O’Donnell Park

Enhancing Downtown Milwaukee’s Economic, Environmental and Social Networks through Sustainable Design

By Justin Flynn
Acknowledgments

This Thesis would not have been possible without the love, support, and the encouragement I received from my parents, little sister... I do not have words to adequately describe my sincere gratitude for all they have provided me, though I hope to show them in the years to come. I have profited greatly from the mentoring of the LA teachers here at NDSU I am truly indebted to the LA teachers for fostering a pursuit and fascination in me for this field of work that I know and love as Landscape Architecture.
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Thesis Introduction
Thesis Question

How might a sustainable ecosystem facilitate a community?
This thesis begins to address, how does a city provide essential resources for a city in a public urban space? A question designers have asked themselves since the beginning of urban design. In this day and age currently, we are getting better at answering this issue, providing urban society with food, water, power in ways that have never been done before. However, is what is society doing currently enough? Research begs to differ showing two major problems: First, current trends are unsustainable and will not last. Secondly, if allowing areas of resources are not appealing, users will not use them. Fortunately, there also are a set of solutions or applications, from organic agriculture to integrated sustainable solutions such as Aquaponics that could be applied to the problems. Functioning in an aesthetically appealing way that people will flock to, creating a sustainable ecosystem that is both operational and visually appealing. Asking the question, how might an urban community facilitate a sustainable ecosystem with regards and allocations to community needs both physically and aesthetically.
Thesis Introduction

With growing populations, it becomes a challenge to naturally and aesthetically provide basic human needs and resources to an urban community. Thus it is the intent of this thesis to see how might a sustainable ecosystem facilitate a community. For the reasoning that, conventional methods of harvesting resources exert a tremendous toll on the planet. It must be explored on how a city can reverse current unstable harvest of resources. The circumstance of resource availability leads to the consequence of unsustainable resources, being utilized in unattractive ways. The over-availability of unsustainable recourse options increases the demand for sustainable options, and production practices. However, implementing sustainable ecological solutions even on a small scale can reverse or prevent trends of urban decay in a visually appealing manner. Still in question though is how these preventive measures can be feasible enough on a small scale, to enable sustainable resource practices to replace conventional methods.

Statement of Intent

Environmental solutions have been used on a small scale level and in theory. However, it is the goal of this thesis to create a sustainable ecosystem. To start off this project, I will have to find on a small scale the community’s needs so I can conclude what the community needs to do to thrive without support. Second, find biomimicry models such as green roofs that will fit the community’s needs. Then applied all methods into a sustainable system of design that will be integrated into the desired location. Finally allowing for a practical assessment to see if the system will be effective or not through surveys, models, testing, and criticism.

Project Motivation

I love designing green roofs they are my passion and what I plan on designing when I graduate in the spring. In addition to green roofs, one of my other passions is sustainable design. Since the two are rarely combined, I feel thesis would be an excellent opportunity to begin to design something that could impact a significant issue in a unique way. The big issues I want to address is the future sustainability crisis I believe we will have in the near future.
The apparent objective of this project is to create a sustainable ecosystem which in itself is the project typology as well. The overarching theme and design precedent of this project really defines, what must go into this project. In simplest terms a sustainable ecosystem is “in ideal sustainable ecosystems, everything is already provided within the ecosystem for life to survive.” (Kanter, 2016).

In addition to the dominant typology, the design must address this project as a redesign of an existing green roof. In perspective, this also means that design should consider a second typology as well. The best guiding factor for this will be to use standards that are made through GRP or Green Roof Professionals. Standards and codes for this typology can be found in the codes analysis section.

**Project Emphasis**

The oblivious emphases of this project is sustainable design. However, this is a broad topic that can be narrowed into the three core areas that the site must be productive in accomplishing goals outlined below.

**Economically Productive**

First and foremost if a site is not economically stable, it will not last. Thus a site must be economically productive to function in a community. Thus the design of a site must be able to bring in enough profit to befit a community. What exactly this entails is further explored in the research aspect of this thesis.

**Environmentally Productive**

Environmentally productivity needs to be emphasized in a sustainable ecosystem for it to be functional. It is easy to see how pragmatically environmental practices need to be implemented. In Naturally, sustainable design that is environmental productive will be defined in the research aspect of this thesis.

**Sociologically Productive**

Most importantly the O’Donnell Park can be well funded and sustainable, but if people hate to be on the site or do not know of the site, then it will not be effectively used. Sociologically productive site will involve the community in the location and the suitability of it. Besides, a productive sociological site will draw in tourist and be a model for other cities to model after as well in an ideal scenario.
Site Selection

The first step to this sustainable design project will be to choose a place that can demonstrate that a sustainable ecosystem can meet the needs of an urban community in a sustainable/aesthetic manner. With a basic idea where this project will work and will be able to be tested, sites in the Milwaukee area have been chosen. The city is recognized for having a growing interest in urban gardening, which is seen in this the city. As Will Allen, a leader in the Milwaukee growing power movement states, “Milwaukee over the past two decades has significantly increased their interest in community garden almost tripling in size since the late 1980's(Allen, 2013). Also, numerous contacts with builders, architects, and engineers in the city have been made, which would come in handy for obtaining research. With that in mind several sites have to be chosen, after careful consideration, the desired site has been selected in a location that would best fit the design parameters necessary to test my thesis statement.

Thesis Explanation

The site chosen was an existing green roof and parking structure in downtown Milwaukee. The O'Donnell Parking Structure located on 910 E Michigan St, appeared to be the first choice for the following reasoning. First, the site is due to be remodeled with the intent to be redesigned for the community and their needs. Secondly, being in contact with contractors/designers of the site allows designers to obtain data on aspects that are past their expertise. Allowing designers to have a complete project that is well within the scope of knowledge of a basic designer. Also, it is in a perfect location to meet the community's needs. Finally, parking garages have the ideal space and, structural requirements for what is proposed for the site. An excellent example of this is what Ehrlich Architects, did in Claremont, Calif, the firm recently consolidated Pomona College’s parking into a garage with a lacrosse-and-soccer field on top. Which is accredited for being the ideal structure for green roofs due to the weight of cars is well above the weight requirements of most green roofs. (Roberts, 2012)

Figure 1.

The image above is a birdseye image of the existing site and the new North Western Mutual (NML) building as well.
Site Owner

Previously, O’Donnell Park was operated by the Subdivision of Parks, Recreation, and Culture (DPRC) as part of their Downtown Unit. DPRC staff manage operations of the parking structure however, in March 2016 the site was purchased by the art museum which owns the site now. Still in effect despite this purchased commercial space in the Miller Brewing Company Pavilion is currently leased to the Betty Brinn Children’s Museum and Zilli Hospitality Group (ZHG) for the operation of the Coast Restaurant. ZHG also has an exclusive catering contract with the County for the Miller Room, a banquet hall on the southern side of the Miller Brewing Company Pavilion.

Site User /Audience

The site users and audience will really make up who the is the community thus resulting in who that this sustainable site will be facilitating. The main park demographic in the past has been tourists, being in the middle of the city and having 3 of Milwaukee top 10 sites to see within a mile of the site, it makes the site this site attract tourist. However, being next to main downtown users of the site are also business man from local business who want to escape their office for a lunch break. In addition to residents of nearby apartment complexes visit the site with children and dogs. More importantly, since the purchase of the site by the art museum, it is apparent that the site has a new audience with artist as well since the site will be geared towards the art museum and sustainable design.
Project Justification

Why this topic must be explored is because of the importance and significance it places on urban culture and its survival. More significantly, designers must sustainably create environments that are made to last while at the same time being visually appealing. Purely for the reason that the US Department of Economics claims. “That our society in the future cannot keep up with or needs if existing resource trends continue and will be significantly scarce by 2036” (Department of Economic Development, 2008). Thus to make sustainable society one must start to create basic human needs in an urban community, and create a closed loop system of human necessities. Which in perspective closed loop system is defined as “is a societal classification where products and their mechanisms are designed, manufactured, used and handled so as to circulate within society for as long as possible, with maximum usability, smallest adverse environmental impacts, minimum waste generation, and with the most efficient use of water, energy and other resources throughout their life cycles” (Brismar, n.d.).

