

# TRIPEAKS MONTESSORI

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# TRIPEAKS MONTESSORI


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by

Alexander P. Jansen

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# ABSTRACT

## CREATIVITY | INVESTIGATION | INGENUITY

This thesis explores the relationship between students and teachers, and how they learn and grow with alternative types of education, coalescing technology, nature, and open forms of the classroom into a unique learning environment. In this project, the education process is supplemental to everyday study, not hindering any form of learning. The proposal aims to design an alternative learning center with the surrounding site which can conform to every students' individual needs. Flexible indoor and outdoor spaces, progressive learning methods, and clean and sustainable practices are to be incorporated into the design.

Using interview and case study methods, this thesis attempts to model a learning environment for both teacher and student to become a creative and fun atmosphere while encouraging individual development throughout the school. Designed for a rural landscape in Alexandria, Minnesota, the design encompasses the surrounding natural land as a learning point for the children. How then, architecturally, can all these ideas create a positive learning environment for the individual needs of children?

How can the educational model of this school be set up to give students an experimental and meaningful education?

Key words: school, learning center, progression, flexible space, nature, technology, authentic, learning, sustainable

*“Intellectual growth should commence at birth and cease only at death”*

*-Albert Einstein, 1879-1955*

## **The Narrative**

We live in a country where the educational experience is generally the same for the majority of children in the school: learning the same topics, ideas, cultural factors, with similar expected outcomes, especially at the elementary level. However, education is important at all levels in human development. The outcome of our education is something we never lose. Knowledge is invaluable in the minds of those who know how to use it. From an early age, we all learn how to do rudimentary tasks

such as how to eat, walk, talk, and eventually move on to more complex tasks: spelling, calculus, and how to perform on stage. All of this is possible because one bit of knowledge builds on another, creating a plentitude of information within our mind. Our brains have the capacity for so much data; are we filling it the most efficient and effective way?

Children learn at different paces and in different ways. At an early level of development, all interactions with

humans, animals, nature, or technology shape how we grow and learn. If at any point something is negative or over-whelming, we tend to avoid that subject. In a way, we put a block on our mind closing out or delaying what could be an opportunity to learn a certain task beneficial for human development. If we allow this to happen to our youth, they lose the ability to explore new ideas and concepts.

In the same way, when a child is deprived of a learning opportunity within the school setting, they fail to develop social interactions and experimental creativity. Ruining the freedom to be creative at a young age causes a negative impact on that child. We need to loosen the existing rigid, systematic instruction to bleed out any hold backs children (and instructors) may be experiencing in pursuing the fullest body of knowledge.

To learn, we must interact with the environment. As we look at an education system that gives children freedom to learn in a way that suits them uniquely, the educational approach must change too. Most children are confined to a fenced in playground (if allowable outside at all) and a classroom with minimal or no natural light. Standardized teaching techniques and requirements are leaving some helpless in the struggle for a quality education, and lack access to modern technology hinders children to learn in more efficient and productive ways. We have lost connections with nature. We need to reinvent how these approaches are used within the school for the future of our children. All of this creates a new paradigm of education. Because of the many interruptions our current school systems place on children, I will design a new approach to the standard school typology, one that adheres to every child's unique need.

As I explore the implications of this model of education in physical form, growing, learning, exploring, and evolving is necessary for children become the best they can be: entrepreneurs, builders, engineers, businessmen, and innovators. To make these changes in the system I will incorporate the natural world into the design of a learning center. Without the natural world, we would not have the built environment. Synthesizing landscapes and indoor spaces into one cohe-

sive design will be one of the goals for the project. As the architect, there is a high risk for innovative and creative processes to achieve this goal. What does it mean to educate through nature? Maybe it is the primitive idea of playing with sticks and rocks. We can let the children decide. Exploration, ingenuity, and sense of curiosity are all mingled into this significant aspect of education.



Figure 01

Technology has been growing for several decades now. In some ways, it enhances life and creates ease: more advanced medical treatments, easier navigation from point A to point B, and hundreds of other forms. In other ways, it only distracts from the real world. We call it "the Digital Age". We can't avoid it; it is here. We can let it be a distraction, or we can use it for the benefits it may have been intended for before it expanded vastly over the entire globe.

Incorporating technology into the design of the learning center should be not only cohesive but also ingenuitive. It should boost the quality of education and not distract from the everyday learning tasks of the children as they enrich their minds. Education is not solely an 8:00am-4:00pm task; it occurs in every of life before we are born to death.



# Project Typology

Progressive learning center for early childhood and elementary level students in Alexandria, MN.

# Project Emphasis

The emphasis of this project is to redevelop the school within the early childhood and elementary system while blending technology, nature, and the classroom into a creative and inspirational atmosphere for all types of learners. In doing so, this project has the potential to produce a sustainable school facilitating healthy children and diverse learning styles. The design should be a free environment for exploration and learning. If school is meant to be an experiential, meaningful period in the children's life, we should not restrict the ways they naturally learn and grow.



Figure 02



Figure 03



# Project Goals

**What are the elements needed to establish a new trajectory in education?**



Figure 04

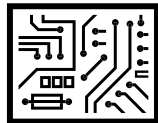
6 key goals set the mood for the project.

01



Clean Energy Design

02



Technology Incorporation

03



Maximize Learning Opportunity

04



Flexible Space Layout

05



Site Integration

06



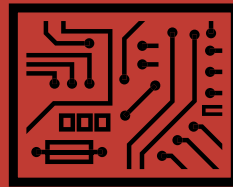
Support Authentic Learning

## Clean Energy Design



As technology progresses, so does building construction. It will start by being sustainable within itself. The school will need to be modest in energy usage. The form and quality of the project should feature these sustainable practices as a learning opportunity for teachers and students. These techniques should be beautifully crafted into the design.

## Technology Incorporation



Incorporate modern digital technology into personal and group work among teachers and students for more effective and efficient educational methods.

## Maximize Learning Opportunity



Increase diverse teaching styles for maximum learning opportunities encouraging multi-generational learning and alternative educators, including teachers, students, faculty, family, outside community members, and professionals.

## Flexible Space Layout



Healthy schools promote healthy students. As the variable climate of the site changes over the school year from frigid cold to humid and hot, indoor and outdoor spaces are both necessary for maximum instruction. The progressive learning model must allow for expansion, contraction, and flexible teaching styles.

## Site Integration



The building design should blend into the site to not compete with the existing landscape. The design should carefully consider the natural resources and forms of the land.

## Support Authentic Learning



Learning should be both fun and encouraging for all student and educators in the building. Authentic education is the highest priority to achieve this progressive model.

# User / Client

## Designed for Students and Staff

The building will have many uses. The majority of the users will be the students attending the school as well as the teachers instructing the students. There will also be other various staff and faculty in the building during normal school hours. After normal school hours, the building will be occupied by staff and faculty for lesson preparation, after school programs, and community events.

## Ownership

The learning center will be owned by the Minnesota Department of Education and locally run by the City of Alexandria's public school district. Although it is a public school, there will be a tuition to attend the school because of the unique model of the school, similar to a Montessori school. Because of the ownership, the district will be responsible to pay for the building.

## Unique Requirements

The district agrees that this type of learning center is unique; it will serve as a case study for future school designs in the district, state, and country. All hired employees must attest to the district's rules and regulations.

# Project Justification

This project is important to me because education is the basis of every aspect of the person: mental, physical, and spiritual. Without it we are no better than other creatures walking along the earth. We have a capacity for learning and using information and we are obligated to use it for the greater good of our families, community, and world.

It is important to consider why there are so many types of schools around the globe, specifically the United States: all types of learning models for all types of children. Some are cultural and some are dictated by the government while some reflect personal choice. As designers, we should help to achieve quality education for all generations by giving all children access to local, unique learning centers where they can flourish into adulthood.



Figure 05

*“...to achieve  
educational excellence  
and inspire a life-long  
passion for learning.”*

*-Alexandria Public School Mission*



# RESEARCH

## What is Education?

### A Look into Our Current Education Models

There are a number of different learning styles in the United States today. Some models work well while others lack motivation and support, thus many children are left with an unequal education. The region where a child live also has a significant role on how education is meaningful and productive. It is up to designers and educators to help depict why current school systems are not helping children learn to their fullest capacity. Gould Evans writes, “Our education system has an obligation to prepare future generations for a rapidly changing world” (2016). Because of the shifting biosphere and its implications on our future, we should be constantly refurbishing our school system to give children a revamped, progressive education that will excel children into future generations.

The variety of school systems in the world is vast: public, private, some larger than others, homeschooling, and so on, but which unique system gives a child the opportunity to learn in such a way that the child lives a healthier, holistic life because of that education? Educators around the United States need an ever-changing current system for their profession while keeping in mind the most important task: the education of the child. Sir Ken Robinson said “The fact is that given the challenges we face; education doesn’t need to be reformed — it needs to be transformed. The key

to this transformation is not to standardize education, but to personalize it, to build achievement on discovering the individual talents of each child, to put students in an environment where they want to learn and where they can naturally discover their true passions” (Robinson, 2009). Education is the underlying goal of school and is vital to the world today. It is how we live, and it is imperative for our future.

There are two main models I would like to discuss: public and private, and within many combinations have developed. Public schools offer several choices with almost 100,000 schools in the United State educating 50 million students from kindergarten to high school (Teach.com, 2016). Public school is controlled by the government and must meet minimal testing credentials in order to advance in the system. Although free for the students, they rely heavily on funding from the Federal and State governments. This is a very common system in the United States, but as previously stated, it is hurting our students in this type of system by holding back creativity and originality when a child’s learning is standardized.

Within the public category is a smaller body of schools, educating 1.3 million students K-12 per year. These are called charter and magnet

schools and are usually controlled by the community or co-op who set the goals and standards for the program. These types of systems usually have higher academic standards and smaller class sizes allowing for a more personal connection to learning.

On the other side of the school system is the private sector. This encompasses many schools around the country. Although originally founded by the Catholic Church, many denominations, faiths,

adopt insights from the human being and nature for the development of the child, creating a sense of wonder and a love for learning.

