Regenerative Architecture: The Symbiotic Relationship between Humans and Nature

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Regenerative Architecture: The Symbiotic Relationship between Humans and Nature
By
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REGENERATIVE ARCHITECTURE:
THE SYMBIOTIC RELATIONSHIP BETWEEN HUMANS AND NATURE
DEDICATION

This thesis work is dedicated to my parents, Ever and Rut Lobos, who have continuously supported me, spiritually and mentally, during my graduate studies and throughout life in general. I would not be where I am today had it not been for their unconditional love and encouragement, and for that, I am eternally grateful.
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First and foremost, I would like to thank God for helping me throughout this journey. My achievement could not have been possible without His guidance and blessings.

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Finally, I must express my profound gratitude to my parents, Rut and Ever Lobos, and to my brothers, Ebers and Fernando Lobos, for providing me with unfailing support and continuous encouragement throughout my years of study. This accomplishment would not have been possible without them. Thank you.
During my early childhood, Ebers, my older brother, and I invested many hours outdoors entertaining ourselves through various activities until our mother called us in for dinner. We never saw it as an obligation, but rather as an opportunity to release any accumulated stress from long hours at school. I remember always finding great serenity devoting time outdoors because it felt like the only platform where we could escape our responsibilities and express ourselves the best way that we knew how. Our early childhood did not consist of handheld video game consoles or Netflix-like streaming services. Our fun happened from pure imagination and motivation. Then Fernando, the youngest of the three brothers, was introduced as the newest member of our family in June of 2001.

It was difficult to notice the slow approaching disconnection to our natural environment. As my brothers and I grew older, we began to dedicate more of our time indoors. I believe this happened because our idea of entertainment and distractions shifted from outdoor activities to indoor ones. We were strongly influenced by our friends at school, who always had the new devices, so naturally, we wanted them too. Somewhere along the way, I slowly began to question why our interest in spending time outdoors disappeared. As time went on, more people began to move into our neighborhood; streets became crowded with cars making our front yards unsafe and prone to accidents if there was no adult supervision. Many factors continued to contribute to this change. Ultimately, I have concluded that the architecture of the neighborhood began to adapt to a new standard of living—a living environment that eliminated many of the outdoor experiences and opportunities that I had experienced prior.

Our neighborhood felt very disconnected. There were no parks for people to gather in and our narrow sidewalks, which were in poor condition, did not inspire people to walk or commute. Houses were closely spaced together along a highly dense street. Because of the constant noise flooding our homes, backyards were given tall fences, to compensate for the distractions. I felt that this was a questionable architectural decision. Forcing activities to the back side of the yard eliminates the possibility to have neighbor-to-neighbor interactions. These decisions isolate us from one another even further. If the architecture in which we grew up had been different, then possibly, our childhood could have consisted of a stronger connection to our neighbors and our outdoor environment. Strategies as simple as reducing speed limits in neighborhood settings through the use of paving materials, or using trees to provide a sense of safety for pedestrians walking on sidewalks, are responses to that disconnection. The objective of implementing these strategies is to reinforce human interactions and improve safety. By doing so, we create settings that encourage public communication, safety, and incentivize interactions with our environment. However, this was not the case for me, and most of my mid-teens were spent indoors.

I believe our environment is constantly improving in innovative ways. And, I also believe that these innovations should retain a connection to our natural environment. Therefore, as I grew older, it was important for me to become a part of this movement and seek solutions that improved connections.
ABSTRACT

Architecture of today often features building technology that is degenerative and becomes rapidly obsolete. A solution to this dispirited situation is regenerative architecture. Regenerative architecture is a theory based on engaging the natural environment by responding to, and using, living and natural systems to guide the architectural design. The goals of regenerative architecture include focusing on the health and wellbeing of inhabitants, environmental conservation, reduction of environmental impacts through building design, and aiding the restorative process of the natural world. This project investigates and establishes the symbiotic relationship between humans and the natural environment through regenerative architecture by investigating Nature Deficit Theory, while exploring the concepts of Biophilic Design and Psychology of Space. This project is an illustration of how regenerative architecture can create awareness and responsibility toward the natural environment.
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MANIFESTO

We hear neighborhoods, communities, and cities ask for support.
Forced density builds tension.
Provides disharmony and threatens identity.

We must not lose our humanity.
Our generosity.
Our empathy.

We must devour less.
Contribute and renew.
Make a bigger impact.
With a smaller footprint.

Architects must respond.
Embrace communities and context.
And extend beyond the borders of our site.

We must not execute the same mistakes.
To satisfy the few.

Architecture must respond.
It must adapt, evolve, and speak;
Create opportunities.

Architecture must:
Feel
Stimulate
Innovate
Regenerate.

Architecture is a response.
We must all be designers.

We must think of the future and turn good into great.
A future we all deserve.
A future that we must demand, expect, and protect.
INTRODUCTION

In our pursuit for modernization, we are further disconnected from the natural environment. Architecture is a discipline that has the power to re-link our connection to the natural world, the ability to enhance human health and well-being, and the potential to unite diverse people and communities.1

The objective of this thesis is to investigate and establish a symbiotic relationship between humans and the natural environment through regenerative architecture. The word symbiotic refers to an interaction between two different organisms living in close physical association to one another.2 In the case of this project, the symbiosis is happening between humans and nature. This project will create a symbiotic relationship between the two by implementing architecture that is regenerative with nature so that the users, the architecture, and the natural environment receive mutual support and benefit.3

This project will focus on crafting a place that educates and reconnects people to nature. This will be accomplished by investigating Nature Deficit Theory while incorporating the concepts of Biophilic Design and Psychology of Space. By carefully including nature into the research and design process, this project will draw awareness and responsibility toward the natural environment. Doing so will demonstrate that coexistence with the natural environment is obtainable without having to deplete the planet’s natural resources faster than they can be replenished.

Our Future

During the past 5,000 years, the emergence of large-scale agriculture, technology, fabrication, industrial production, and engineering established only a small fraction of human history.4 Humanity’s emotional, problem-solving, critical thinking, and constructive abilities continue to reflect skills and aptitudes learned in close affiliation with natural systems and processes, which remain fundamental for human well-being, growth, and productivity.5 The belief that human progress and civilization are measured by the separation of nature is an inaccurate and dangerous illusion.6 Society’s physical and mental health continues to be highly dependent on a connection with the natural environment.7

Currently, human society lives in an era that prides stronger connections and well-being via the aid of modern technology, but our actions imply a stronger disconnection from one another and our environment.8 For children, this concern is even greater. A study conducted by the University of Michigan Institute for Social Research reveals that over the last 20 years children between the ages of 2 to 17 have seen an increase in the amount of time spent in school or studying. During this same time span, there has been a decline in the amount of time children spent playing sports or being outdoors.9 This is a major concern for upcoming generations. Children in schools that invest and surround themselves with natural elements—such as trees, plants, and grass—are more likely to have healthier behavior than those children who receive less exposure.10 This thesis project will promote more interactions between humans and the natural environment through educational programs.