Something that nature has been doing in its way for thousands of years to bridge the gap between its user and its user’s needs. Consequently, scientists, engineers, and Landscape Architects have been using biomimicry, which is defined as the sense of using nature as a design model to create designs and innovations (Benyus, 2002). Some of those solutions are permaculture, vertical gardens, and green structures. Besides, these methods have been proven to be visually and sensually appealing. Thus making the user want to use these spaces. In retrospect of this topic, a site must be selected that can accommodate these said needs.

Since the site is in the center of the city and has a parking garage it makes this site ideal for a redesign. The image above should be an easy transition for a public parking garage to a sustainable ecosystem.

The image above shows the exact transition I hope that this site can accomplish.

The image above show the main three areas of a sustainable environment. Also, the image shows how the three images must coexist together and function together to work as one site sustainable site.
Methodologies Overview

There is no doubt that this project can be significant in the world let alone the Milwaukee area. However, for this project to accomplish its goals, proper research must be conducted and tested. To do that though there must be set methodologies that connect feasible practices to pragmatic thinking. This section will explore three basic methodologies that can help drive the successful design of a sustainable ecosystem. The methodologies are all base of the methodologies found in the book Landscape Architecture Research by Professor Deming which is a required text for this thesis project.

Methodologies Evaluation

Realizing from important research that the site needs to be sustainable in years to come. The best way to do this is using the evaluation and diagnosis method of research as described as" Evaluation always involves a process of discrimination and comparison between alternatives. Comparison (which of these things is not like the other) and the discernment of difference are also active in components in classification" (Deming 2011). One of the best areas of study for this is diagnostic which is defined as. Diagnostic studies are a useful form of evaluation frequency utilized by landscape architects and planners working in professional offices. They include feasibly studies(evaluating the caring capacity of a site for a certain program), suitability studies (assessing the optimization of a site for a particular program), environmental impact analysis(evaluating the environmental trade-offs between specific interventions. Even different levels of development and cost-benefit analysis(financial trade-offs of various programs or designs)

Methodologies Engaged Action Research

From research it is proven that the site needs to be sociologically productive as seen in the sociological research section on page 20 to do that though the public must be engaged in the location, that is why engaged action research will be included in the said project. Action research is defined as “action research produces new knowledge based on a process of direct engagement cognition and social change. Thus it is a way of learning from practice “by working through a series of reflective stages that facilitate the development of a form of adaptive expertise. Over time action researchers develop a thorough understanding of the ways in which a variety of social and environmental forces interact to create complex patterns. Since these forces are active action research is a process of living one’s theory into practice" (Deming, 2011).Thus listed below are the benefits that are driven from this said research.

Methodologies

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Action Research Key Points

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<tr>
<td>Participatory Action Research design principles</td>
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<td>• Ordinates from a desire to empower communities</td>
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<td>• Rejects objects research protocols</td>
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<tr>
<td>• Engages directly with communities and individuals who in other paradigms would be regarded as research protocols.</td>
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<td>• Aims to empower participants with ability to steer and shape research questions and outcomes</td>
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<td>• Seeks to maintain a distinction between research intended to understanding practice and research designed to improving practice outcomes</td>
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<td>• Challenges research to work in strange ways and places.</td>
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<td>• Is typically based upon case studies although the research design can evolve as project needs become more evident</td>
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All Point are from (Deming 2011, p53)
Figure 9.

The Image above shows graphically the process of design I want to take from start to finish to design my project. Starting with research such as seen in this figure then ending with my final presentation in May. The outcome I hope to obtain in this thesis is the center goals outcomes.
Personally, my design process can be described as realistic organized, planned and done early, with time to fine-tune my design. In all honestly, I design the exact opposite as most. Simply put I am the type of person who hates procrastination and always finish the project well ahead of schedule. When initially I finish the work, the work I produce is sub-par. However, I am the type who plans to be done earlier so I can nit pick the design and make it better. Usually, when I start a project, I design the exact opposite of how most design began a project. Most start with a rough conceptual master plan. However, I design perspectives and details first then base the master plan of my details. Most people/designers, expect and like quality before quantity; I am the exact different I rather have more detail and descriptions than one really one well-done detail this is for the reason that one image can be subjective and less objective. However, a cluster of details allows for a less subjective and more objective, I am the type of design who hates abstract design I want the client to think a certain way. In essence, my design is very pragmatic and cost-efficient for my many years of working as an engineer and as a draftsman. I have begun to value cost efficacy and ease of use rather than elaborate plans. Listed to the right is design steps I plan to take further explained when it comes to design phases.

Diagram 1. Illustrates the exact steps I plan to take conceptually from starting with my thesis question (design brief), to the final stage of design support and delivery, in the form of my final book and presentation.
Jay’s Work Plan VS My Work Plan

Jay’s Work schedule
W01: 01.09.2017 - 01.15.2017 | Focus: Thesis Process
  - Start base materiel
  - Start project Analysis
W02: 01.16.2017 - 01.22.2017 | Focus Thesis Process
  - Finish base material project
W03: 01.23.2017 - 01.29.2017 | Focus: Thesis Process
  - Work on/ finish final project analysis
W04: 01.30.2017 - 02.05.2017 | Focus: Thesis
  - Start project master plan
W05: 02.06.2017 - 02.12.2017 | Focus: Thesis Process
  - Work on master plan
  - Finish Master plan
  - Start sit plan details
W08: 02.27.2017 - 03.05.2017 | Focus: Thesis Process
  - Work on site details
W09: 03.06.2017 - 03.12.2017 | Focus: Thesis Process
  - Finish site details
SBW: 03.13.2017 - 03.19.2017 | No Class: Spring Break
  - Fine tune work
  - Start putting together Presentation boards
W11: 03.27.2017 - 04.02.2017 | Focus: Thesis Presentation
  - Work on Presentation boards
W12: 04.03.2017 - 04.09.2017 | Focus: Thesis Presentation
  - Work on Presentation boards
  - Work on Presentation boards
  - Work on Presentation boards
  - Work on Presentation boards
W16: 05.01.2017 - 05.07.2017 | Focus: Thesis Presentation
  - Presentation
W17: 05.08.2017 - 05.13.2017 | Focus: Thesis Turn in
  - Finish book
Work schedule

My work plan
W01: 01.09.2017 - 01.15.2017 | Focus: Thesis Process
  - Start base materiel and finish it
  - Start project Analysis
  - brain storming Site details and Maser plan
W02: 01.16.2017 - 01.22.2017 | Focus Thesis Process
  - Fin tune base material project
  - Finish project analysis
  - Continue brain storming Site details and Maser plan
W03: 01.23.2017 - 01.29.2017 | Focus: Thesis Process
  - Actually start project master plan
  - Link details to master plan
W04: 01.30.2017 - 02.05.2017 | Focus: Thesis
  - Finish on master plan
W05: 02.06.2017 - 02.12.2017 | Focus: Thesis Process
  - Finish site details
  - Fin site details
  - Start site plan details
W08: 02.27.2017 - 03.05.2017 | Focus: Thesis Process
  - Work on site details
W09: 03.06.2017 - 03.12.2017 | Focus: Thesis Process
  - Finish site details
SBW: 03.13.2017 - 03.19.2017 | No Class: Spring Break
  - Fine tune work
  - Start putting together Presentation boards
W11: 03.27.2017 - 04.02.2017 | Focus: Thesis Presentation
  - Work on Presentation boards
W12: 04.03.2017 - 04.09.2017 | Focus: Thesis Presentation
  - Work on Presentation boards
  - Work on Presentation boards
  - Work on Presentation boards
  - Work on Presentation boards
W16: 05.01.2017 - 05.07.2017 | Focus: Thesis Presentation
  - Presentation
W17: 05.08.2017 - 05.13.2017 | Focus: Thesis Turn in
  - Finish book

The image above shows Jay’s schedule on the Left vs. where I hope to be on the Right. Redesigned in order to go above and beyond what is required to meet the rigorous needs a sustainable ecosystem has
Thesis Research
Research Overview

Research Questions
- What are the communities needs, and how can my project accommodate the community?
- In what areas can a community become sustainable?
- Is my ideal project feasible?

