



Resurgence

Adapting Ecological Succession to Promote Human and Wildlife Interaction

NORTH DAKOTA STATE UNIVERSITY

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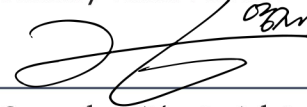
A Design Thesis Submitted to the Department
of Architecture and Landscape Architecture
of North Dakota State University

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Degree of Bachelor of Landscape Architecture



Primary Thesis Advisor



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Abstract

This work studies the effects of turf grass surrounding rural housing. It examines degree of turf grass management, the human relationship with nature and turf grass, aesthetics of nature and turf grass, principles of ecological design, cultural connections and values of the land, and finally the psychological responses to turf grass and natural landscapes. This research suggests that turf grass disconnects the user to their land both physically and aesthetically. Along with disconnection, it suggests that turf grass disrupts habitat.



Statement of Intent

Typology: Ecological planning and succession based design

Claim: Rural is not always natural. Land surrounding our homes often consists of turf grass and concrete; this area disconnects the connections we have to our land and disrupts habitat.

Premises: Adapting ecological succession to promote human and wildlife interaction

Unifying Ideas:

- 1.) Through the use of surveys, find the preferred ratio of turf grass to diverse vegetation on the participants property. Find what a healthy ratio is for sites that have:
 - (1) A healthy habitat for biota.
 - (2) Positive psychological/physical connection to ones land.
- 2.) Study the users aesthetic preference that best connects them to their land.
- 3.) Study the ecological framework of the site and find the number of plant and animal species it could support.
- 4.) Study the users cultural practices, specifically hunting and analyze how that connects them to their land.

Project justification:

“No society can retain for long its economic or cultural prosperity if it is built upon a despoiled natural world. . . . we must dispel the great fallacy of the modern age that human society no longer requires varied and satisfying connections with the non-human world”(as cited in Kahn,1999, p.20). I believe this statement to be true even in rural areas.

On many rural properties, it is normal for housing to be surrounded by vast amounts of turf-grass and hard-surfaces. My hypothesis is that this area of turf and hard surface disconnects important connections one has to their land. I also believe this area has a negative impact on the biota on the land.

In most cases, these people chose to live in a rural area because they wanted a life outside of the cities. They wanted a life that brings them closer to the natural world instead of being surrounded by concrete, bricks and steel. Many chose to live on land for the same reasons they love camping or hunting; they want to be a part of the natural environment that surrounds them.

So then why do they have this area of disconnection surrounding their home? It may be due to many factors out of the homeowners knowledge or control. For those who want psychological restoration and habitat for upland deciduous/wetland biota, this research analyzes problems associated with these “disconnection areas”.

Stress reduction, mental and physical health recovery are a few key psychological and physiological benefits of spending time in a wilderness area. Also, people with access to nearby natural settings have been found to be healthier than other individuals and have also shown increased levels of satisfaction with their lives (Kahn, 1999).



Annotated Bibliography and Critical Evaluation's

Louv, R. (2005). Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder. Chapel hill, North Carolina: Algonquin books.

Richard Louv's book, "Last Child in the woods", brings together research to show a direct connection to nature is essential for healthy childhood development. The research also indicates that for adults and children to be physically and emotionally healthy, there needs to be a direct connection to nature. Along with pointing out this problem, Louv offers practical solutions and simple ways to heal the broken bond. The majority of these solutions are right in our own backyard.

I have always felt that spending time in nature is an important factor for a healthy life-style. Nature may be defined differently by people but most people's ideas of nature are fairly similar. As a child growing up on many acres of forest and swamp, nature was all of this area that had little to no human disruption. As I grew older it became more apparent that even though pieces of land felt natural, I could see they were being effected by surrounding landscapes such as turf grass, concrete and roads. None the less these forests were still a natural place where I spent a lot of my time.

For some people nature is very spiritual and part of their path to enlightenment. For me, nature provides a way to live my life while playing an active role on my land. Instead of living off of a grocery store, I can provide food by hunting and raising animals. I can grow my own food and even search for food on my land. I can also create my own energy and heat my home with wood. I believe having the skills to live off of your land shapes you into a better person, and to have this way of life it starts with getting into nature.

This book helps to prove the feelings I have always had towards nature. Although the majority of this research revolves around benefits for children; there are still many connections that apply to adults. Along with the hard facts this book provides, the author also provides solutions to connecting to nature. This is very relevant information seeing that my topic is creating connections to nature through design.



Hilty, J., Lidicker Jr., W., & Merenlender, A. (2006). *Corridor Ecology: The Science and Practice of Linking Landscapes for Biodiversity Conservation*. Washington, D.C.: Island Press.

“Corridor Ecology” provides guidelines that combine conservation science and practical experience for maintaining, enhancing, and creating connectivity between natural areas for an overall goal of conserving biodiversity. They attempt to engage readers from a variety of different disciplines. They also strongly promote appreciation for the importance of connecting humans and natural systems in land planning efforts.

For my thesis to be successful, understanding the ecological framework of my site is a very important component when creating connections to the natural environment and creating a healthy ecosystem. Because I believe a direct connection to nature is required for a healthy lifestyle; I need to know how to promote healthy biodiversity. Without healthy biodiversity there cannot be a healthy lifestyle. This book provides me with many guidelines needed to conserve and create biodiversity on my site.

Every chapter in this book is loaded with great information but there are three main fundamental concepts to understand in this book that I have found extremely relevant to the problems on my site. The three fundamental concepts that I have pulled from this book are: Understanding habitat fragmentation on my site, understanding how to restore connectivity between these fragments, and finally how to increase human benefit through habitat connectivity, restoration and reclamation. All of these fundamental principles will be used in my inventory and analysis.



Kahn, P. (1999). *The Human Relationship with Nature*. Cambridge, Massachusetts: MIT Press.

In the book, “The Human Relationship with Nature”, Peter Kahn outlines a series of original research projects exploring the human relationship with nature. For the past eight years, Kahn has studied children, young adults, and parents in diverse geographical locations across the globe. Through all of these studies, he analyzes relationships with nature and pursues the following questions: How do people value nature, and what are their thoughts on environmental degradation? Do children have a deep connection to the natural world that gets cut off from a growing society? What connections occur later in life? How does culture affect environmental commitments and sensibilities? Are there universal features in the human relationship with nature? Kahn’s findings draw on work in psychology, biology, environmental behavior, education, policy, and moral development.

Developing a relationship with nature is a key role in my thesis design so many of the ideas and questions proposed in this book make it relevant to my thesis. I can use his studies and philosophy to create a framework to organize and understand the connections my family and I have to nature. By seeking answers to the same questions he has, but on a personal level, I believe this book will open my mind to design concepts that will strengthen the connection of my family and I to nature. The question concerning the cultural effects on our connection to nature is an important question that I have begun answering for myself.

One of the most significant parts of our culture where I live is hunting and fishing. Hunting is a way for me to harvest my own food. Along with being able to provide for my family and myself, I enjoy everything about the hunt and everything that leads up to it. It has always been a large part of our healthy lifestyle. Along with being able to provide for my family and me, I have learned things about wildlife and the natural landscape that I would have never learned in a class. For a true hunter, hunting in itself is a lifestyle. I spend time before the hunting season is open managing habitat and creating food plots for animals. I spend time when the season is over in January to make sure deer have adequate food and bedding areas for long freezing winters. In my culture, hunting brings us closer to wildlife. I would argue that I care for wildlife and habitat in way that is deeper than anything non-hunters can ever experience from having a removed perspective on it.



Brady, E. (2002). *Aesthetics of the Natural Environment*. Tuscaloosa, Alabama: University of Alabama Press.

In the book, “*Aesthetics of the Natural Environment*”, Emily Brady helps the reader understand what aesthetic appreciation of nature is and also what it involves. She develops her own personal theory on aesthetic appreciation of nature which integrates subjective and objective approaches. The topics discussed bring together environmental philosophy philosophical aesthetics, which include: The nature of aesthetic experience, aesthetic value, Theories of aesthetic appreciation of nature, art and environment, imagination, emotion and meaning in aesthetic appreciation of nature, the justification of aesthetic judgments of nature, the intersection between aesthetic and ethical value, the role of aesthetics in nature conservation and environmental policy.

A crucial part of my thesis involves connecting people to aesthetically rich landscapes that also serve to better the habitat and non-human biota of a wetland and deciduous forest. With all of the different topics covering aesthetics, this book offers very valuable information that can be used to understand another important issue outlined in my thesis; this is the issue of turf grass psychologically disconnecting people from nature. From surveys I have conducted, I can see that people in rural areas generally view turf grass as less appealing than natural vegetation and also view turf grass as a disconnection from nature. The surveys give me direct results but the content in this book really helps me understand why people feel this way. This book also offers conservation and environmental planning techniques that would help prevent future degrading of the aesthetics and ecological framework of my site.



Beck, T. (2013). Principles of Ecological Landscape Design. Washington, D.C.: Island Press.

In the book, “Principles of Ecological Design”, Travis Beck provides readers access to principles, strategies, and specific directions to ecological planting design. The author explains the key ecological concepts and their application to the design and management of sustainable landscapes. It covers topics from bio-geography and plant selection to global change. Beck draws on real world cases where professionals have put ecological principles to use in the built landscape. He believes that all ecological landscapes have an “underlying right”. To construct landscapes to perform as we need them to, we need to first understand this “right” that they are destined to have. This book provides all of the concepts and principles to construct sustainable and ecological performance based landscapes.

This information will be useful when it comes to designing the landscape on my site. I have always been a believer that form should follow function and Travis follows this idea very closely. Travis Beck provides us with ways to find the function of our landscape before we start designing. I think this is a very important step especially when designing a landscape that functions as a ecological and sustainable landscape.

Case Study

Studio YOD Lab's Verholy Guest Houses



Poltova region of Ukraine

Designers at Studio YOD Design Lab work to the ethos of connecting the environment with their unique architecture. Each light-weight, metal-framed structure is set on a screw base and raised a meter above the ground. This allows for quick assembly of the structure without harming the surrounding landscape, especially the root systems of the surrounding pine forest. Studio YOD Design Lab is primarily an architecture firm but I still believe we can take some important principles from this project.



Studio YOD Lab's Verholy Guest Houses

The idea of assembling a house without harming the surrounding landscape is great, but realistically not feasible for many residential sized homes in a rural area; especially if you are building in a wooded area. Although it's not feasible to protect the surrounding landscape when building a home in a rural area; it should not stop us from reclaiming or restoring land that has been degraded outside of the home.

Looking at the houses in this case study we can see how well the houses blend, reflect and wrap around the trees in the pine forest. The stepped terrace doesn't change its form to move around the landscape; it instead embraces the trees and allows the user to make the decision on how they are going to move through the space. This is a great example of how a required structure can work seamlessly with a landscape.

It is common to see sidewalks, driveways and stairs stamped over-top of vegetation and existing landscape destroyed to make space for these requirements. Although the landscape wasn't altered in this design, the principle of integrating vegetation into these required hardscapes can still be achieved even if it means we have to reclaim or restore areas around our homes.

The destruction of landscapes for these necessities most often occurs because it is simply easier to build without vegetation getting in the way. Also, many people feel that vegetation slows them down from getting from one place to the next. The reality is though, if it is designed correctly, it would still allow users to move through the site quickly while providing the same users with the option to circulate in their own way.



Studio YOD Lab's Verholy Guest Houses

Another key principle in this design embraces is using the natural landscape as ground cover. The type of structures in this design were easily assembled which in turn kept the forest floor in pristine condition. Like I said before, this can be very difficult or near impossible to do when building a typical house in a rural area, but that doesn't mean we can't restore the land after that house is built.

The forest floor in the picture offers room to move through the site while still supporting a diversity of plants and organic structure. It allows the people inside of the home to have a very close connection to nature when looking outside. When the user steps outside they are immediately surrounded by nature and wildlife. In cases where housing is surrounded by turf grass, stepping out of the house may serve as a disconnection space where there is no connection to nature or wildlife. This site is a prime example of how a natural landscape can engulf a home but still offer space for movement outside of the home.

For some housing, it may not be practical to have the house surrounded by a 100% natural landscape; but the principles in this study can still be applied in that type of scenario. Even if small amounts of turf grass are desired on a site, that doesn't mean the site needs to be void of all other vegetation. On this site, you can see there is a small amount of turf grass but because of how the landscape is laid out, it seamlessly blends with the turf grass. The main reason it blends so well with this landscape is because the landscape appears to have no boundary.