We all have our own story and preference for schooling. But what if there was a school that touched every child in ways that excited them and made them love school? Can we even call it school at that point or is it a lifestyle of learning? How, then, should we educate our young students for the future? We need to relook at the definition of education.

In its simplest form, education is what is human in us (Giussani, 1995, pg. 7). Looking at hypothesis' for what is right and wrong, true and not true, is purely education. The past can only be authentically presented within the context of a life's experience (Risk, 8). To me, the best way we learn is through mature experiences. For example, say Johnny picks up a stone off the ground as he had done many times before, and then realized he burned his hand. He did not know the stone was part of a fire pit with a blazing fire inside, but he soon learned. He lived his life in criticism, meaning he compared his experience to what he knew and observed. True education means to critically understand these things to say either yes or no to all the questions presented in life, science, history, astrology, whether skeptical or eccentric—this is what will be the turning point for a young child to mature in his education. “We need to rethink basic nature of human ability and the basic purposes of education now.” (Robinson, 2009, pg. 40). Learning from the past from trial and error, this is real education.

Education is always evolving; transforming to suit technological advancements, population requirements, and cultural lags in our community. Oxford's definition of education reads “the process of receiving or giving systematic instruction, especially at a school or university.” (Oxford Dictionary). Although this common definition can be in agreement for most traditionalists, it limits education to its full potential. “What is catastrophically wrong with this mode of thinking is that it severely underestimates human capacity” (Robinson, 2009, pg. 39). This can be a problem when trying to fully educate our youth.



Figure 06

and secular bodies grasp this idea for education. They are not funded by the government and usually have a particular subject of interest reading children for higher education and can infer household belief on the students as a school.

Education standards is what makes a school system different from the rest. They all carry similar interests—science, English, history, math, art, and so on. For instance, the home schools and private schools exceed in teaching one-on-one or small group coaching, but with the added benefit of personal growth, spiritually, and the connectivity you wouldn't get as much within the public school setting. For some, these are required qualities that parents need for their child's education. Another example is the Waldorf schooling system. This is predominantly private method for teaching, although in recent years the public system has adopted many ideas and conclusions from it. To me, it is intriguing because of the sense of urgency and criticism it creates within the system. It focuses on thinking, feeling, and willingness by cultivating a sense of truth, imagination, and responsibility (Mission and Vision, 2016). They



We know that standardized testing is not the best option for learning. Oscar Wilde said, “Consistency is the last resort of the unimaginative.” (1885).

Many studies show that it isn’t helping the cause for children. We all have our own way of learning at our own paces. I am one of them. I did not do well on those kind of tests, but I excelled in other areas such as art, music, wood shop, and so on. Robinson says that there is tremendous emphasis on standardized tests and rarely any funding for “non-essential” programs such as the ones I excelled in. We wonder why children today seem so unimaginative and uninspired; our current systems are draining the creativity out of children (2016). Our industrialized system likes to cram facts and figures into students’ heads. “This process is a safe default, but in fact, learning is far more powerful when contextualized to each student’s individual life experiences.” (Gould Evans, 2016, pg. 8). All the standardized testing is making children alienated from the entire culture of education. Education is the system that is supposed to develop our ideas and natural abilities (2016). We need to ask questions such as ‘how can we inspire our children to want to learn curiously and naturally?’ and ‘how can we help them reach their full potential?’ Robinson says that “[The] one-size-fits-all approach to education marginalizes all of those who do not take naturally to learning this way.” (2009, 36). The goal of our schools is to inspire children to be the greatest, to develop concepts and ideas, raise self-esteem, and want to learn and grow as they mature, not rid original ideas that will lead into our future.

To regain our need for an authentic education, we must look at our early ways of doing things before the school systems were set in place. Before the classroom existed, people learned parallel with nature. They learned from the trees, sun patterns, environmental conditions set in place by the region they lived in. All areas around the world had their own civilized way of teaching and learning from the Greek Paideia to Indian universities such as Nalanda in the first millennium. Most early schools before mass literacy taught subjects on reading, writing, religion, art, music, and dance. Until the invention of the one room schoolhouse, education

in the United States lacked formalization. All education was done in the home. As the population and need for formal education grew dominated by the Industrial Revolution, mass education methods met the needs of economic interest of the era (Robinson, 2009, pg. 35). At the time, this was set in place, educating all those who did not have any formal education. What this did, though, was create a system that took away from the uniqueness of learning.

One of the most important criticisms today is the use of the outdoors within the school systems. Nature as a tool for learning is very limited for children today. For large public institutions, only a small amount of outside education is offered. Most of the time is taken up by the ‘meat and potatoes’ classified by professors and principals and minimal amounts of time for arts and outdoor time. Richard Louv said in his recent publication *Last Child in the Woods*: “Nature inspires creativity in a child by demanding visualization and the full use of senses ... In nature, a child finds freedom, fantasy, and privacy: a place distant from the adult world, a separate place.” (2005, pg. 7). To counter recent growths in child obesity, depression, mental illness, attention disorders, and the need to be plugged in, Louv continues to say that in the span of a century, the American experience of nature has gone from direct utilitarianism to romantic experience to electronic detachment (2005, pg. 16). Nature and preventative therapy should be used



Figure 07



Figure 08

as the means for mental illness and attention disorders first before the use of medication, which has been proven to benefit children, but in reality they are being overlooked. Medications may seem like the easy way out for parents and teachers, but they are being prescribed too often when we have an abundance of natural beauty that can help lower symptoms. In fact, new evidence suggests that the need for such medications is intensified by children's disconnection from nature (Louv, 2005, 49). Cornell University reported that classrooms with a window looking outside to nature can help children with stress (2003). Rachel Carson, a nationally renowned environmentalist and writer, wrote "Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts." (1962). Education is about being curious of what is around us. If we deplete ourselves of it, we die to our senses for what we were made for.

Louv uses his personal experience in his book to explain that nature was the turning point for his childhood; it's what everyone used to do: "Nature is reflected in our capacity for wonder ... [it] calmed me, focused me, and yet excited my senses." (2005, pg. 9, 10). He continued by interviewing

3,000 households all over the country from coast to coast to find the reason why children were not outside during the day like he used to be growing up. He ambitiously told a child during an interview to go play outside for two hours in the field while he spoke with his parents. With much resistance, the child (and the other children around) came back not after two hours but more than two, surprised themselves that they liked being in the field. This is exactly what is missing in our daily routines as educators to get the children out to go play. "These are some of the utilitarian values of nature, but at a deeper level, nature gives itself to children ... At this level, inexplicable nature provokes humility." (Louv, 2005, pg. 8). Louv finishes by saying that this is "the new landscape of the childhood." (2005, pg. 8).

Switching to modern conditions, though, as technology advances, the use of gadgets, smartboards, and devices should be cohered into the classroom. It serves a great purpose for this new generation of today's students. Think about it: our new students entering into kindergarten today won't graduate until 2029 and further, retire until 2081. Imagine how much technology will advance and be intertwined into our world then. According



to Gould Evans, “Technology should be integrated but not obstructive ... Yet it should be ever present (ambient) such that shifting from analog to digital activities is seamless.” (2016). The use of non-digital learning should not be a hindrance in the education process but be adaptable with the school model, yet be constantly updating and changing to keep up the pace with rapid changing needs, applications, and platforms (Gould Evans, 2016, pg. 59). The advancement of technology is much needed for the future of our education systems; it’s happening now and will be more present in future days.

and innovative ideas, all while providing them the best education we can. They are the future of the world, let’s not set them up for failure. As Robinson concludes, “The future for education is not in standardizing but in customizing; not in promoting groupthink and “deindividuation” but in cultivating the real depth and dynamism of human abilities of every sort. For the future, education must be elemental.” (2005, 394).

These systems have great ideas but also carry negative impacts on children. Some are standardized concepts that children cannot grab onto, others are imposed religious beliefs, and some do not offer ample outdoor time. Upcoming, there are new models transposing to meet the needs of the current conditions set by the children themselves. Gould Evans says that we need to set expectations for such anticipated change (2016). We do, indeed, need to set up our school so that we can evolve our ideas and habits to provide the best education for our youth. Gould Evans Architects has started the trend, let’s continue to fight for a better education for our children, encourage imagination through their childlike nature, spark new



Figure 09

# Annotated Bibliography

Carson, R., Lear, L., & Williams, T. (2002). *Silent Spring* (001 Series). Houghton Mifflin Harcourt.

*Rachel Carson was the leading ecologist, writer, and biologist of her time. In her 1962 publication Carson alerts a large audience of environmentalists and the general public on environmental and human dangers of pesticides in the chemical industry affecting the air, water, and land we live in. This post-WWII reaction spread to many people in the movement from small town to congress. The author is aware of the needs of nature and how we need to support all types of preservation for future generations.*

Cordasco, F. (1976). *A Brief History of Education: A Handbook of Information on Greek, Roman, Medieval, Renaissance, and Modern Educational Practice* (Revised). Rowman & Littlefield.

*The book provides a concise overview of education practices reflecting many topics in history: agricultural, academic, significant historical people, and collegiate. It explains the different types of education historically. For my sake, the author explained the historical significance beginning with early forms of education.*

education - definition of education in English | Oxford Dictionaries. (n.d.). Oxford Dictionaries | English. Retrieved from <https://en.oxforddictionaries.com/definition/education>

*The Oxford English Dictionary provides tens of thousands of definitions for the English language. First published in 1884, the writers took 5 years to reach the work ant. This dictionary was high tech at the time of publication; existing dictionaries were incomplete and deficient. This definition compared the use of education to modern day thinking*

*with the ever changing definition.*

Giussani, L. (1995). *The Risk of Education*. New York, New York: The Crossroads Publishing Company.

*Luigi Giussani was a high school professor as well as a priest who was interested in the lives of people on a theoretical level. In his book *The Risk of Education*, he discusses the definition of education in terms of fundamental truths. He then elaborates to the element of faith. Giussani was well aware of his surroundings as education. The audience of the paper should be well equipped on the conditions of the topic from Giussani's text.*

Gould Evans. (2016). *Inflection--Anticipating the Next Great Shift in America's Education*. Gould Evans.

