beauty that was shown in the plantings was unlike anything I have seen before in a vegetable garden.



Figure 30: Benches and tables made from tree trunks create a playful but naturalistic seating area.

Photo by author



Figure 31: Small structures at the Mordecai Children's Garden create great little places to play. Photo by author



Figure 32: Raised beds planted with colorful flowers, lettuces, and tomatoes. Photo by author

Figure 33: Bright flowers compliment the vegetable plants. Image Credit: Julie Casault, Gardener

http://www.botanicgardens.org/sites/default/files/blog-photos/IMG_7294-225x300.jpg

Longwood Gardens – Children’s Corner

Location: 1001 Longwood Rd, Kennett Square, PA 19348

Size: ¼ acre portion of more than 1,077 acres of gardens, woodlands and meadows.

Client: Longwood Gardens

Designers: Longwood Gardens and Longwood students

Goals: Children’s play area exposing children to large scale artworks and waterplay while teaching about bees and ecosystem functions.

Maintenance/management: Botanic Garden employees and volunteers.

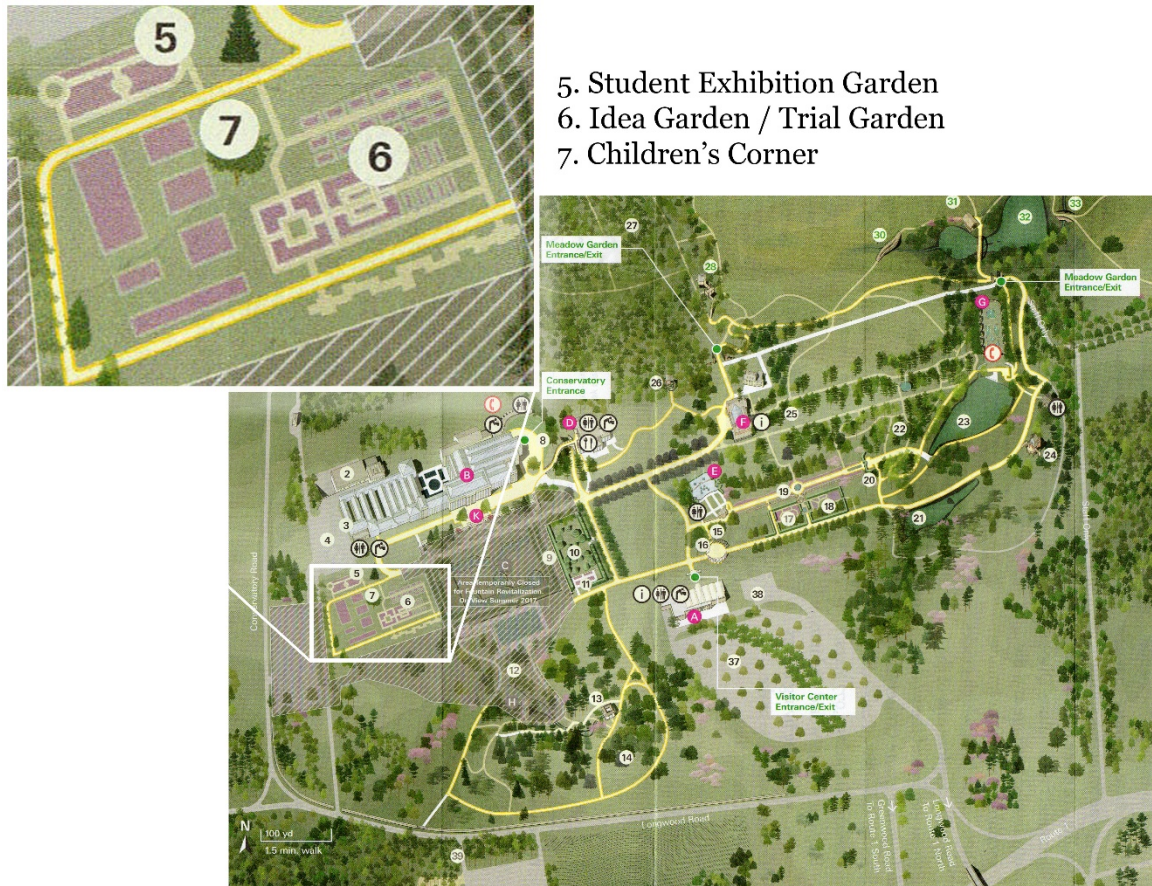


Figure 34: Enlarged map of Longwood Gardens Children's Corner. Map art by Longwood Gardens

Key Design concepts: Highly built area to circulate children and introduce them to the positive and necessary role of the bee in our ecosystem. The children's corner is also adjacent to the student exhibition garden and the idea gardens. Though the student and idea gardens are not generally installed by or for children, they are created and maintained by adult students of Longwood Gardens. The proximity of these flower and vegetable gardens to the Children's corner allow children to explore unique growing structures for plants and experience gardens of different scales.

Key Design inspiration: The flightpath of a bee is conveyed in a paving pattern, the hive is created with fences and a structure with vines growing on it, and the

queen's status in the hive is elevated with a throne in the garden. All the education is enhanced with signage and interactive boards. The use of sculpture in the area is stimulating; from the play fountain shaped like a flower up to the flower solar panel sculpture. The theme is artfully conveyed in sculpture.



Figure 35: Flower play fountain in the Children's Corner is shaded by mature trees and overlooks the idea garden. Photo courtesy of Longwood Gardens, Judy Stevenson



Figure 36: Honeycomb patterned 'maze' with informational signage about ecological functions. Photo courtesy of Longwood Gardens



Figure 37: Bee flight pattern paving pattern in the Children's Corner. Photo Courtesy of Longwood Gardens



Figure 38: Flower solar array. Photo by author

Figure 39: Bee throne. Photo courtesy of Longwood Gardens



Figure 40: House frame in the Student Exhibition Garden is planted each year with different plants to create an enclosed playhouse for children to feel the intimacy that can be created with plants.

Photo by Patrick Collins

Rutgers Gardens – The Student Farm, The Youth Garden and VSA Plots

Location: 112 Ryders Ln, New Brunswick, NJ 08901

Size: <1/2 Acre

Goals: Expose the community, students, faculty, Rutgers Gardens guests and the public at large, to agriculture and food production. The Student Farm donates a quantity of produce to a soup kitchen in New Brunswick while other produce is sold at a farmer's market and to Dining Services for the University. The Youth Garden hosts summer camp and school groups. The Volunteer Supported Agriculture (VSA) Garden follows organic growing methods, crop rotations and incorporation of cover crops.



Figure 41: Aerial view of The Student Farm at Rutgers. Image Credit: Google Maps

Maintenance/management: The Rutgers farm manager and student interns supported by the Office of Agriculture and Urban Programs manages the farm with budget from the university, grants, donations and revenue generation.

Key Design concepts: The youth community garden, the student farm, and the VSA plots are focused on production. The form of the garden is functional and rectilinear. Rutgers Gardens is also engaged in community outreach, so there are areas for gathering throughout the garden.

Key Design inspiration: The most inspiring portion of the garden is the post production handling station and shade structure. These elements are inspiration for the built elements in the Boys & Girls Club design. The wood and metal structures are simply built but innovate with the use of unconventional materials. The sink of the post-harvest station is made from a keg and the benches under the shade structure integrate recycled wood pallets into their construction.



Figure 42: Students designed and built the furniture under the shade structure using both new and recycled materials. Photo by author



Figure 43: Shade structure and post-harvest station at The Student Farm. Photo by author

The fenced area that contains the student farm also contains the Youth Community Garden used in the children's programs at Rutgers Gardens. The children's programs provide experiences for kids throughout the gardens

property and the summer camp includes a vegetable garden harvesting experience. The Gardens also feature a robust group exploration program, where schools or groups can plan a self-guided tour of the gardens. To visit the youth garden and the student farm groups need to plan an employee guided tour because the area is inaccessible when not used by the staff or VSA volunteers. In addition, the Rutgers Gardens team provides a ‘learn through horticulture’ program partnership that is intended to be done in the classroom or after-school program environment. These important interactions for children create an effective and personalized connection for children to the Rutgers Gardens community.

5.3 School Gardens

School gardens included in this category are from both the east and west coast. School gardens are an important context for the Boys & Girls Club garden because the educational component is one goal of the Trenton Club. The Edible Schoolyard is a model that has taken twenty years to develop. The garden is well funded and the curriculum is shared through an online network. Princeton Day School has a large school garden with an outdoor classroom inspired by barn architecture. This garden is open to students as a place to work, play, or harvest food. The garden at the Oak View School is a terrific example of a starter garden in an urban area. The school is in a residential area and the garden is built in raised beds on the asphalt surface that dominates the schoolyard. While the Edible Schoolyard and Princeton Day School focus on education in schools, the Oak View Elementary garden is primarily tended by a faculty member and group of dedicated volunteers.

The Edible Schoolyard Project Berkeley

Location: 1781 Rose St, Berkeley, CA 94703

Size: 1 ¾ acre – includes kitchen building and tree plantings down to the track

Client: King Middle School

Designers: Edible Schoolyard Project & King Middle School employees and Students



Figure 44: King Middle School; The Edible Schoolyard to the west. Image Credit Google Maps

Goals: The Edible Schoolyard Project is an important contributor to the effort to increase education in the areas of agriculture and health. Edible Schoolyard Project grew out of efforts at the school and now works to ‘build and share national edible education curriculum for pre-kindergarten through high school’ (“Our Work | The Edible Schoolyard Project” 2016). The Edible Schoolyard Project program offers curriculum online, trainings, and network support for interested parties. The Edible Schoolyard Network boasts 5465 partner locations throughout the world. The Edible Schoolyard is also a unique program because it

was started by a very influential individual with access to a revenue stream that many other organizations may lack.