Kirsten Maledick, an assistant professor of Population Health Sciences at the University of Wisconsin, Madison, also supports these claims by stating that living in neighborhoods that provide more green space associated with better mental health for children and adults and is associated with positive health behaviors, such as physical activity.11 However, proving that greenery has a direct connection to improving health and mental health has been challenging. Fortunately, there are studies that begin to support these claims.12

9. Ibid.
11. Lader, Chor, and Griffiths, “American Youth.”
12. Ibid.
13. These studies include Frankum, “Beyond Toxicity,” and “Evidence of Nature.”
14. Ibid.
15. Ibid.
16. Ibid. and Frumkin, “Evidence of Nature.”
17. Ibid.
18. Ibid.
19. Ibid.
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41. Ibid.
42. Ibid.
43. Ibid.
44. Ibid.

Today, most children between the ages of 8 to 18 spend nearly 7 hours a day in media consumption—this includes devices such as television, video games, computers, phones, and music.10 This amount of time in media consumption is enough to create a deficit in physical activity, possibly leading to a decline in consumption of healthy foods and growth and learning in environments that allow for healthy development. If humanity can design themselves into environments that ignore healthy living, then theoretically, humanity can design themselves out of it by adopting a radically different paradigm for development.2

Humans and the Environment

Nearly every step in human history has been accompanied with a leap in environmental degradation.2 In the beginning, the species was strongly in-tune with natural surroundings. ‘Nomadic hunter-gatherer tribes used to roam the lands, following the ebb and flow of the seasons.’3 These tribes had a measurable influence on the environment, but their influence was manageable due to their population size. With the advances in technology, humans have found more efficient methods of sustaining themselves, such as agriculture, but have left a negative influence on the environment. Introducing more permanent settlements led to a rapid population growth and the disconnection from our natural environment.

For example, permanent settlements and factories attracted workers into city-like settings and therefore, these settings developed into urban environments. The increasing density created a need for housing. As a response, high-rise structures were designed and built. The objective of these structures was to house as many individuals as possible in apartment units.4 Stacking units on top of one another—as opposed to spreading outward toward suburban settings—insured that people remained relatively close to work and any other amenities the city provided at that time. Even though this is an efficient way of accommodating more people into cities, it can result in further isolation from natural environments.

The Industrialists, engineers, and inventors involved in the Industrial Revolution never envisioned such consequences. In fact, the Industrial Revolution as a whole was not really designed. Instead, it gradually took shape, as industrialists, engineers, and designers

The National Wildlife Federation states that, in the last two decades, childhood obesity has increased rapidly.13 American children are “out of shape, tuned out, and stressed out because they’re missing something essential to their health and development: connection to the natural world.”14

It is important to note that media consumption is not necessarily a negative factor. Media may sometimes be treated as another form of education, one that uses sound and visual movement to convey information. This is a very powerful means of sharing information for people who are more visual learners. However, excessive media consumption is a negative factor. The negative influence of media on children is having a direct connection to reducing the amount of time spent in nature, a need for housing. As a response, high-rise structures were designed and built. The objective of these structures was to house as many individuals as possible in apartment units. Stacking units on top of one another—as opposed to spreading outward toward suburban settings—insured that people remained relatively close to work and any other amenities the city provided at that time. Even though this is an efficient way of accommodating more people into cities, it can result in further isolation from natural environments.

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the use of natural resources became less of a concern. This was perceived as a “mother earth” who constantly regenerated and provided for the needs of humanity.32 The industrial era has disrupted human-nature relationships. Industries have allowed humans and machines to dominate and control nature, often at the expense of the flora and fauna that inhabit them.33

In the nineteenth century, when these practices began, the qualitative and quantitative impacts of industrialization were not significant. The environment itself was perceived as a “mother earth” who constantly regenerated and provided for the needs of humanity.32 Today, many adults believe that children have a troubled and isolated relationship with nature that differs from past generations.33 Children’s disconnection to nature is often associated to modern issues such as urbanization and technology.34

For the new generation of children, direct experiences with nature are slowly being replaced by indirect experiences through electronic media and machinery.35 Children are losing their ability to experience the world directly as they transformed nature into products. Grasslands were overtaken for agriculture, while forests were cut down for wood and fuel. Factories situated themselves near natural resources and bodies of water for easy access, manufacturing processes, and to dispose waste.36

But there were notable flaws in the Industrial Revolution’s design that resulted in some crucial problems and devastating consequences. In the beginning, urban cities created unsanitary living conditions, causing diseases and death as the growth of cities accelerated the damaging separation between nature and humans; and, the obsession with efficiency and convenience created an environment of greed and exploitation. Cradle-to-grave designs dominate modern manufacturing. According to some accounts, more than 90 percent of materials extracted to make durable goods in the United States become waste almost immediately. Sometimes, the product itself lasts longer.31

Nature deficit theory argues that “the proliferation of electronic media and machinery.35 Children are losing their ability to relate to the life experiences of others.36 In short, children are in a type of house arrest. In danger of losing their capacity to think or learn about the world directly.”33

Today, the design of the modern urban built environment has substantially contributed to the transformation and degradation of natural ecosystems and human disconnection to the natural environment.37 This design paradigm has resulted in unsustainable energy and resource consumption, major biodiversity loss, widespread chemical pollution and contamination, extensive atmospheric degradation and climate change, and human alienation from nature.38 However, these results are not an inevitable by-product of modern urban living, but instead a critical design flaw. Adopting a fundamentally different approach to the modern built environment, one that reweaves reconciliation, if not harmonization with nature, could begin to provide solutions to this disconnection.39

Regenerative Architecture

Today, the design of the modern urban built environment has substantially contributed to the transformation and degradation of natural ecosystems and human disconnection to the natural environment.37 This design paradigm has resulted in unsustainable energy and resource consumption, major biodiversity loss, widespread chemical pollution and contamination, extensive atmospheric degradation and climate change, and human alienation from nature.38 However, these results are not an inevitable by-product of modern urban living, but instead a critical design flaw. Adopting a fundamentally different approach to the modern built environment, one that reweaves reconciliation, if not harmonization with nature, could begin to provide solutions to this disconnection.39

Regenerative architecture is one approach to this harmonization with the environment. Regenerative architecture is a theory based on interactions within a system that ultimately improves itself.39 The objectives are to establish a design concept that aims at a low-environmental-impact approach that minimizes and mitigates widespread chemical pollution and contamination, extensive atmospheric degradation and climate change, and human alienation from nature.38 However, these results are not an inevitable by-product of modern urban living, but instead a critical design flaw. Adopting a fundamentally different approach to the modern built environment, one that reweaves reconciliation, if not harmonization with nature, could begin to provide solutions to this disconnection.39

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Biophilia and Human Well-Being

Regenerative design will combine biophilic features and environmentally sensitive technologies to promote restoration. This thesis project aims to consider what Murphy and his team call the “human dignity” in the communities in which they work. Even though the projects covered vary in scale and context, they all pursue the same ideology, that “simple, site specific architectural designs can make nurturing environments, even if that means engaging nature. Murphy presents the question: “what more can architecture do?” Murphy and the team see architecture as an opportunity to invest in the future of communities by taking a holistic approach toward design, one that critically considers all aspects of it. Each project aims to consider what Murphy and his team call the “human handprints” of buildings. His discussion includes the TedTalk building process in Rwanda, healthier hospitals in Haiti, and a visually communicative campus for the deaf community in the United States. Murphy further explains how a building process that sources and hires regionally can “improve the local economy and inspire the local communities.” Figure 1. The High Line, New York City. This project is a good example of biophilic design. It is a repurposed train line that is now a 1.45 mile long park full of grass, plants, and perennials. Adopting regenerative architecture can answer the question of how designers can be sustainable and provide solutions to concurrent problems via the aid of the natural environment. This thesis project will employ this ideology, as well as biophilic design and psychology of space, in order to create a design that respects the relationship between humans and nature and therefore creates a symbiotic relationship. Regenerative design will combine biophilic features and environmentally sensitive technologies to promote restoration.