*Over the past 6 months, Gould Evans Architects has been doing research to develop a new model for an educational school system. Bases off of a similar one-of-a-kind model in Florida, this new California model incorporates collaborated learning, integrated organization, and new design techniques and well as many other concepts and ideas. The document serves as a great resource for educational teaching. It provided modern references for up-to-date ideas of how to fix our educational systems.*

Lear, L. (2015). *Rachel Carson's Biography* [Biography]. Retrieved October 11, 2016, from <http://www.rachelcarson.org/Bio.aspx>

*Rachel Carson was raised in Springdale, Pennsylvania in 1907. She, forher time, was the leading ecologist, writer, and biologist. She graduated from Pennsylvania College for Women in 1926 and received her MA in zoology*

from Hopkins University in 1932. She led the revolt against pesticides after WWII and was heard through Congress speaking out toward all people to save our water, air, and land. She provided a thoughtful quote regarding the use of nature.

Louv, R. (2005). *Last Child in the Woods: Saving Our Children from Nature-deficit Disorder* (1st Edition). Algonquin Books.

*Richard Louv is a leader in nature-related topics revealing the real truth for children and their lack of natural encounter today. In his book *The Last Child in the Woods: Saving Our Children from Nature-deficit Disorder*, he explains the relationship between children and nature, why we need nature, personal experiences with the subject, and what it is like for the children to reencounter nature. His breathtaking book provides many insightful points for reasons children should be in tune with nature.*

Minnesota Waldorf School Statement of Philosophy, Mission and Vision | Minnesota Waldorf School. (n.d.). Retrieved from <https://mnwaldorf.org/mission/>

*The Waldorf system is one of many educational models growing in popularity in the United States. It uses critical childhood development techniques such as frontal growth from the power of imagination and the sense of truth with daily encounters from nature and hands on learning. This model is especially helpful when one studies the link between school and nature.*

Mookerji, K. (1989). *Ancient Indian Education: Brahmanical and Buddhist* (Vols. 1–2). Banarsidass Publishers.

*This book runs through the education of the Vedas, the scriptural basis for which Hinduism is based. It talks about education in terms of literature and philosophy important to the Indian culture. This source helped define the early*

*forms of education.*

Robinson, K. (2009). *The Element: How Finding Your Passion Changes Everything*. Penguin Books.

*Ken Robinson is a leading thinker and speaking for self-fulfillment and creativity, talent, passion, and achievement. His book *The Element: How Finding Your Passion Changes Everything* provided many insightful passages about the education of the child and the need for quality educations. All of his thoughts in the book reflect one important goal: finding your Element, a term he uses for the success of the person in education, business, and the community in the twenty-first century.*

Types of Schools. (2016). Retrieved October 11, 2016, from <https://teach.com/where/types-of-schools/>

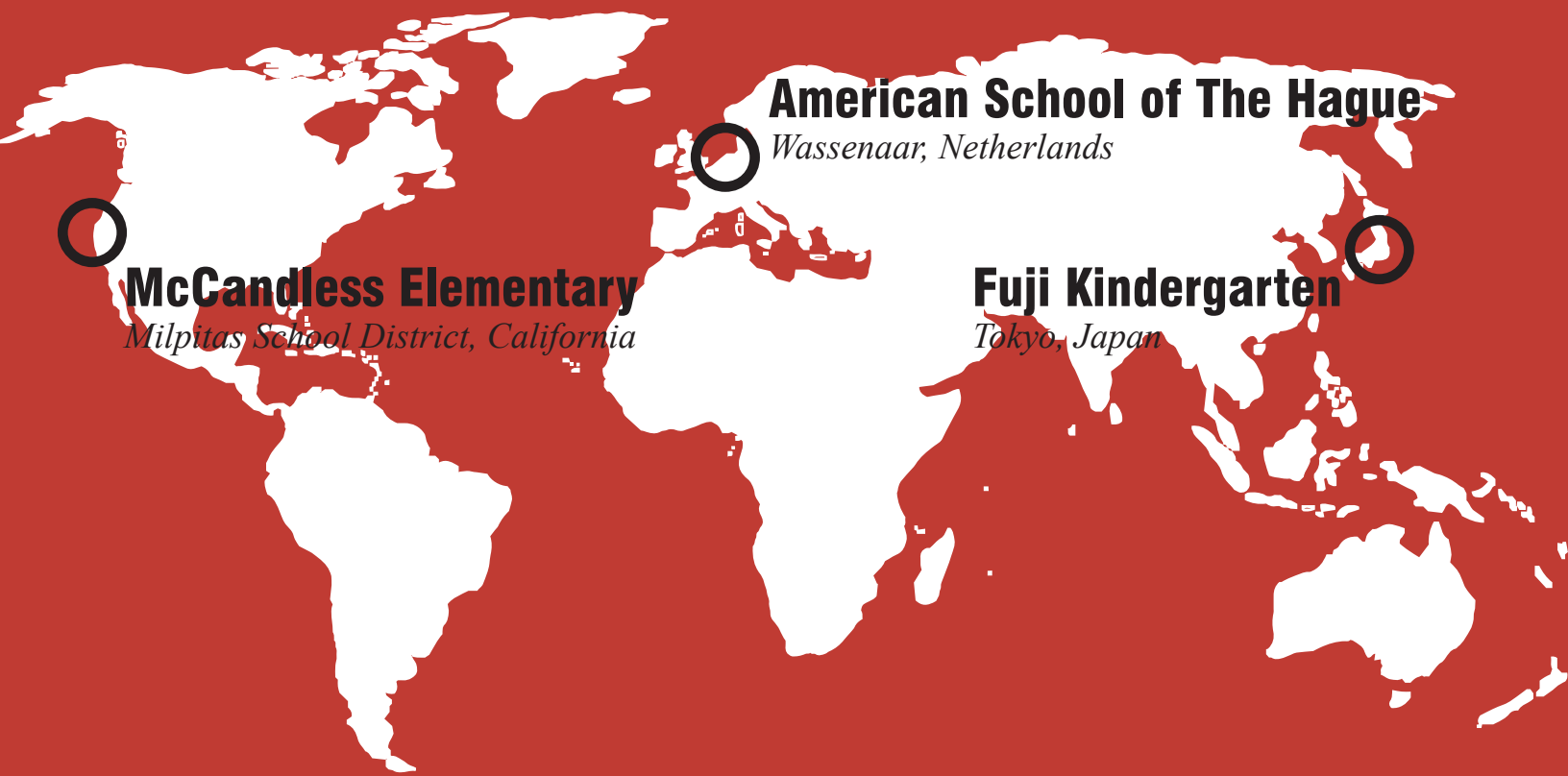
*This site offers a complete list of the main education models set forth within the United States. The site gives help for those interested in pursuing a career in teaching and gives adequate definitions for each main model while providing other basic information such as salary, tips, and how to get a job.*

Wilde, O., & Jackson, J. W. (1991). *Aristotle at afternoon tea: the rare Oscar Wilde*. Fourth Estate. Retrieved from [https://books.google.com/books?id=u\\_IKAQAAMAAJ](https://books.google.com/books?id=u_IKAQAAMAAJ)

*This book carries a collection of Oscar Wilde's articles, criticisms, and journals. Wilde was known for his plays, stories, epigrams, and poems. He had a niche for essays. In this text, he illustrates his personal views of the art of conversation. He provided a positive outlook on education reform.*



# PRECEDENT STUDIES



**McCandless Elementary**  
*Milpitas School District, California*

**American School of The Hague**  
*Wassenaar, Netherlands*

**Fuji Kindergarten**  
*Tokyo, Japan*

Each of the studies added particular value to the understanding of the design idea while linking directly to the research completed. All three studies share the same typology, but are each uniquely different in their style of educating: McCandless offers insight on programmatic layout and curriculum; Hague gives understanding to materiality and comfort including light and space quality; and Fuji Kindergarten shows an open plan and gives children freedom to play how they please on a natural and open playground.

The locations of the case studies is significant. Each school is in a different climate zone, allowing for further understanding in relation to the site in Alexandria, MN—hot summers and cold winters. Milpitas, California is a warm Mediterranean climate with warm winters linked to Tokyo's humid subtropical climate. The climate in Netherlands has cool summers and mild winters.

Each case study also helps define different architectural styles.





Figure 10

# Case Study One

## McCandless Elementary

*Milpitas School District,  
California*

*“This school will demand that the teachers work as collaborators rather than individual ‘directors’ of their classrooms.”*

*Cary Matsuoka,  
Superintendent of the Milpitas School District*

The Milpitas School District is in the city of Milpitas, just north of San Jose, California. In this area, there school resides with only a small number of families, with plans to grow. McCandless Elementary school is a valued resource for immigrants traveling mostly from China and India, supporting the Silicon Valley technology industry.

The campus looked at six design principles to govern their design:

### **Progressive teaching practicing progressive instructional models**

This principle demands professional growth for the collaborative teachers with a development program, peer

coaching, and encourage change and risk taking.

### **Diverse learning styles and learning models**

An array of spatial sizes support various learning styles for student and faculty growth. Multi-modal furniture provides easy reconfigurations, integrated high and low-tech tools in indoor and outdoor spaces give students freedom to choose where and how they learn.



## Movement and learning in motion

Encourage hands-on, physical, kinetic learning for each student in or outdoors for learning year-round.

## Authentic learning experiences

Students work with professionals to give them opportunities emulating real world explorations with nature, science, and creativity.

## Parents and community as active partners

Each learning community creates a culture that promotes “extreme hospitality”, a close-knit multi-cultural community for students, parents, outside professionals and other community members. Adequate multi-use space is given to this principle.

## Embed sustainability throughout

Healthy schools promote health students. Sustainable design principles become an educational learning tool for students for present and future practices.



Figure 11

## A Culture Designed for Innovation

The school community is set up in learning teams. These are comprised of 4- teachers teamed by grade level to lead each team. This provides the necessary collaborative approach for the learning goal of each student. Teachers are continually evaluated on their collaborative merit.