Maintenance/management: Students and Faculty of King Middle School.



Figure 45: Figure 45: Wash station under a simple shade structure. Photo by author

Key Design concepts: The Edible Schoolyard Berkeley is a well-established and maintained garden. The garden is planted in the ground and focuses on production of food and flowers. There are many different projects throughout the garden that are examples of the teaching that has taken place in the garden, including a wayfinding map drawn by students showing the different areas of the garden. Areas of the garden include California native plants, long season vegetable crops, the tool shed, glass house, kiwi vine tunnel, earthen bench, espalier apple line, community picnic table, and compost. Each item is unique and fits within the curriculum of Edible Schoolyard Project. The kitchen building

is close to the middle school, along with the long dining tables and the harvest wash station. The wash station is under a shade structure and the water from the wash station flows into a garden located next to the shelter. The tool shed, chicken coop, and glass house are located near the back of the property, there is also an additional gate that serves as a truck delivery entrance. Moving north towards the running track, the property slopes down and is planted with a forest of trees. Fennel creates a shaded and sheltered walk passed the compost and down to the running track.



Figure 46: Crop labels painted by students wait for new crops to be planted. Photo by author

Key Design inspiration: The obvious influence of students was the most inspirational part of the Edible Schoolyard Berkeley. The plant markers and earthen bench were all created by students. The storage area was clearly geared towards children being able to independently access the tools, gloves, and boots. Empowering them to work in the garden and showing that they have control of the space. Additional inspiration came from the plantings themselves. The

mixing of vegetables and flowers once again struck me as a beautiful and beneficial way to structure the production aspect of the garden. The use of large shrubs and vines to create covered walkways and corridors created a feeling of intimacy.



Figure 47: Long tables and benches for gatherings, eating, and instruction, set with flowers from the garden. Sheltered pathways invite visitors into the garden just beyond the table. Photo by author



Figure 48: New lettuce crops are protected by netting. In the distance are beds mixed with flowers and vegetables. Photo by author

Oak View Elementary School Garden

Location: 150 Garrabrant Ave, Bloomfield, NJ 07003

Size: 1/50th acre

Client: Oak View Elementary School

Designers: Oak View Elementary School

Goals: Grow food on the school grounds to demonstrate where food comes from and donate to a local soup kitchen.

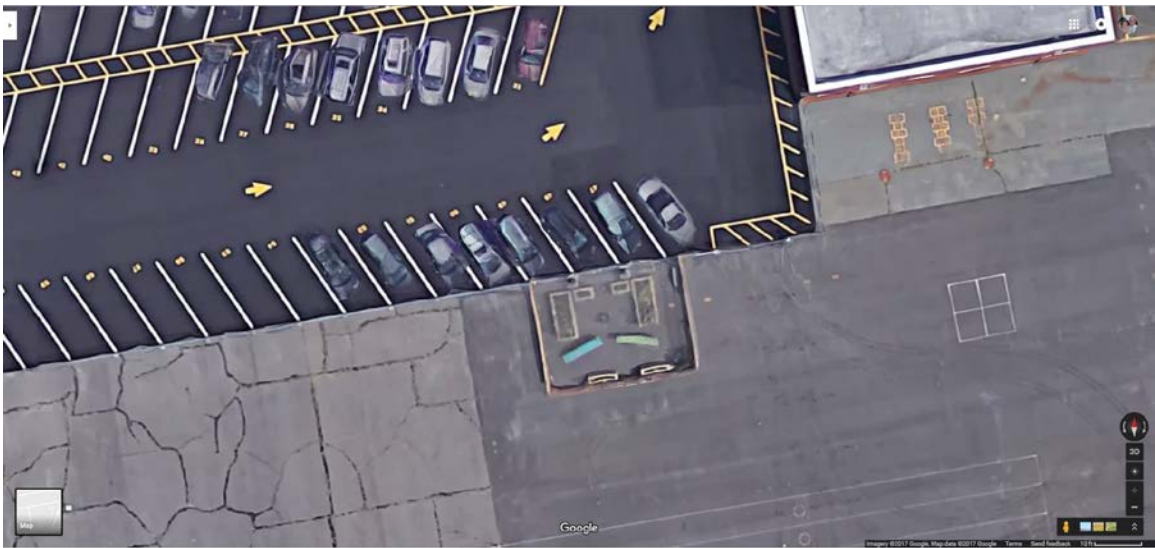


Figure 49: Tiny garden at Oak View Elementary sits in the asphalt playground next to the parking lot. Image: Google Maps

Maintenance/management: Parent/teacher group and students

Key Design concepts: Raised beds that have an irrigation system from barrels in the enclosed area of the garden.

Key Design inspiration: The garden is installed on an asphalt parking lot. The entire school yard is paved so the group built raised beds and installed them on the asphalt surface. These beds are used for year-round production by installing the covers seen in Figure 50. This helps the students to understand seasonality

and requirements for specific vegetables to grow. It also enables them to see the changes that need to be made to the garden to grow at different seasons.



Figure 50: Modified from the aerial, this half of the garden shows the addition of a potting table.

Photo by Jan Perrone Greco



Figure 51: Raised bed at Oak View Elementary is lined with hay for winter protection. Photo by Jan Perrone Greco



Figure 52: Small but mighty, Oak View donates their produce to a local food kitchen in Montclair.

Photo by Jan Perrone Greco

Figure 53: Greens growing in covered raised beds for the winter. Photo by Jan Perrone Greco

Princeton Day School Garden

Location: 650 Great Rd, Princeton, NJ 08540

Size: ¼ acre

Client: Princeton Day School

Designers: Faculty and Students

Goals: Bring lessons to life in an outdoor garden laboratory. The garden is used as a hands-on partner to classroom instruction and provides a fun and engaging way to participate in almost any subject.

Maintenance/management: Faculty, students, and volunteers

Key Design concepts: Raised beds assembled to maximize growing capacity and educational potential, paired with a barn inspired structure. The structure is



Figure 54: Aerial view of the Princeton Day School Garden shows that the garden is surrounded by open space. Image: Google Maps



Figure 55: Barn inspired structure at PDS, looking north from the open space. Photo by author

equipped with solar panels and running water for an outdoor kitchen. There is a large instruction space cooled by ceiling fans. The instructional space opens onto a small pervious paver patio overlooking the surrounding open space.



Figure 56: Harvest station inside the garden fence separates the educational and kitchen spaces from the raised beds. Photo by author

Key Design inspiration: The innovative use of structure to grow plants and the sheer magnitude of growing space are inspirations in this garden. A variety of materials are used around the garden to create trellises for vines. Some creating walls, other arches; all showing that space can be created with structure and

vegetation and showcasing the habit of specific types of plants. Each raised bed is labeled with a house number for easy navigation during instruction with students and volunteers. This is a beautifully kept garden and the students are encouraged to “graze” after school and at recess, this encourages positive eating behaviors, mental health, and good judgement.



Figure 57: Archway of morning glories and hops shows that space can be created with vines, wood and wire. Photo by author

Figure 58: Vines grow on a length of chain link fence, creating a wall of tomatoes. Photo by author



Figure 59: The raised beds are filled with corn, zinnias and everything in between. The main entrance from the schoolyard is seen in the distance. Photo by author



Figure 60: View into the garden from the main entrance, the structure is barely visible over the vegetation. Photo by author

5.4 Analysis and Reflection

The following diagrams were produced during thesis research to compare my proposed design for the Boys & Girls Club of Trenton to a variety of other children's gardens I visited during and after the design process. The designed gardens range from 1/50th acre to almost 3 acres and all are intended to be used by children and young adults. Even though, natural untouched land is the extreme end of the spectrum for childhood development there is evidence that efforts, no matter how small or large, to create gardens and "everyday nature" are beneficial for people.

Scale – This diagram shows that a garden for children of can be any size; the featured gardens range from a 1/50th of an acre in an asphalt schoolyard with 4 planters all the way up to more than 2 1/2 acres of space on the roof of a parking structure. The majority fall into the 1/4 to 1/2 acre range because they are in urban areas and some are comprised of multiple parcels to create more space for gardening. Others however are suburban and are designated areas within larger garden or play facilities.

Context – The context for each site ranges from dense urban to suburban. These garden installations range from California to New Jersey. California provides a longer growing season so these case studies of urban gardens can function much more on an urban agricultural level than those in New Jersey. Though the New Jersey growing season is longer than other more northern locals. The lack of available land presses New Jersey gardens to be fashioned on a smaller more informational scale.