Often times around housing, you will see a 3-5' border filled with rock or wood mulch with a few plants placed throughout it. It becomes very obvious when looking at a site like this that the landscape is artificial and heavily contrasts the turf grass. Looking at the site in this case study we can see that the exact opposite is occurring. The canopy of the forest flows over the turf grass to connect the vertical spaces on the site. The natural ground cover vegetation seems to bleed into the turf grass instead of there being a plastic or concrete edge material to separate them. Finally, The medium height vegetation moves through both the natural area and the turf grass area on the site to make everything feel connected.



Site Proposal

Site: Anderson residence and land, MN.

Strengths: This is the land I was raised on. I know the environment, culture, and community. The site is on a large area of land which will make it easier to connect wildlife corridors.

Limitations: The site is 3.5 hours away from Fargo so I will only be able to visit on weekends. The site has some housing around it so it will be challenging to connect corridors off of my site.



Research Questions

1.) Through the use of surveys, find the preferred ratio of turf grass to diverse vegetation on the participants property.

Find what a healthy ratio is for sites that have:

(1) A healthy habitat for biota.

(2) Positive psychological/physical connection to ones land.

2.) What is the users aesthetic preference? What best connects them to their land?

3.) What is the ecological framework of the site and what number of plant and animal species could it support.

4.) What are the users cultural practices that connect them to their land.



Methodology

Psychological data:

To understand physiological connections to turf grass and the regions biota, multiple surveys were conducted.

Survey #1: This picture formatted survey was used to understand what landscape settings and vegetation attracted people the most and also what settings they perceive as natural. There are a total of 26 pictures with two questions per picture. The first question asks how attractive the setting and vegetation is. The second question asks how the setting and vegetation is perceived as natural. These two questions are asked for all 26 pictures. The answers are all on a 5-point Likert scale.

Survey #2: This picture formatted survey was used to figure out what animals are preferred on the participants land. This survey simply asks participants to place a check-mark in the box next to the picture if they wish to see that animal on their land.

Ecological data:

To understand what a healthy ratio is for 'turf grass & hard surface : upland deciduous forest & wetland'. I first wanted to understand turf grass and hard surfaces in rural areas. I looked at what it used for, how it was viewed aesthetically and how it effected the connections users have to nature and their land. This information was collected mostly from conversations with homeowners after the survey was completed. I then researched the species our land supported ranging from Whitetail deer to small birds. When that data was collected, I looked into what the minimum requirements were for species in my region and what the best habitat is for these species. Using the results collected from both surveys I can then design a landscape geared towards the clients desired wildlife and aesthetic needs.



Survey #1

Why was this survey conducted?

This survey was used to understand how:

- 1) Turf grass effected the attractiveness of a site
- 2) How turf grass effected how natural a site felt

How was this survey formatted?

The survey itself is 13, 11x17 pages with two pictures per page to make a total of 26 pictures (pictures from survey shown in pages 16-22). Each page is considered a “set”. The survey form (52 questions) asks participants to rate the “Attractiveness of the setting and vegetation in every picture. Also, how you perceived the setting as natural. Do not rate architecture or creative photography but focus on the setting and vegetation.” Participants of the survey were all rural landowners in Cedar, Minnesota. Total there were 7 participants and all of them had turf grass surrounding their homes.

Questions are asked on a 5-point Likert scale which allows for quick and easy responses. For the attractiveness of the setting and vegetation question, the scale is as follows: “Horrible”, “Not attractive”, “Somewhat attractive”, “Very attractive”, and “Extremely attractive”. A check mark by “horrible” would be logged as 1 point where as a check mark by “Extremely attractive”, would be logged as 5 points.

For the “How did you perceive the setting as natural?” question, the Likert scale is as follows: “Not at all natural”, “Very little nature”, “Somewhat natural”, “Very natural”, and “extremely natural”. A check mark by “Not natural at all”, would be logged as 1 point where as a check mark by “Extremely natural”, would be logged as 5 points.

What types of methods are used in this survey?

Pictures in each set are related in the style of architecture, season and intent/use. The main difference between the pictures is the top picture in each set appears less managed and has less turf grass than the bottom picture. Although both pictures are rated on a Likert scale, they are placed next to each other so the participant can see two related settings with varying amounts of turf grass and managed landscape.

Sets 1-6: These sets mainly focuses on the aesthetics of turf grass and vegetation around housing. Set 4 and 5 also use a more “managed” natural landscape to see how participants react to constructed “natural” looking settings.

Set 7: This set is meant to see how people feel about open spaces and vegetation. One reason people like turf grass is because they can look far out over their land without vegetation obstructing their view. The top picture in this set allows the user to view for miles but instead of turf grass as the main vegetation, there is diverse vegetation that stays low to the ground along with outcropped boulders.

Sets 8-10: These sets focus on vegetation in and around water, the layout of vegetation in and around water and turf grass around water.

Sets 11-12: These two sets focus on the same type of vegetation but the bottom picture in each set is a more managed setting with more turf grass.

Set 13: This set strictly sticks to vegetation use as a ground cover. The top picture uses a more diverse ground cover versus the commonly used turf grass in the bottom picture.



Survey #2

Why was this survey conducted?

This survey was used to understand:

1) What mammals and birds participants want to see on their land.

How was this survey formatted?

This survey is one 11"x17" page with pictures of mammals and birds. The survey asked participants to put a check mark by every mammal and bird they would like to see on their land. This survey page was at the end of the first survey and was created for participants to quickly let me know what mammals and birds they would like to see on their land.

What types of methods are used in this survey?

The mammals and birds pictured in the survey are all in the region of Minnesota where the survey was conducted. All of the participants have turf grass surrounding their homes so I wanted to include animals that live in turf grass habitat. For example, moles, voles, mice and other small mammals were included in the survey. Some birds that eat insects, worms and grubs off turf grass were also included.



Survey #1 (pages 16-22)



set 1



set 2



set 3



set 4



set 5



set 6



set 7



set 8



set 9



set 10



set 11



set 12



Survey #2



WHITETAIL DEER



BLACK BEAR



COYOTE



BOBCAT



FOX



FISHER



BEAVER



OTTER



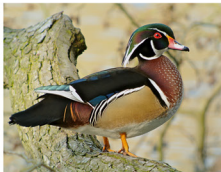
PINE MARTEN



MINK



RABBIT



LARGE BIRDS



SMALL BIRDS



RACCOON



SQUIRREL



MOLE



VOLE



POCKET GOPHER



SHREW

Survey #1 Results

Likert scale rating

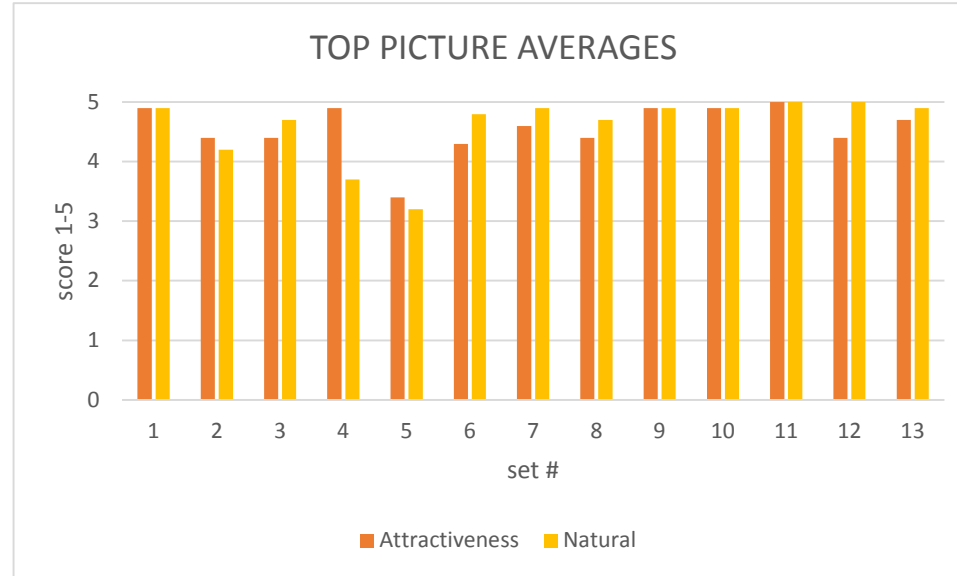
Attractiveness

- 1: Horrible
- 2: Not attractive
- 3: Somewhat attractive
- 4: Very attractive
- 5: Extremely attractive

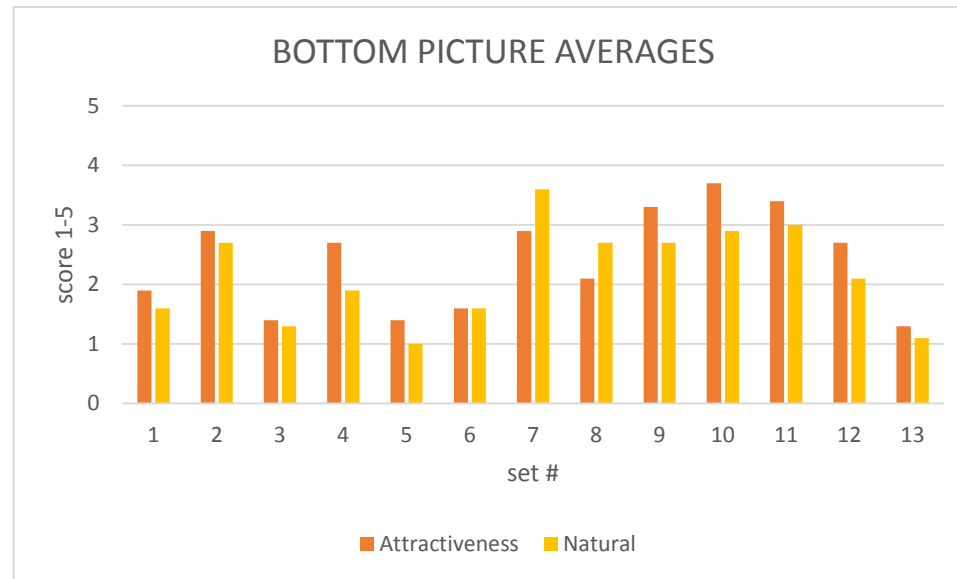
viewed as natural

- 1: Not natural at all
- 2: Very little nature
- 3: Somewhat natural
- 4: Very natural
- 5: Extremely natural

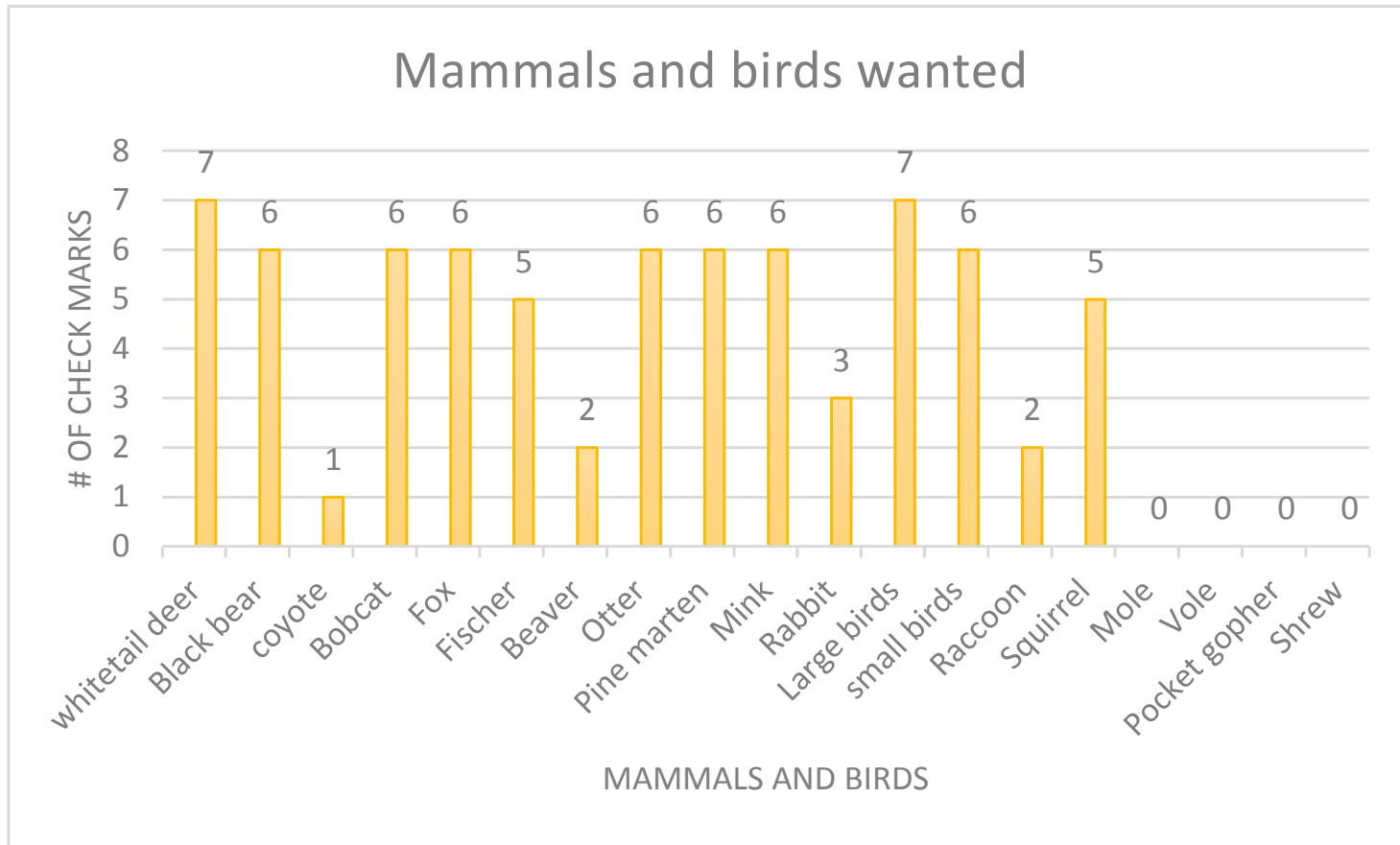
SET #	Attractiveness	Natural
1	4.9	4.9
2	4.4	4.2
3	4.4	4.7
4	4.9	3.7
5	3.4	3.2
6	4.3	4.8
7	4.6	4.9
8	4.4	4.7
9	4.9	4.9
10	4.9	4.9
11	5	5
12	4.4	5
13	4.7	4.9