Figure 10.

The image above shows my basic thought process: that I need to start asking the right questions to have proper research. Resulting in the hypothesis below being formed to help answer those questions.

Research Hypothesis
I presume that from research that I will learn that my project is very feasible to accomplish. It is reasonable to think that people have done my project on a small scale simply from basic studies I have seen in my school work. I have a creeping suspension that the project will need to be advanced in research in the area of methods and how this project can be feasible.

Research Approach

The first area of research for this project will need to be how feasible my project is, that way I can gauge what I can do on this project. The next step will be to address the communities need in a sustainable ecosystem. Lastly project methods will need to be research that way a designer can gauge how to create said project. The next step will be to see the communities needs. This will be done through case studies and project methodologies. Followed in the same manner as table 1 as far as process goes.

Table 1.

The Local Community’s Needs

Now that a site has been selected the next step will be to see and find out who is occupying the site, and what basic needs or resources that the said site will have to provide for. The first question that must be asked is: what is the state of the site and who uses the site. Next, it must be reviewed what needs the said site can support. Also, there must also be a consideration into the future of the site, and what possibilities society will have in the future of this site. Can it be expanded, or will this site be used as a case study in the near future? Through basic site inventory and sustainable research, necessary parameters can be thought of and mentioned in further detail, with possibilities to achieve them as well. Through the analysis method Jason Grim a fellow researcher states to find a site to be ecologically sustainable a site needs to meet three primary areas, environmental socially, economically productive (Grimm, 2010). Allowing designers to address the community needs on a possible scale. Through this said scale I have found needs and methods to meet those needs as seen in the appendix. Proving that my project is feasible, which is also seen in the explanation of the three areas of emphasis described in the next few pages.
Environmental health is an enormous worry of many administrations and individuals in the politically sustainable ecosystem crusade. Thus researchers have stated a site must be environmentally productive, the reasoning behind this thought is that society cannot continue with current trends, more importantly, society needs to fix this problem is three main areas. Food water and energy listed below are justification reasoning and process ideas for those three main areas.

**Food Needs**

In the current decade, it has been harder of society to feed its communities in a healthy way, let alone that involves the community and is environmentally productive. “In the next 20 years the global population is going to be 60% urban, and food access is going to become a primary issue” (Girardet, 2004, p.3). In 2007, the globe became an urban society by passing the rural/urban threshold, while the U.S. has been primarily urban since 1910 (Redwood, 2010). As creators and organizers of urban landscapes, landscape architects hold a vital tool in the growth of any urban community. Food is both a fundamental and worldwide issue. The lack of productive urban land, food insecurity, uncontrolled urban growth, the lack of stable local food markets, land use conflicts in the urban areas. For example, the Center for Urban Education about Sustainable Agriculture states “on average food travels 1500-2500 miles from field to plate and in return is producing extreme levels of carbon dioxide that are a detriment to the environment let alone, most products are often unhealthy options” (CUESA, 2016). Rich Pirog in the Leopold Center writes about Iowa’s food systems and energy usage and, more specifically, the food system’s impact based on food miles and how a city could fix this problem by being environmentally productive as I have outlined below. Pirog compared the results of a conventional system, Iowa-based local system. He analyzed each system based on fuel consumption, a value of the fuel consumed, C02 emissions and distance traveled (Pirog 2001, p. 33).

Findings from this study support that an urban food system would be environmentally productive if food could be grown on site or if a community could shorten the span between field and plate in conclusion both methods in his studies would substantially reduce greenhouse gas emissions (Pirog 2001, p. 33). Showing that a site needs to be environmentally productive to meet the criteria of being sustainable in an urban ecosystem.
Site Needs

Water Needs

To be environmentally productive current trends in water must be manipulated according to Doctor Wang in his book Improving Health & Well-Being in the Built Environment “Water is essential to life, and its positive experience in the built environment can relieve stress, promote satisfaction, and enhance health and performance. The attraction to water can be especially pronounced when associated with the multiple senses of sight, sound, touch, taste, and movement. Moreover, in conclusion, a sustainable ecosystem water is necessary and produced from natural resources such as rain and natural occurring bodies of water”(Wang & Tsien, 2011). Clean water is not just a need for society but plants as well; that is why it will be an objective of mine to sustainably provide the water requirements of all organisms for the immediate area. The first step will be to brainstorm methods of using rain water such as green roofs Bioretention and detention basins. Then test and research these methods to see how they fit into nature. Secondly if needed to make up for lack of water the site produces naturally. Methods of naturally using water from the nearby Lake Michigan to meet the site’s needs will be utilized. Lastly, it will be a goal to use water in an efficient manner aesthetically. Such as making methods of water transportation into art, or just detain the water in a visually appealing way as previously outlined by Dr. Wang.

Energy Needs

Energy in a big concern for the city of Milwaukee let alone the planet. Resources such as power and water exert the same toll on the environment as seen in the traditional energy sector. For example, in 2005 agriculture produced 8.2% of the CO2 emissions based out of all the U.S. economic sectors. Transportation (27.5%), industry (18.6%) and electric power (33.5%) (Hofstrand, 2008). This means modern energy industry is the primary cause of these other industries’ impact on the environment. In addition to food miles, food deserts, and health care; urban land use is a standard issue in urban communities that must be solved by being environmentally productive. Thus it is a goal to create enough energy on the site, not only to provide for the sites needs but possibly the surrounding area as well. Nature is known for providing for not only the entities needs as well as the other aspects as well. Take for example plants and animals that both support them self’s but their offspring as well. Methods I plan to use to accomplish this goal are outlined in Jennie Benyus book Biomimicry Innovations Inspired by nature those innovations include ”, solar energy harvested by panels that are also designed to heat water much like vegetation uses water. Also, wind power can be employed as well. (Benyus, 2002) Lastly it is a design goal to make these said elements visually appealing as well, through the simple use of nature. Feeding back into the goal of making my site environmentally productive.
Economically Productive

After WWII when a larger portion of the population was able to move and live in suburbs of American cities it opened up new land for chain stores to grow directly affecting a community needs, more importantly, impact a community’s economy (Grimm, 2010). Today urban resources such as food water and energy had become the dominate market in all areas of the economy for example In 2005 the top ten retail chains had a hold of 30% of consumer spending. Twenty percent of this spending was in food sales, and 46% was dominated by five companies: Walmart, Kroger, Albertson’s Safeway, and Ahold. Independent groceries only had 17% of the sales (Mitchell, 2007). Showing that public resources as stated above makeup 91% of the economy thus it is an intricate part of a community making up much of the budget of the urban environment. Thus Urban areas would be the best place to implement production to create local food, energy, and water resources.