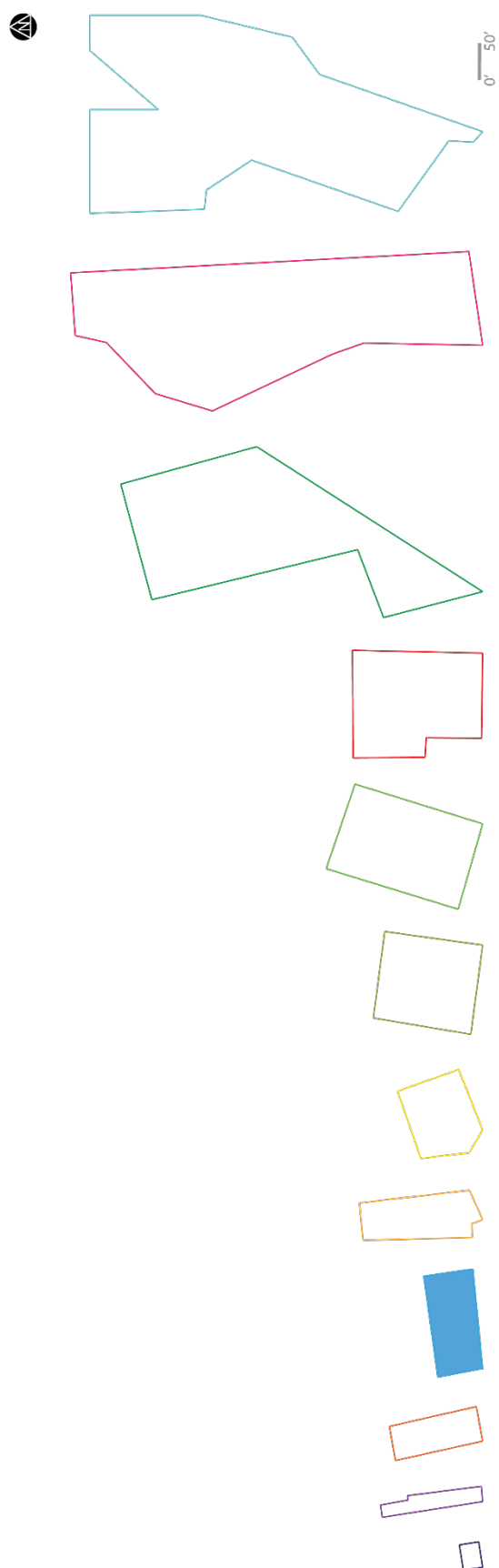


Figure 61: Scale Gradient of case studies. Image by author



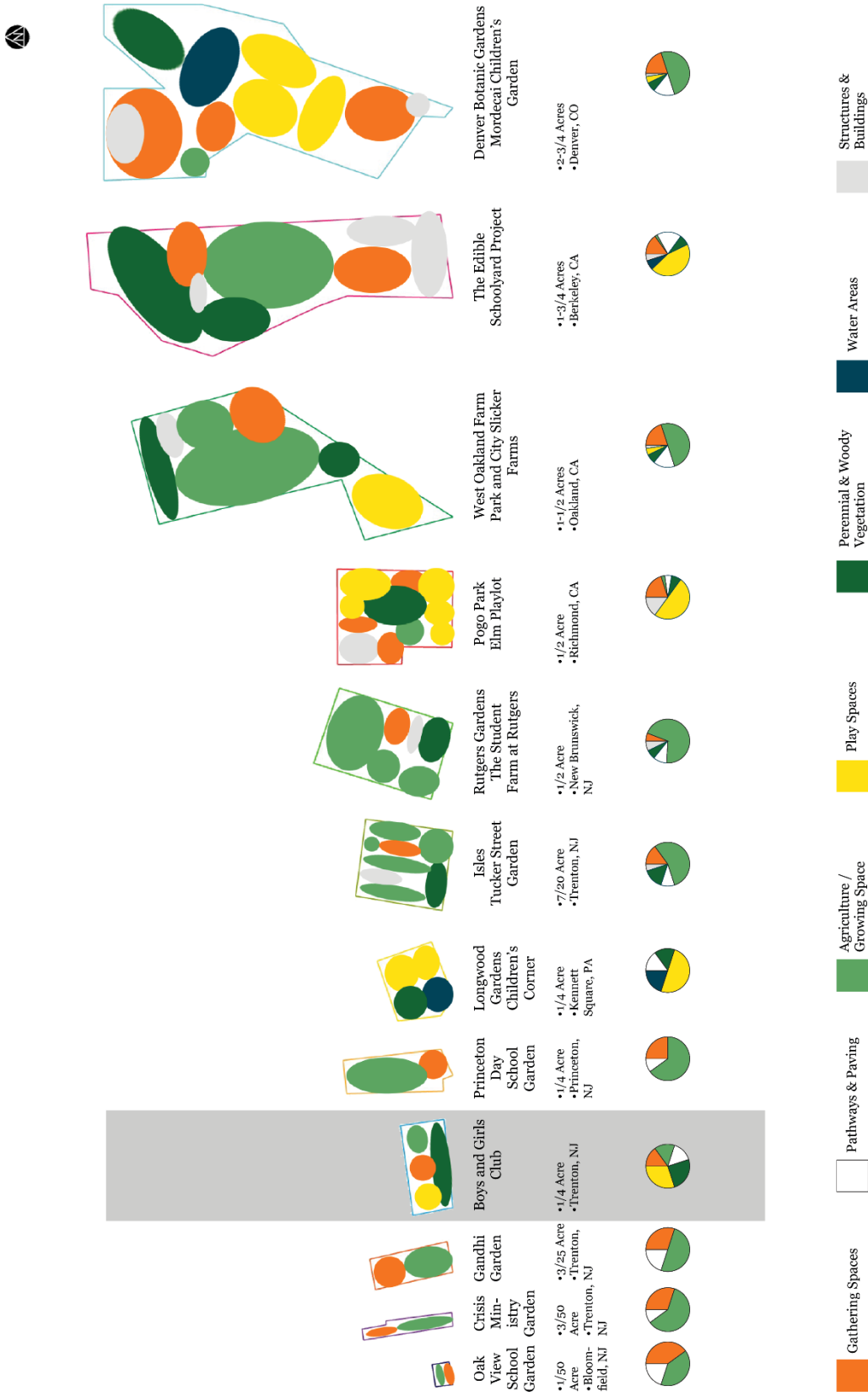
Figure 62: The context ranges from dense urban to suburban. Even though they are in different cities the aerial images look like they all fit into the same context. Image by author

Programming - Looking at the programming we can see that the smallest spaces are integrating gathering space and growing space. As the properties grow in size the programming becomes more intense. The most commonly included programming in all of these spaces is growing space for vegetables and gathering space for education, socialization, or event hosting.

Several of the gardens have significant percentages of play space incorporated into the design. Water was only featured in two of twelve gardens, both are in botanic garden settings. Though the Boys & Girls Club garden design doesn't offer a specific water play feature. One use of the play field is to put out a sprinkler to have the kids play and water the lawn. These designs are very focused on programming as nodes off a central pathway. The design for the Boys & Girls club integrates play where the other gardens of similar size are still only for gathering and growing plants.

Circulation – The circulation (of course) has a hierarchy. The path systems are extensive, every bit of the site is accessible. Designated walking paths for the public lead from one location to another within the garden. However, there is a secondary set of pathways that are purely functional to the agricultural areas. Places with more growing space have more small pathways through the beds and rows. These pathways are not typically traversed as circulation but more as obligation to the farm functions of the property. Understanding this hierarchy gives insight into the greatest use of the properties and the priorities of each garden.

Figure 63: Diagram showing programming, size and location of case studies. Image by author

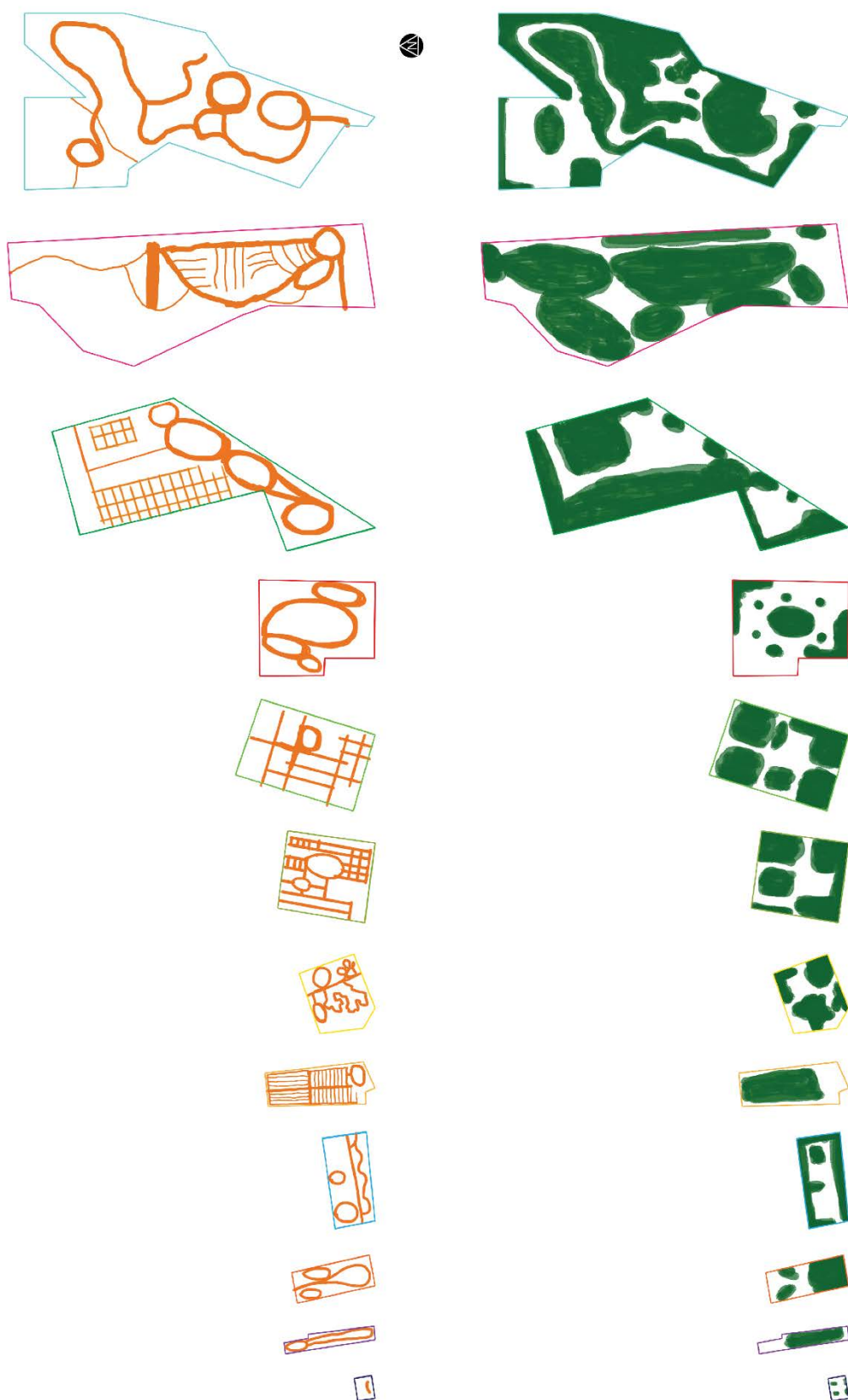


Gathering Spaces Agriculture / Growing Space Play Spaces Perennial & Woody Vegetation Water Areas Structures & Buildings