SET #	Attractiveness	Natural
1	1.9	1.6
2	2.9	2.7
3	1.4	1.3
4	2.7	1.9
5	1.4	1
6	1.6	1.6
7	2.9	3.6
8	2.1	2.7
9	3.3	2.7
10	3.7	2.9
11	3.4	3
12	2.7	2.1
13	1.3	1.1



Survey #2 Results



Analysis of Survey #1 Results

Preferences of nature and vegetation around small and large housing (sets 1-7)

According to sets 1-7 in the survey, rural landowners show an aesthetic preference for housing with diverse vegetation surrounding it. On average, housing with diverse vegetation surrounding it, was rated 2.44 points higher on a 5 point Likert scale versus housing surrounded by turf grass. Along with the top pictures being rated aesthetically more attractive, they were also rated high in how land owners perceived the setting as natural. In fact, on average, 6 out of the 7 sets were rated at only a .2 point difference between how the “setting was perceived as natural” and “attractiveness of vegetation”. We can also see from the data on the graph that all of the bottom pictures had the same correlation between how natural the site felt and how attractive the setting was. These results show that on average, if a setting around a house appears “very or extremely natural” on the Likert scale, then it is likely that a rural landowner will feel a strong aesthetic connection to that setting. Likewise, if the site didn’t feel natural, the participants didn’t have a strong aesthetic connection. One minor deviation from this theory occurs in the top picture in set number 4 in which the rating for how natural it was perceived was on average 1.2 points lower than its attractiveness score. After deeper analysis of this picture and the data we can see why this deviation may have occurred.

The top picture in set number 4 was specifically selected because the design conveys a human-constructed natural feel, in other terms, the design feels artificially natural. Although this picture has very diverse vegetation and large boulders closely surrounding the home, participants could feel that it was slightly less natural than the other pictures and on average, rated it 3.7 out of 5 for how natural it felt. What I find interesting is how it scored an average rating of 4.9 out of 5 in attractiveness of the setting. This shows that in some cases, an artificially constructed natural setting can still be perceived as “very natural” and be “extremely attractive” according to the Likert scale used in this study.

Preferences of nature and vegetation around small and large housing (sets 1-7)

An important point to note is how participants viewed the bottom picture in set 4. Even though 50% of it has diverse vegetation and is close to the home, it was rated at a 1.9 for how natural it felt and 2.7 for how attractive it was. On a 5 point Likert scale these numbers are pretty low, and for how similar the diversity of vegetation is to the top picture it is worth taking a closer look at. The main factor in this design that sets it apart from the top picture is not the vegetation, but the way the vegetation is laid out around the house. We can see that in this area of turf grass, there are two patches of plant groups. What is really bringing down the score in the “nature” section here is the size and shape of these planting beds. The plants themselves look like they belong in a prairie but the shape is small and surrounded by turf grass so this makes it feel un-natural. The planting beds also appear to be dominated by a light colored mulch which is a dead give-away that it was constructed by humans. The main lesson that comes from set 4 is that the designer needs to be very careful when constructing an “artificially-natural” design. If the correct techniques aren’t used, the “artificial nature” will become aesthetically displeasing and users will not feel a natural connection.

The lowest scoring top picture in the “vegetation surrounding housing” group was in set 5. This picture was rated 3.4 out of 5 on the attractiveness of the setting and vegetation, and 3.2 on how natural the site felt. The top picture in set 5 was specifically chosen to see how people would rate a partial formal vegetation arrangement around housing. The trees in the setting are laid out naturally but it’s

Preferences of nature and vegetation around small and large housing (sets 1-7)

clear that the shrubs are laid out in rows with surrounding turf grass. Because this is the only picture in this category that has a formal vegetation layout, it becomes clearer as to why it had a lower rating. All participants of the survey viewed this formal vegetation and managed landscape slightly less attractive than other top pictures.

Set number 7 is the last set in this category and is used to understand expansive views outside a house. In personal conversations with home owners I asked what they liked about turf grass. The most common response was that they liked to be able look over their land. This got me thinking about different diverse vegetation options besides turf grass that would offer expansive views and also key habitat for wildlife. With that in mind, I selected the top picture in set 7 to show people that there are very diverse vegetation options that offer vast views overlooking ones land and also key habitats for wildlife depending on what vegetation is used.

According to the data for the top picture in set 7, participants rated the attractiveness of the site 4.6 and rated how natural it felt at 4.9. They rated the bottom picture 2.9 for attractiveness and 3.6 for how natural it felt. The data suggests that if expansive views can be achieved using diverse vegetation or turf grass, participants would chose diverse vegetation over turf grass.

Conclusion and critical thinking (sets 1-7)

Before this survey was conducted, my hypothesis for these first seven sets was that rural land owners would prefer a house closely surrounded by diverse vegetation. I believed they would also prefer a natural looking landscape. My reasoning behind this was simple, I believed most people who chose to live in rural areas are there to be surrounded by nature. After collecting results of all 196 questions in the first 7 sets, the data clearly showed that my hypothesis was correct. Interestingly, all of the participants of the study are land owners with turf grass ranging from 1 to 10 acres covering their property. So then why did they rate pictures with turf grass so poorly if they themselves own so much turf grass?

When I asked them this question, the overwhelming response was that they have simply never thought about bringing vegetation so close to their homes. Many of the participants told me they have never actually seen anything like some of the examples pictured in the survey. After talking to the participants I realized what it essentially came down to was this; because it's the "social norm" to plant turf grass, they did not explore other options for their land, and because turf grass is easy and fast to plant after building a house, they just planted turf grass thinking that was their only option. Unless you are putting an irrigation system in, it doesn't take a designer to plant turf grass and it's socially accepted and sought after by almost everyone in the United States because many Americans don't know anything different than turf grass lawns. When building a house in a rural wooded area, a section of forest is cleared out to

Conclusion and critical thinking (sets 1-7)

build. After the house is built, many people don't think about re-planting trees, shrubs or native grass in an area that they just cleared. For many people, it is just easier to plant turf grass instead of hiring a designer or doing critical thinking themselves.

The main objective behind this survey was to find aesthetic preferences, so without diving too deep into the discussion of turf grass being un-sustainable, expensive, and time consuming to maintain, I thought it was still worth asking participants about how their turf grass has effected them in these categories. The response to this was almost always that they hated mowing and blowing leaves off of their lawn. Some even said to me they were looking to decrease the size of their yard. I thought this was interesting that the main concern was time spent on their yard and not how much money they spend on gasoline, mowers, fertilizers, irrigation and maintenance. I mentioned to some of them that according to the lawn institute, Americans spent 6.4 billion dollars on turf grass and according to the EPA, Americans bought 70 million pounds of fertilizer just for turf grass lawns. They were not very surprised when I told them that and I'm sure they know from first-hand experience that it isn't cheap to have a well maintained lawn. Even after mentioning those facts and getting them to think about the money spent on lawns, the overall grudge against turf grass was the time that they were spending to take care of it.

Conclusion and critical thinking for (sets 1-7)

I was raised on land with large areas of turf grass and know first-hand how much work it is to maintain. To this day, I drive home on fall weekends just to help my family blow leaves off the yard and mow. On average, it takes about two hours to mow all the turf grass on our property with an 8 foot deck mower. Many people may be surprised by this amount of turf grass but the truth is it's not uncommon to find in rural areas.

The last subject that was brought up when talking about turf grass surrounding our homes, was about how turf grass offers open spaces for people to gather and bond together. Growing up in a home with a large yard I can agree that it gave us a place to play football and baseball. It also gave us room to have parties and set up games and tents. I have to agree that it does offer good vegetation for these things but the problem is, these things still only took up small portions of the total amount of turf grass.

Vegetation in and around water (sets 8-10)

According to sets 8-10 in the survey, rural landowners show an aesthetic preference for diverse vegetation in water and closely around water. On average, water with vegetation in it or closely surrounding it, was rated 1.7 points higher on a 5-point Likert scale versus water with turf grass surrounding it or vegetation that appeared managed and formal around it. Along with the top pictures being rated aesthetically more attractive, they were also rated high in how landowners perceived them as natural. In fact, sets 9 and 10 had a rating of 4.9 for “attractiveness” and “how it was perceived as natural”. In set 8 there was only a .3 point difference between the two categories. We can also see from the data on the graph that all of the bottom pictures had the same correlation between how natural the site felt and how attractive the setting was. Like the results of sets 1-7, participants show that if the setting appears “very or extremely natural” on the Likert scale, then it is likely that they will feel a stronger connection to the site aesthetically. Likewise, if the site didn’t feel natural, the participants didn’t have a strong aesthetic connection.

Conclusion and critical thinking (sets 8-10)

Looking at the bottom pictures in these three sets we can see that set 8 and 9 have turf grass surrounding the water and set 10 is closely surrounded by managed and formally rowed vegetation. An important point to note is sets 8 and 9 were both scored lower on the Likert scale than set 10 which does not show as much turf grass as picture in 8 and 9. The bottom picture in set 10 was an average of 1 point higher than the bottom pictures in sets 8 and 9. From this data and previous data showing that pictures with turf grass are rated lower on a Likert scale, it is likely that the bottom pictures of set 8 and 9 were also rated lower because they showed more turf grass in combination with a non-natural structured feel. Although the bottom picture in set 10 was rated lower than the top picture in set 10, it shows that participants still appreciate diverse vegetation closely surrounding water even if some of it is managed and structured in rows.



Preferences of vegetation as high, medium and low ground cover (sets 11-13)

According to sets 11-13 in the survey, rural landowners show an aesthetic preference for diverse vegetation as ground cover over turf grass vegetation as ground cover. On average, diverse vegetation as ground cover was rated 2.23 points higher on the Likert scale than pictures with turf grass as ground cover. Along with the top pictures being rated higher aesthetically, they also had a high rating in how landowners viewed them as natural. In fact, on average, there was only a difference of .26 points between how natural the setting felt and how attractive the site was. We can also see from the data on the graph that all of the bottom pictures had the same correlation between how natural the site felt and how attractive the setting was. Like the results of sets 1-10, participants show that if the setting appears “very or extremely natural” on the Likert scale, then it is likely that they will feel a stronger connection to the site aesthetically. Likewise, if the site didn’t feel natural, the participants didn’t have a strong aesthetic connection.