Biophilia and Human Well-Being

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The second element of biophilic design is natural shapes and forms. Natural shapes and forms include elements that represent or simulate shapes and forms found in the natural world. These elements can then be used on building facades and within interiors. Some of the attributes that will be included in the project are tree and columnar support (e.g., Figure 2), egg/oval forms, shapes that resist straight lines and right angles, and geomorphology, which focuses on embracing landscapes and geology. These elements will be used when designing and integrating structure, flooring, furniture, and the siting and form of the building itself.

The third element is natural patterns and processes. This element emphasizes integrating attributes that represent characteristics found in nature into the built environment. Sensory variability, information richness, transitional spaces, and hierarchically organized ratios and scales are examples of ways natural patterns and processes will be included into the thesis project.62

Light and space is the fourth biophilic design element. Natural light, filtered and diffused light, light and shadow, and spaciousness are attributes of nature that focus on the quality of light. Spatial awareness, spatial variability, shape as space and form, spatial harmony, and inside-out spaces focus on how spaces can be manipulated to improve connections to the natural environment.63

The fifth element of biophilic design is place-based relationships. Place-based relationships involve attributes that connect culture and ecology in a geographical context. This connection of people to place demonstrates the inherent human need to establish control and ownership over resources, attaining safety and security. “Locational familiarity—the feeling of home—remains a deeply held need for most people.”64 Geographical connection to place, landscape orientation, and landscapes features that define building form are attributes that will be incorporated into the design in such a way that individuals develop an emotional attachment to, and relationship with, the spaces. This will be done by blurring the lines between nature and architecture. Doing so will help individuals feel more connected to the broader culture of the space, which in turn will create an emotional attachment to that space, resulting in appreciation for, and an investment in, nature.65

Evolved human-nature relationships is the sixth biophilic design element. This element includes fundamental aspects of the inherent human relationship with the natural environment. Good evolved human-nature relationships is more than simply addressing an affinity to nature. Prospect and refuge, curiosity and enticement, security and protection, and exploration and discovery are all elements of a more complex relationship between humans and nature that reveal the evolutionary influences. These attributes demonstrate a need for true engagement with nature and with design that seeks to connect the indoors with the outdoors.66

All six biophilic design principles and roughly 70 attributes have been listed in Figure 3. This matrix will be reintroduced in the design solution to align the attributes with design responses. These responses will explain how the thesis project has achieved these principles of biophilic design.

Psychology of Space

The design of a physical space can influence the mental state of the people inhabiting those spaces, enough to shape people’s behavior and attitudes.67 Psychologists—also known as environmental psychologists—have systematically gathered information about human responses to color, smells, texture, furniture arrangements, ceiling heights, sound, and shapes. This information is then documented and used by place scientists to collaborate with designers in order to create places that evoke memorable experiences.68 The Pantheon is an early example of a place that evokes this type of experience. The symmetrical arrangement of the column structure and building scale, for example, create a serene and awe-inspiring space for religious and civic events.69

[52] Robert, Heerwagen, Mador, Biophilic Design. 52-53. 52
[53] Ibid. 52
[54] Ibid. 52
[55] Ibid. 52
[56] Ibid. 52
[57] Ibid. 52
[58] Ibid. 52
[59] Ibid. 52
[60] Ibid. 52
[61] Ibid. 52
[62] Ibid. 52
[63] Ibid. 52
[64] Ibid. 52
[65] Ibid. 52
[66] Ibid. 52
[67] Ibid. 52
[68] Ibid. 52
[69] Ibid. 52

Figure 3: Elements and Attributes of Biophilic Design. While all of these attributes will be addressed in the design solution, to some degree, the bold attributes are the most relevant to this project because they are the most recognizable attributes that elicit feelings of nature within this project.
Many of our responses to the information we collect through our senses today is the result of all the years humanity spent in the savanna during our prehistory. Unlike lions or rhinos, humans are relatively weak, small, and defenseless. However, humans have developed some deep-rooted reactions to particular experiences that makes up for our lack of prowess. For example, humans are not comfortable sitting with their backs to an open space because it’s difficult to sense danger approaching. We also know that warm colors tend to attract humans. This is the reason stores often paint their back walls warm tones, such as red or orange—in order to draw users into spaces.70

Humans enjoy natural light; more so if the light creates a dappled effect. The Louvre Abu Dhabi Museum in Abu Dhabi creates this same type of experience but in an interior setting (figure 4). These types of settings evoke memorable experiences because they remind us of sitting underneath a tree in nature. Humans also enjoy sitting in places that feel like refuge. Library Delft at the University of Technology in the Netherlands (figure 5) creates this feeling of refuge. The library introduces a space in which a low ceiling with dimmed lights is adjacent to a space with a tall ceiling and a more brightly lit setting. Ultimately, all people are the same when it comes to how they want to interact with the environments around them. People appreciate places that make them feel comfortable, valued, and secured.72

However, space designers experience places differently than people without all of the training that they have received. For example, people with design experience and training find a broader color palette acceptable than the general population. The same yellow-green color that a designer might find desirable is the same color disliked by the larger population. So, if society desires a space that looks traditional or requests that a design does not include yellow because it’s displeasing to them, it is the designer’s responsibility to respect those decisions because changing the

Figure 4  Louvre Abu Dhabi Museum, Abu Dhabi

Figure 5  Library Delft, University of Technology, Netherlands

physical environment can “guide people toward inspiration and tranquility, companionship and privacy, delight and comfort, freedom and strength.”73

Wooing of the Earth

Even if all species have an impact on the planet, it is the human species that has brought a noticeable environmental degradation. Not all species have the cognitive capacity to understand, or the physical ability to create change, as humanity can.74 But these species have found a way to exist in harmony with the natural environment, something the human species has yet to learn. Therefore, it is humanity’s responsibility to draw awareness, restore the environment, and establish harmony.

Rene Dubos called the process of harmonizing with nature the active “wooing of the earth.”75 The objective is to reshape nature to satisfy human needs, but in ways that commemorate the integrity and value of the natural world. Therefore, human intervention, if practiced with restraint and respect, can avoid arrogance and environmental degradation. With humility and understanding, effective biophilic design can potentially enrich both nature and humanity.89

Wooing of the earth suggests the relationship between humankind and nature (can) be one of respect and love rather than domination. The outcome of this wooing can be rich, satisfying, and lastingly successful if both partners are modified by their association so as to become better adapted to each other.76

The objectives for this thesis project come from the research previously stated. Based on regenerative architecture, the project will regenerate and adapt to the existing site conditions in order to be educational, contextually aware, and responsible. Based on Biophilic Design, the project will utilize the six principles of design so that the architecture connects people to nature in a sustainable manner. Based on Psychology of Space, the project will include programs that address education. These programmatic elements will includes spaces that allow children and adults to explore, discover experiences, and appreciate the built environment and the natural environment.
DESIGN SOLUTION

This project is a Community Nature Center. Its primary goal is to create a place where children and adults can gather to learn about local wildlife and vegetation, the site, and the built environment. The design is comprised of four elements: approach, learning space, exhibiting space, and observation deck. All four elements of the design are interconnected through transitional nature spaces, some paved with compacted gravel and some left as existing nature trails. To further express the design’s connection, rammed-earth walls establish hierarchal presence as organic elements that stitch the programmatic components within the forested site. Doing this allows the users to experience the beauty and power that nature and architecture can collectively provide.