Entrances to most of the gardens are limited. Most are fenced in and have restrictions for egress. The safety of visitors is paramount, as is the investment made in the space. Therefore, these places are fenced in with limited or restricted access. They function on schedules and maintain rules of entry to control vandalism, loitering, and other illicit activities. This is completely understood, none of these spaces lack for egress. They all have clear and pronounced gateways so they can be easily recognized.

Vegetation – While these gardens are all well programmed, they still maintain a balance of vegetation that is beneficial to visitors and stewards. The cover depicted is mostly ground planting. There are several gardens that have significant tree cover that is not well represented here. These places have a grounded feeling because they have been built around mature trees. Mature trees provide shade and structure to the space creating a welcoming and cooling area to enjoy outdoor activity or relaxation. The greenness of these places contributes to their comfortable atmospheres, therapeutic benefits and the temperature at many of them. Most of my visits were in the summer and the places with good tree cover were cool, comfortable places to be, and that wasn't lost on the visitors.

Figure 64: Circulation and Vegetation Diagrams. The path systems are extensive; every bit of the site is accessible. These places are well vegetated. Image by author



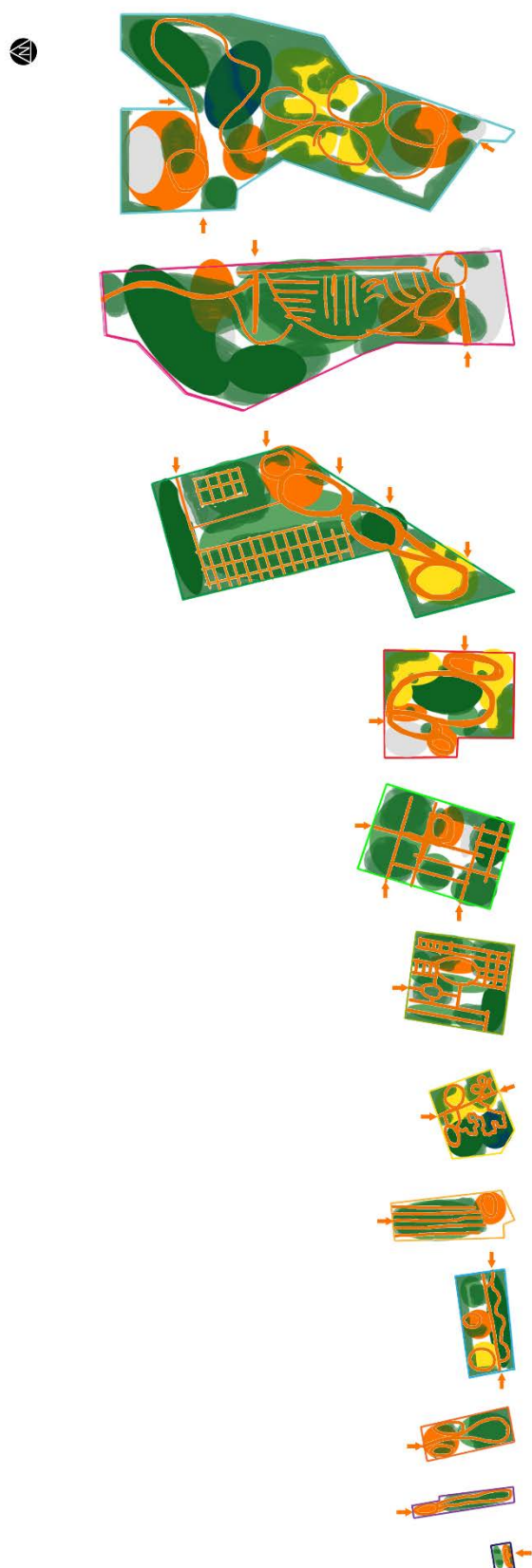


Figure 65: Composite of programming, circulation, entrances, and vegetation diagrams. Image by author

Putting it all together we can see that these places are highly programmed. These diagrams make clear the notion that their sponsors and stewards are trying to incorporate as much activity as possible into the garden. These spaces are hyperactive, they are excellent examples of program driven landscapes. The confluence of economic pressures on organizations providing play and learning spaces and the donors supplying the funding has led to highly programmed spaces being created in the public and private sectors. The value of land is ever increasing, the demand for donors to see actual built environments as a result of their donations has created spaces that are restless in their content.

Time Magazine reported in 2015 that people generally lose concentration after eight seconds (“You Now Have a Shorter Attention Span Than a Goldfish” 2017). Because we lose attention faster in the digital age, do we need places with so many activities to entertain us? Are these spaces hyperactive because we are hyperactive? Is this a result of nature-deficit disorder? Spaces dictate to us exactly what we are supposed to do in them, because some may believe we lack the imagination to use them differently.

The gardens included in the analysis are all highly programmed. It doesn’t appear that over programming or hyperactive designs are impairing children’s ability to enjoy the outdoors. The desire to touch and experience nature or greenness is growing for children, for their parents, and for people in general. Places with more parks are more desirable places to live and have higher property values. Even though, natural untouched land is unattainable in the urban confines, there is evidence that the efforts to create gardens, urban green space and “everyday nature” are beneficial for childhood development.

Furthermore, organizations and designers want to fill the spaces they are creating with objects so that there is no “wasted space”. The analyzed gardens are seemingly designed around their path systems; however, landscape architects learn very early on in school that pathways should be designed last and that priority should be placed on the creation of nodes. These nodes or spaces should be different in size to indicate a hierarchy and finally the path should be designed to connect these spaces. The analyzed gardens are overly dependent on pathways to shuffle visitors and patrons through the landscape as though they were looking at the Macy’s Christmas windows.

Some of these gardens are recognizing that play has transformed. They are providing small interventions for free play, however many are adopting the desire to maximize programming and possibly take it too far. Most of these gardens, though created by designers, feel as though they have been designed for circulation first and have put aside a basic tenet of modern landscape architecture, create the space to be comfortable and beautiful.

The Boys & Girls Club garden includes a variety of programming and design elements that are not applied in other small gardens included in the comparison. The garden incorporates perennial and woody vegetation in the design to create a choice of environment within the garden. Larger gardens in the analysis include perennial and woody vegetation in their spaces, where smaller gardens are maintaining only growing space and social space. Longwood Gardens and Pogo Park include significant vegetation in their gardens because they were created in places with mature trees. Other gardens like West Oakland Farm Park and Mordecai Children’s Garden are including significant vegetation in their

newly planted designs. This conveys an understanding of layering in the landscape and demonstrates the need for additional plant material. New plantings were incorporated in these designs because there was nothing existing to capitalize upon. Having mature trees to integrate into the design creates instant space and depending on the variety of tree, cool places to gather because of evapotranspiration from certain species of mature trees.

Maintaining some of the existing vegetation, including the *Paulownia tomentosa*, helps to create shade and a combination of spaces, while still incorporating plants from everyday nature. Preserving some of the existing vegetation shows the children that new landscapes can incorporate the plants they see every day while inserting plants they should see every day. Sometimes incorporation of new plants doesn't make such a known impact, the act of simply playing among plants will show children that they can be safe near vegetation. The circumstances create a teaching opportunity and a dialogue about plants, ecology, urbanism, and the natural world.

I've found that there is no one way to design or program a space for kids. Our expectations for children's behavior, their ability to entertain themselves or be entertained, and educated, is sometimes different from what is written in the research. If we follow the concerns of Louv and others, children need to practice the things that previous generations have taken for granted. Children need to practice playing in unprogrammed spaces; outdoor play is not something that is built into childhood any longer. Outdoor play must be thoughtfully added to childhood experiences and practiced frequently.

Chapter 6: Conclusion

Gardens and the act of gardening is therapeutic and exposure can improve a person's attitude. The gardens for children and educational gardens I visited are all shapes and sizes and they are all successful in their goals for their respective communities, because they integrate greenness and social space to produce beneficial outcomes for their visitors.

What have I learned from this mixed method study of children's gardens? What didn't I see in the literature but guides me? I witnessed during my visits to gardens, and while volunteering at the Club, that children are unpredictable and they are innovative. They are going to use the spaces we design in ways we may not have thought of, this too is a defense of understanding the psychological underpinnings of human interactions with nature.