Conclusion and critical thinking (sets 11-13)

Looking at the top picture in set 11 we can see that there is a diversity of vegetation at low and medium heights. To get accurate results from these pictures I chose vegetation found in Minnesota. The larger vegetation used in both the top and bottom pictures are the same species and also in the same season. The main difference between the two is that the bottom picture has turf grass. Like the other pictures with turf grass, this picture was scored lower than the top picture. The bottom picture in set 11 was scored 1.6 points lower than the top picture which scored a perfect 5 from all of the participants. My thought process behind these pictures was that they essentially portray views looking out a window; and even though the bottom picture is a view all participants have looking out their windows, it was still rated 1.6 points lower than the top picture which is a view no participants have looking out their windows.

Conclusion and critical thinking (sets 11-13)

Looking at the top picture in set 12 we can see that there is a diversity of vegetation at low and high heights. We can also see low and high vegetation used in the bottom picture but the main difference is that the low vegetation in the bottom picture is turf grass. We can also see that the higher vegetation the same height, maintained well and in rows. Participants rated the top picture in set 12 at 4.4 for attractiveness and the bottom picture 2.7 for attractiveness. According to these results rural landowners prefer a natural feeling tall ground cover forest over a managed park-forest with turf grass.

In set 13 I wanted to see how participants viewed turf grass as a low ground cover vegetation and also how they viewed textured informal vegetation as ground cover. Unlike many of the other pictures, these pictures focused strictly on one species of vegetation and not vegetation around a particular place or in a particular setting. This set was used to find out how participants felt about the vegetation itself and nothing else. The top picture in set 13 was rated 4.7 for attractiveness and 4.9 for how natural it was perceived. Even though there is one species of plant in this picture, it has more texture than turf grass and a slightly taller and wilder appearance. According to the data, all of the participants preferred this type of ground cover over turf grass.

According to the data, participants rated the bottom picture of turf grass at 1.3 on the Likert scale for attractiveness and 1.1 for how natural it felt. These were the lowest scores given in the survey by participants. What I find most interesting about this is if we look at the Likert scale used, we see that 1 point is given when participants put a check mark by “Horrible”. All of the participants of the study are landowners with large amounts of turf grass which is why I find it perplexing that this picture of turf grass is viewed as “Horrible”. The score for how natural participants perceived the picture was rated 1.1 which equates to “not at all natural” on the Likert scale. The correlation between “attractiveness” and “how it is perceived as natural”, is once again, very close.

Analysis of Survey #2 Results

Preferences of mammals and birds on participants land

According to the data from survey #2, Whitetail deer and large birds are wanted by all of the participants of the survey. Closely following these top choices were Black Bear's, Bobcat's, Fox, Otter's, Pine Martin's, Mink, and small birds. Mammals that were not wanted by any of the participants were Moles, Voles, Pocket Gophers, and Shrews. The mammals and birds pictured in this survey are all located in the region of Minnesota where the survey was conducted. It may seem abnormal to have Moles, voles, Pocket Gophers, and Shrews in the survey, but because they are commonly found in turf grass, I found them relevant to the survey.

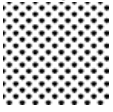
Conclusion and critical thinking

According to this survey, the mammals and birds that participants prefer to see on their land thrive in upland deciduous forests, Tamarack swamps, prairies, wetlands and open bodies of water. Interestingly, the mammals participants do not want to see are commonly found living in turf grass which surround all of the participant's homes. I don't believe this comes as a surprise to most home owners, but it brings up the topic that if home owners want to start seeing these preferred mammals and birds, they need to take an active part into creating or restoring habitat.

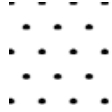
Preliminary Site Inventory + Analysis



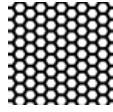
Turf grass



Tamarack and shrub swamp



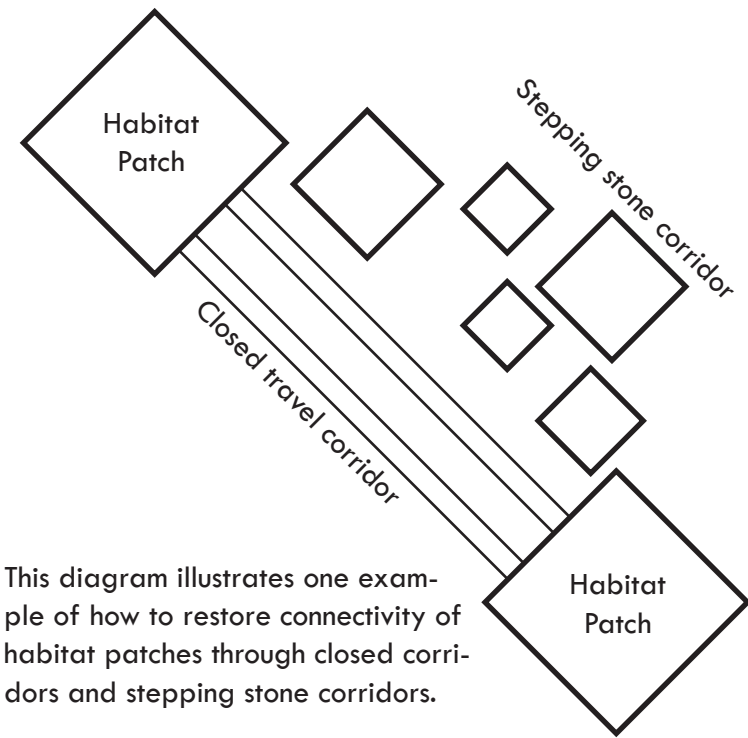
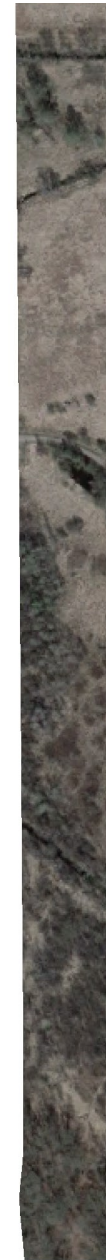
Upland deciduous forest



Alfalfa/corn field



Habitat Fragmentation



This diagram illustrates one example of how to restore connectivity of habitat patches through closed corridors and stepping stone corridors.

This map illustrates the fragmentation of habitat that is occurring on and around the property. We can see that there are four main habitat patches in this map. On my property, there are two main habitat patches with housing, humans, turf grass, water and concrete filling the voids.

These void spaces may not appear large compared to the sizes of the habitat patches, but from first hand observation and field inventory, I can see how they greatly effect deer movement on our land.

Sections of Yard Commonly Occupied by People

The orange circles in the picture indicate which sections of yard are most commonly occupied by people. The largest circle highlights the area in the yard where a fire-pit is located. It is extremely rare for the rest of the turf grass to be occupied by people unless there is a large party.

Looking back at the homeowners survey results show that they had a lower aesthetic preference towards pictures with turf grass. With that in mind, if people are only using small portions of this yard, the rest of the turf grass yard essentially becomes wasted space. These are spaces that could be used for habitat restoration and a more aesthetically pleasing landscape geared towards what the homeowners loved in the survey.



This picture shows how turf grass, housing, people, roads and water fragment habitat on the southern portion of our property.



(Looking West)

Site Photos











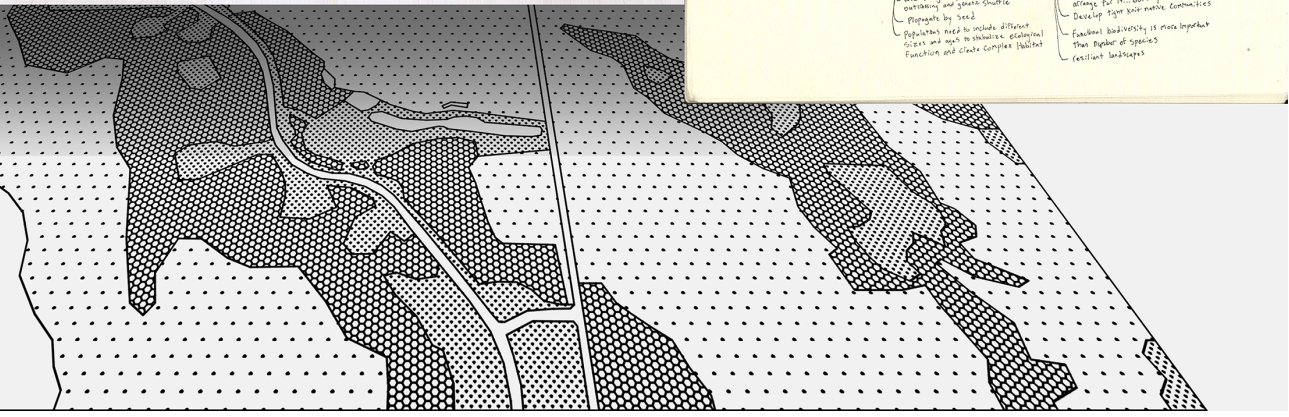
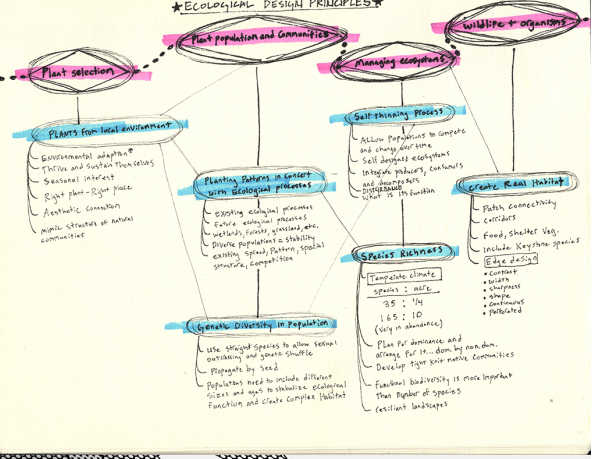
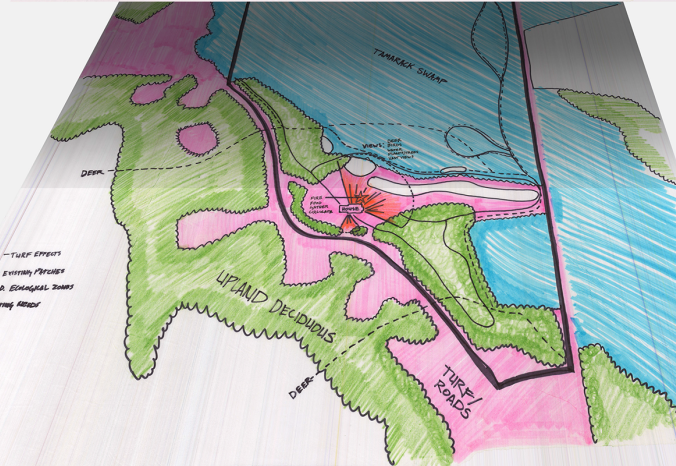
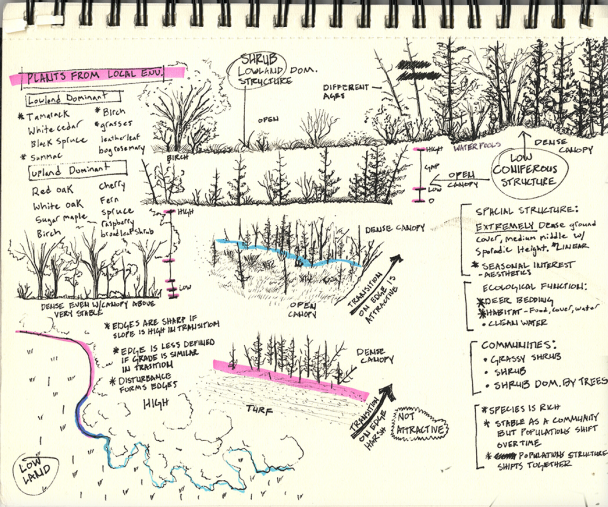
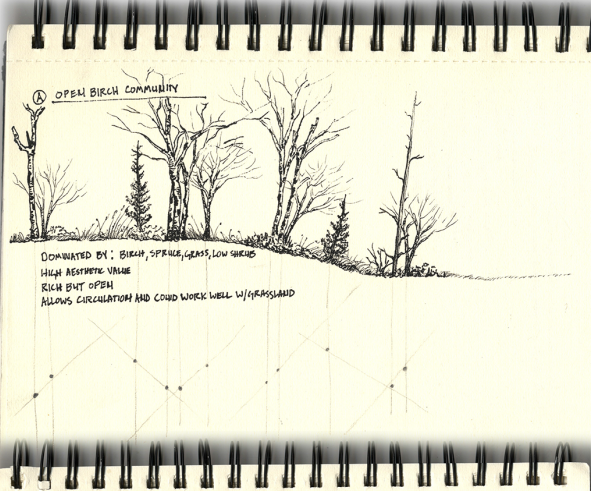
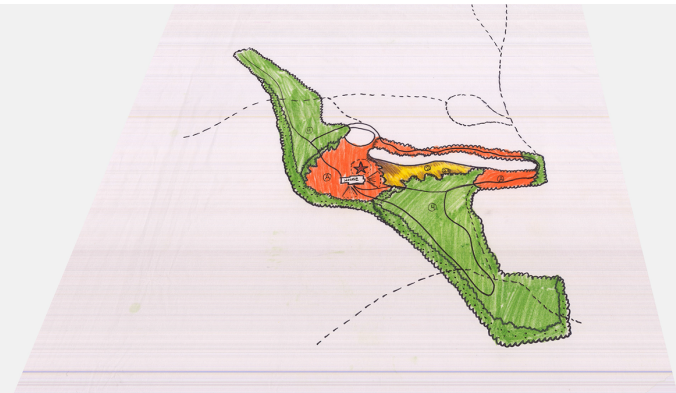
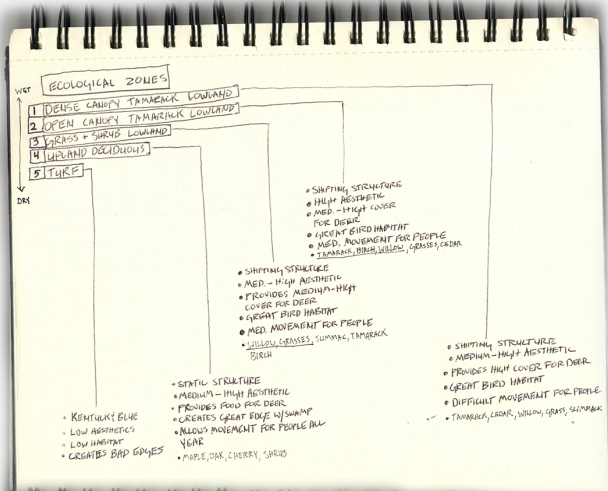