Thesis Objective

This thesis proposal is an attempt to restore a connection to the natural world. The architecturalepience ways to establish a symbiotic relationship between humans and the natural environment through regenerative architecture by using biophilic design and psychology of space. In order to begin the design process for this thesis project, a few important items needed to be identified. First, an audience needed to be determined; second, a project site needed to be selected; and third, a design needed to respond and adapt to the thesis objectives and site.

Site Selection

Of the possible natural landscapes within the Memphis region, Shelby Farms Park was selected as the project site because of its scale, location within the city, and user group. The Park and this thesis project are very much aligned with one another because both are attempting to improve the environment, educate and conserve nature, and encourage people to connect with the natural world (figure 6).

The Site Within

The project site within Shelby Farms Park is located between Pine Lake and Woodland Discovery Playground. This specific site was selected for its rich site characteristics and adjacency to the Woodland Discovery Playground, a responsive playground that offers immediate access to one of the user groups, children and parents. At this location, there are opportunities to engage nature at Pine Lake or create meaningful and serene moments deep within the forest.

The Playground

The Woodland Discovery Playground is a unique, 3.5 acre environmentally sustainable playground at Shelby Farms Park. The intentions for the playground were to promote play and discovery while nurturing healthy development of children’s physical and social well-being. The playground provides an environment that fosters interaction and engagement. Building upon child development research, the playground sets a new standard of design for outdoor play areas. This playground meets the same design intent as the nature center, which is why its adjacency to the nature center is ideal (figures 7-9).

Shelby Farms History

Shelby Farms was home to Frances Wright’s Nashoba Experiment during the mid-nineteenth century. Ms. Wright, a humanist reformer, set up a commune on the land intended to prepare slaves for their future freedom by training them with various skills and educating them in the liberal arts. In 1928, Shelby County acquired 1,600 acres of land to use as a penal farm. By 1942, the penal farm lands expanded to more than 5,000 acres, and it had become a national model visited by prison experts from around the country. In the late 1960s, Shelby County determined the penal farm was no longer viable and shut it down. In October of 1975, Garrett Eckbo submitted a final plan that transitioned from a development-oriented approach to one that treated the land

2. Ibid.
3. Ibid.
as an important and impressive resource for the community. In 1981, the Tennessee State Legislature established the Agricenter Commission to promote education, research, and agricultural sustainability with the explicit intent of spurring economic development. In December of 2006, the Shelby County Commission approved a Conservation Easement. And in August of 2007, the Shelby Farms Park Conservancy assumed management of 3,200 acres of the Shelby Farms Park territory from Shelby County.

A Park for Everyone

One objective of Shelby Farms Park is to become a park that caters to all people living in the Memphis Metropolitan region (figure 10). Since the Park is centrally located within Memphis, improving connectivity and accessibility to residents of the Mid-South Region is very important. The northern and southern boundaries of the property already offer immediate opportunities to create these first linkages to the broader metropolitan region and can be instrumental in encouraging improved access for all. Improving connection will attract new user groups, which will further expand, populate, and beyond. Though it lies just east of the I-240/I-40 loop, Shelby Farms is located at the geographic center of the Mid-South region, and can be instrumental in promoting improved access for all. This combination of size, location, and amenity generates a true destination potential for the Park within the Mid-South Region—a new “green heart.”

To the north of the Park is the Wolf River and the proposed Wolf River Greenway. This pedestrian connection is intended to tie Collierville and Germantown all the way to downtown Memphis and the Mississippi River via a paved recreation trail that runs along the Wolf River. A portion of this Greenway connection is already in place in Collierville and along the Germantown section of the River-Park boundary. It is currently in the planning stages as it moves west along the Park’s southern perimeter and through the City of Memphis to the Mississippi River.

To the south of the Park is the Wolf River and the proposed Wolf River Greenway. This pedestrian connection is intended to tie Collierville and Germantown all the way to downtown Memphis and the Mississippi River via a paved recreation trail that runs along the Wolf River. A portion of this Greenway connection is already in place in Collierville and along the Germantown section of the River-Park boundary. It is currently in the planning stages as it moves west along the Park’s southern perimeter and through the City of Memphis to the Mississippi River.

The Site Today

Today, the vision of Shelby Farms Park is still to continue the growth and development of the agricultural and recreational use that it currently provides. The Park sits on a 4,500-acre reserve of meadows, woodlands, trails, and lakes. These public landscapes continue to provide the resources that attract a broad range of users and interest groups who enjoy recreational activities that allow for cultivation, growth, health and well-being. These include farming, research, food production, energy creation, education, markets and festivals. The Park also provides opportunities for arts, music, culture and large-scale outdoor events. By providing these amenities, traditional land practices allow for the new urban culture of health and fitness, play and education, and ecology to create a unique place of large-scale interaction with the land. As such, the Park continues to become a leading-edge, international model for design and sustainable management practices.

These types of functions and large-scale interactions that the Park provides are extremely important because it ensures that this thesis project will attract and receive healthy exposure from the public. This exposure, combined with the architecture, allows users to expand their understanding and appreciation toward the natural world. Therefore, Shelby Farms Park is the ideal location for such an endeavor.
Concept

After thoroughly analyzing the Shelby Farms project site, it was determined that preserving as much of the existing conditions was critical to the design process. This meant that dense clusters of trees would receive priority and the architecture introduced into the site would conform to the boundaries of the trees and topography (figure 12). Trees that were largest and/or oldest with healthy lifecycles would be reused and incorporated into the design while younger trees would mature around the building footprint. Taking this approach meant that the architecture within the forest would become more aware, responsive, and adaptive to its context (figure 12). As a result, the architecture does not simply sit in nature, but rather coexists with nature.

This approach means that a user’s experience with the site and architecture would shift, informed by a new perspective. Typically, most Shelby Farms Park users engage the site through walking trails that the park provides, but this approach misses the opportunity to experience nature at different perspectives. This project introduces new experiences that take a greater advantage of the park’s impressive characteristics (figure 14). Within this project, people are elevated to new heights through the exhibit space, roof terraces, and observation deck. However, existing nature trails are preserved, and new trails are introduced, so users still have the opportunity to connect with nature at the ground level. As will be evidenced later, each one of these experiences creates unique experiences for a user to connect to nature.

It is extremely important to consider how the structure engages the earth. Providing only one building to house all the programmatic elements meant that the project needed to fit within one large nature space. This could certainly be the case if the footprint of the building remained small at ground level and then stretched up, adding all the necessary programmatic elements to expand over a series of floor levels. However, this solution felt more challenging as it seemed to disengage the users and the architecture from the natural environment into a tower-like structure. Instead, the solution shifted, and the design was divided into three major components. This insured that nature was carefully included into the design process in order to harmonize and establish an intimate connection between the architecture and the environment.