An example of the benefits of being environmentally productive are explained by Carolyn Steel in her book the Hungry City as followed production of local food could increase the community economy would be benefited greatly (Steel, 2013). Besides, green roof themselves are very economically friendly the Green Roofs of Healthy Cities Organization states “green roofs can potentially pay for themselves in 10 years and provide tax, water, and heating benefits for over 40 years making them economically appealing” (McIntyre & Snodgrass, 2010).

Showing that if a site is the economy is.

Figure 14.

The image above shows the three most important areas of design and how they connect to sustainability and the community.
What is Sociologically Productive

It is a proven fact that for a public space to be used, it needs to have adequate space for interaction and social needs. Professor Warren concluded that since the residents had a higher standard of living they were more willing to engage in public affairs because they had built up community equity to the point where. They felt they owned a piece of the community and should have a right to make decisions for its future and use in the future (Warren, Thompson, & Gaston, 2011). Sociological productivity is tough to measure yet, Jan and Cornelia Flora of the North Central Regional Center for Rural Development have established their Community Capitals Framework. This outline describes the seven types of social capital in a community. It explains that invest natural capital adds to cultural, human, social, political, financial, and built capital. By increasing social capital, the Flora’s explain that a community will have a strong foundation and become a sustainable community (NRDC).

That is why it is not only a design goal to provide basic needs as outlined above as well as draw people into space for other uses as well. That way the space will have multiple uses and attract user into an area. That means the site can be utilized as an educational tool as well promoting the importance of the site as well and meet society’s needs. This programmatic element I believe can coexist with the items as mentioned above. For example, combing seating next to sensory objects like an apple tree, which provides food and visual appeal. Hopefully resulting in the user wanting to be in that said space. More importantly making the user want to interact, and sustain this site making the site socially productive. Being right next to one of Milwaukee’s biggest art museums this site naturally can blend into the existing infrastructure, by being visually appealing, more importantly, aesthetic can provide appeal much like social space does for the site. Driving the user into the site to see the importance of said site, and encouraging the user to use the site.

Overall the aesthetics of the site should be a part of the art and sculptures of the location itself. After all the site is part of the art museum, thus it is designed goal to make as much of the site’s infrastructure and surfaces art as much as possible making the site social productive in a sense. Fitting an overall theme, that will should be carried within the block as well. Giving the user a feeling that this garden belongs to the site, and is not just thrown on the site for convenience sake allowing the user to feel socially part of the site.

Sociologically Productive

The social studies in science and technology assume the perspective that knowledge and technology are built and legitimized in a certain context. A context that encompasses machines, texts, scientists, laboratories, imagination, power, interest. Considering any human construct, science and technology also embrace several social elements, and without a thorough observation in the practice itself, some might say that these elements would disappear from its composition. Science and technology would appear as necessary, functional, detached from the worldly concerns. The traditional epistemology and technology’s philosophy guided us the belief that the real knowledge and its working technologies would not be related to these listed elements.
Biomimicry Models

As seen in previous sections biomimicry will be the tool that drives, this place to be sustainable and create a survivable ecosystem. As foreseen nature has been creating sustainable ecosystems for thousands of years. Benyus once again states “With current trends, biomimicry is becoming more and more popular and more and more inventions are being made through the mechanism of nature it is easier to use nature in design” (Benyus, 2002). A few ideas for this site are the following. A green roof that mimics how a plant cell operates. Aquaponics which use fish to clean water for plants, just like how plants have done in a pond for thousands of years. Solar panels which mimic how a leaf captures light, to provide a plant with basic nutrients the plant’s needs. Other models will be later identified once the site’s needs are fully researched.

Figure 17. This image shows Benyus design method of using biomimicry in the real world, a model which will be used in design as well.

Practical Assessment Conclusion

Warping it all up there is potential for an urban community to create and sustainable ecosystem in an urban area that meets both physical and aesthetic needs of a society. As seen, the chosen site of the O’Donnell parking structure shows potential for a sustainable ecosystem upon basic evaluation. A site that’s basic needs can be researched and studied. Then basic needs and methods can further implement and accessed on how they might look to nature to solve the problems played out. While all relating back to providing appealing aspects a site needs to survive for many years to come.

Figure 18. The image above is how a Japanese train has mimed the natural design of the Kingfisher’s noise to be 40% more aerodynamic. Design that shows how easy it is to use biomimicry.

Figure 19. The image above and below show exactly how the natural environment can be used in design infrastructure such as in a whale fin base turbine or a flower-based structure system. Designs I plan to use in my park as well.

Figure 20.
Throughout this book, Allen has composed over 30 year’s testimonials on the positives of urban agriculture in the community. In itself, this book is beneficial to research, because it begins to show how anyone can create a small-scale urban garden let alone create a large scale food empire, such as Will has done for himself. Likewise, this book sheds info on also why we need urban gardens, by showing data on, how urban agriculture can affect community health, why big box stores are not needed, as well illustrate how a community garden can denture racism.

Scientist and educator Janine Benyus names and explains the phenomenon know as biomimicry. She illustrates how cutting-edge researchers create biomimic designs as they stir vats of proteins to release their power; analyze the way electrons are working around a leaf cell turning sunlight into fuel; discover miracle medications by watching what chimps eat when they’re sick; studying the hardy prairie as a model for low-maintenance agriculture. Showing how biomimicry could even be applied to such a place as Milwaukee Wisconsin. Besides, this book shows a plethora of resource and websites that can be referenced to do such innovations.

Through this journal Sharabir and Parwinder, tell the tragic story that cities are in need of urban agriculture more than ever. Realistically, though, this research is beneficial in understanding how society has come up with solutions to this problem. By studying the city of Cleveland, the authors claim that a town can fix it food problem and shortages, in a few simple steps. Still, at the end of the day, this source also goes into the details or logistics, that would be needed to accomplish this goal. More importantly concluding us that are society mindset could be what is holding us back from a greener community.

Focusing more on food urbanism than urban agriculture, Grim begins to show a broad picture of not only why a city can have sustainable food practice, but how they can happen. Useful to Urban Agriculture study Jason shows models and layout of how urban agriculture can be used in a city, such as London. Giving detail plants that grow well in urban environments. Alongside these models are also urban typology studies that beg for an answer to the primary food shortages society has, that in the end, this system could fix as well.

The city in this day and age faces significant challenges, including social and economic issues, uneconomical consumption of resources, transportation congestion, and environmental squalor questions this reading touches on. Also, this text asks: How will our future generations survive? How can we contest and resolve urban growth with the maintainable use of resources for future generations to succeed? Where and how urbanism comes into the representation and what “sustainable” municipal forms can do in light of these events.

The whole justification of using this source is to have insight on why urban communities need to create sustainable ecosystems. Doctor Don Hofstrand agriculture specialist has spent years researching how agriculture plays into the impact of greenhouse gases. Allowing for hard numbers to be shown on how food needs to be grown locally because of the tremendous effects food production has on the environment.


One of the great forms of urban agriculture is privately owned gardens, providing green products to urban areas with the benefit of avoiding city politics. While at the same time giving people the economic benefits, and much need provisions to create a healthier society. This journal shows how a city, can transform from a food deprived city into a more green society, which is also healthier at the same time. Overall directing the viewer to ask can these private gardens also make people physically happier as well.


Increasingly regulations and the appeal of LEED-related projects have increased the admiration and desirability of green roofs. This book has taken a comprehensive look at how to successfully adapt green-roof knowledge to the variable and risky North American climate, and how to design developments that will operate and endure as efficiently as those in Germany, Switzerland, and other European countries. This book fills the gap by providing a summary of practices and techniques that are used in North America. The authors offer options regarding structure, function, horticulture, and logistics.