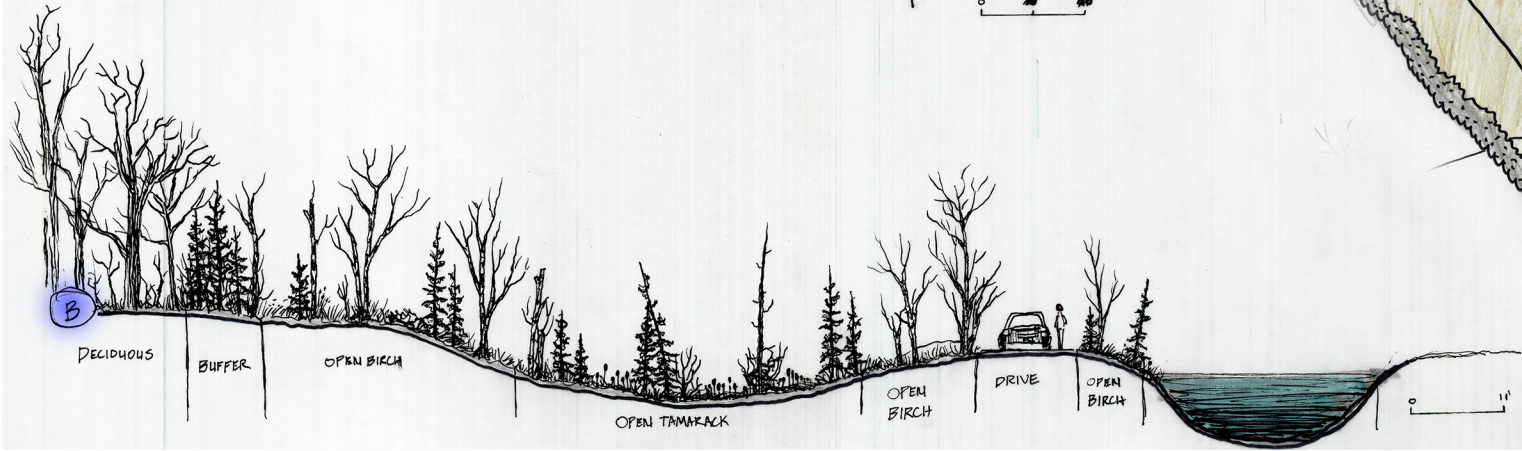
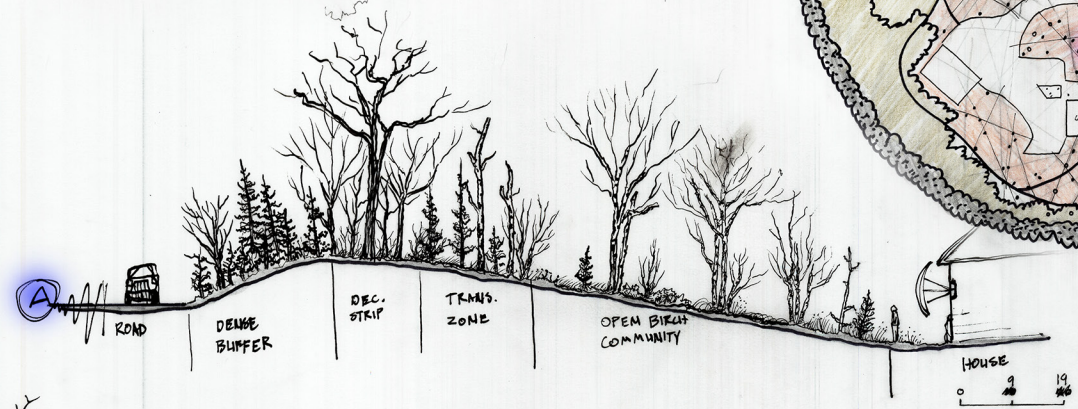
Design Development

Master Plan development



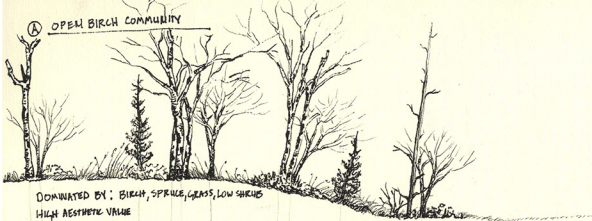
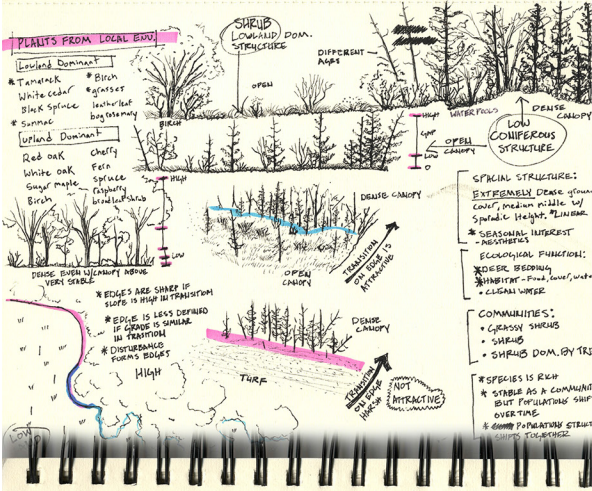
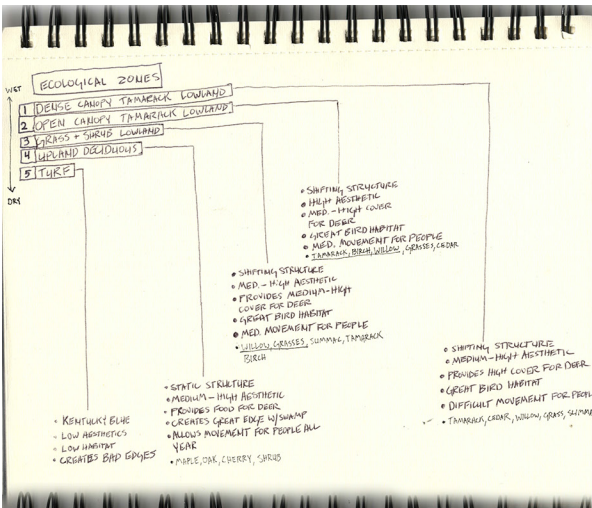
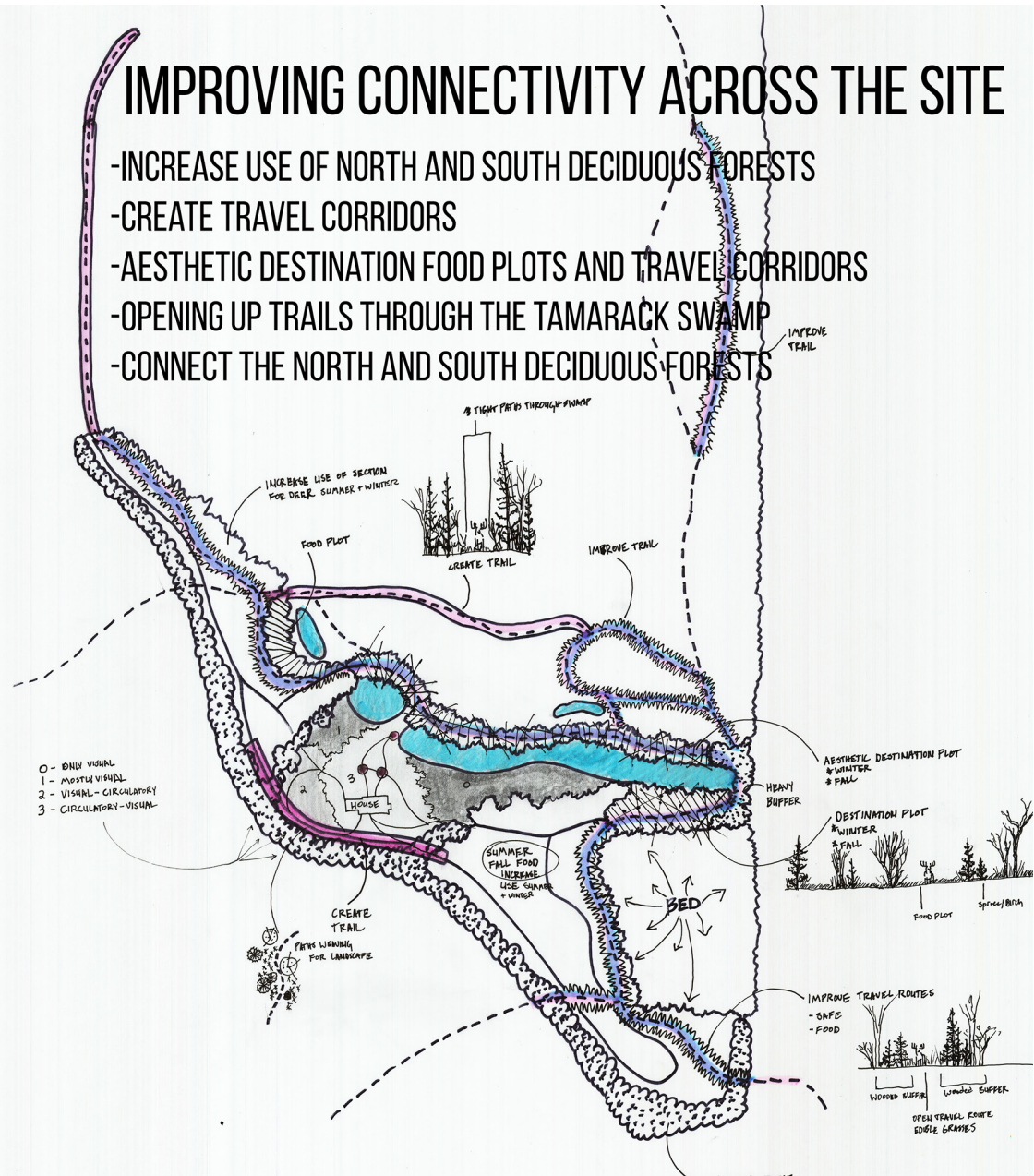
MASTER PLANNING SCALE