In addition to dividing the architecture into three components, the project pieces the earth only when necessary. The largest component of the three sits on a 20’ x 20’ column grid. The rest of the project is supported by 3-foot rammed earth walls and uses the existing conditions to circulate users around the project. This is crucial because reducing the building footprint on the site minimizes site alteration. Minimizing site alteration shows that this project is contextually aware of its surroundings and demonstrates that coexistence with the environment is conceivable if the natural world is treated with humility and understanding (figure 15).

Program

The program for this project derived from precedent research (figures 18-19) and site analysis (figures 20-25, 29). As stated earlier, the project is divided into three components. Within these components, programmatic elements include public and private reading areas, media rooms, exhibit space, outdoor walkways, and observation platforms. First, it was important to understand the relationships spaces would have to one another so a Bubble diagram was created to explore possible solutions. After understanding the project needs, I moved onto square footages and the type of experience I intended users to have. Figures 16, 17, and 26-28 show this process.
The Viipuri Library is an educational building that studies the quality of light, sound, and reading spaces.

- Conical skylight funnel diffuses daylighting without allowing direct shadow-producing solar rays.
- Rolling wood ceiling in lecture hall is designed to direct and focus sound.

The Viipuri Library
Alvar Aalto
Viipuri, Finland
1935

Lichterman Nature Center
Memphis, Tennessee

This project is a great example of a facility that engages visitors with educational exhibit spaces and the natural environment.

- Interior Showing Skylights
- Process Sketch—Program. Sketch investigates programmatic needs and spatial adjacencies.
- Process Sketch—Programmatic Square Footage. Sketch investigates program square footage requirement. This example is of the lobby space.
- Viipuri Library
- Lichterman Nature Center
- Interior
- Exterior
- Interior Showing Skylights
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- Lichterman Nature Center
- Interior
- Exterior
- Interior Showing Skylights
Figure 26   Process Sketches—Programmatic Relationship. Sketch investigates how program can be placed on site.

Figure 27   Process Sketch—Building and Site Relationship. Sketch investigates how building components can adapt to site.

Figure 28   Process Sketch—Building Form. Sketches investigate how building form can adapt to nature. Figure 29   Site Plan  Analysis

Below is a legend that will be used throughout the remainder of the project. When these colors appear on drawings, they

- Environmental Features
- Natural Shapes and Forms
- Natural Patterns and Processes
- Light and Space
- Place-Based Relationships
- Evolved Human-Nature Relationships

Site Observations:
- Medium tree density with varying canopy heights.
- The tree tops in this area are high, allowing for great visibility into surrounding areas. However, these spaces tend to serve as communal areas when recreational events happen and therefore, the space can get loud and distracting.

Woodland Discovery Playground (E) features six play nests, each focused on a different type of play. Here, children of all ages can discover new ways to play.

- The project (F) is nestled within a dense forest area in order to enhance the users' experience with nature. The surrounding environment provides a comfortable setting for learning and exhibiting.
- The solar panels on the rooftop (F) harvest energy to lower power consumption for the building.
- Parking Lot A is currently unpaved and it is mostly used during weekends when the park experiences heavy traffic. As a response, the lot has been paved with a permeable material to allow water to filter into the earth. Further measures have been implemented to filter and minimize environmental pollution. Lily Pad Pond serves as a bioswale and reinforces the filtration process.

Legend
- A: Parking Lot Expansion
- B: Existing Parking Lot
- C: Drop-Off
- D: Public Restrooms
- E: Woodland Playground
- F: Project Site

Figure 29   Site Plan  Analysis
As visitors approach the site from Pine Lake parking lot, they are immediately greeted with a public restroom facility to the left (figure 31), the entrance to Woodland Discovery Playground to the right (figure 32), and an entrance leading people toward Shelby Farms Nature Center (figure 29) down the center. As they make the approach to the nature center from the parking lot, they are guided by a rammed-earth wall.

The element of evolved human-nature relationships suggests the attribute of curiosity and enticement. This project incorporates that attribute as visitors approach the building. As demonstrated in figure 30, visitors do not see the entrance to the building as they make their approach; instead they see a solid rammed-earth wall. There are no openings in the wall. This is done in order to build the feeling of curiosity and desire to explore and discover.

To the left of the rammed-earth wall is a large open space for people to sit and gather. Trees in this area have high canopy tops, and at certain moments, visitors can get a glimpse of Pine Lake. As visitors continue down the path, the topography begins to drop, but the elevation of the wall remains the same. The wall stops and breaks its rhythm when existing trees obstruct its path, and then continues without being destructive. This is because the element of place-based relationship suggests that the building form should be responsive to the existing site, while also attempting to converse with and respect the natural environment. At the end of the path, the walking trails intersect. The wall that started at 3 feet at the parking lot, has now grown to 15 feet.

Figure 31  Site Sketch—Public Restroom Facility

Figure 32  Site Sketch—Woodland Discovery Playground Entrance

Figure 30  Approach from Parking Lot

Approach From Pine Lake Parking Lot

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Natural Shapes and Forms and Place-Based Relationships:

- Rammed-earth wall adapts to site and points the way to the entrance of the building. As one progresses, the wall remains at its starting height and the topography drops away. The wall may be developed from locally-sourced soil, which can potentially include soil excavated on site.

- Place-Based Relationships and Evolved Human-Nature Relationships:
  - Compacted gravel allows for wheelchair access. Also, the material is porous, allowing water to seep through and mitigate water run off.

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Approach From Woodland Discovery Playground

Visitors can also approach the project site through the Woodland Discovery Playground trail. This trail is made out of a porous compacted gravel, the same that is found in the approach from the parking lot. This approach is more vegetated, but it still provides visitors with a sightline into the building. Biophilic design emphasizes retaining a human-nature relationship in its six principles; this glass facade at the egress stairs, achieves that objective. Through this visual opening, users can see and fully understand how the repurposed structural tree columns are being implemented into the project. Figure 33 demonstrates how the columns are supporting the second floor slab and roof structure.

The concept of psychology of space talks about using color to draw people into spaces. This project accomplishes that objective through the egress stairs. As visitors pass by the glass facade (Figure 34), they will see the vibrant red/orange color of the stairs. This energizing color aims to entice and encourage stair circulation, as opposed to mechanical circulation. Utilizing stair circulation can improve people’s health and well-being.

The primary building material for this project is rammed-earth, an earth-based wall system made of compacted gravel, sand, and clay that is extremely strong and durable. (The wall may be developed from locally-sourced soil, which can potentially include soil excavated on site.) Additionally, rammed-earth may be modified with 5-10% cement and steel rebar to increase the structural properties for the material. Stabilized rammed-earth walls need little added protection, but are usually coated with an air-permeable sealer to increase the lifespan. Rammed-earth gives limited insulation but excellent thermal mass. Rigid insulation may be added to increase thermal resistance.12

The curve of the rammed-earth wall is a natural shape responding to the site, purposely resisting straight lines and right angles. It also corresponds to the observation deck’s curve, where it extends over the water at Pine Lake, creating design consistency.

Environmental Features and Evolved Human-Nature Relationships:


Natural Shapes and Forms: Structural tree columns support second floor and roof systems.

Environmental Features and Evolved Human-Nature Relationships: The elevators have been purposely isolated to the service corridor in the efforts of promoting healthier living by encouraging stair circulation.
Figure 35: Process Sketches—Human-Nature Relationship, Water Drainage, and Natural Ventilation. These sketches investigate how natural ventilation enters along the glass facade.