## Community

The classroom doesn't exist in this building. They are replaced by Learning Communities. Each community of 4-5 teachers supports 96-120 students each with a differentiated learning strategy. Learning Communities are reliant on high-performance acoustics, effective team teaching, integrated use of technology. A blend of settings support a wide range of activities from open to private, large to small, and indoors to outdoors. Principles of 'Universal Design for Learning' are employed throughout –a space for every type of learner. The Learning Communities open to the central courtyard and well as smaller outdoor rooms. The use of transparency allows for easy supervision. A Large multi-purpose building also opens to the main courtyard and is connected to the amphitheater as supports the dining services and it used for large scale gathering within the school and community.

## An Innovative Learning

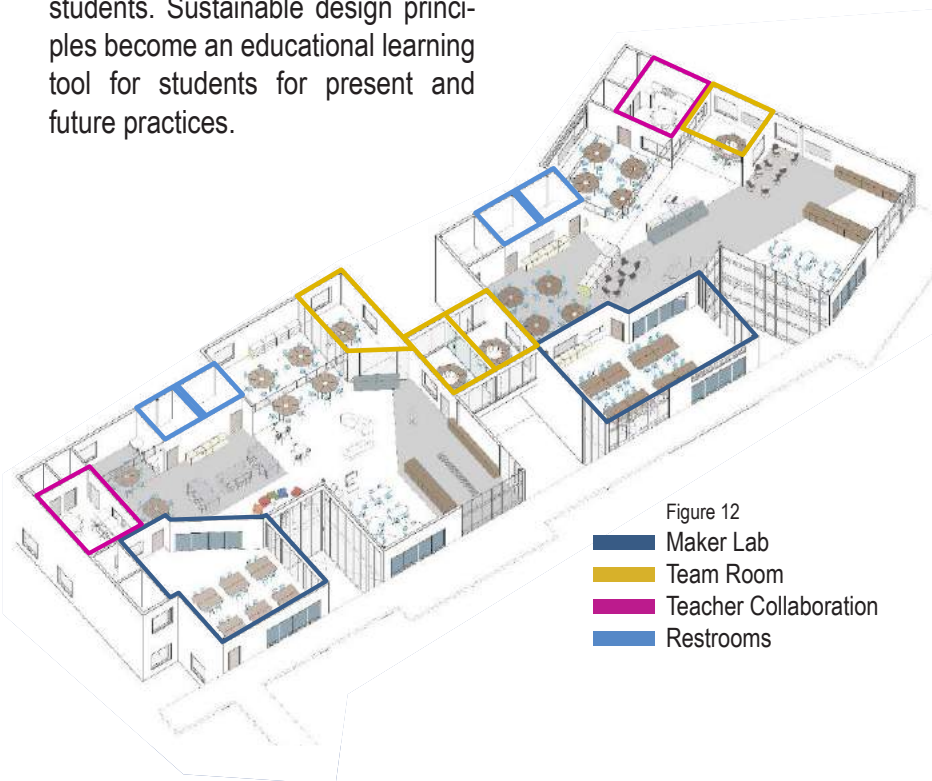


Figure 12

- Maker Lab
- Team Room
- Teacher Collaboration
- Restrooms

The site promotes learning-based play which can be seen in the “adventure playgrounds” as constructivist play versus controlled prescriptive play. Other informative playgrounds include the components of stages, forts, sundials, rain gauges, and more.



Figure 13

## *Case Study Two*

### **American School of The Hague**

*Wassenaar, Netherlands*

*“The materialization of the new building refers to a barn by applying wood substructures, caps and wooden parts for wall cladding.”*

*Kraaijvanger Architects*

The American School of The Hague is a school for The Early Childhood. The farm consists of a series of buildings making up the campus that is entirely integrated in the environment and landscape. Recently, the school built and addition to an existing sixteenth-century farmhouse called the “barn”. It can hold up to 250 children age 0-6 years of age. The addition to the school includes a nursery, twelve classrooms, a gym and a multipurpose room. The site’s historic significance persuaded the shape and height of the building of the neighboring agricultural structures.

#### **Materials**

The architect Hans Goverde of Kraaijvanger Architects used soft wood for external cladding and ties the new construction with the old, rustic setting. Exposed beams show through inside for extended warmth and comfort. The architect wanted to use warm material for both interior and exterior because the building is used by small children prone to danger and exploration.

To fit in with the agrarian aesthetic, large windows spread the roof and walls of the structure and fill the building with natural light bouncing from both sides. A glazed walkway reveals a void between the main space in the building and the atrium where the main entrance sits.

The landscape of the school is based on the objectives for the school. It contains several playgrounds to suit differing age groups with greenery, educational components such as vegetable gardens, and sloped landscape to separate the site from neighboring landscapes.

The school features educational techniques to teach children how to use energy efficiently. It uses solar panels, LED fixtures, cold and heat storage, waste water reuse, and recycled materials. The school strives to teach this to their students at a young age.



Figure 14



Figure 15



Figure 16





Figure 17

## Case Study Three

### Fuji Kindergarten

Tokyo, Japan

*“...It is good to makes your students do want you want, it is even better to create an environment in which they can be creative and explore the world.”*

*Antoine de Schipper, Author.*

Fuji Kindergarten is a school for 500 Tokyo children. Tezuka Architects, in 2007, designed a school for young, adventurous pupils based on his earlier 2001 Roof House, having a similar round shape and walkable roof idea.

This project is widely known for the rooftop playground. It features circular circulation so kids can run in circles endlessly as Tezuka noticed about the children while designing the building. Tezuka's main philosophy behind his design was to let go and let the children create their own fun. He didn't want to put a slide in the design because that tells what they can and can't do with it, but ended

up adding it for some other reason. He mentioned that kids need a small dose of danger, hence his creation of a transparent railing and a large, vast oval rooftop with no guidelines on how to play.

One problem Tezuka faced while designing is the tree problem. There were trees on the site that he wanted to keep. What he did was brilliant. He let the trees stick through the building and turned it into a more natural playground, shown in Figure 20.





Figure 18

## Open Plan

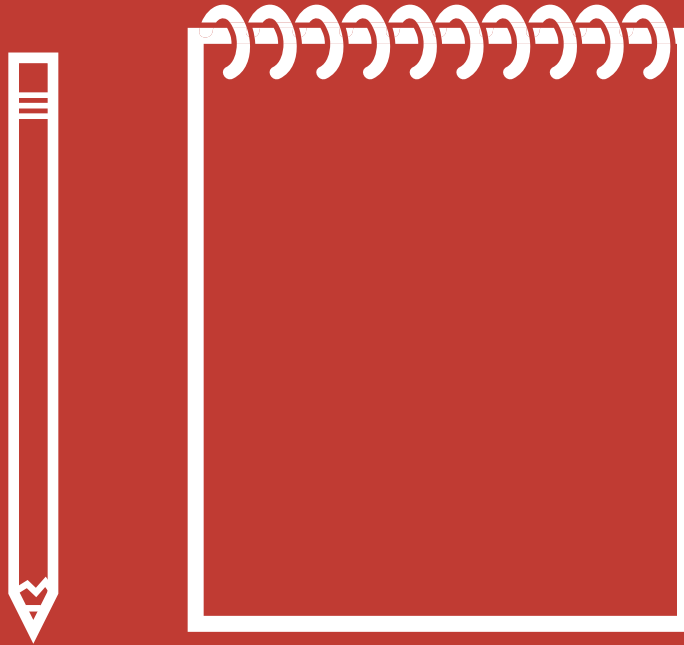
On the lower end of the building, the architect wanted to open the building as much as possible. He did this by installing six rails of sliding glass doors make the inside outside, shown in figure 11. The interior can almost completely open to extend the size of the interior. Tezuka noted that if children get distracted they will eventually they get back in the group and start with a fresh mind; it's a circle. This open plan allows for interdisciplinary classes, exemplifying children learning from their peers instead of just their teachers. When children are on their own exploring, it creates wonder in others to follow. This parallels Tezuka's philosophy for the building.



Figure 19



Figure 20



## The Program

With a total net SF of a little over 22,000 (gross: 58,000), the building is small and needs only small amount of interior space to be a successful school. The learning center houses early childhood, pre-K, and K through 6th grade. The spaces of high importance are the media center and the learning communities. Each “learning community” for each grade level will consist of a multi purpose spaces for large group work, small group work, and individual work. This is to adhere to the learning typology set for the school.

With a large site, the building footprint takes up only a small about of space allowing for a highly natural site. This is crucial for the success of students in the school giving the them freedom in exploration, investigation, and options.

## Function

Since elementary schools are the beginning of young children's education, the school shall be designed for maximum learning opportunity encouraging learning from every generation including teachers, students, faculty, parents, outside community members, and professionals.

Learning happens outside the classroom since students are only with teachers for a few hours a day. Therefore, all areas of the design, including circulation space, media centers, gymnasiums, and cafeterias should be an open place to learning individually and with groups.

## Economy

Since each learning community has multiple options for learning, each child can learn at his or her own pace. The "classrooms" should be designed flexibly and efficient to maximize methods to these changes.

Learning Communities promotes group collaboration between mentors and their peers as well as students and their classmates. The design should support all types of progressive instructional models.



Figure 21

## Form

Since the landscape of rolling hills and prairie grass exist on site, the design should match the location and not compete with the existing landscape. The design should carefully consider the natural resources and forms of the land.

The form of the building should reflect sustainable practices as a learning opportunity for teachers and students. Careful consideration should be used when designing spaces, including masses, systems, and materials.

## Time

As the reworking of a new learning model for elementary education continues to change, the school must be designed to allow for expansion, contraction, and malleable teaching styles.

Health schools promote healthy students. As the temperate climate of the site changes over the school year, indoor and outdoor spaces are both necessary for an open, changing education. The design should create sustainable learning models indoors and outdoors.