This book, by researchers employed in urban agriculture, inspects concrete strategies to integrate city agriculture into the urban setting. Drawing on unique field work in the towns across the quickly urbanizing global, the book inspects the influence of urban farming and city farming to livelihoods and food security. Letting such researchers have a design code book to follow when it comes to practical solutions that will work in urban farming. Moreover, there are case studies in various environmental conditions that could be applied such a project as the one proposed.


Carolyn Steel is known as the world’s most renowned food urbanist, researcher, and has to lead the way in redesigning the city with urban agriculture in mind. Throughout her book, she begins to describe how some cities are shaped by the availability of food. Tragically nowadays due to the lacking design and urban sprawl, there is a food epidemic among nations of the world. Interestingly enough Steel gives insight on how urban agriculture can be used in a variety of steps to deter food crises. Shedding light on how from the streets to the kitchen food production can be changed for a more sustainable society.
Precedent Analysis
Case Study Narrative

When thinking about what exactly this site needs, site examples that have been done in the past can be examined. Now initially of dozens of sites that could help with inspiration for my design. However, to be practical, I need to narrow which sites I drew inspiration from to have an advanced idea of what exactly to use in my design. That is why I started to brainstorm keywords that a sustainable ecosystem needs to have. Those words are represented in figure 21. From there, I started to see which design examples or case studies incorporated the most words or showed the bigger outlined word the best. Terms such as environment, materials and functional. As a result, I was able to find 3 case study that I could use as design inspiration in my project. Guaranteeing that I have a design that encompasses key aspects that will make this thesis successful.

The Three Main Sites

The main Three sites that I want to explore are the Dragonfly farm, Citta Della Scienza both by Vincent Callebaut also, the Mobius project by Micheal Pawlyn. Each site is uniquely from each other but has an overarching them of being a sustainable ecosystem. Allowing for a different inspiration that will definitely effect my end design.

What All Three Case Studies Have in Common

The image below shows exactly what all three sites have in common to be functional in sustainable design these seven main ideas are further expressed and shown in the design precedent outlined in design overview and conclusion. Showing how in essence these sites prove that my site is very feasible.
Citta Della Scienza

Location: Rome Italy   Designer : Vincent Callebaut

Project Overview

The motivation of the design for the new Città Della Scienza is to convert the military district into a self-sufficient urban ecosystem. The project is geared at becoming a model of new urbanization introducing an important emphasis on sustainability. In addition to structure functions with visual appeal in mind, while promoting sustainable design, low carbon transportation, renewable energies, automation technologies, and new green building materials.

The food is grown on site with the bio-degradable waste going into an aerobic digester. What’s one of those? Well, it would use the food waste to produce heat for the greenhouse and feed electricity back into the grid. Like a natural ecosystem, the site would ‘close the loop’ by reusing its waste products, while feeding the locals food grown on site and producing clean energy. Something that my site will implement as well. In addition to applying other heating and cooling technologies as well.

Conclusion

The landscape architecture aims at reaching the following green features according to Vincent Callebaut website. "The retrieval of rainwater for irrigation of public and private green areas, photovoltaic electricity production, the domestic hot water production by solar tubes, the regulation of microclimates in public spaces (daylight and shadow), the civic solid waste recycling on site by biomass, the energy-efficient buildings (treatment of facades with respect to guidance), and finally the lighting appliances with integrated micro-wind turbines (Project Cittadella Scienza, 2016)."
The Dragonfly Building

**Project Details**
- A productive greenhouses
- A public housing
- A food market
- A 32 story farm
- Self-heating
- A “Living Machine” water system
- Self sustaining energy consumption

**Use of Space**
In this Utopian superstructure offices, research labs, housing, and communal areas are interspersed between orchards, farms, and production rooms. Plant and animal farming is arranged throughout the Dragonfly's steel and glass set of wings so as to maintain proper soil nutrient levels and reuse of biowaste. The spaces between the wings are designed to take advantage of solar energy by accumulating warm air in the exoskeleton during winter. Cooling in the summer will be facilitated through natural ventilation and evapo-perspiration from the plants. Exterior vertical gardens filter rain water which is then mixed with domestic liquid waste. Together they are treated organically before being recirculated for farm use, preserving and distributing nitrogen, phosphorus and potassium(The Dragonfly,2016).

**Project Overview**
Modeled after the wings of a dragonfly, this unbelievable urban farm idea for New York City’s Roosevelt Island intends to ease the difficulties of food mileage and shortage, and recouple patrons with producers. Spanning 132 floors and 600 upright meters, the Dragonfly can house 28 different agricultural fields for the manufacture of fruit, vegetables, grains, meat, and dairy. A mixture of solar and wind power make Belgian architect Vincent Callebaut’s Dragonfly idea 100% self-sufficient.

**Conclusion**
Urban farming is a growing trend amongst savvy city dwellers today, but in a densely packed borough like Manhattan, growth must come vertically. In this Utopian superstructure offices, research labs, housing, and communal areas are interspersed between orchards, farms, and production rooms. This concept is what I hope is the end goal for my project as well. I hope to take Utopian views as seen above and apply them to my project.
The Mobius Project

Location: London England  Designer: Michael Pawlyn

Project Overview

The Mobius Project encourages the users to have an interconnection of inputs and outputs in the form of a closed loop model that provides all that society needs in one location. In theory is a small scale design of what The O'Donnell park hopes to be.

Figure 27.

Use of Space

According to the Mobius project website the site use space in the following ways. There are three main cycles: food production, energy generation, and water treatment. The groundbreaking feature of the Mobius Project is in the method that it co-locates and mixes these procedures in synergistic cycles. The structure can handle much of the biodegradable waste from a native urban area using composting and anaerobic digestion. The restaurant, apart from being supplied with fruit, vegetables, and fish from the greenhouse which cuts down on food miles, can operate at close to zero waste as food leftovers can be fed to fish or composted (The Mobius Project, 2016).

Figure 28

Conclusion

This project could help generating a sense of community and reconnecting people with food while addressing many of the infrastructural requirements of sustainable living in urban areas. The plan is to do the same thing on O'Donnell Park by taking the ideals and designs of strong community this site has and apply it to the site.
Project Location
O’Donnell Park, positioned at the boundary of Wisconsin Avenue, contains a public plaza with two pavilion structures atop a 1,332 space parking structure. The greater of the two pavilions, the Miller Brewing Company Pavilion, is roughly 53,774 square feet, according to a recent property assessment. The smaller pavilion, the Promontory Pavilion, public and private space. The public plaza contains a large open area at street-level, part of which is a grassy area known to the public as the “South Garden” and a second level above the Promontory Pavilion, called the “North Garden.” Numerous stairs and elevator towers were built through the property (O’Donnell City Report, 2014).

Site Analysis History
Since O’Donnell park is an existing park is important to study the existing site and the needs that site has or already meets. This section is geared towards understanding what existing infrastructure is on the site, how it needs to be repaired, along with studies on how user use the site. For the reasoning that this information can help a designer understand what the park all entails and how a designer can use the site to create a sustainable ecosystem.

Brief History
According to The City of Milwaukee records, official planning for O’Donnell Park started in 1985 with a $250,000 annexation for planning and analysis of a 5-acre park on top of a 1,100 space parking facility (a 900 space surface parking lot existed at the current site of O’Donnell Park at the time of the planning). The project, previously called Lake Terrace, was approved in December 1986 at a projected cost of $24.1 million. The State of Wisconsin and the City of Milwaukee donated to the project. In September 1989, the County Board approved a resolution name again the project the William F. O’Donnell Park, in honor of the former County Executive. In August 1992 (O’Donnell Park Construction Audit). Included in O’Donnell’s complex history are structural deficiencies and design defects, which were recognized before the property was finished. As of June 1992, the projected total development cost for O’Donnell Park was more than $32 million, not including the cost of the aforesaid operational maintenance (O’Donnell City Report, 2014).