Figure 66: Digging at the Mordecai Children's Garden in Denver. Photo by author

Predicting uses and designing spaces with free play areas helps avoid misuse of over programmed space. I don't know if Michael Van Valkenburgh Associates thought that kids would climb the ice wall sculpture in Teardrop Park when they made it. However, I do know that Mundus Bishop Design intended for digging to occur in a patch of dirt at the Mordecai Children's Garden in Denver. Including free-play or non-traditional programs in the designs of gardens for children can help them to practice the outdoor experiences of which they have been deprived. We need to include play in more of our gardens and parks. We need to acknowledge that outdoor play is no longer a skill ingrained in childhood as it was for previous generations. We must leave space for children to explore and build the confidence gained when finding their own way through nature. This will help to disentangle the current and future generations from nature-deficit disorder and will help to create new stewards for public and private lands.

Gardens and parks demand inclusion of areas that imitate natural areas. Exposure to vegetation helps children practice being outdoors. Children should be able to experience the feeling of being enclosed in vegetation or exposed on an open field. More spaces should include a choice of environment. Building layers into the landscape allows children to choose where they want to be, and understand where they are comfortable. We need spaces where children and people are able to and encouraged to connect with the outdoors, everyday nature and green spaces.

Going back to my initial question: How do Landscape Architects create urban gardens as a catalyst for learning? My answer is by building them. There is no formula for creating these spaces, they are each individual. Gardens are not

the only action plan that have been put in place in Trenton and other urban areas, they are a piece of the puzzle. Exposure to a garden and everyday nature can change the way a child is developing, or the way that they see the world.

I know that The Boys & Girls Club was only expecting a giant vegetable garden when we told them they should not spend money on an expensive catalogue playground, I KNOW they were surprised and excited when they saw how much we could get into their little space. They were excited about the opportunity to have their kids run around in grass and learn to grow vegetables, and be enclosed in vegetation. They didn't expect to have something so diverse.

I learned to work with the client and to help the client to expect and deserve more. I listened to their desires and their needs and I worked to create a garden that would cater to their needs today and that would grow with them. Even though I have experience in the world, and this is not my first career, working to surpass the client's expectations was something I did not exactly expect from myself. As I worked to create something with them and for them that will change their kid's everyday nature, I also changed my view of urban green spaces and the role they play in culture and everyday nature.

I always knew that urban green spaces were important but I never fully realized the role that they play in public health. The potential to improve educational outcomes, public health outcomes, and property values, that come out of improving urban green spaces and creating everyday nature is important. Supporting these efforts is a practical and holistic way to improve public health and personal wellbeing.

The children of the Boys & Girls Club of Mercer are going to be skeptical and some a little scared of the garden. This garden will grow with them, there is space to grow in programming and there is space for vegetation to grow and create new space. The children will be able to observe the native forest growing around them - as they grow older, so too will the plants. The opportunities created by this garden are remarkable. Remarkable because the investments are relatively small. However, those small investments create a grand gesture. This garden can demonstrate new everyday nature to kids who are not accustomed to experiencing any nature.

Pushing for inclusion of free play areas in parks, public spaces, and private gardens is a way to encourage interaction with everyday nature. Encouraging development of vacant urban spaces can demonstrate that these places matter. Illustrate to people in urban areas that they should expect greenness and everyday nature in their neighborhoods. Even if interacting with everyday nature changes the life of just one of the hundreds of children who will play, there that is enough.

Appendix 1: Construction Notes

The following drawings were created to scale for the Boys & Girls Club of Mercer to proceed with budgeting and project management with a licensed Landscape Architect.