Figure 22

# Space List

Table 01

Function	People Capacity		Unit	No. of Units	Area/Unit	Net Area	Net Area Subtotal
<b>Administration</b>							
Principals Office	1	3	1	1	150	150	150
Receptionist	1	1	1	1	80	80	80
Reception Seating	1	10	1	1	200	200	200
Small Conference	-	6	1	3	150	150	450
Large Conference	-	20	1	1	300	300	300
Nurse/Health Services	1	4	1	1	500	500	500
Server Room	-	2	1	1	150	150	150
File/Work Room	-	4	1	1	300	300	300
Toilet	1	1	1	2	120	120	240
Subtotal	5	51	9	12	1,950	1,950	2,370
<b>Gymnasium</b>							
Main Gym	-	-	1	1	8,000	8,000	8,000
Equipment Storage	-	5	1	1	150	150	150
Office	1	3	1	1	100	100	100
Multi -purpose	-	-	1	1	1,700	1,700	1,700
Subtotal	1	8	4	4	9,950	9,950	9,950
<b>Media Center</b>							
Entry Vestibule	-	-	-	1	80	80	80
Reference Desk	1	-	-	1	80	80	80
Lounge Seating	10	20	1	2	400	400	800
Storage	-	1	1	1	100	100	100
Table Seating	-	20	1	1	320	320	320
Comp Lab	-	20	1	1	1,000	1,000	1,000
Book Shelves	-	-	1	1	120	120	120
Subtotal	11	61	5	8	2,100	2,100	2,500
<b>Cafeteria/Kitchen</b>							
Kitchen	-	-	1	1	1,500	1,500	1,500
Cafeteria	-	-	1	1	13 sf per student		1
Dry Food Storage	-	1	1	1	300	300	300
Cooler	-	1	1	1	250	250	250
Freezer	-	1	1	1	350	350	350
Dishwasher	-	2	1	1	300	300	300
Toilet	-	1	1	1	120	120	120
Receiving/Holding	-	2	1	1	300	300	300
Office	1	2	1	1	150	150	150
Subtotal	1	10	9	9	3,270	3,270	4,771



## Space List Continued

Function	People Capacity		Unit	No. of Units	Area/Unit	Net Area	Net Area Subtotal
<b>Classrooms</b>							
Early Childhood	30	30	1	1	1,200	1,200	1,200
Kindergarten	30	30	1	1	1,300	1,300	1,300
Classrooms	30	30	1	6	1,000	1,000	6,000
Teacher Collaboration	3	3	1	8	200	200	1,600
Multi purpose	-	60	1	1	1,500	1,500	1,500
Subtotal	93	153	5	17	5,200	5,200	11,600
<b>Support Space/Circulation/Restrooms</b>							
Custodial	1	1	1	1	600	600	600
Custodial Closet	-	-	1	-	40	40	40
Circ and Structure	-	-	-	-	-	-	-
Room	-	-	-	-	-	-	-
Subtotal	1	1	2	1	640	640	640

## Area Summary

Table 02

Function	Net Area	Net Area Subtotal	Net:Gross	Gross Building Area
<b>Administration</b>				
Principals Office	150	150	0.50	300
Receptionist	80	80	0.50	160
Reception Seating	200	200	0.50	400
Small Conference	150	450	0.50	900
Large Conference	300	300	0.50	600
Nurse/Health Services	500	500	0.50	1000
Server Room	150	150	0.50	300
File/Work Room	300	300	0.50	600
Toilet	120	240	0.50	480
Subtotal	1,950	2,370		4,740
<b>Gymnasium</b>				
Main Gym	8,000	8,000	0.50	16000
Equipment Storage	150	150	0.50	300
Office	100	100	0.50	200
Multi -purpose	1,700	1,700	0.50	3400
Subtotal	9,950	9,950		19,900

## Area Summary Continued

### Media Center

Entry Vestibule	80	80	0.50	160
Reference Desk	80	80	0.50	160
Lounge Seating	400	800	0.50	1600
Storage	100	100	0.50	200
Table Seating	320	320	0.50	640
Comp Lab	1,000	1,000	0.50	2000
Book Shelves	120	120	0.50	240
Subtotal	2,100	6,500		5,000

### Cafeteria/Kitchen

Kitchen	1,500	1,500	0.55	2727
Cafeteria	1	0.55	1	
Dry Food Storage	300	300	0.55	45
Cooler	250	250	0.55	454
Freezer	350	350	0.55	636
Dishwasher	300	300	0.55	545
Toilet	120	120	0.55	218
Receiving/Holding	300	300	0.55	545
Office	150	150	0.55	272
Subtotal	3,270		4,771	5,943

### Classrooms

Early Childhood	1,200	1,200	0.50	2400
Kindergarten	1,300	1,300	0.50	2600
Classrooms	1,000	6,000	0.50	12000
Teacher Collaboration	200	1,600	0.50	3200
Multi purpose	1,500	1,500	0.50	3000
Subtotal	5,200		11,600	23,200

### Support Space/Circ./Restrooms

Custodial	600	600	0.50	1200
Custodial Closet	40	40	0.50	80
Circ and Structure	-	-	0.50	0
Subtotal	640	6	40	1,280

### Total SF

22,270 NET 60,063

## Land Use Requirements

Table 03

Function	People	Gross Building Area	Floors	Building Footprint	GAC	Land Area
<b>Administration</b>						
Building	270	57,935	1	57,935	3.5%	1,655,000
Parking	60	12,000	1	12,000	0.7%	1,655,000

# Relationship Matrix

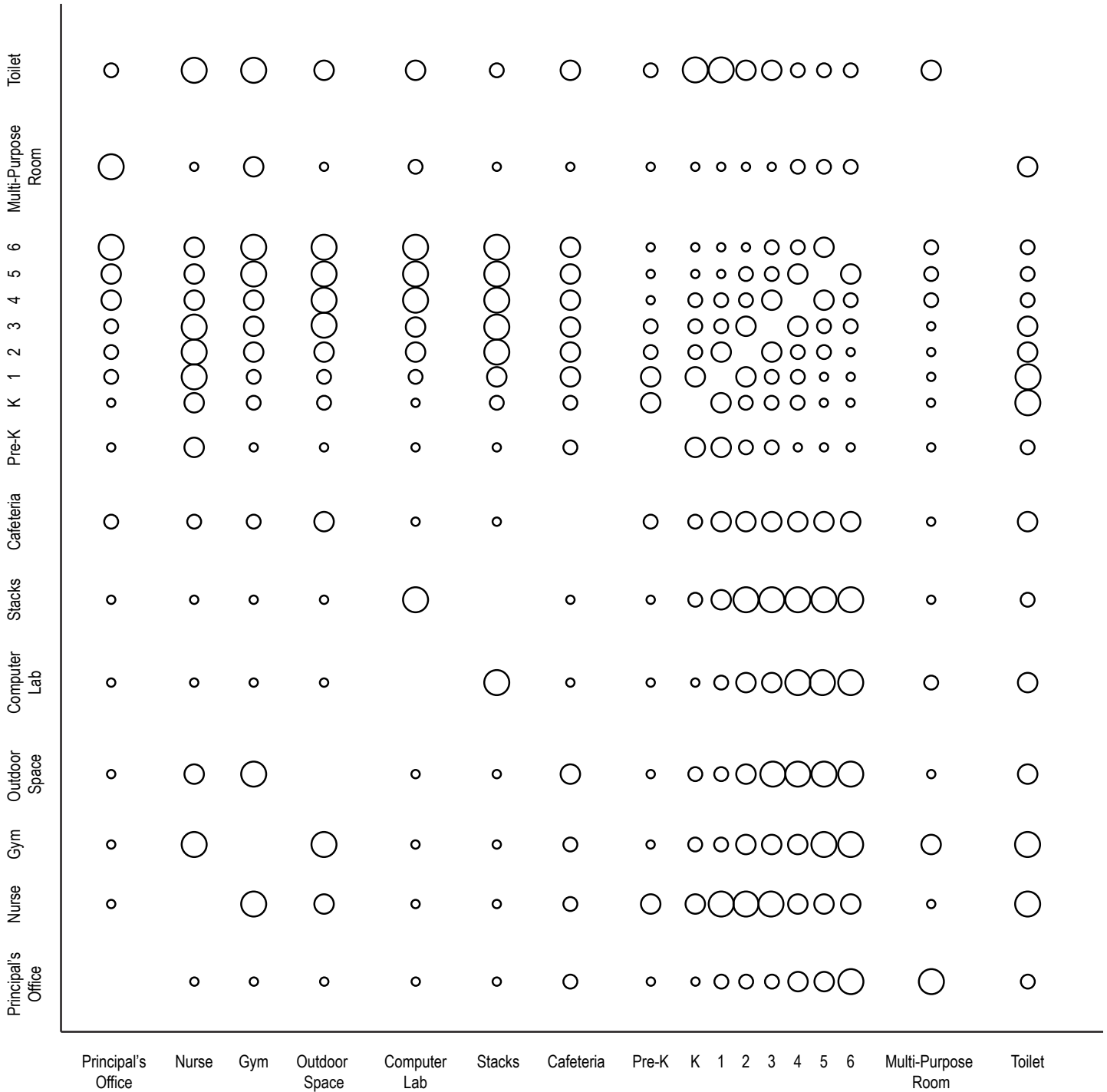


Table 04

The matrix above shows the relationship between the many different relationships within the school ranging from spaces to levels of educations. It is clear there is a high priority on children and exploration space.

## Spatial Importance to Students

The graphic reveals the importance between the various areas in the school in relations to students needs. The main three are the media center, learning community, and the outdoors. The media center and learning community promote learning while the outdoor spaces allow for exploration and creativity.