Figure 36: Process Sketch—Natural Ventilation. This sketch investigates how natural ventilation enters and circulates through the building.

Figure 37: First Floor—Learning Space

Legend
1. Entrance
2. Vestibule
3. Reception/Lobby
4. Private Seating
5. Reading Pods
6. Book Stacks
7. Reading Lounge
8. Egnial Stairs
9. Storage
10. Media Learning
11. Conference
12. Mechanical/Electrical
13. Stairs
14. Outdoor Walkway

Place-Based Relationships: The rammed earth walls conform to the natural landscape by preserving trees and adopting topography contours.

Natural Shapes and Forms: Using circles as a reading area to express the idea of sitting underneath a tree canopy.

Natural Patterns and Processes: Interface carpet is a sustainable flooring solution that includes circles inspired by the learning circles and reception entrance carpet. The patterns and textures are inspired from natural environments to enhance learning experiences within the spaces.

Environmental Features and Evolved Human-Nature Relationships: The elevators have been purposefully isolated to the service corridor in an effort to promote healthier living by encouraging stair circulation.

Natural Patterns and Processes: Interface carpet is a sustainable flooring solution that includes circles inspired by the learning circles and reception entrance carpet. The patterns and textures are inspired from natural environments to enhance learning experiences within the spaces.

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Environmental Features and Evolved Human-Nature Relationships: The elevators have been purposefully isolated to the service corridor in an effort to promote healthier living by encouraging stair circulation.
First and Second Floor

When visitors enter the first floor, they will be greeted by a reception space. Biophilic design states that integrating nature—or simulated nature characteristics—into the built environment has health and behavioral benefits. A green wall is located behind the reception space to help foster these benefits as visitors enter the space (Figures 38-39).

Organic shaped floor materials help define programmatic spaces. The reception and lobby spaces feature Interface carpet, a sustainable flooring solution, while the learning space is defined by a polished concrete floor. Subcategories are then defined by furniture arrangement and carpet textures and patterns.

Biophilic design also states that having a visual connection with the natural environment can enhance emotional and psychological experiences. As a response, this building features a floor to ceiling glass facade facing west on both floor levels. Biophilic design also states that having a physical interaction with nature is just as important. So, the first floor level provides visitors with the opportunity to step outside and engage with the forest (Figures 35-36, 40-41). This space is ADA accessible, and therefore, anyone can experience the forest.

The learning space incorporates various types of seating arrangements—some spaces are private and create a sense of refuge while other spaces are more collaborative. This furniture can be rearranged to accommodate programs such as educational workshops or recreational events. In this way, the architecture’s flexibility creates an environment that encourages various types of activities to take place while exposing the visitors to natural environments without it becoming a tedious task. All the furniture used in this project comes from manufacturers such as Knoll and Coalesse, who design with environmental consciousness.

When the learning space is not hosting a workshop or event, it will serve as a library. The information shared in this library will be related to Shelby Farms Park, the natural environment, and...
the built environment. The media room, located in the service corridor, will educate users via the aid of documentaries, interactive smartboards, and computers and Pods.

The second level floor slab is open-to-below where the tree columns are located, in order to allow the structure to pierce through and support the roof structure as well (figure 42). The columns used are recycled and repurposed trees from the construction site.

Psychology of space mentions that people enjoy sitting in spaces that remind them of natural environments, especially if natural light is part of that experience. In the learning space, seating elements have been placed around the tree columns to provide a sense of comfort and refuges. Here, users experience ambient natural light from the west facade, and also the skylight system from the second floor. The openings are 4 feet in diameter, but are still large enough to allow some natural light— from the skylights above—to enter. To further express the idea of light entering into the space, LED lighting strips have been added on the inside of the openings to express the light even more (figure 43).

Environmental Features, Natural Shapes and Forms, Natural Light, Place-Based Relationships: Ceiling structure is open where the tree columns are located to allow the tree columns to also support the roof structure. These openings allow some natural light—from the skylights above—to enter. To further express the idea of light entering into the space, LED lighting strips have been added on the inside of the openings to express the light even more (figure 43).

Environmental Features, Natural Shapes and Forms, Natural Patterns and Processes: Ceiling has acoustical properties that help absorb and diffuse sound.

Environmental Features, Natural Shapes and Forms, and Evolved Human-Nature Relationships: Circle reading areas can serve as seating between the vegetated spaces. The carpet within is from Interface carpet, a carpet solution that uses recycled materials.

Natural Patterns and Processes: Refuge pods are a homage to biophilia and serve as a place of "refuge." These pods are made of 3From, a semi-transparent material allowing light in while still providing a sense of privacy and relaxation.

---

Figure 42 - Process Sketch—First Floor Ceiling

Figure 43 - Interior Learning Space
Figure 44 Process Sketches—Observation Deck and Roof

Figure 45 Process Sketches—Building-Nature Relationship. This sketch investigates an alternative building floor plan.

Figure 46 Second Floor—Exhibit Space

Legend
15 Stairs
16 Elevator
17 Restrooms
18 Conference Room
19 Communication Office
20 Storage
21 Open Space
22 Exhibit Space
23 Terrace
24 Outdoor Pathway
25 Observation Deck

Natural Patterns and Processes: The exhibit space features flexible presentation panels. These panels may be rearranged or stored, depending on the activity.

Environmental Features and Evolved Human-Nature Relationships: Stair case incorporates stadium seating that allows for reading and relaxation while enjoying views into nature.

Light and Space: Circular seating wraps the columns. Natural lighting may enter and create a dappled-light effect.

Natural Shapes and Forms: The rammed-earth walls serve as structure for the project.

Place-Based Relationships: The rammed-earth walls serve as structure for the project.
Vertical Circulation

As visitors make their way up to the second floor, they are confined by two massive rammed-earth walls (figure 46). The walls have three-foot-width stepped windows to frame views out into nature. This is done to retain the human-nature relationship as visitors circulate in the building. These views are then coupled with stadium seating, where visitors can sit and enjoy the space without obstructing others. The roof structure is offset from the wall 1.5 feet from each side, allowing natural light to wash the wall and creating a soft light of light into the window openings. This light, along with the wooden staircase, softens the heaviness of the rammed-earth wall and concrete floors (figure 47).

Service Hallway

Evolved human-nature relationships are important to maintain in the built environment, even if the space seems less important to the overall project. In this project, visitors are reconnected to nature in the service corridor; here, users are greeted with a large restroom, elevator, or administration offices. The opening provides a constant rest stop with the stadium stairs. The smallest one is 7 feet tall and 3 feet wide.

Natural Shapes and Forms

Natural lighting allows users to sit and read while engaging with their environment. Wood trim resembles the forms of the natural shapes and forms, which are having views to nature. Wood trim is used along the glass facade. In this space, lime green circular skylights are added to the wall. These skylights attempt to keep design consistency with the circular skylights located in the exhibit space (figure 48).

Exhibit Floor

The element of light and space has heavily influenced the design of the exhibit floor; it is very spacious, open and flexible, allowing for various types of gatherings to happen. The exhibit panels are moveable and can either be rearranged or stored to accommodate different activities such as workshops or seasonal exhibits.

Vertical Circulation

Vertical circulation helps draw natural lighting into the space.

Evolved Human-Nature Relationships: Window opening is stepped up with the stadium stair. The smallest one is 7 feet tall and 3 feet wide.