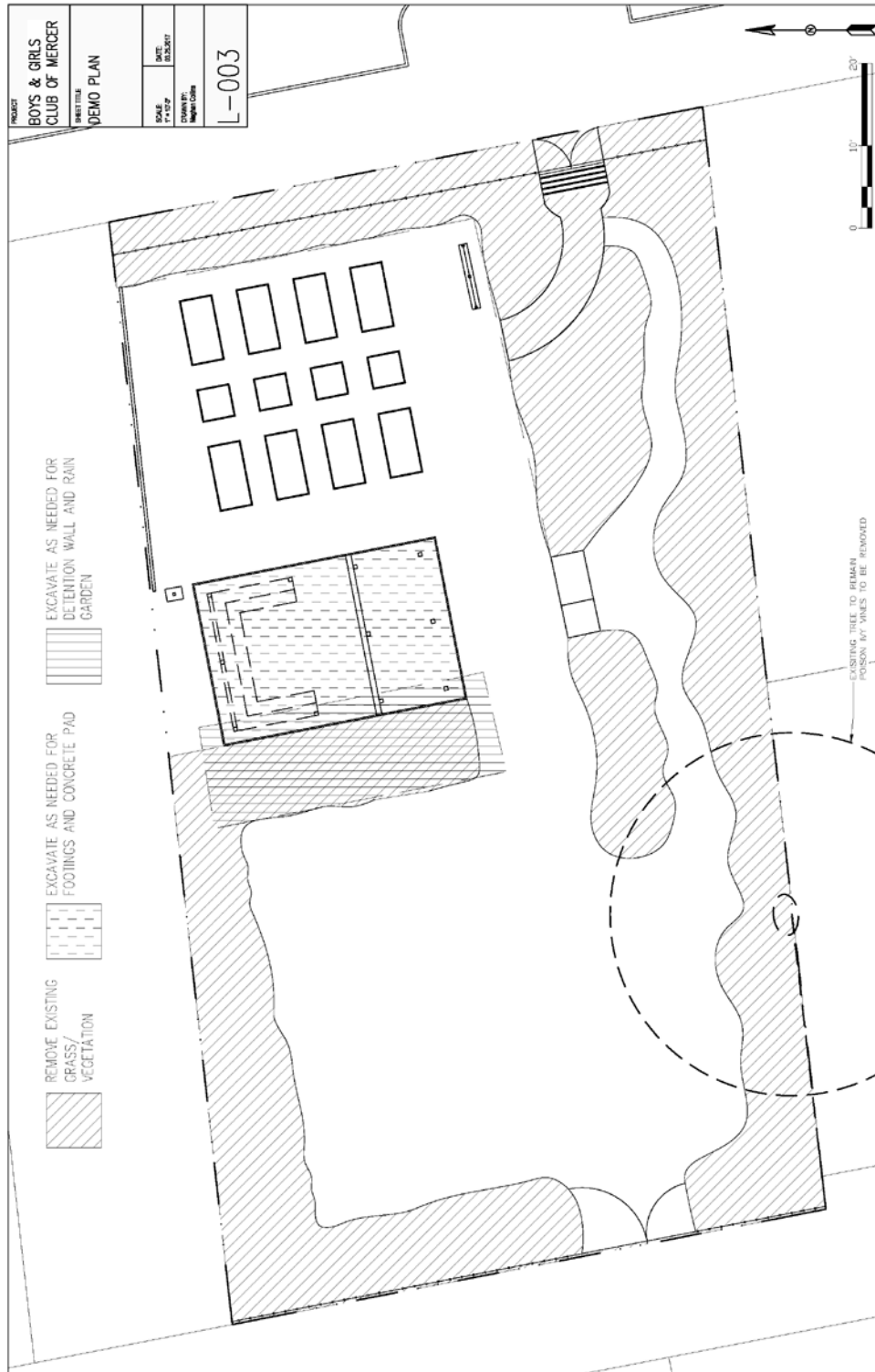


Figure 67: Demolition Plan - NTS. Image by author

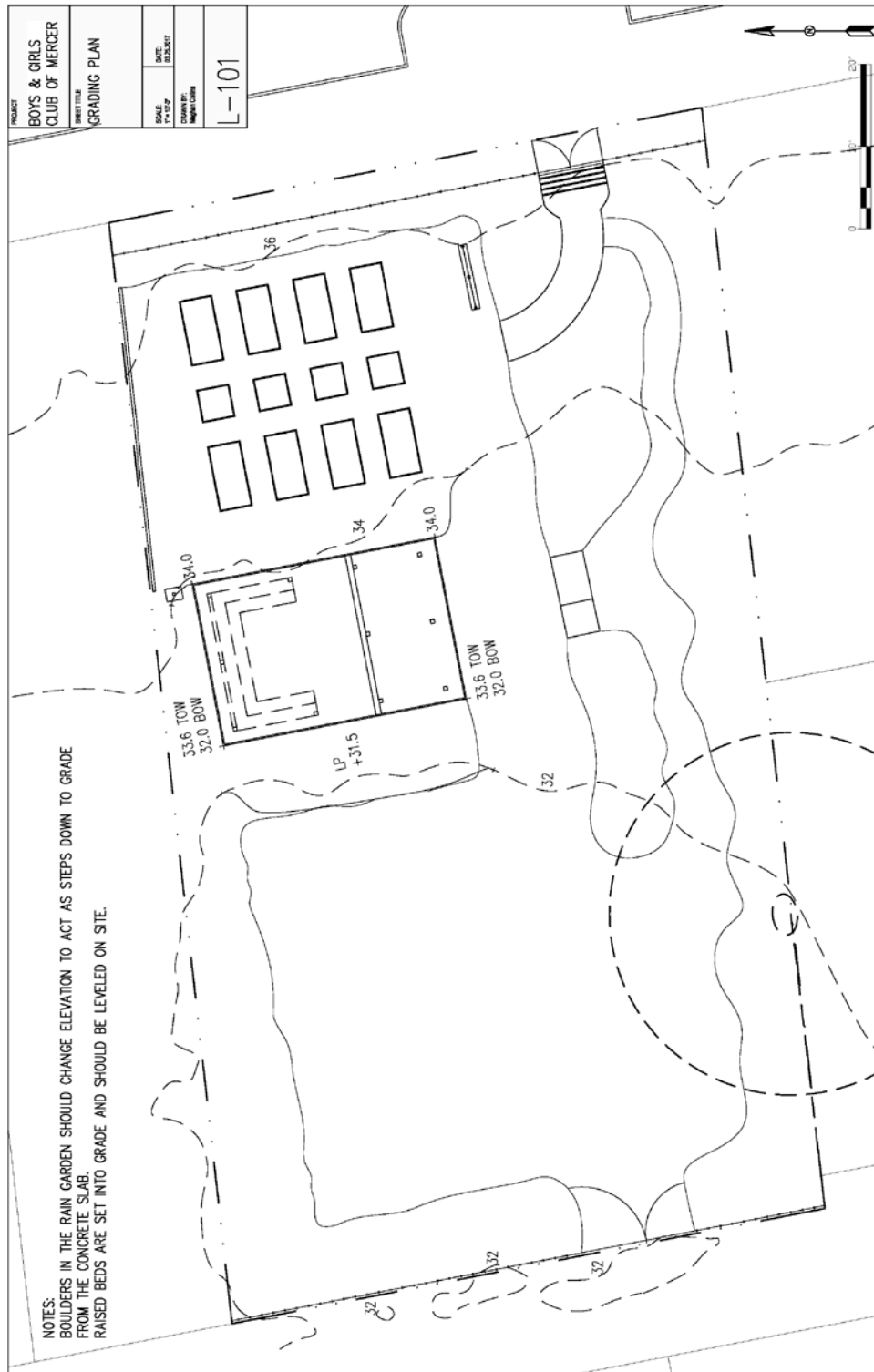


Figure 68: Grading Plan - NTS. Image by author

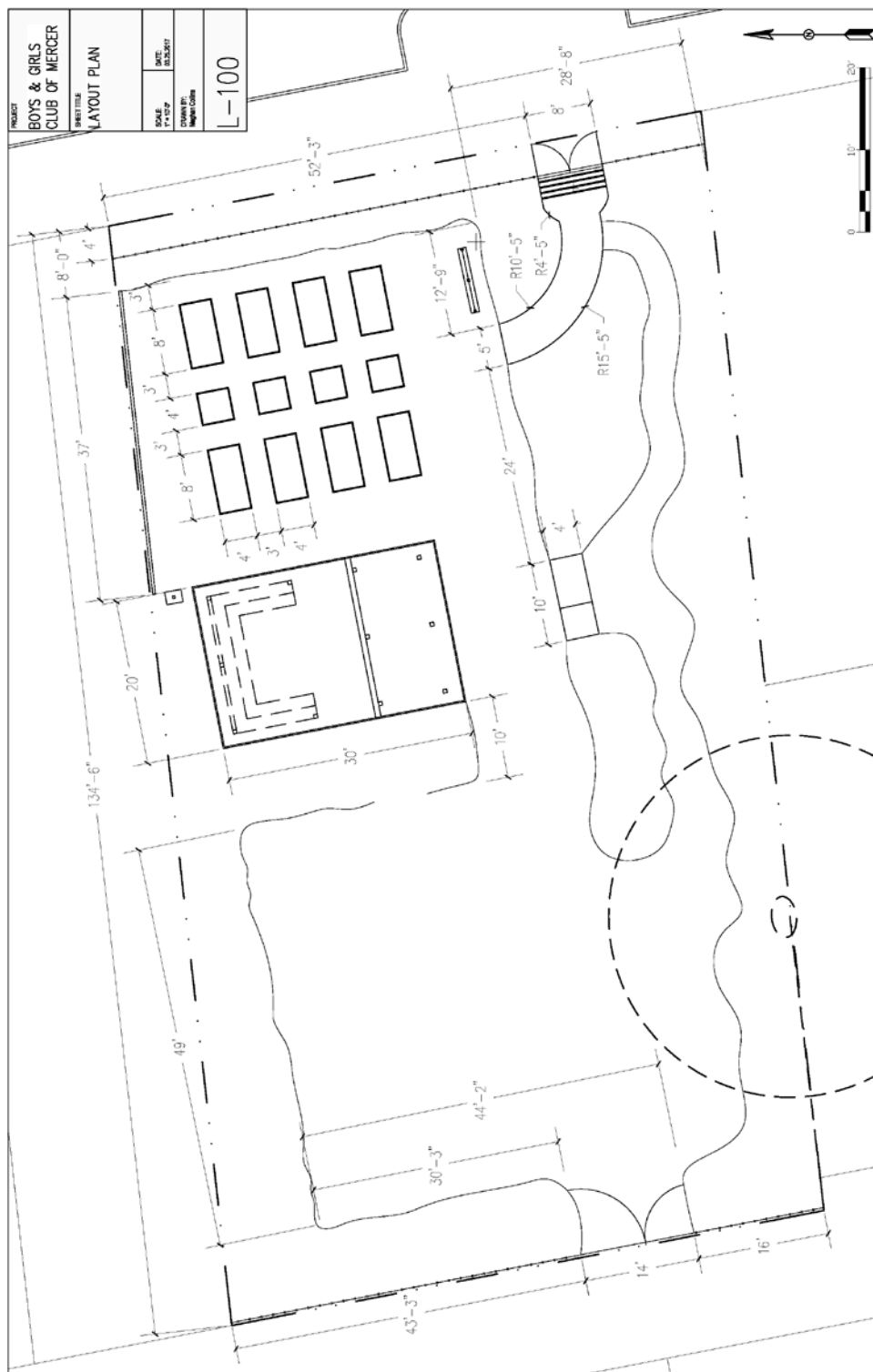


Figure 69: Layout Plan - NTS. Image by author

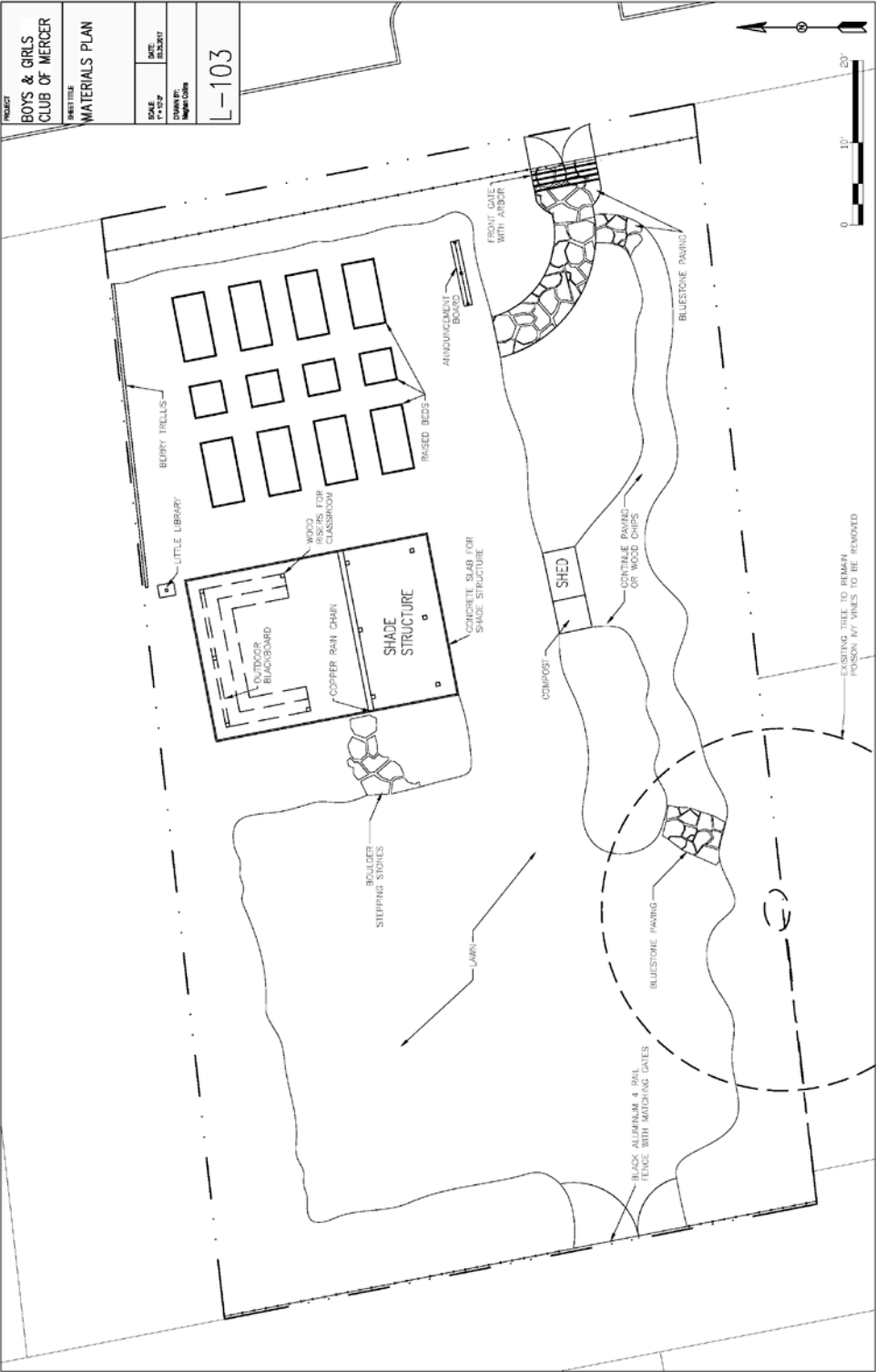


Figure 70: Materials Plan - NTS. Image by author

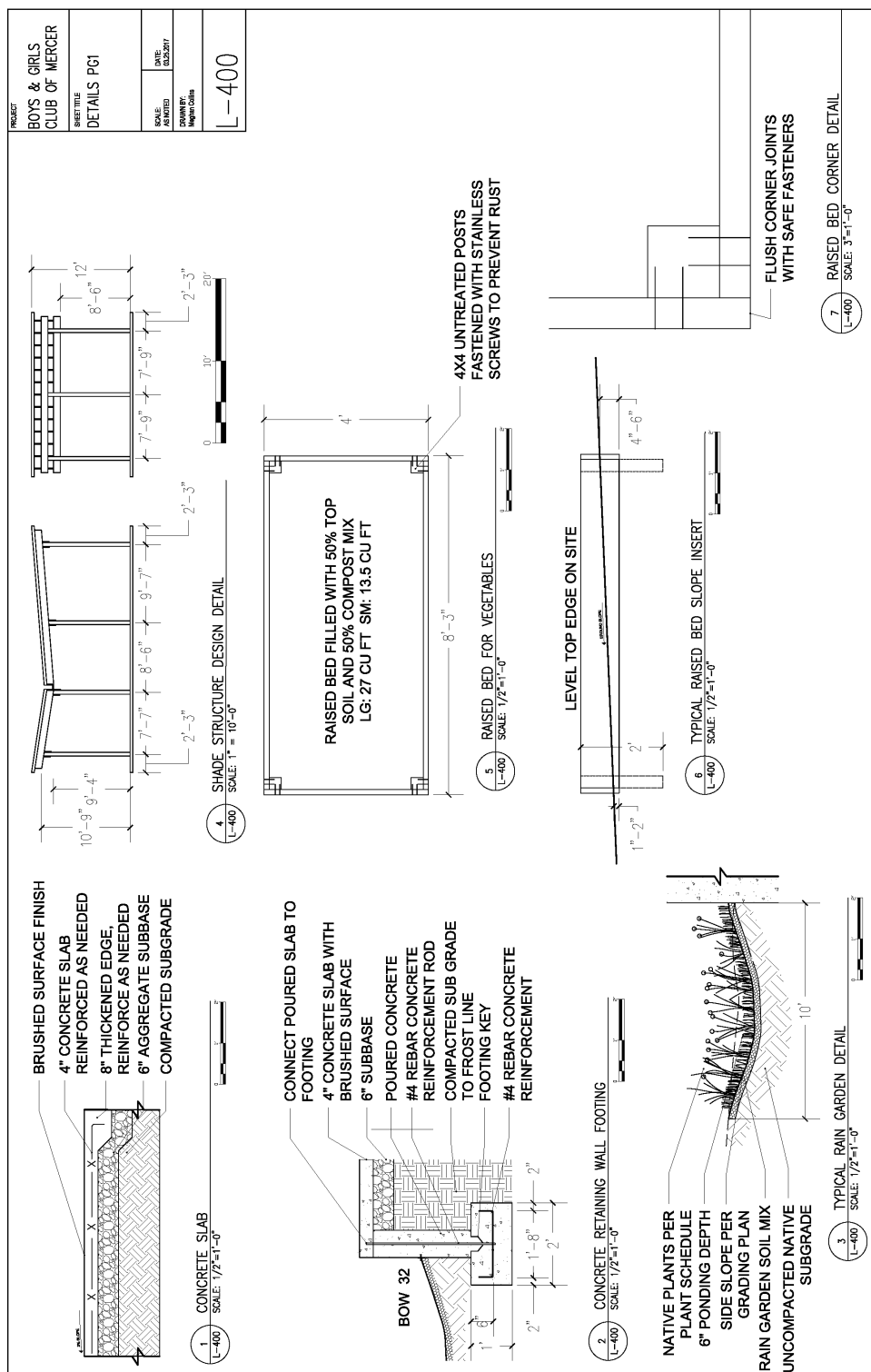


Figure 72: Details page 1 - NTS. Image by author

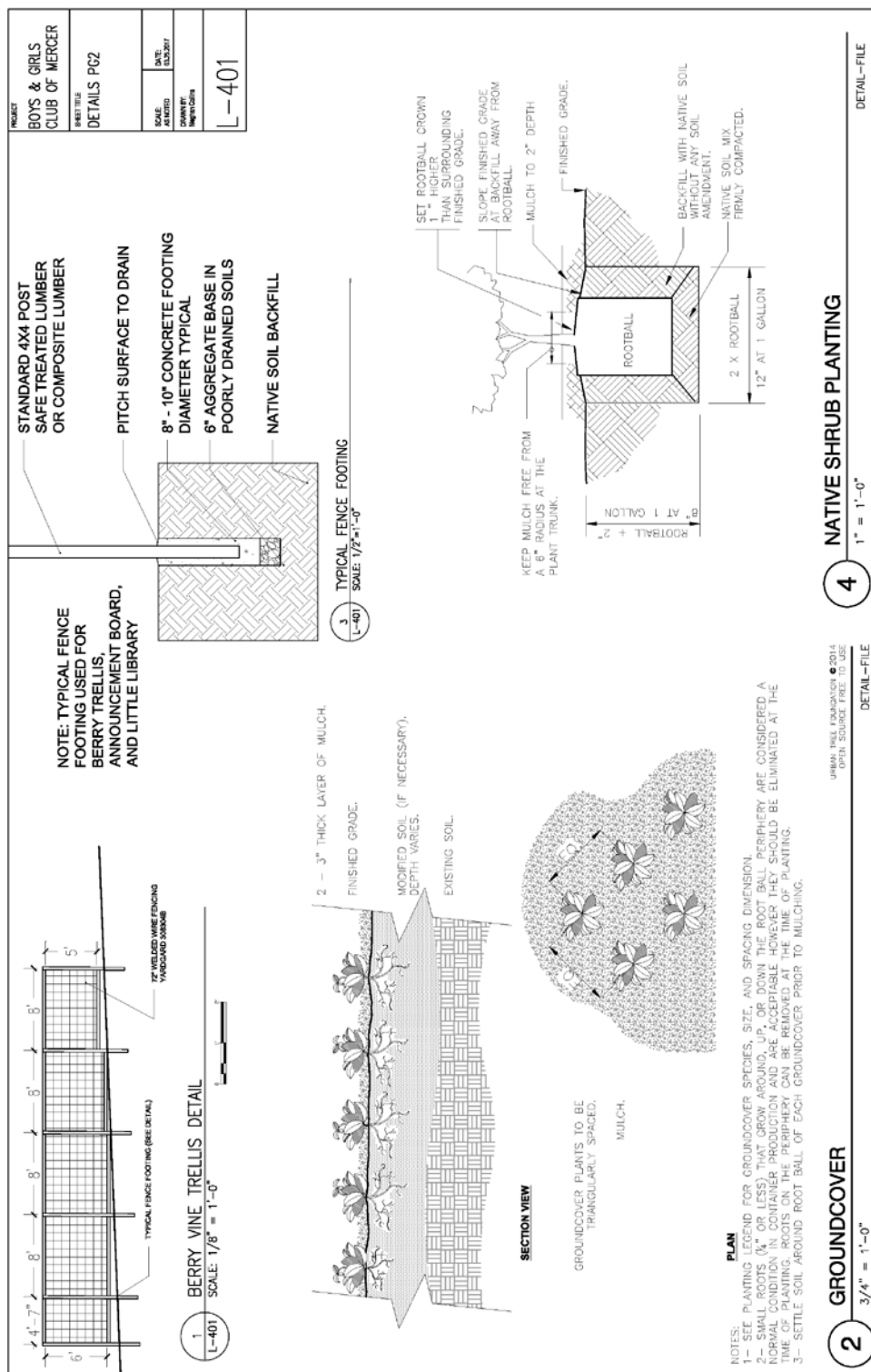


Figure 73: Details page 2 - NTS. Image by author

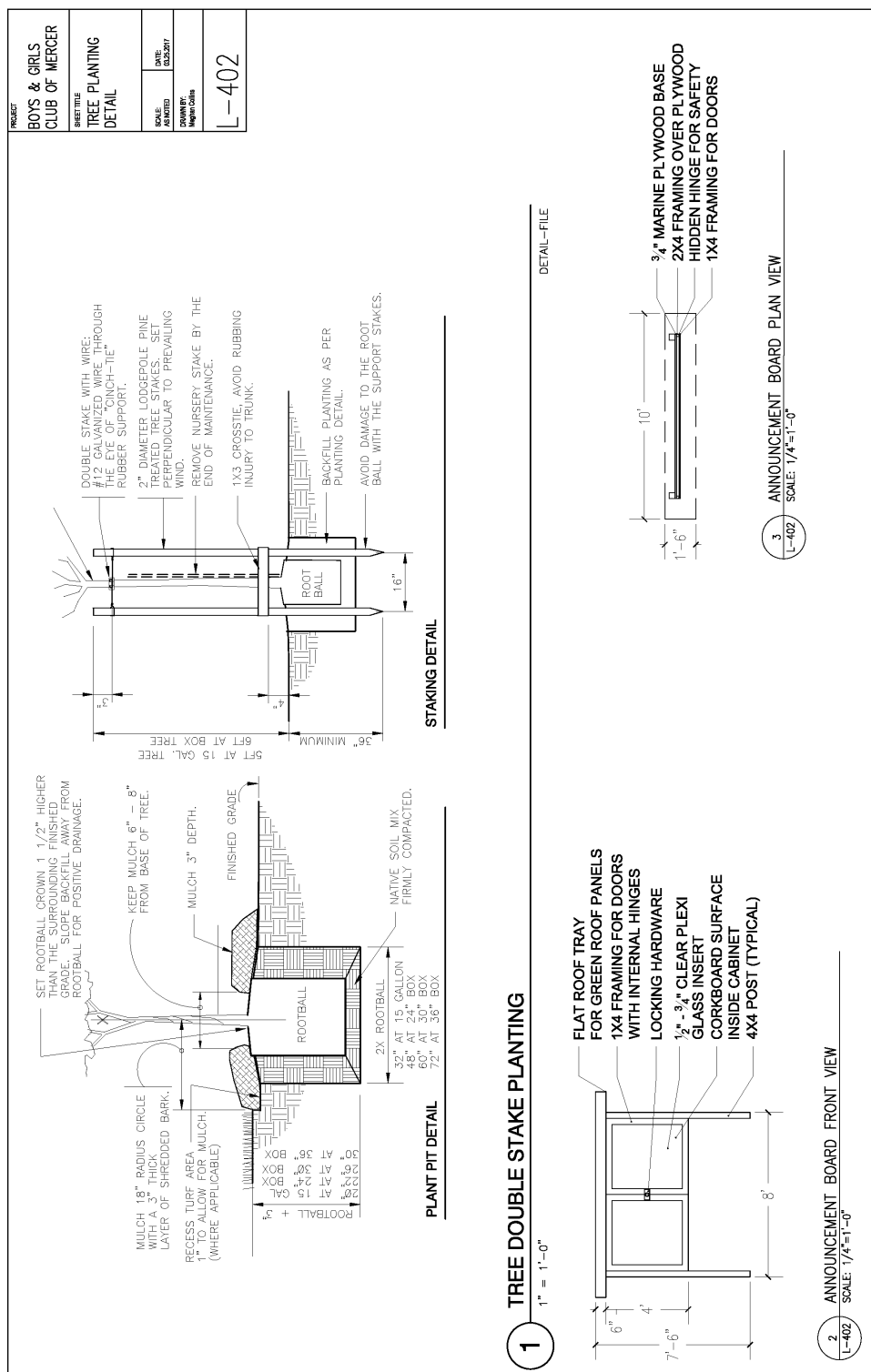


Figure 74: Details page 3 - NTS. Image by author

PLANT SCHEDULE				CONTAINER		SPACING		REMARKS	
TYPE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	COMMON NAME	SIZE	COMMON NAME	SIZE	COMMON NAME
TREES									
JUN EM3	4	Juniperus virginiana 'Emerald Sentinel'	Common		Red Cedar Juniper				
DECIDUOUS TREES									
ACE RE2	6	Acer rubrum	Common		Red Maple				
	2	Betula nigra	River Birch						
COR FLO	4	Cornus florida	Eastern Dogwood						
HAM VIR	1	Hamelia virginiana	Common Witch Hazel						
LIO ST2	4	Liquidambar styraciflua	American Sweet Gum						
MAG SWE	2	Magnolia virginiana	Sweet Bay						
R-HU GLA	2	Rhus glabra	Smooth Sumac						
SHRUBS									
CLE VIR	2	Clematis virginiana	Common						
CLE ALN	11	Clethra alnifolia	Virgins Bower						
HYD ANN	1	Hydrangea arborescens 'Annabelle'	Summersweet Clethra						
	1	Hydrangea quercifolia	Annabelle Smooth						
HYD QUE	1	Hydrangea quercifolia	Hydrangea						
ILE GLA	18	Ilex glabra	Oakleaf Hydrangea						
ILE RED	7	Ilex verticillata 'Red Sprite'	Inkberry Holly						
ILE SOU	1	Ilex verticillata 'Southern Gentleman'	Red Sprite Winterberry						
	3	Ilex verticillata 'Winter Gold'	Southern Gentleman						
ITE V12	11	Itea virginica	Winterberry						
KAL LAT	3	Kalmia latifolia	Virginia Willow						
LIN BEN	3	Lindera benzoin	Mountain Laurel						