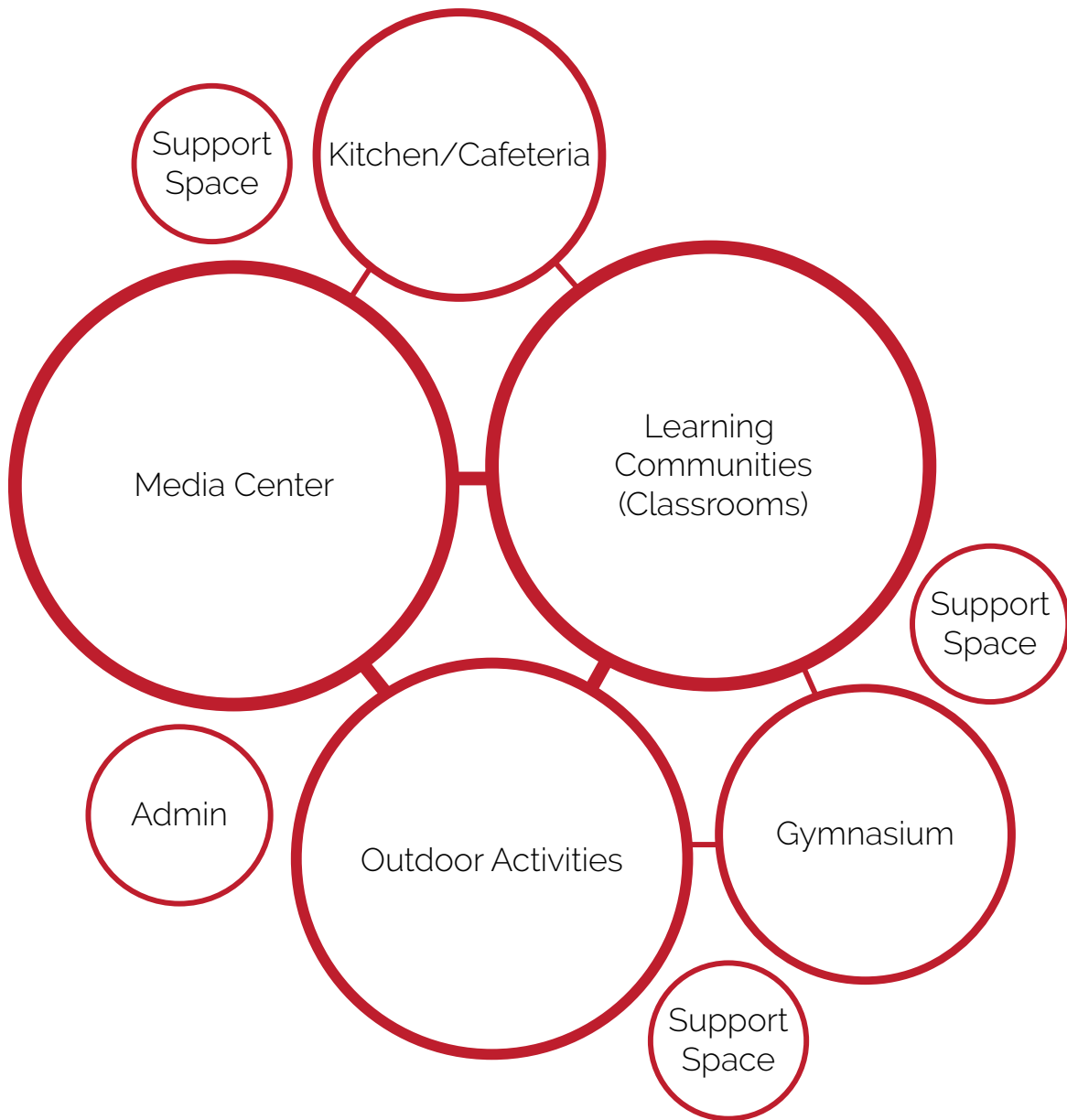


Table 05

# Spatial Importance to Staff

Compared to figure 9, this graphic shows the importance of spaces to teachers, faculty, and other professionals. It gives the importance to the administration space as well as the learning communities, where most of the learning is programmed for teacher growth and students.

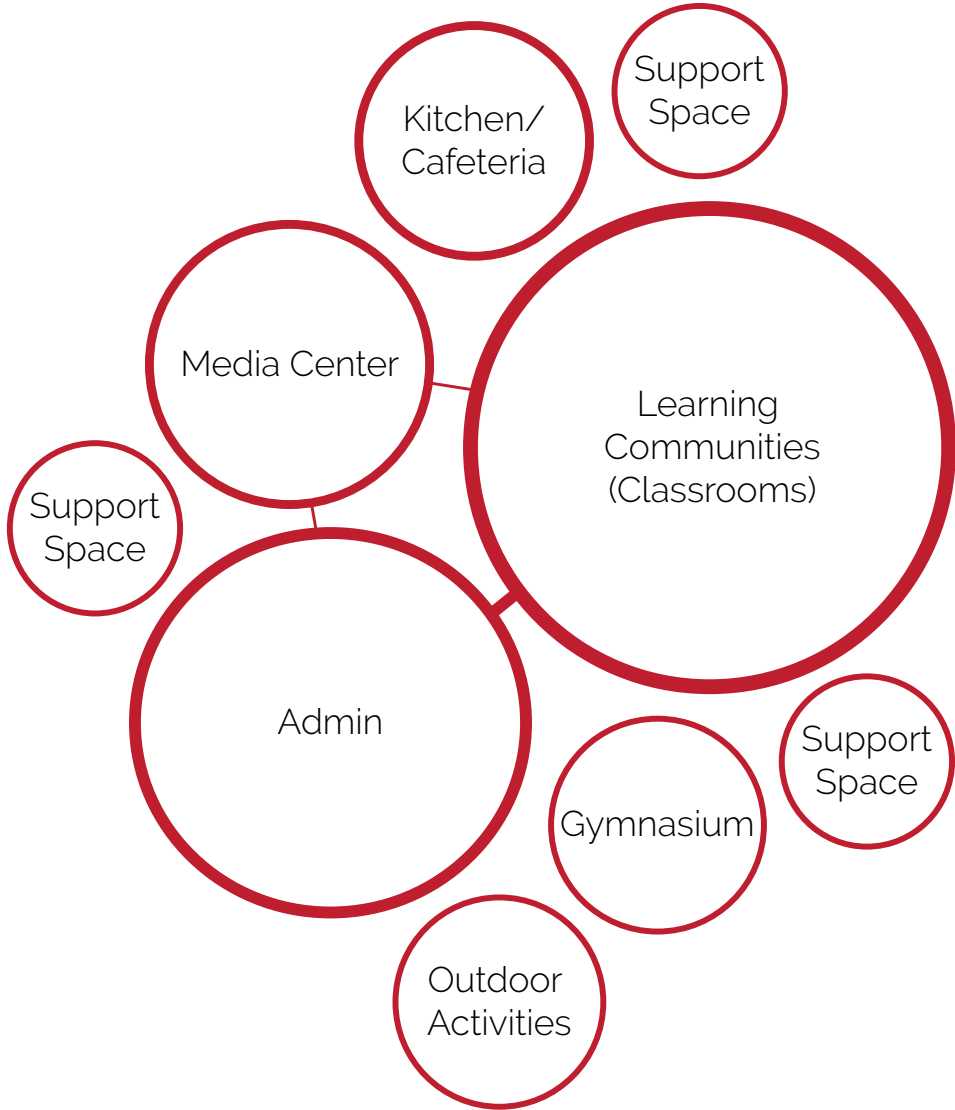


Table 06

# PROPOSED SITE

**518 Hawthorne Street  
Alexandria, MN 56308**

**Block 32**

**Parcel number: 63-7660-000**

**School District: 206**

**County: Douglas**

**Zip Code: 56308**

**Longitude: -95.3941**

**Latitude: 45.8679**

**Height above sea level: 1414 ft**

**Topography change: 50 ft**

**38 acres**

**Estimated value: \$1,000,000**

The site has a warm feel with a diverse terrain of stony field, wooded forest, and a small creek.

Rolling hills create the most significance on the site with a with steep boundary paralleling the creek. Although small, the creek creates a quiet noise peaking interest to those nearby.

The site is filled with natural beauty. Those who really appreciate it are the ones who can get close to the creek and run in the hills. Many people pass by this site and don't realize it's full potential,

meaning this site in under utilized because of the private ownership and what he has chosen to do with the site.

The site is perfect for a school because of the immense size and variability of the site: a flat field for organized sport, a few hills for sledding, a creek for exploration, and a view around for wonder. When I visited, the trees were changing colors, to me this is just a taste of what it could be when populated with children.





The Site is located Southeast of town 2.5 miles from the heart of downtown Alexandria and one half mile from the newly constructed Alexandria Area High School. There is also a new public high school located two miles to the north of the site.