Evolved Human-Nature Relationships: Bathroom seating area is also having views to nature.

Natural Shapes and Forms: The LED light fixtures were selected for their organic forms, which resembled the forms of the skylights.

Natural Shapes and Forms and Evolved Human-Nature Relationships: Service hallway is a program item that sometimes gets ignored. It has been treated (a program item that sometimes gets ignored) has been treated with the same respect in this project. The approach to the restrooms provides a constant view into nature. Wood trim softens the rammed-earth texture where it has been cut to make this opening and seat.

Light and Space: Restroom helps draws natural lighting into the space.

Figure 47 Vertical Circulation

Figure 48 Service Hallway

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Light and Space: Restroom helps draw natural lighting into the space.</td>
<td>Evolved Human-Nature Relationships: Window opening is stepped up with the stadium stair. The smallest one is 7 feet tall and 3 feet wide.</td>
</tr>
<tr>
<td>Evolved Human-Nature Relationships: Bathroom seating area is also having views to nature.</td>
<td>Natural Shapes and Forms: The LED light fixtures were selected for their organic forms, which resembled the forms of the skylights.</td>
</tr>
<tr>
<td>Natural Shapes and Forms and Evolved Human-Nature Relationships: Service hallway is a program item that sometimes gets ignored. It has been treated with the same respect in this project. The approach to the restroom provides a constant view into nature. Wood trim softens the rammed-earth texture where it has been cut to make this opening and seat.</td>
<td>LED Lighting: The LED lights included in this project are up to 80 percent more efficient than traditional lighting, such as fluorescent and incandescent lights. With LED lights, 95 percent of the energy is converted into light and only 5 percent is wasted as heat, compared to fluorescent lights which convert 95 percent of energy to heat and only 5 percent into light. They also contain no toxic elements and draw less power than traditional lighting. Less energy use reduces the demand from power plants and decreases greenhouse gas emissions.</td>
</tr>
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</table>

Figure 47 Vertical Circulation

Figure 48 Service Hallway

14. SEPCO, “Advantages of LED.”


Place-Based Relationships: Solar panels help generate energy to reduce power consumption and air pollution.

Evolved Human-Nature Relationships: Solar panels allow for nature lighting to wash the rammed-earth wall texture. LED lighting is the primary source for artificial lighting.

Evolved Human-Nature Relationships: Rammed-earth wall stops where existing trees exist and continues between the spaces.

Place-Based Relationships: Glass facade allows for users to engage tree canopies and the wildlife within them.

Evolved Human-Nature Relationships: Outdoor walkway provides nature through transitional space.

Figure 51 Site Section A

Figure 52 Egress Stairs Section B

Figure 53 Process Sketch—Lighting and Acoustics

Figure 54 Process Sketch—Lighting and Acoustics

Figure 55 Transverse Section C

Figure 56 Process Sketches—Lighting and Tree Column

Evolved Human-Nature Relationships: Outdoor walkway creates a sense of mystery and curiosity as it conceals the main entrance behind it.

Evolved Human-Nature Relationships: Wall creates a sense of mystery and curiosity as it conceals the main entrance behind it.

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Evolved Human-Nature Relationships: Wall creates a sense of mystery and curiosity as it conceals the main entrance behind it.
Light and Space: Skylights allow for natural lighting. Perforated screens are used to diffuse and cast dappled lighting effects into the exhibit space. This helps reduce artificial lighting needs.

Place-Based Relationships: Green roof improves stormwater management by reducing water runoff, reducing noise and air pollution, and increasing urban biodiversity by regenerating a habitat for wildlife.

Place-Based Relationships: Rammed-earth walls conform to natural landscape by preserving trees and conforming to topography contours.

Environmental Features and Natural Shapes and Forms: Trees that were removed from the construction site were trimmed and reused to serve as structure for the project.

Environmental Features and Natural Shapes and Forms: Reading pods are an homage to biophilia and serve as a place of "refuge" for reading or relaxation.

Natural Patterns and Processes: Wavy ceiling structure helps absorb and focus sound within each 20' x 20' bay.

Regenerative Systems

Traditional electricity is typically collected from fossil fuels such as natural gas and coal. When fossil fuels are burned to produce electricity, they release harmful gases that are the primary cause of air pollution and global warming. In an effort to design with environmental conscience, this thesis project employs nine solar panel units on the roof of the building. Solar power systems produce clean, pure energy from the sun. Installing these solar panels helps combat greenhouse gas emissions and reduces the dependence of fossil fuel.

The green roof also serves as a regenerative system. It improves stormwater management by mitigating water runoff, improving water quality, conserving energy, reducing the urban heat island effect, increasing the lifespan of roofing membranes, minimizing noise and air pollution, and most importantly, increasing urban biodiversity by providing habitat for wildlife. This green roof system is regenerative because it gives back to the environment (figures 51-55).

The heating, ventilation, and air-conditioning (HVAC) are another sustainable contribution to this project. The systems selected for this project are highly efficient because they reduce power consumption, air pollution, and heating and cooling costs. This system can provide warmer, but dryer air using desiccant dehumidification in summer, or cooler air with warmer windows and warmer walls in winter, creating better thermal comfort and improving indoor environmental quality for users (figures 56).

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The final design element of this thesis project is the observation deck. The objective of this design element is to serve as a reflection space where visitors can embrace, reconnect, and learn from the natural environment. Here, visitors are able to apply and experience the knowledge they have obtained from the learning and exhibit spaces (figure 62).

The building provides two approaches to the observation deck. The first approach happens from the learning space. When visitors step outside onto the balcony, they have the opportunity to approach the observation deck through an existing walking trail (figure 56). This trail is not paved and provides a fully immersed experience of nature. The second approach happens from the exhibit space. Here, visitors are elevated off the ground 20 feet but end up 35 feet off ground by the time they reach the end of the deck. This is because the topography continues to drop as visitors move closer to Pine Lake. This experience is just as immersive, but at a different level.

The observation deck flooring is made out of recycled wood, the railing is made of steel cabling with a handrail of wood trim; this is to soften the visitors' experience (figure 57).

The structure of the deck is steel because this material allows the deck to span 30 feet before a tree-like column helps distribute the load downward into the footing (figure 58). Once the deck reaches Pine Lake, it is then supported by a 3-foot steel reinforced, rammed-earth wall (figures 59-62). This wall extends over Pine Lake in an organic manner to create a soft transition. This extension creates a unique experience that Shelby Farms Park currently does not offer, and therefore, will attract more public attention and exposure for the entire project.
Evolved Human-Nature Relationships: Wall features large openings where the stair landings occur in order to preserve a constant connection to the natural environment while providing different experiences.

Evolved Human-Nature Relationships: Glass Elevator allows for ADA accessibility onto the structure, and provides continuous views along the vertical journey.

Natural Shapes and Forms and Evolved Human-Nature Relationships: Observation deck reaches over Pine Lake to provide users with experiences that they typically would not find in Shelby Farms. At this observation deck, users are able to reflect and appreciate what they have learned in the previous structure.

Environmental Features and Place-Based Relationships: Observation deck is supported by a structural rammed-earth wall. The material is composed of gravel, sand, clay, and 5-10% cement. Steel re-bar is added for seismic reinforcement.

Environmental Features and Place-Based Relationships: Class Elevator allows for ADA accessibility onto the structure, and provides continuous views along the vertical journey.