- PLANT COMMUNITY LAYOUT
- CIRCULATION PATTERNS
- KEY AREAS FOR SITE PLAN DEVELOPMENT

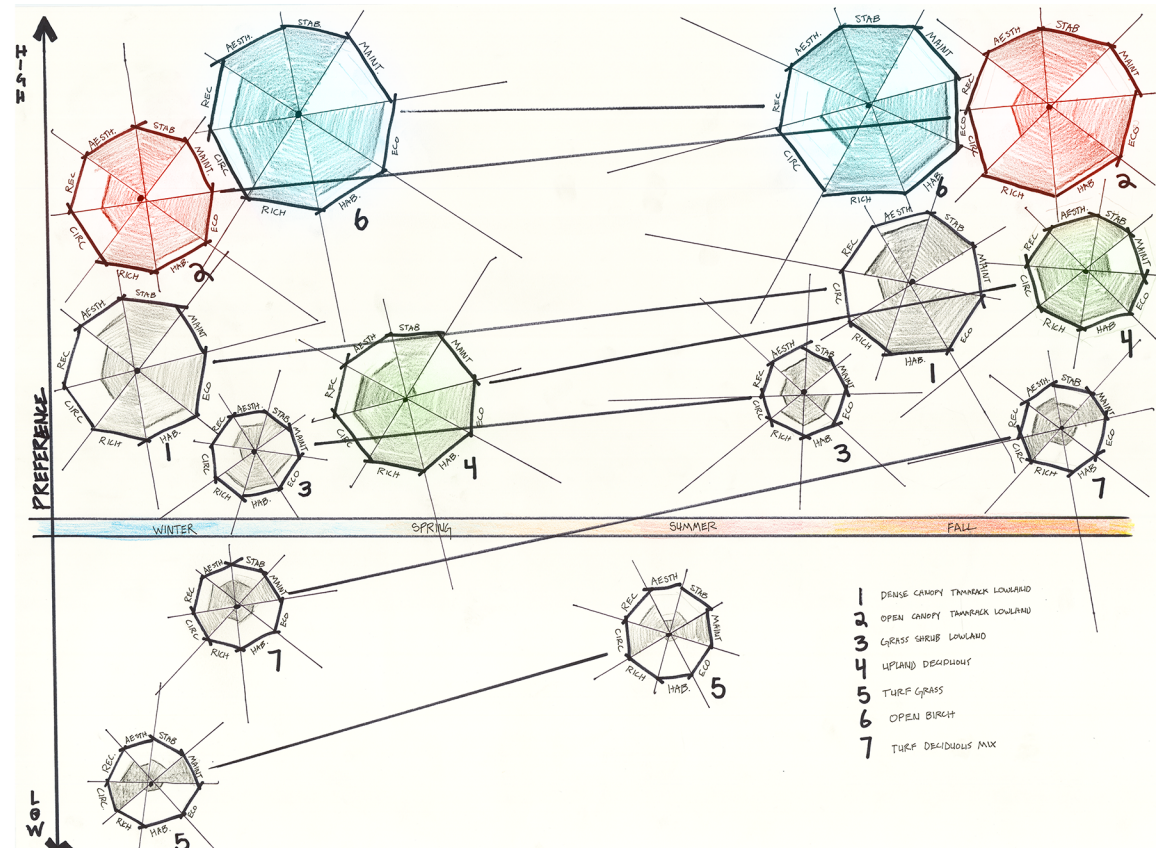
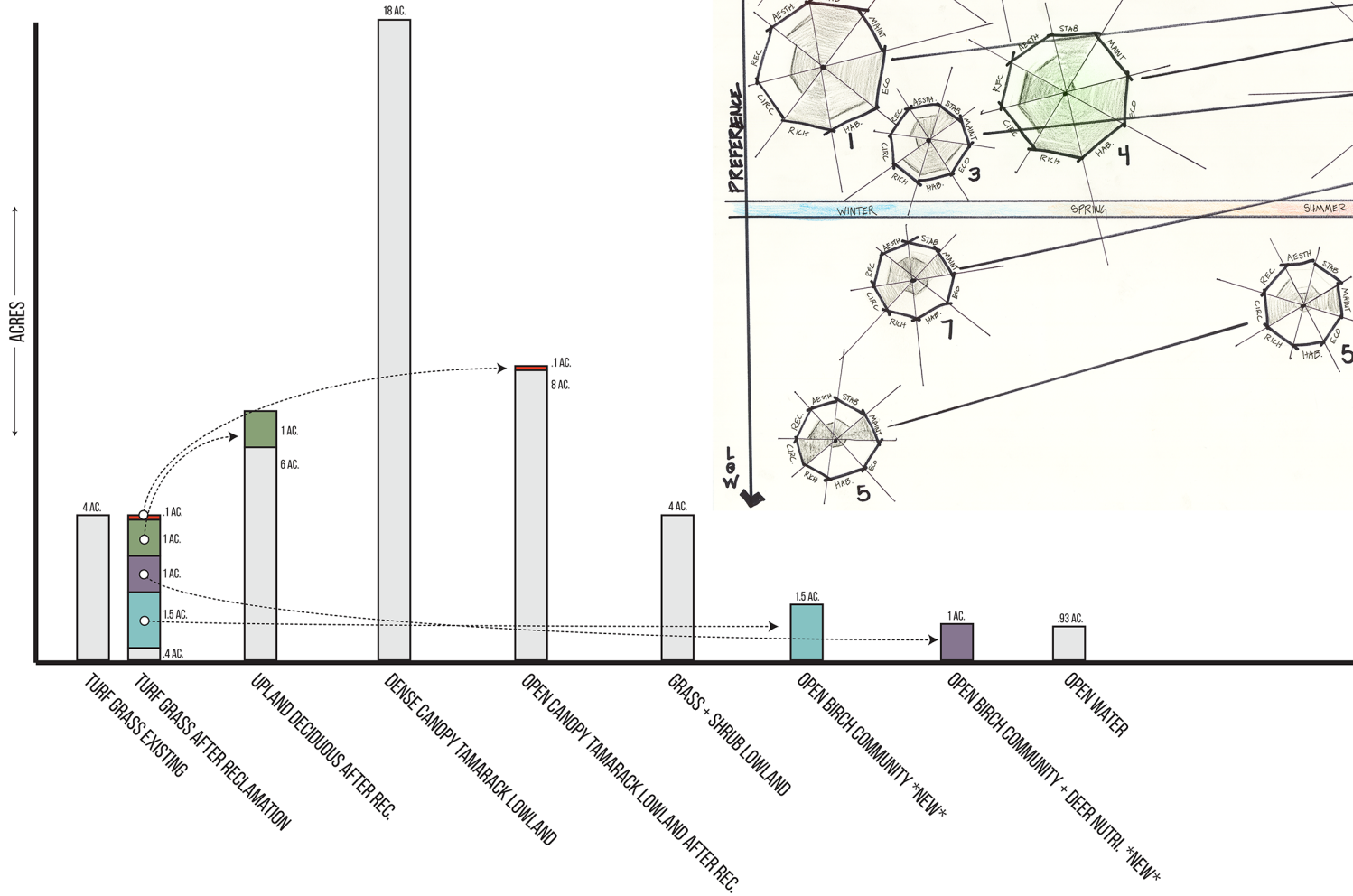


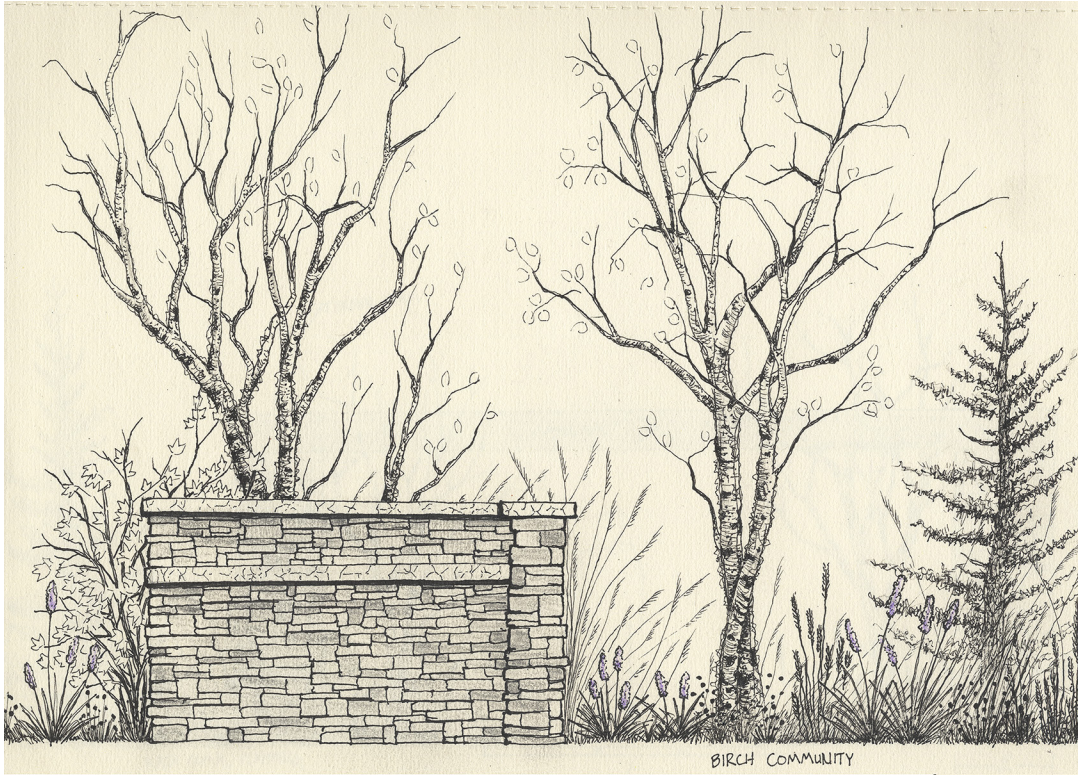
IMPROVING CONNECTIVITY ACROSS THE SITE

- INCREASE USE OF NORTH AND SOUTH DECIDUOUS FORESTS
- CREATE TRAVEL CORRIDORS
- AESTHETIC DESTINATION FOOD PLOTS AND TRAVEL CORRIDORS
- OPENING UP TRAILS THROUGH THE TAMARACK SWAMP
- CONNECT THE NORTH AND SOUTH DECIDUOUS FORESTS



Data analysis for site plan





CENTRAL DRY-MESIC OAK-ASPEN FOREST

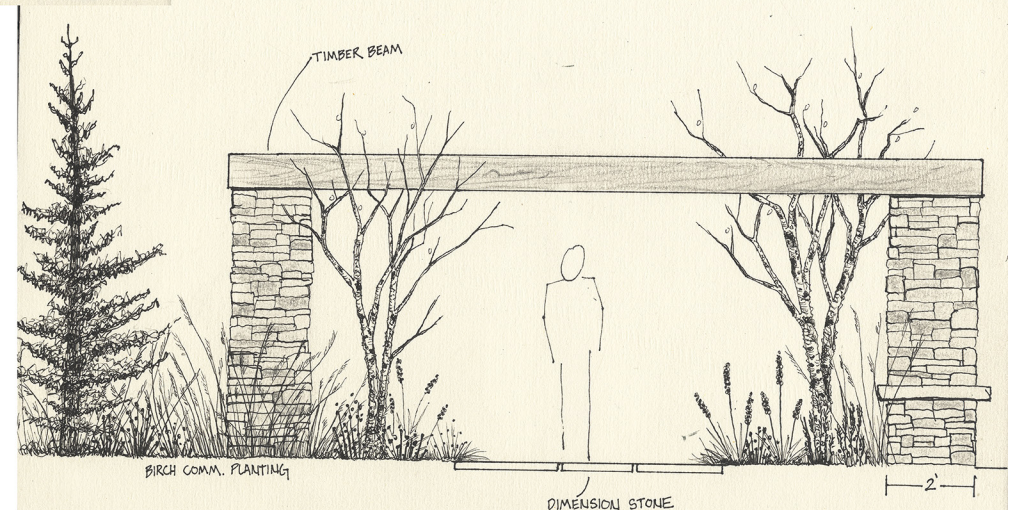
35-55 YEARS- TRANSITION PERIOD MARKED BY BY RAPID DECLINE IN QUAKING ASPEN MIRRORED BY INCREASE IN PAPER BIRCH, NORTHERN RED OAK, AND RED MAPLE. PINE AND SPRUCE BECOME UNDERSTORY DURING THIS PERIOD.

55-135 YEARS- MATURE FORESTS CHARACTERIZED BY MIXED CANOPIES OF PAPER BIRCH, ASPEN, AND SOME RED OAK, WITH MINOR AMOUNTS OF RED MAPLE, PINE AND SPRUCE.