RHO CA3	6	Rhododendron catawbiense	Spicebush						
	6	Rhododendron x 'Delaware Valley White'	Catawba Rhododendron						
RHO DE6	6	Rhododendron x 'Delaware Valley White'	Delaware Valley White						
VIB BUL	4	Viburnum nudum 'Bulb'	Azalea						
VIB NUD	1	Viburnum nudum 'Winterthur'	Brandywine Viburnum						
SUN PERENNIALS									
ACH 'N	13	Achillea millefolium 'New Vintage White'	Common						
ASC S11	16	Achillea millefolium 'Sunbeam'	Vinage White Yarrow						
ASC CIN	17	Achoepias incarnata 'Chobarella'	Sunbeam Yarrow						
ASC TUB	21	Achoepias tuberosa	Swamp Milkweed						
AST ENG	11	Aster novae-angliae	Butterfly Milkweed						
BAP PUR	7	Baptisia australis 'Purple Smoke'	New England Aster						
CHE GLA	5	Chelone glabra	Blue Wild Indigo						
CHE PIN	12	Chelone lyonii	Whila Turtle-head						
ECH CYG	20	Echinacea purpurea 'Cygnet White'	Pink Turtlehead						
	40	Echinacea purpurea 'Hope'	Eastern White Coneflower						
ECH HOP	40	Echinacea purpurea 'Hope'	Eastern Purple Coneflower						

Figure 75: Details page 4 - NTS. Image by author

PLANT SCHEDULE				PLANT		
TYPE	QTY	BOTANICAL NAME	COMMON NAME	CONTAINER SIZE	SPACING	REMARKS
EUP DUB	6	<i>Eupatorium dubium</i>	Joe-Pye Weed		36" o.c.	
IRI VER	11	<i>Iris versicolor</i>	Blue Flag		24" o.c.	
LOB COM	7	<i>Lobelia cardinalis</i> 'Compliment Red'	Cardinal Flower		12" o.c.	
LOB SIP	16	<i>Lobelia siphilitica</i>	Great Lobelia		12" o.c.	
LUP PER	14	<i>Lupinus perennis</i>	Wild Lupine		24" o.c.	
MON BER	15	<i>Monarda fistulosa</i>	Bergamot		24" o.c.	
PHL PAN	10	<i>Phlox paniculata</i>	Garden Phlox		18" o.c.	
RUD HIR	19	<i>Rudbeckia hirta</i>	Black-eyed Susan		24" o.c.	
SHADE PERENNIALS Qty Botanical			Common	Spacing		
AQU CAN	30	<i>Aquilegia canadensis</i>	Canadian Columbine	Quart	12" o.c.	
DEN BIP	19	<i>Demissa bipinnata</i>	Cuplet Fern	Quart	24" o.c.	Acceptable Sub.: Demissaefolia punduloba