Environmental Features and Place-Based Relationships: Observation deck is supported by a structural rammed-earth wall. The material is composed of gravel, sand, clay, and 5-10% cement. Steel re-bar is added for seismic reinforcement.
Figure 62 Observation Deck

<table>
<thead>
<tr>
<th>Environmental Features</th>
<th>Formal Shapes and Forms</th>
<th>Natural Patterns and Processes</th>
<th>Light and Space</th>
<th>Place-Based Relationships</th>
<th>Material/Haptic Meanings</th>
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</thead>
</table>
| Water: - flow for agency to promote vertical circulation. | Natural Morphology: open face, carpet textures. | Sensory Variability: manual light and radiance; mineral earth tones, and expansion to natural environment. | Natural Light: natural light is throughout the entire project. | Landscape: Camouflaged to Place. | Geometric/Constructive Meanings: |}
| Water: - Adjacency and alignment over Rice Lake | Tree and Columnar Supports: Patterned Shelves, Vertical patterns. | Growth and Efflorescence: Change times on site will reflect around the building footprint. | Form and Diffused Light: Outdoor light to create an illuminated space for objects. | Biological: Connection to Place. | Plant Source Meanings: Trees and contours. |}
| Air - Natural ventilation is introduced into the learning space | Animal: Mobile. Mobile is to see wildlife. | Central Core RAM: meaning and effort space serve as central focal point. | Light and Shadow: Building is covered to provide view into nature and Rice Lake. | Order and Complexity: The building form is organic but the interior spaces favor 20/20. | Wildlife Meanings: Wildlife habitat. |}
| Light: - Green roof provides | Natural Ventilation is | Central Core RAM: meaning and effort space serve as central focal point. | Light and Shadow: Building is covered to provide view into nature and Rice Lake. | Order and Complexity: The building form is organic but the interior spaces favor 20/20. | Wildlife Meanings: Wildlife habitat. |}
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SUMMARY AND RECOMMENDATIONS

Evidence reveals that humanity’s actions have been a contributing factor to the deterioration of human health, exhaustion of species, pollution of the environment, and the destruction of natural landscapes. Humanity still depends very much on the planet to provide: without it, humans cannot feed, clothe, or care for themselves sustainably.1

This thesis project investigates how to achieve architecture that can be regenerative toward the environment. The project’s objective is to create a place that espouses education and nature experiences. In order to enhance these experiences, the project was divided into three separate spaces to allow visitors to engage the entire site for maximum exposure to nature. The architecture is a response to the existing site conditions and uses its surrounding context as a foundation for design, adapting to the natural systems to help conserve and minimize site alterations.

Based on the original objectives, this thesis project meets the original objectives. Evidence reveals that humanity’s actions have been a contributing factor to the deterioration of human health, exhaustion of species, pollution of the environment, and the destruction of natural landscapes. Humanity still depends very much on the planet to provide: without it, humans cannot feed, clothe, or care for themselves sustainably.1

As humanity moves forward, innovation must pursue regenerative design. Humanity must learn to change their current ways of living and their attitudes toward the planet in order to preserve the resources and wildlife that remain. If the intention is to inhabit this planet in the future, it is important to be responsible toward urban development and the relationship to the natural environment. This is accomplished through the comprehensive design of regenerative architecture with developing technologies and the re-engagement of humans with the natural environment.


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List of individuals surrounding the text. This is a list of individuals surrounding the text. This is a list of individuals surrounding the text.
For it is in our hands to craft healthy environments – a future that we must demand, expect, and protect. We must think of the future and turn good into great. We must all be designers.

FEEL

ARCHITECTURE MUST:

It must adapt, evolve, and speak;
To satisfy the few.
And extend beyond the borders of our site.
Architects must respond,
WITH A SMALLER FOOTPRINT.
CONTRIBUTE AND RENEW,
WE MUST DEVOUR LESS,
We must not lose our humanity,
Provokes disharmony and threatens identity.

The architects?

is part of a old forest and therefore any construction would be very difficult to do.

Overton Park has many good characteristics but the park offer in terms of amenities.
Shelby Farms Park, the project is very limited to what it can lacks exposure. The site is not visible from street side and that this thesis does. However, the facility seems dated and

WHY SHELBY FARMS?

primary factors for selecting this site.

The goals of Shelby Farms Park are very much aligned with group of people. At this park, you will find individuals from different cultures and age groups. This reason alone is the master-plan development and it is constantly improving.
In order for this thesis proposal to work accordingly, it is

In addition to its scale, the park has a rich set of diverse
encourage people to reconnect with the natural world.
the community in order for this project to give back.

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APPENDICES

Appendix 1: Presentation Boards

Figures 64-88 are the final presentation materials.
The observation deck reaches over Pine Lake to provide users with experiences that they typically would not find in Shelby Farms.

Natural Materials
The observation deck is supported by a structural rammed earth wall. The material is composed of gravel, sand, clay, and 5-10% cement. Steel re-bar may be added for seismic reinforcement.

Solar Panels
Solar panels harvest sun rays as a form of energy to lower energy consumption and efficiently power the building.

Typical Roof Drainage
In addition to structural support, the rammed earth walls help drain water from the rooftop.

High Efficient HVAC
High efficient HVAC has been integrated in order to reduce energy consumption.

Lighting
Skylight allows for natural lighting to wash the rammed earth wall to minimize artificial lighting. LED lighting is the primary source of artificial lighting.

Tree Columns
The trees that were removed from the construction site were trimmed and reused to serve as structure for the project.

Views
The project feature large floor-to-ceiling glass facades in order to preserve a constant connection to the natural environment.

Refuge Pods
These reading pods are a homage to biophilia and serve as a place of "refuge."

Acoustics
The wavy ceiling structure helps control and direct sound within each 20' x 20' bay.

Lighting
Skylights allow for natural lighting. Perforated screens are used to diffuse and cast dappled lighting effects into the exhibit space.

Walls
The rammed earth walls conform to the natural landscape by preserving mature trees and adopting topography contours.
Biophilia

It is a term popularized by American psychologist Edward O. Wilson in the 1980’s, when he developed the concept of biophilia. Biophilia focuses on humans’ innate attraction to the natural environment through biophilic design. It suggests a deep history with nature.

The term nature-deficit disorder is credited to Richard Louv, the author of Last Child in the Woods. It is not an official diagnosis in the International Classification of Diseases and Related Health Problems. Instead, it is a label used to address the increasing cost to children as they are increasingly deprived of direct contact with nature and the experience of unstructured free play in the out-of-doors.

Research related to children’s direct experience with nature is growing. In 2000, Wells reported that proximity to nature and exposure to natural settings enhanced children’s cognitive abilities, especially in terms of executive function. She also found that direct experience with/nature to nature and natural processes. It suggests a deep history with nature.

Appendix 2: Process Piece

Figures 89 and 90 are images of the final process piece. This process piece is an attempt to explore and express the relationship between nature and the built environment. The piece is made of concrete, steel wiring and rebar, computer keycaps, and vegetation. These materials are an abstract representation of the innovation humanity has made in regards to technology, urban living, and natural environment. The idea is that nature (the vegetation) is growing and climbing the process piece. This is possible because the foundation (the concrete and wiring) allows for nature to grow on to it. Nature stops half way to represent balance. This balance can then be translated as nature and the built environment living in a symbiotic relationship.