A Sudden Death
On June 24, 2010, a 13-ton piece of cosmetic concrete fell onto three individuals as they left the O’Donnell Park parking structure. One was killed instantly; the other two were injured (O’Donnell City Report, 2014). The image above shows the memorial that was posted for the victim who lost his life.
Overview

A Brief closing

The garage was closed from June 24, 2010, to June 28, 2011, for substantial repairs, including the removal of all the cosmetic concrete panels similar to the one that fell, in order to ensure the property was safe for use.

Remaking the lakefront

A committee of civic and government leaders is recommending several changes to Milwaukee’s downtown lakefront to pave the way for future uses, including commercial development.

In 2015 the Park was obtained by the art museum striking a new plan and innovation of this site as seen in figure 31. The city of Milwaukee struck up a report that describes what is happening on this site. “The Milwaukee Art Museum says it has struck terms for a deal to buy the O’Donnell Park parking structure from Milwaukee County that will include the museum take ownership of much of the Milwaukee County War Memorial Center property. The deal would let the museum take over the much-debated O’Donnell Park on the downtown lakefront. Dan Keegan, Milwaukee Art Museum director, announced the proposal Monday with County Executive Chris Abele and County Board chairman Theo Lipscomb (O’Donnell City Report, 2014).”

Figure 31.  

In October 2012, a jury trial was held where $39 million in damages were awarded to the estate of the individual killed and those injured in the accident. According to a March 2015 letter prepared by Corporation Counsel for the County’s outside auditors, the County was found to be 2% at fault, and their portion of the verdict was approximate $172,000, which was paid by the County’s insurer. The County was also awarded a recovery of $6 million against a defendant, a County contractor, for the County’s costs to repair the facility and for lost revenue during its closure. An appeal was filed and is still pending at the time of this audit’s publication. To date, the County has not received its $6 million awards (O’Donnell City Report, 2014).”
New Design Images

New Design Synopsis
Images to the left, right and bottom show The new designs Great Engineering has created and are proposing for the park. The new design focuses on art and human interaction within the space. However, the new model is not environmentally sustainable or appealing to the public as seen NML case study seen on page 67. Showing that is a need for a new design especially since this design has not be improved by the city.

Figure 32.

Figure 33.
Code Narrative

The city of Milwaukee is known for having very strict building codes that in essence are part of a community needs because they keep the site safe and usable. Without following codes, accidents and deaths can happen on a site such as this. Like what happened in 2010 when a pedestrian was killed on the site due to improper codes as explained in previous sections. Due to this incident, the art museum has made safety a main concern of theirs as seen in the image below. That is why it is the main goal of this section to see what codes this design needs to follow in addition to outlining repairs that the building needs to keep up with current codes. So that the Park will be able to exist and be a safe establishment that people feel comfortable in. A place where a user feels safe and is not reminded of the terrible accident that happened in the past.

Panel installation

Concrete panels were attached to the O'Donnell Park garage with two steel connectors instead of the four that building specifications called for. The size and spacing of the pins also varied greatly, contrary to specifications. Lawyers in a civil trial are arguing over whether that change was authorized and if it was the cause of the June 24, 2010, collapse of a panel that killed a teen.

Building design shows four connections to be used.

Parking surface

■ The four connections would fit like pegs

Panel installation

Only two steel connections were used along the top of the panel

13-ton decorative concrete panel would be supported by the wall

Other connections were in place at the base of the panel but were not considered weight-bearing.

Figure 34.

Figure 35.

Water leaks: Ongoing efforts to stop water leaks throughout the facility need to continue despite how involved the park’s original design must be changed. Making this an opportunity for new irrigation design or green infrastructure to be implemented.

Figure 36.

The settling of concrete walls poses a huge safety concern that must be addressed, giving a designer a creative opportunity to incorporate safe green built walls in the area.

Figure 37.

The site lacks appeal when it comes to site furnishings that are in need of repair, as seen in the park bench above. Giving a chance for new green design to be implemented on the site.
Though the site has Marvelous vegetation and seasonal programmatic elements the sites vegetation is in need of repair as seen in the images above of clogged drains, weed infested beds and damaged trees. Listed below is a basic analysis of what is needed for repair.

- Total trees: 75
- Total trees needing maintenance: 45
- Trees needing removed: 3
- Total Planting Beds: 11
- Planting Beds Needing Repaired: 5
- Drains Clogged Vegetation: 5
- Turfed area needing repair: 3

Figure 39
Milwaukee Codes for the O’Donnell Parking Structure

Green Roof Code/Ratios

- Hardscape to Softscape: 75% (25% Turf to Vegetation Ratio)
- Semi-Intensive to Intensive Ratio: 45% (55% Parking to Public Space Ratio)

Maximum Human Occupancy: 5540

Green Roof Soil Code

- Extensive (0-6 inches): 25%
- Semi-Intensive (6-9 inches): 45%
- Intensive (6+ inches): 55%

Parking Structure Codes

- Railing must be installed at surfaces 3 feet above grade
- Code allows for 1350 parking spaces
- Entrance and exit must be 15" wide
- Building must be set back 15"
- Lighting need every 15'

O’ Donnell Code Timeline
- 1986 built to city codes
- 1996 codes are reviewed
- 2000 slight code update
- 2010 death occurred
- 2010 repairs made

Figure 40.
City Codes Needed to Be Followed

82-3 Weight loads
101-1 Traffic codes
252-1 Egress
295-903 Park Codes

295-127 Rules of Construction
295-403 Parking
295-405 Landscaping
295-303 Occupancy

295-407 Signs
295-409 Lighting
295-411 Encroachments

Street & Tree Requirements

Egress View Requirements

E1 Egress locations 6 Required
O1 Right Away Protection
Steps and Ramps Meet Codes Above No Additions/Modifications are Necessary

Figure 41.
As seen in the previous section it is seen that the site lacks sustainable infrastructure thus it is the intent of site program to introduce a programmatic element that meets the communities needs in a sustainable fashion. Showing a rudimentary idea of what is needed in the space based on the site analysis Along with details on why that space is used and well as logistics as well. Also, diagrams are included to show a basic analysis on where show elements should be located at the base of various aspect outlined in this section. Then lastly to bring everything together a problem statement has been added to show the considerations the design has to have to function. Bring everything together so that a designer knows what the site needs to have and why. Reflecting the needs and methods the site will need as seen in the appendix.

### Space List

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<th>Function</th>
<th>Maximum Occupancy (people)</th>
<th>Capacity</th>
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<td>1</td>
<td>33,915</td>
<td>6,000</td>
<td>162,915</td>
</tr>
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</table>
Solar panels: are established on the site to provide power and heat water as well. The system used is a biomimetic system that mimics how a leaf utilizes water. Size is determined by areas power needs as seen in research.

Wind turbines: Wind turbines on the site will provide clean sustainable power while minimizing space. Size and quantity is based off a case study a site of similar size as said project.

Vegetable beds: will be water filtering beds using hugelkultur and swam techniques to utilize graywater black water and compost to grow plant designs and sizing will be established one program elements spaces are chosen.

Fruit trees: will be community chosen trees that are zone 4 hearty and are appealing to the local community. Size and quantity will be base off-site needs.

Green roof gardens: will be intensive gardens with special filtration fabric to allow rainwater to be recycled. In addition, planting and size will be aesthetic or crops based off of location and needs.