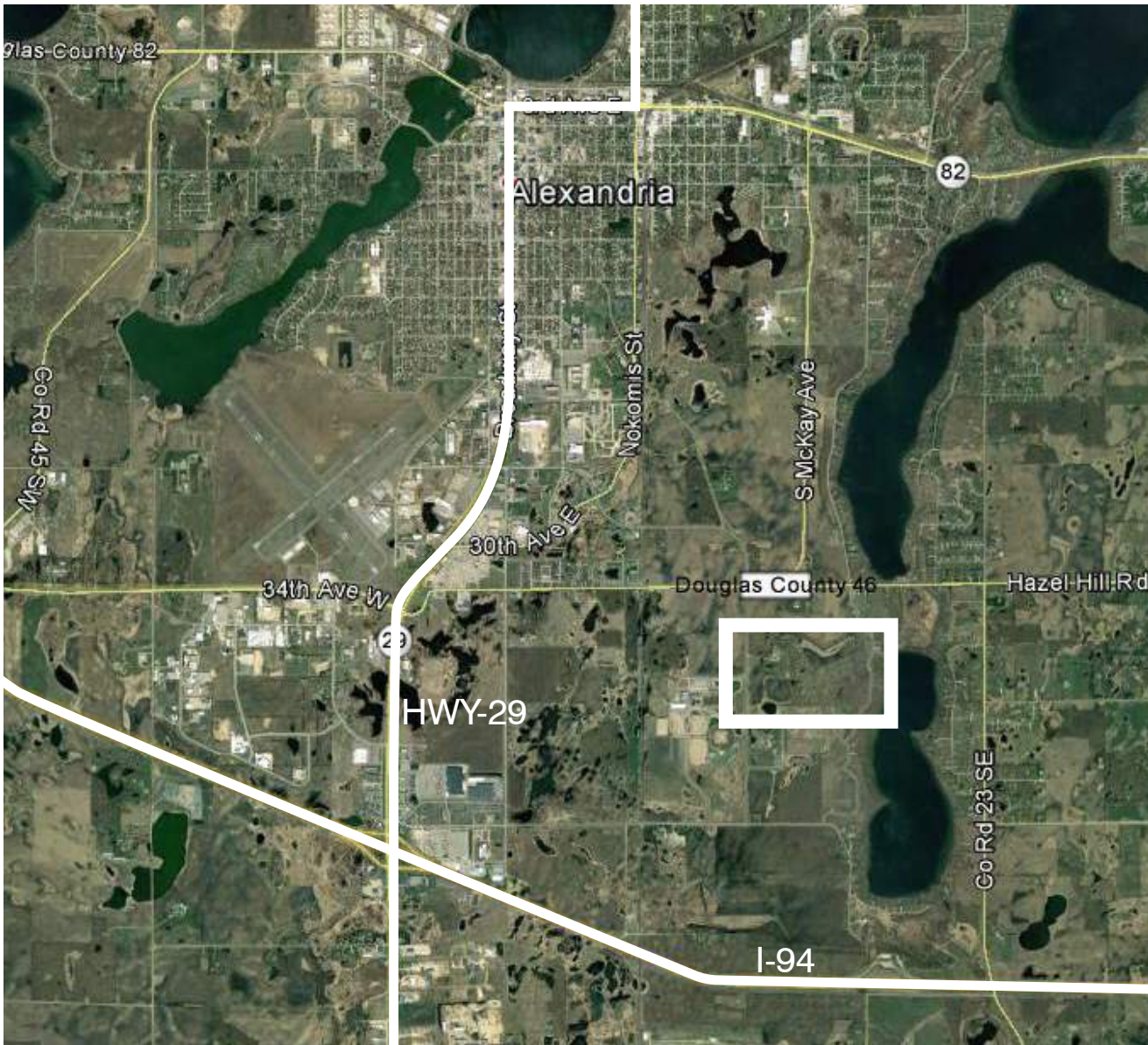


Figure 23



Figure 24

Looking at the site, the west side of the site seems to be a good entrance for the school. This area is flat farm land and can easily be left alone for its natural beauty.

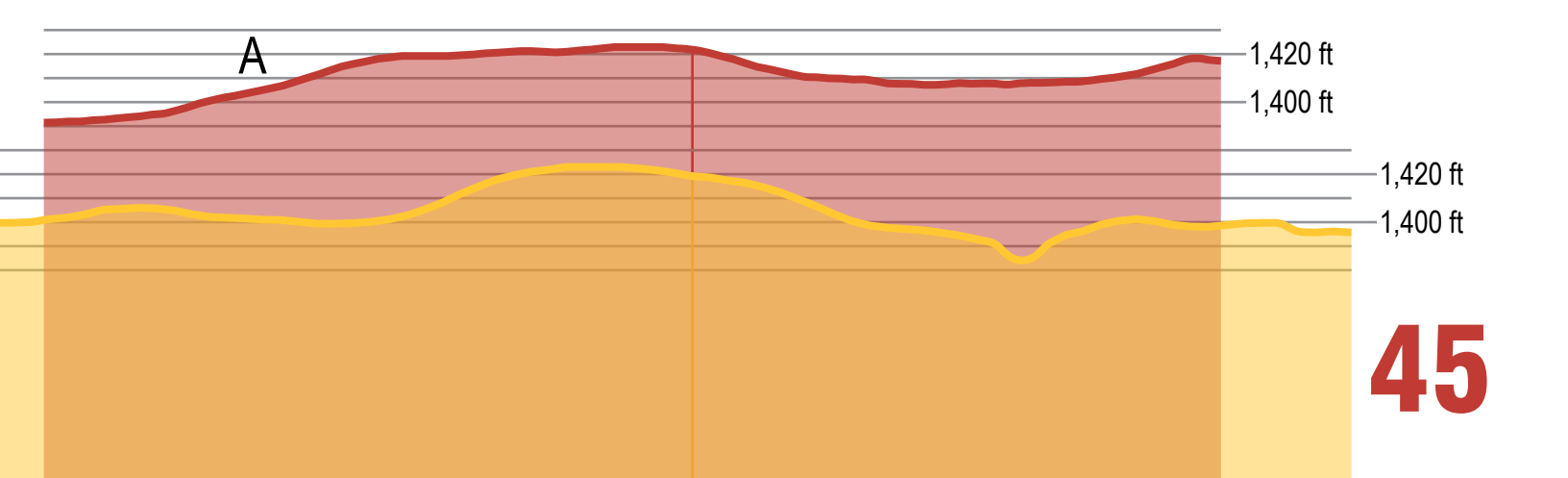
On the right, the site begins to slope up to the highest portion of the site. Still grassy like the west, this portion of the site has tremendous views of the surrounding land, lakes, city, and newly constructed high school, west of the site.

The east side of the site surrounded by a dense forest is a small creek with steep contours. This area is a quite and private portions of the site and could be utilized in a few different ways for the program of the school.