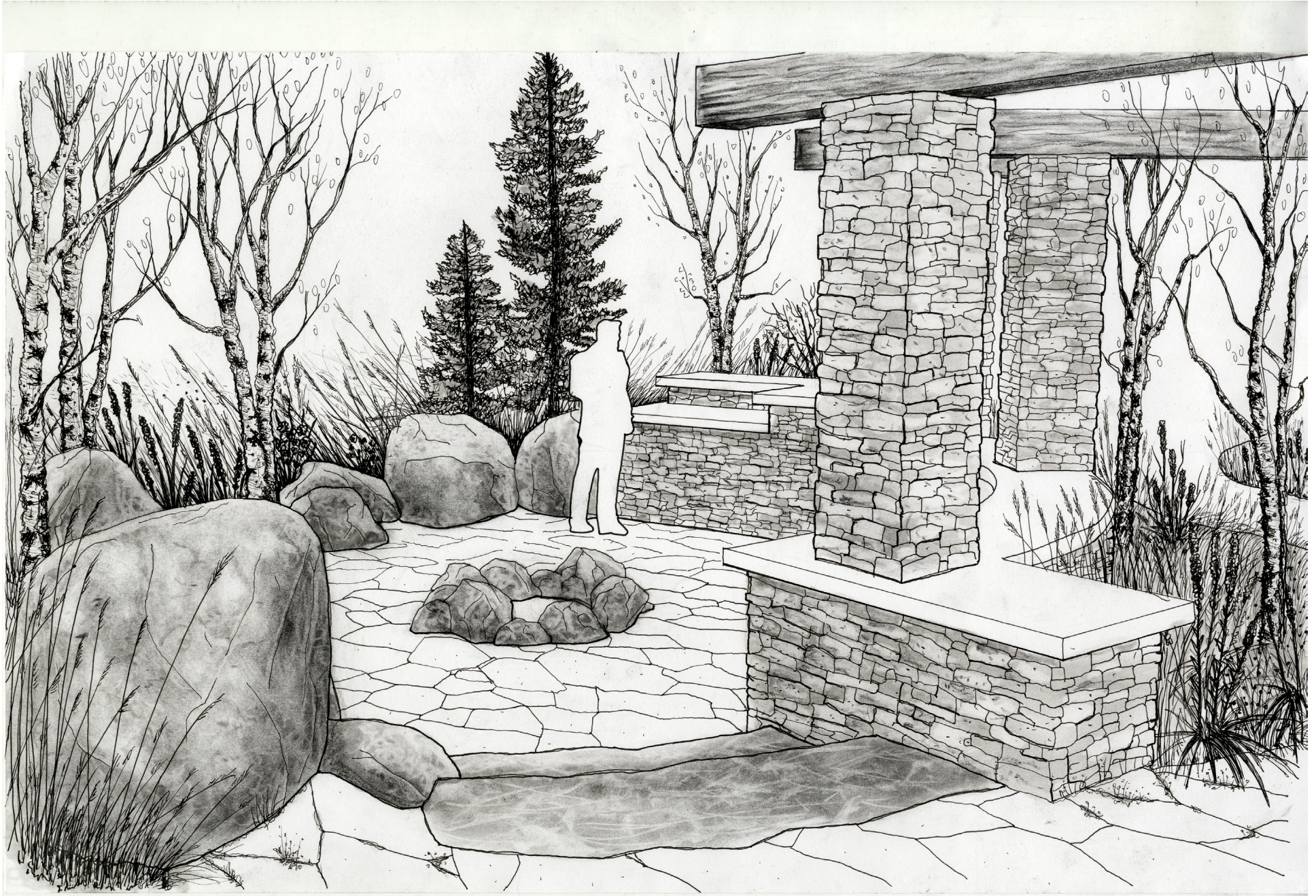
>135 YEARS- OLD FORESTS MIXED CANOPIES OF QUAKING ASPEN, PAPER BIRCH, RED OAK, PINE AND SPRUCE.

*PAPER BIRCH AND ASPEN ARE QUICK REGENERATORS AFTER DISTURBANCES

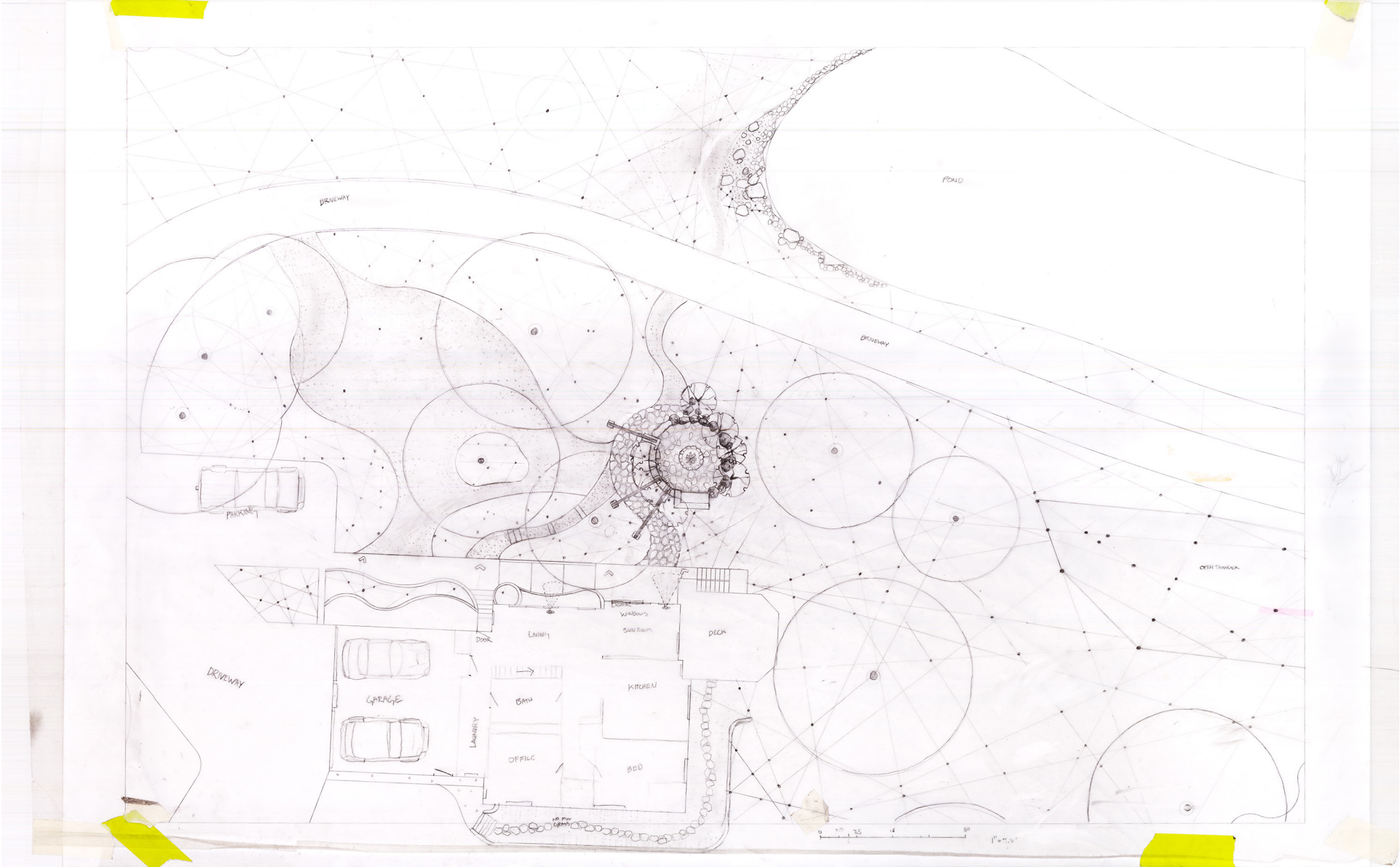
STONE COLUMNS RISE OUT OF THE LANDSCAPE AND ADD A VERTICAL ELEMENT TO MAKE THE HARDSCAPE AND VEGETATED AREAS FEEL CONNECTED.