Wind turbines Wind turbines on site will provide clean sustainable power while minimizing space

The garden mounds: will follow horticulture techniques that maximize water and compost usage.

Food trucks area: on the site will promote community business as well as make up for lack of variety with food burning the lunch break.

Toolshed: is on site to hold the tools that are needed for farming and maintenance of the said roof

Water filtration: will be utilized in a verity of ways from aquaponics to solar panels that heat water, to black and gray water filtration.

Retention ponds: are to be in the sloped area and used to collect water, and to filter and purify black and gray water.

Aquaponics: to properly grow a plant and also filter black water aquaponics will be included on the site to increase the holistic sustainability of the site.

Art: the site is owned by the art museum, and the people have said art should be on the site, to meet these needs art must be included in programming.

Educational areas: to promote continued sustainability in the area educational areas where people can be thought about sustainable features on the site must be included.

Social areas: the green roof was intended to be a social area for local business men, also upon analysis the site will need an area of public appeal such as entertainment areas to meet the societies needs.

Farmer markets: are intended to be a place of the community to sell goods to support the felicities needs. In addition to giving back to the community both economically and social. The site should be programed to meet communities size and needs. Ideal this could be done in phase to maximize usage.

Seating: in the site will come in a variety of forms from a picnic table, standard park bench to amphitheater areas for educational seminars. Sizes and quantities will be exceeded when program elements are placed to improve accuracy.

Composting areas: will include various methods from keyhole gardens to utilizing garden mounds size and scale of said areas will be established once other program areas are established to allow accurate sizing requirements.

Recycle areas: will be made of sustainable bins and size and scale of said areas will be established once other program areas are established to allow accurate sizing requirements.

Blackwater management: will take place in retention ponds, aquaponics areas, and in smart filtration restrooms size and scale of said areas will be established once other program areas are established to allow accurate sizing requirements.

Graywater management: will take place in retention ponds garden mounds and in solar panels that heat the water size and scale of said areas will be established once other program areas are established to allow accurate sizing requirements.

Parking: the site was originally built as a parking garage and are the sites main income thus, parking will need to exist on the site.

Restrooms: the site has to the existing restroom which is more than big enough to keep up with sites need. However, they will need to be remodeled to be sustainable.
### Landscape Area Summary

<table>
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<tr>
<th>Space Name</th>
<th>People</th>
<th>Capacity</th>
<th>o.Units</th>
<th>et Area</th>
<th>Area Gross</th>
<th>et area subtotal</th>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>100,000</td>
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<td>A</td>
<td>A</td>
<td>A</td>
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<td>Recycle area</td>
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<td>3</td>
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<td>A</td>
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<td>2,000</td>
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Table 5.

### Land Use Requirements

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<th>GACL</th>
<th>and Area</th>
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Table 6.
Problem Statement

Function
Environmental productivity is a dominant aspect of this park, and the design and character of this site must reflect this key role.
Sociological productivity is a central characteristic of this park, and the design and appeal of this site must reflect this key role.
Economic productivity is a leading feature of this park, and the design and character of this site must reflect this key role.
Since the site will be used year round, programming should adhere to all weather conditions in a profitable fashion.

Form
Since the surrounding environment is culturally significant, the master plan must embody green infrastructure for psychological effects.
Since there is a desire for a natural feeling, yet there are varying structural needs, the location must implement aesthetic biomimic models into the design.
Since there are multiple interceptions dividing the site, the master plan must integrate the divided areas into a cohesive whole, as well as provide appropriate security for users.
Since the site has a cultural identity, the master plan must appeal to said identity.

Economy
Since the development depends on sustainable profit, proposals must consider the triple bottom line of development. Thus design must have a short and longterm positive profit margin.
Since the site has two owners the art institute and the city of Milwaukee, the design must adhere to both budgets.
Since it is desired to take advantage of current bid climate, insulation should be done shortly to take advantage of low building prices.
Since this will be a public site, landscape cost and site repairs should be consistent with other public sites in the area.

Time
Since the communities needs are always evolving and may grow past the planned project, The master plan must allow an open-ended framework for expansion.
Since the site is already is disrepair, the master plan must fix need repairs in a timely matter.
The O’Donnell park is at the core of future city tourism and development. Thus the park must be able to evolve and grow to meet new responsibilities and affiliations.
Figure 42.

Relationship Diagram

Proximity

Reliance

Benefit

Similarity
Listed below is the main a graphic of the six main programmatic element themes that are desired to be included on the site. From there as seen on the next page to make assigning where programmatic elements in the future easier and to make sure the items are in the best location possible, program elements are grouped with elements that share the same overarching theme as seen in the outer circle. For example, mound gardens and vegetable gardens are under the food category because they both provide food. Then correlations are made between programmatic elements. As explained in the section below. Allowing for a designer to grasp a basic idea of where program elements should go base of similarities proximity benefits and Reliance said program elements have with one another.

![Diagram of six main programmatic element themes: Social, Water, Energy, Food, Waste, Existing.](image)

**Proximity**
A proximity correlation is drawn to program elements that would benefit to be close together. For example, it makes sense for a tool shed to be next to gardening areas for pragmatic and convenience sake.

**Reliance**
A Reliance correlation is drawn to program element that one or more element relay on each other to function thus considerations to proximity and details must be made. For example, for proper graywater management, a retention pond must be used to remediate said water.

**Benefit**
A Benefit correlation is drawn between program elements that will function better if one or more of said elements are on the said site. For example green roof and provide filtered rainwater for vertical gardens if utilized properly.

**Similarity**
A Similarity correlation is drawn between program element that is similar in methods or in nature. For example, blackwater and graywater management both rely on plants to filter water which is useful to correlate so that some program elements can be programmed in the same ease of use the same resource to accomplish a goal.
Plan For Proceeding

Key Terms
Listed below are key terms found in this book that define this thesis and more importantly how I proceed. For the reasoning that these terms are key principles that the design must incorporate. Along with these terms listed below are where to find them in this book.

- Sustainable ecosystem page 4
- Environmentally productive page 5
- Economically productive page 5
- Sociologically productive page 5
- Biomimicry page 21
- Aerobic Digester page 27

Documenting the Design Process

The plan I have for documenting my thesis is to scan in sketches and provide screenshots/pictures of my model both physical and detail models then comment on the process with verbal explanations so my process can be properly explained and documented.

Definitions of Research Direction

How research is defining this project is by first showing me that my project is feasible and has been done in theory and on a smaller scale. Giving my project a clear definition of what can be done and the range of methods that can be used to accomplish the project goals as seen on page 55-58 of the appendix. More importantly, research has defined the three major areas that the project that must be emphasized to be sustainable, those areas being the environment, economy, and sociological aspect of the site as defined on page 5. From there research showed methods that could be defined and research as seen in outcome chart on page 54. Then research also defines sustainable solutions as design needing to be inspired by nature, as seen in the biomimicry section. Research thusly defines the methods and needs of the community based on the guiding factors that were found.

A Plan for Design Methodology

The first step of utilizing the methodologies outlined in the thesis narrative is to figure out the needs of the community, in order to see how and what is needed to make the site sustainable. To accomplish this goal I will use engaged action research, how I plan to use said methods outline in the narrative section of this thesis. I will create a community-based design that looks at what the needs of the community which can be seen in the appendix page 58-59, which show exactly how I will include the community in the development and design process, which was outlined previously in other sections.

The next step in applying methodologies is to evaluate the needs of the community. To do this I will be applying methods of sustainable design that can be tested and justified to work. I plan to use diagnostic studies outlined in page 9 to guide my research to see if said site is feasible in the form of logistic reaches, such as calculating the cost benefit of said methods as seen if page 55-58 of the appendix.