HEU CO3	20	<i>Heuchera americana</i>	American Alumroot	Quart	60" o.c.	
MAT PEN	2	<i>Matricaria pennsylvanica</i>	Ostrich Fern	Quart	30" o.c.	
OSM CIN	16	<i>Osmunda cinnamomea</i>	Cinnamon Fern	Quart	24" o.c.	
SOL SPH	6	<i>Solidago sphacelata</i> 'Golden Fleeca'	Autumn Goldenrod	Quart	18" o.c.	
TIA EL2	44	<i>Tiarella cordifolia</i> 'Elizabeth Oliver'	Foamflower	Quart	18" o.c.	
GRASSES Qty Botanical			Common	Spacing		
AND NIA	6	<i>Andropogon gerardii</i> 'Niagra'	Big Blue Stem	Plug	24" o.c.	
AND RE5	29	<i>Andropogon gerardii</i> 'Red October'	Big Blue Stem - Red Fall Plug	Plug	18" o.c.	
AND SCO	6	<i>Andropogon scoparius</i>	Little Blue Stem	Plug	12" o.c.	
CAR SED	44	<i>Carex pensylvanica</i>	Pennsylvania Sedge	Plug	12" o.c.	
CAR SEE	17	<i>Carex x 'Seersucker'</i>	Seersucker Sedge	Plug	24" o.c.	
SCH PR6	41	<i>Schizachyrium scoparium</i> 'Prairie Munchkin'	Prairie Munchkin Little Bluestem	Plug	12" o.c.	
SOR NUT	3	<i>Sorghastrum nutans</i>	Indian Grass	Plug	24" o.c.	
GROUND COVERS Qty Botanical			Common	Spacing		
CHR SU3	68	<i>Chrysogonum virginianum</i> 'Superstar'	Golden Star	Plug	12" o.c.	
FRA SUR	17	<i>Fragaria x 'Sure Crop'</i>	June Strawberry	Plug	20" o.c.	
GER DRE	4	<i>Geranium x 'Dreamland'</i>	Cranesbill	Plug	20" o.c.	
PHL DR4	6	<i>Phlox subulata</i> 'Drummond Pink'	Drummond Pink Creeping Plug	Plug	20" o.c.	
RHU ARO	6	<i>Rhus aromatica</i>	Phlox			
SED TE3	20	<i>Sedum x Tematum</i>	Fragrant Sumac	Plug	20" o.c.	
FRUIT PLANTS Qty Botanical			Common	Spacing		
RUB EC2	4	<i>Rubus fruticosus</i>	Woodland stonecrop	Plug	20" o.c.	
RUB ID2	4	<i>Rubus idaeus</i>	Shrubby Blackberry		48" o.c.	
RUB OC2	3	<i>Rubus occidentalis</i>	Raspberry		48" o.c.	
VAC ANG	8	<i>Vaccinium angustifolium</i>	Black Raspberry		60" o.c.	
VAC HIG	4	<i>Vaccinium corymbosum</i>	Lowbush Blueberry		72" o.c.	

Figure 76: Details page 5 - NTS. Image by author

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