Vertical elements, seat walls, food prep areas, and natural elements

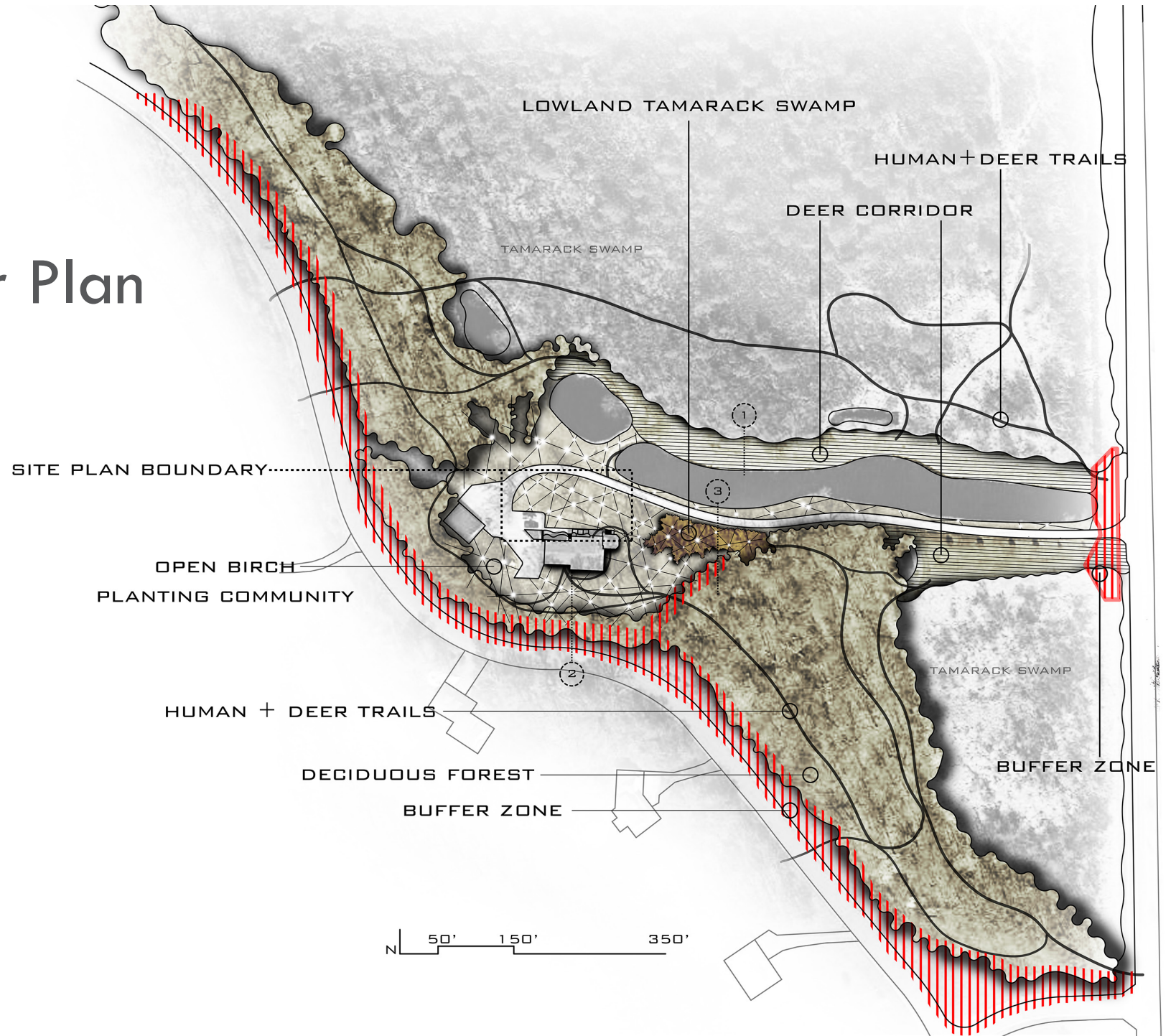


Site plan sketching

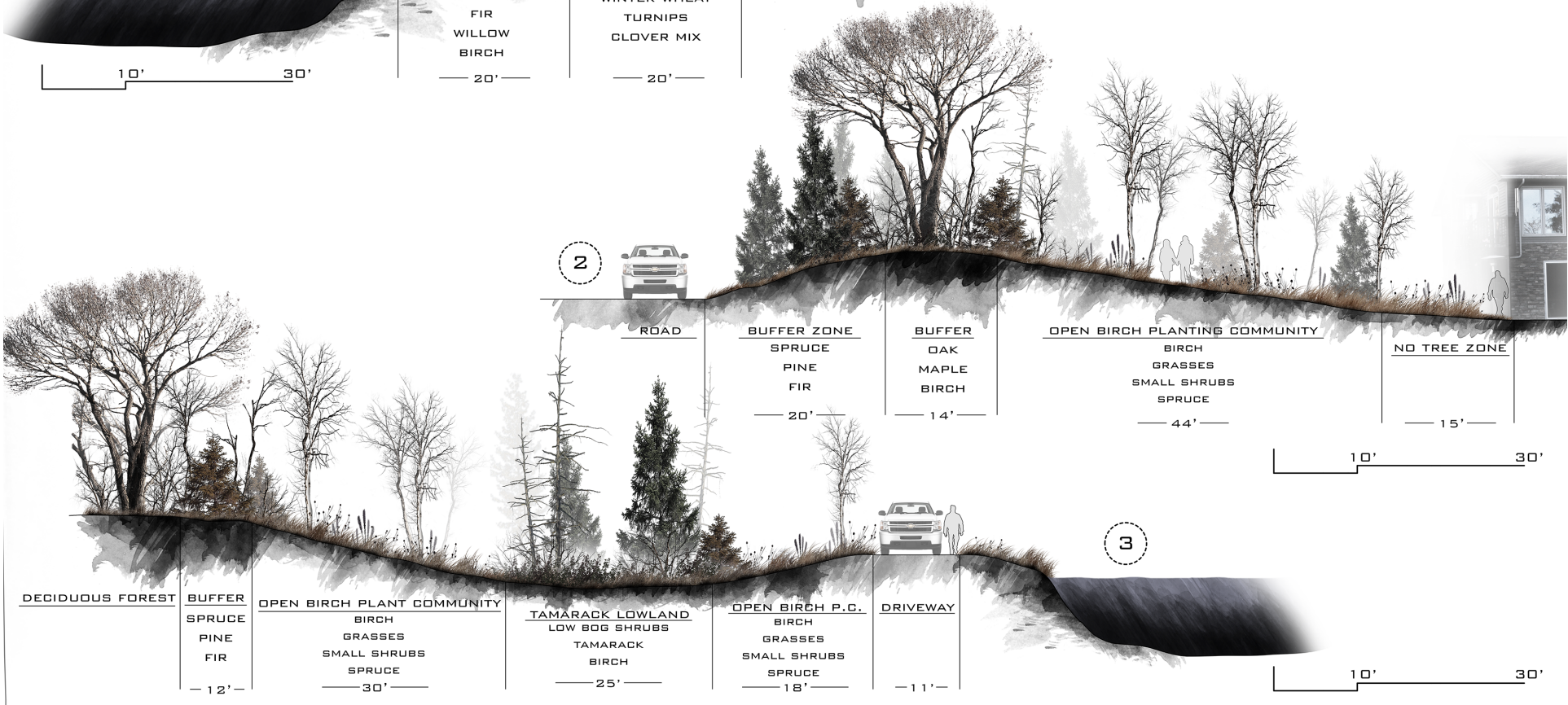
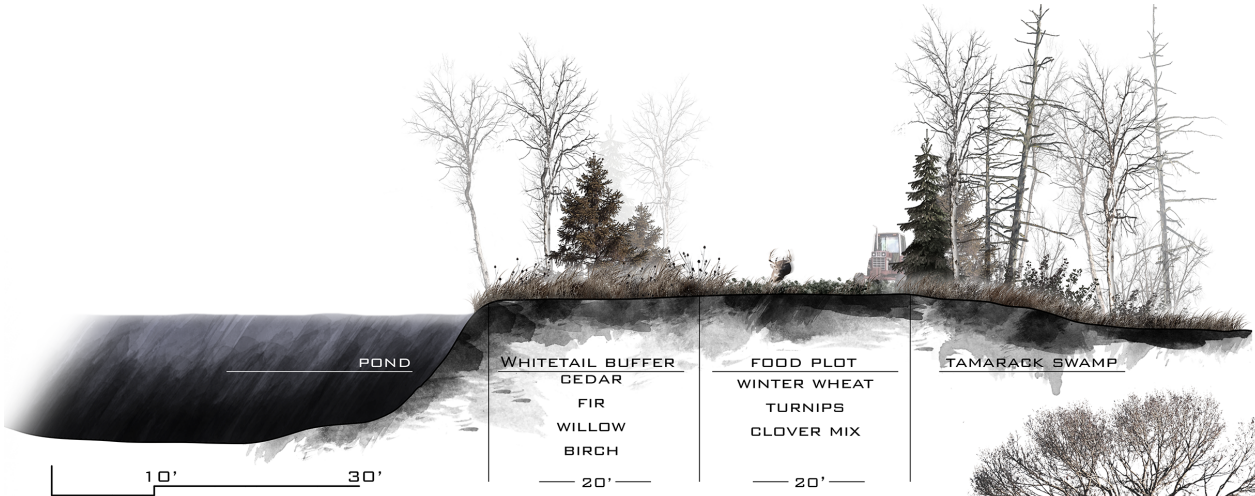


Final Design

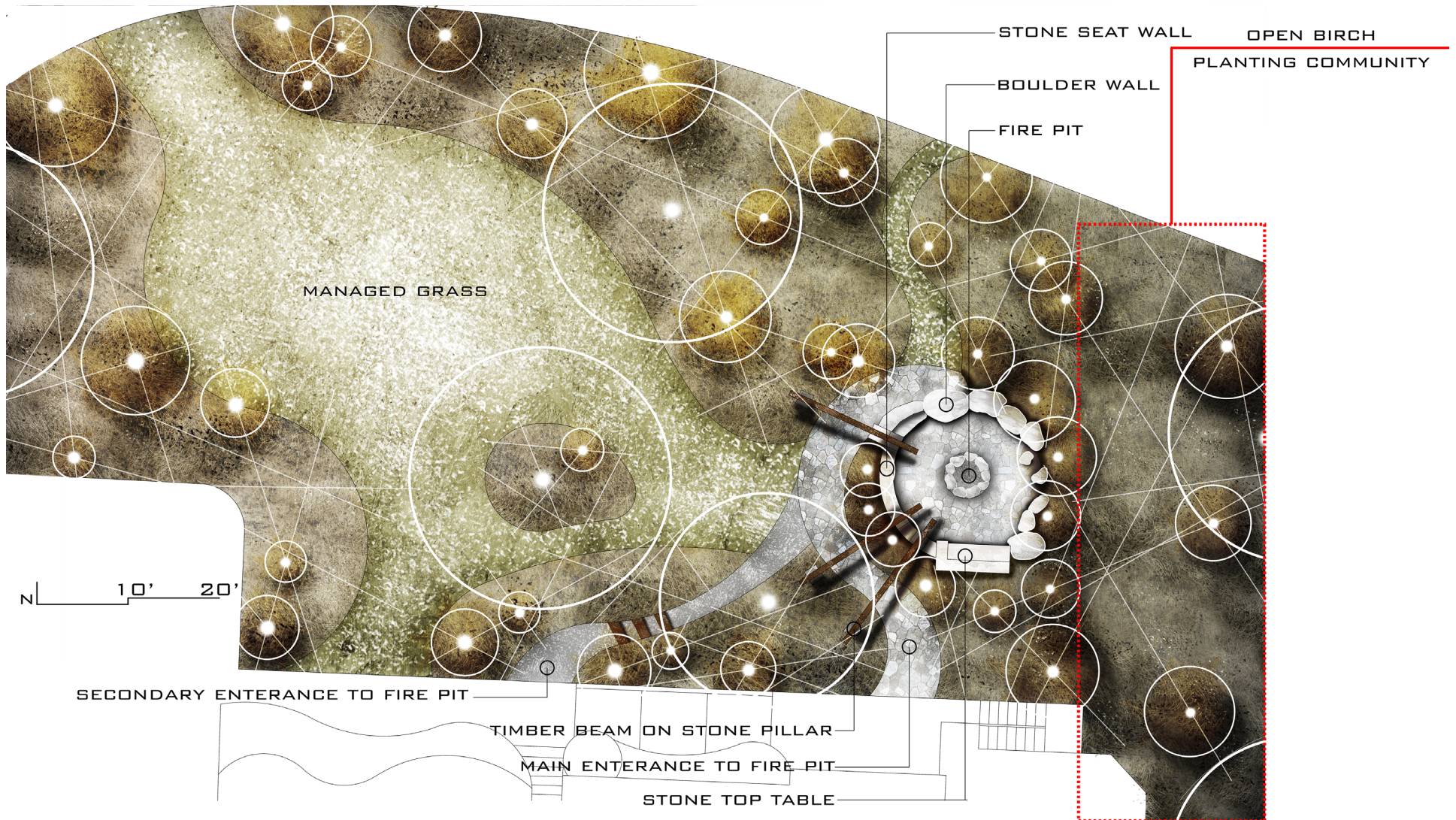
Master Plan



Sections from Master Plan

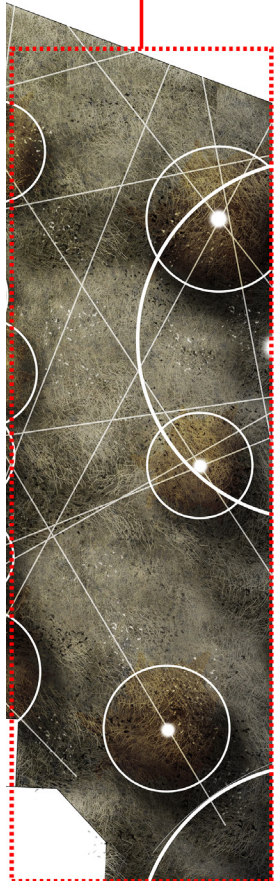


Site Plan



Site Plan Details

OPEN BIRCH PLANTING COMMUNITY

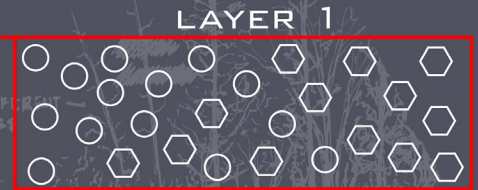


KEEPING THE CANOPY OPEN ALLOWS FOR VAST VIEWS OF THE LAND AND GOOD UNDERSTORY GROWTH

NATIVE PERENNIALS GROW THROUGH SHORT GRASSES TO ADD COLOR AND TEXTURE ALL YEAR. TALL MATRIX GRASSES HAVE A LOW DENSITY TO KEEP PERENNIALS VISIBLE. THE MAJORITY OF THE PLANTING IS STRUCTURAL TO GARUNTEE UNIQUE TEXTURE AND MONOCROMATIC COLOR ALL YEAR.

70% STRUCTURAL PLANTS FOR TEXTURE
ADAPTING ECOLOGICAL SUCCESSION TO PROMOTE HUMAN AND WILDLIFE INTERACTION
RESURGENCE
30% FILLER PLANTS FOR COLOR/STRUCTURE

LAYER 1: MATRIX PLANTING CONSISTING OF TALL GRASSES SPACED AT 3' - 4.5'



LAYER 2



LAYER 2: PERENNIALS AND WOODY PLANTS ARE ARRANGED IN SWATHS AND TIGHT GROUPS. LEFT-OVER SPACE IS FILLED WITH SHORT GRASSES.

LAYER 3



LAYER 3: LINES ARE DRAWN ACROSS SITE AND TREES ARE PLACED AT INTERSECTIONS.

THESIS 572
TYLER ANDERSON

* SPECIES IS RICH
* POPULATION STRUCTURE
SHIFTS TOGETHER
* ATTRACTIVES
* OVER TIME



Perspective of front yard

This perspective shows the “Ideal open birch community” in a dormant stage. Even when dormant, the almost black color of cone flower seed heads contrast the golden color of little blue stem and almost white tufts of grass. The open canopy allows vast views across the yard all year round.

Perspective of corridor



This perspective shows the wildlife corridor across the pond. This corridor allows deer to move and stay comfortable while eating. The vegetation also allows them to bed along the food source which has vegetation that stands throughout the entire year.



Perspective of front yard



This perspective shows the patio area. As you enter the patio you step down into the area and are immediately surrounded by vertical pillars, seat walls and boulders. Surrounding these features is the “Ideal open birch planting community”. The place feels natural but has some rustic hard-scaping that holds you in the place.