The last step will be to apply my personal design style to the project. As outlined in pages 10-11 I plan to use my design process that was outlined to guide my designs elements as seen in pages 55-58 of the appendix. I have taken these guiding principles and designated them to the reasoning behind the methods by adding a justification section that outlines the significance and applicability of each method.
Design Process Narrative
As outlined in the thesis narrative I have a unique approach to the way I want to design O’Donnell Park. This section expresses more in detail some of the parameters that my thesis will entail. To the right are Key methods of design that I plan to use to accomplish my goals. From simple sketch to complex VR models I hope to express my design in a variety of ways in some steps. Those systems are outlined in the schedule and in the milestone outlined to the right. Then my end deliverables are outlined below as well. Showing a step by step visualization of how I intend to create my thesis.

Project Assignments with Schedule
On page 13 is a full schedule of how or professor Jay Kost plans our thesis course. However an assignments schedule is posted below.

W01: 01.09.2017 - 01.15.2017 | Focus: Thesis Process  
• Start base material

W02: 01.16.2017 - 01.22.2017 | Focus: Thesis Process  
• Finish base material project

W03: 01.23.2017 - 01.29.2017 | Focus: Thesis Process  
• Work on/finish final project analysis

W04: 01.30.2017 - 02.05.2017 | Focus: Thesis  
• Start project master plan

W05: 02.06.2017 - 02.12.2017 | Focus: Thesis Process  
• Work on master plan

• Finish master plan

• Start sit plan details

W08: 02.27.2017 - 03.05.2017 | Focus: Thesis Process  
• Work on site details

W09: 03.06.2017 - 03.12.2017 | Focus: Thesis Process  
• Finish site details

SBW: 03.13.2017 - 03.19.2017 | No Class: Spring Break

• Start putting together Presentation boards

W11: 03.27.2017 - 04.02.2017 | Focus: Thesis Presentation  
• Work on Presentation boards

W12: 04.03.2017 - 04.09.2017 | Focus: Thesis Presentation  
• Work on Presentation boards

• Work on Presentation boards

• Work on Presentation boards

• Work on Presentation boards

W16: 05.01.2017 - 05.07.2017 | Focus: Thesis Presentation  
• Presentation

W17: 05.08.2017 - 05.13.2017 | Focus: Thesis Turn in  
• Finish book
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This chart shows the three most important area of study that Grimm recommends for a sustainable site. Then to enhance this design I connect three basic ideas to each goal that in the research I find to be significantly valuable to the site's design.
This chart shows the three main area of study that Grimm recommend for a sustainable site with design details and methods added on. Methodologies that are explored on the next page in greater detail. That are based on the site needs as well.
Program Elements

Element: Roof production
Procedure: Green Roofs with monolithic system-and solar panels
Why: “Green roofs generally become up to 50% cheaper by the square foot as the low organic matter is good because the plants that grow normally in a green roof” (Loram, 809).

Element: Recycling plant material
Procedure: Composting, Keyhole Gardens
Why: “Keyhole gardens hold moisture and nutrients due to an active compost pile placed in gardens as the main source of food supply, it is also an excellent idea for best use of limited space and adaptability to extreme climates” (Hadley, 812).

Element: Small crop production and winter production
Procedure: Green houses with A frame storage glass invasive system
Why: “Utilizing both natural and artificial lighting (especially since the area is blanketed in snow most of the year), three stories of plant trays will revolve inside the building as well as the ceiling in a carousel-like system to maximize light exposure.” (Reynolds, 418).

Element: Smart flood prevention
Procedure: Wetlands with gray water recycling
Why: To prevent flooding and allow a smart use of gray water while proving water to native plants.

Method: Smart ground production
Element: German mound system
Why: “Hügelkultur garden beds (Hügelkultur ditches and mounds) using the same principle to help retain moisture on site, build soil fertility, improve drainage woody debris that is unsuitable for other use” (Allen, 109).

Element: Rainwater harvesting
Procedure: Retention systems
Why: The best thing about rainwater is that it is free from pollutants as well as salts and can be used to grow plants.

Element: Security trellis fencing
Procedure: Trellis vine crop production
Why: “Plants can be used to create a shady screen. Vines growing on a trellis provide some of the privacy of an indoor space, outdoors” (Grim, 38).
Element: Food promotion
Procedure: Food trucks
Why: “Fresh Local sources as much of its menu from local farmers as possible and neighbors provide honey, eggs, potatoes, peppers, carrots, herbs and more. The trucks run on Simply Green Biodiesel, and disposables are biodegradable or decomposable (Grimm, 20).”

Element: Community involvement
Procedure: Farmer markets
Why: “Farmers markets have become a critical ingredient to our nation’s economy, food systems, and communities. Connecting rural to urban, farmer to consumer, and fresh ingredients to our diets, Farmers markets are becoming economic and community centerpieces in cities and towns across the U.S. (Allen, 68).”

Element: Smart fruit and vegetable production
Procedure: Hybrid orchards and gardens
Why: “Plants offers both hybrid and heirloom varieties, but every plant we sell, this Roma-style grape tomato offers great taste and productivity along with economic benefits” (Azadi, 224).

Element: Community involvement
Procedure: Workers Smart incentive program
Why: “By supporting community gardens, Community, and activity, community engagement, safety and economic vitality for a neighborhood and its residents.” (Girewal, 2).

Element: Community employment
Procedure: Hire only locals of Fargo
Why: Hiring local gardens increase community connection with nurseries” (Allen 68).

Element: Pollution reduction
Procedure: Plant filtration systems
Why: “Aquaponics produces both fish and organic vegetables, in a dynamic, natural, pond-type ecosystem, and it does not have the same environmental impact of tremendous water consumption and waste” (Grimm, 52).

Element: Adult and youth involvement
Procedure: Children education programs
Why: “Joining a community garden is a great way to make friends and build community! ... Improve community resiliency through gardening education and culinary” (Steel, 144).
Program Elements

Element : Energy Production
Procedure: Wind and solar energy
Why: "Renewable energy technologies have an enormous potential in the United States and that potential can be realized at a reasonable cost. Market research shows that many customers will purchase renewable power even if it costs somewhat more than conventional power (Barriers to Renewable Energy)."

Element : Community Art
Procedure: Callow art museum to display art
Why: "Art does not solve problems, but makes us aware of their existence," sculptor Magdalena Abakanowicz has said. Arts education, on the other hand, does solve problems. Years of research show that it's closely linked to almost everything that we as a nation say we want for our children and demand from our schools: academic achievement, social and emotional development, civic engagement, and equitable opportunity. (Magdalena)"

Element : Water filtration
Procedure: plant filtering
Why: "Rainwater harvesting is viewed by many, including the EPA, as a partial solution to the problems posed by water scarcity: droughts and desertification, erosion from runoff, over-reliance on depleted aquifers, and the costs of new irrigation, diversion, and water treatment facilities (Pushard)."

Element : Building repair
Procedure: Green reinstallation
Why: To prevent Further dewaths on the site

Element : Parking
Procedure: Remodel existing parking
Why: The site is mandated to have parking under city code.

Element : Street Safety
Procedure: Green buffers, cross walks
Why: "Designing a park for safety is based on what is generally considered to be good design: it meets the needs of its users; it is diverse and interesting; it connects people with place; and it provides people with a positive image and experience. While good design will not necessarily eliminate perceptions of fear or opportunities for crime to occur, it can create the preconditions for effective control (Grimm)."

Element : Weather protection
Procedure: Green wall thermal heating
Why: "To allow for a site to self-heat it’s self and befits society at the same time."