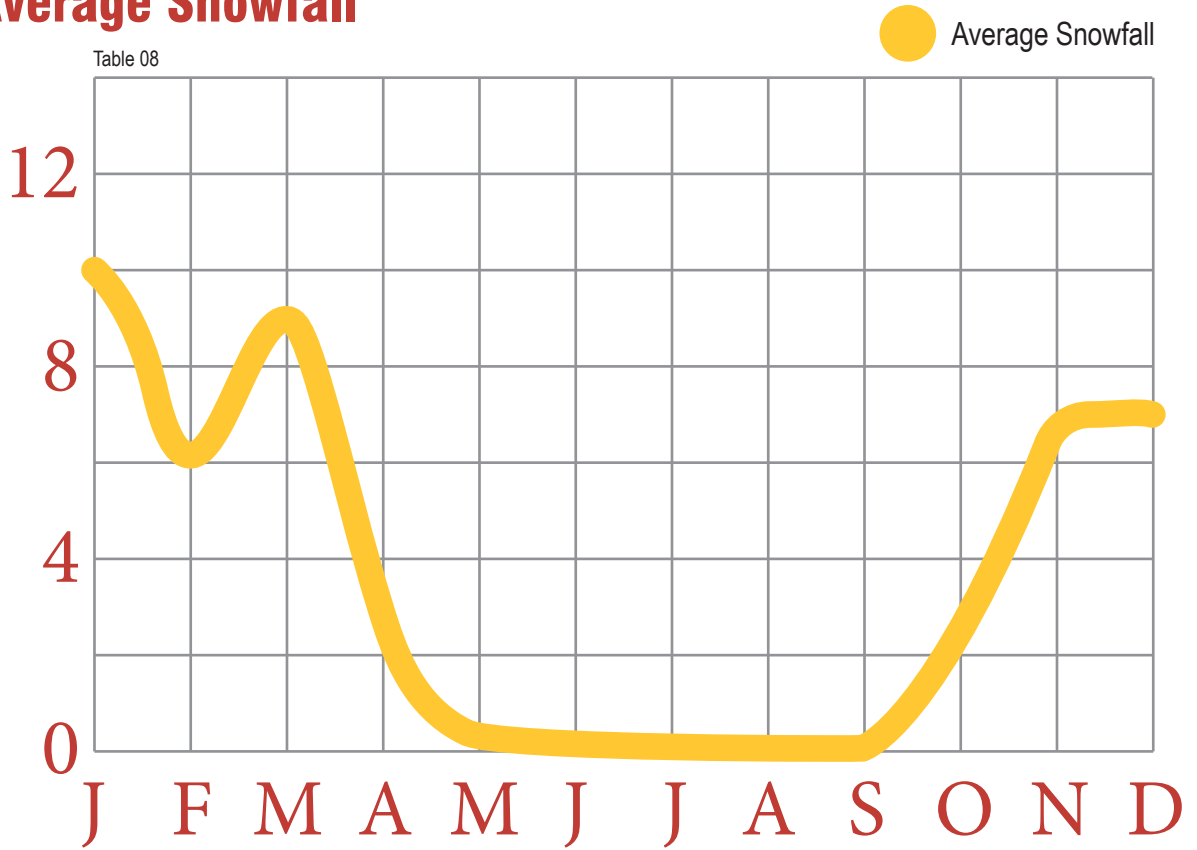
Table 07

**B**

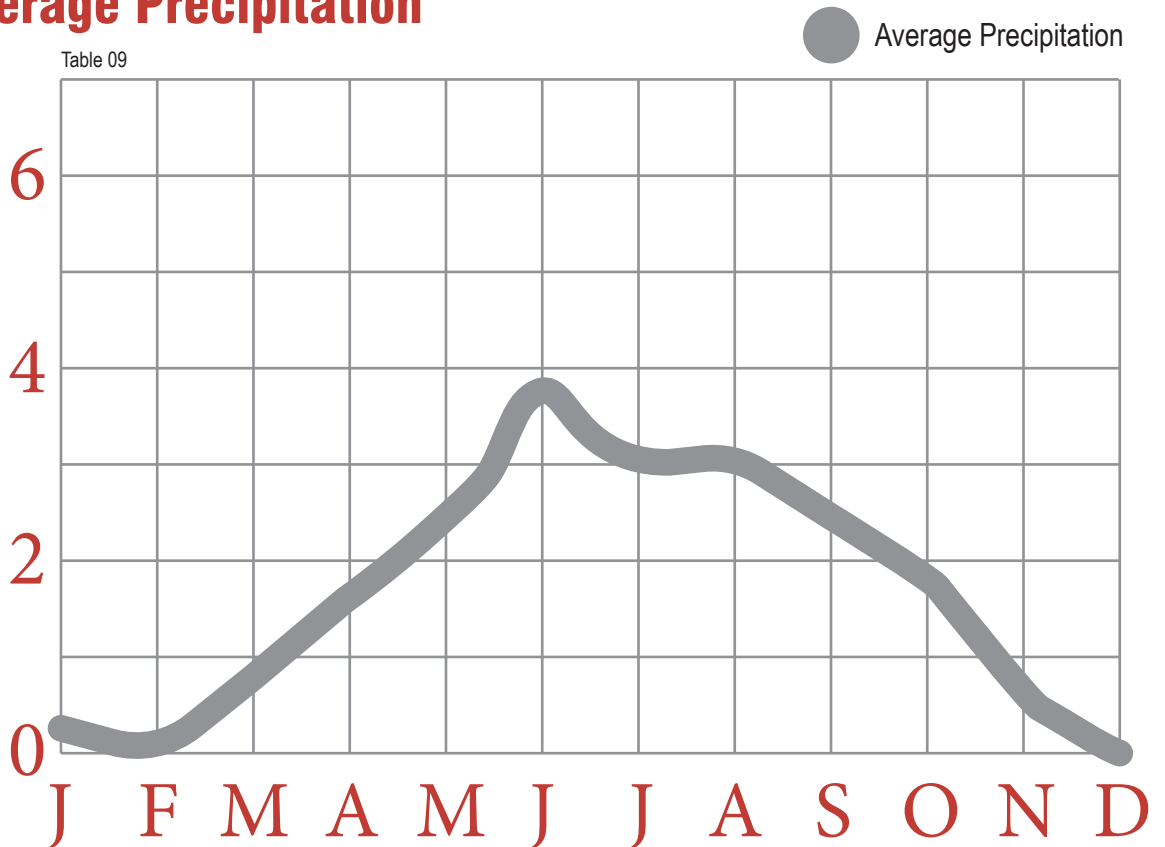




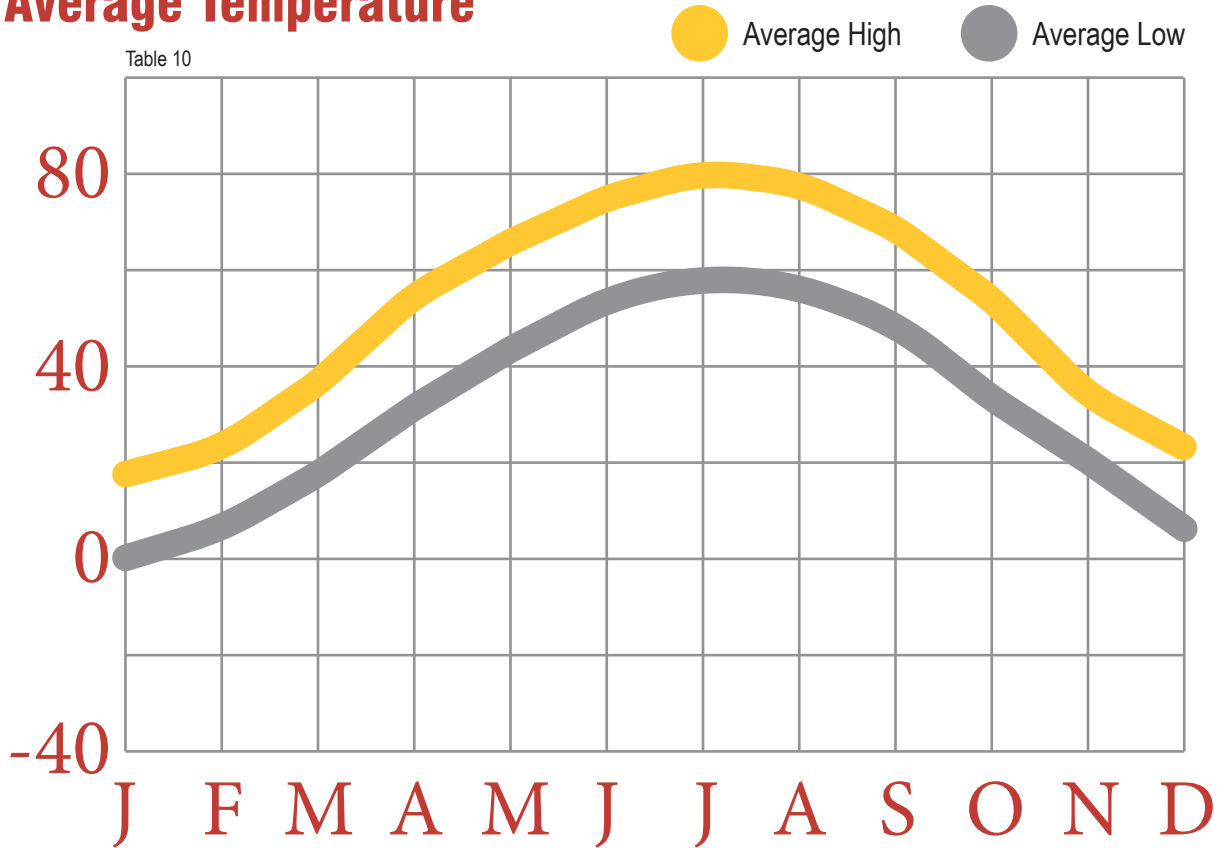
# Average Snowfall



# Average Precipitation



# Average Temperature



# Average Wind Directions

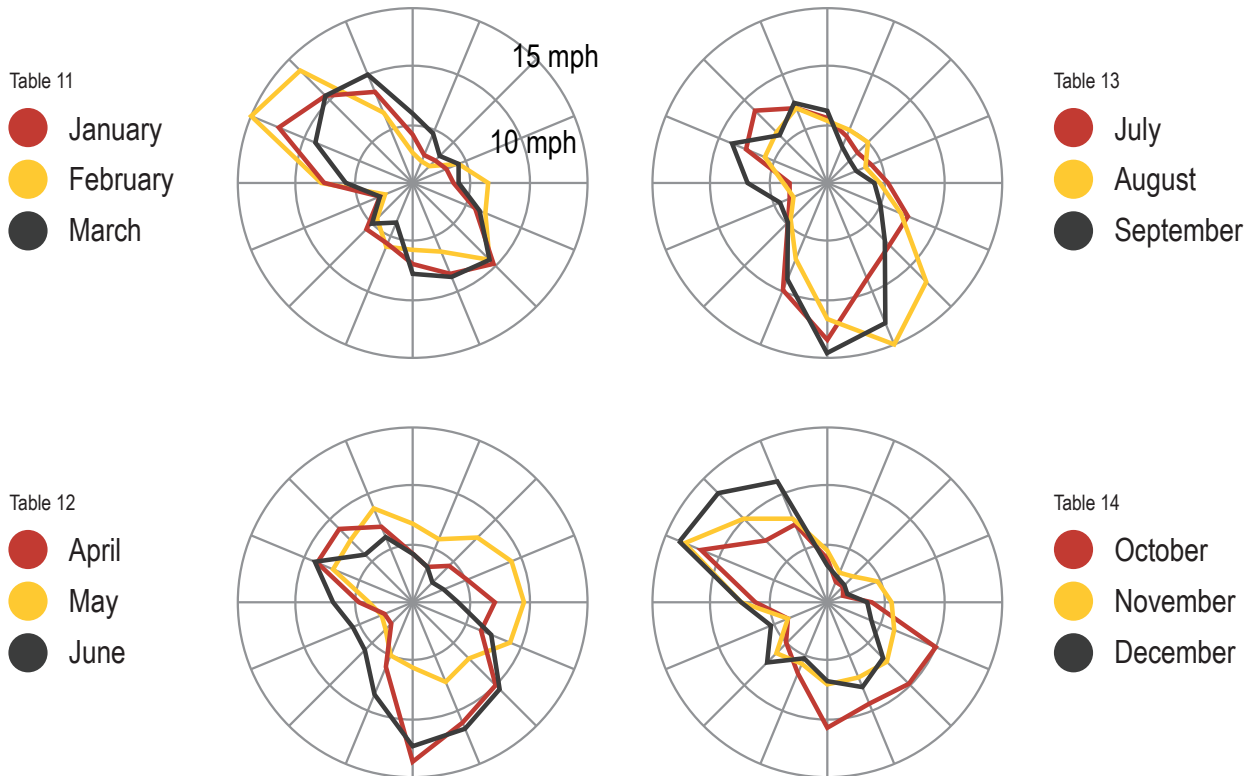






Figure 25 - Looking west from across the creek.

**Average Rainfall: 25.12 inches**  
**Average Snowfall: 43 inches**



Figure 26 - Looking east into the woods on the south side of the site.





Figure 27 - This image faces northwest, the only house/farmstead on the site. No destruction is intended of any existing buildings for the design.





Figure 28 - Piles of abandoned rusty scrap metal cover the east side of the site. Included are tin cans, dishwashers, spring bed frames, and TVs.



Figure 29 - The "backyard" of the hill facing the creek.





Figure 30

The contours of the site can be a bit steep, but also adds to the beauty of the site. There are also large rocks, rusty metal pieces of trash that will be cleaned up, and a small creek that runs through the site. All these things can be harmful, but they will have to be dealt with appropriately into the design for the safety of the students.



Figure 31 - A small creek trickles through the site.







Figure 32 - Towards the middle of the site is the flat highland. This image is looking south.



Figure 33 - Prairie grass on the west side of the site. Beyond the trees is a county road and the new Alexandria Area High School.





Figure 34 - Existing plant on the site.



Figure 35 - Existing prairie grass and plants on site.





## Code Analysis

### **Educational**

Based on the program, the classification of the building type will be Educational, Group E. Occupancy type must include six or more persons at any one time for educational purposes through the 12th grade.

### **Day Care Facilities**

This group includes buildings and structures occupied by more than five children older than 2 1/2 years

of age who received educational, supervision or personal care services for fewer than 24 hours per day.

### **Type IV (HT)**

All buildings shall be classified in one of the five types defined and shall comply with the fire-resistance rating specified. At a minimum, the building shall conform to the details of construction, Type IV construction (Heavy Timber, HT) uses noncom-

bustible materials for exterior walls. Minimum sawn dimensions are required for structures built using Type IV. Fire-retardant-treated wood, cross laminated timber, columns, floors, roofs, exterior structural members shall all comply with Type IV building construction.

### Variables

The allowable floor area shall not exceed 76,500 SF per floor. The height of the building is not to exceed 85' feet and 4 stories. All mezzanines shall be considered a portion of the story below, which will be included in determining the fire area.

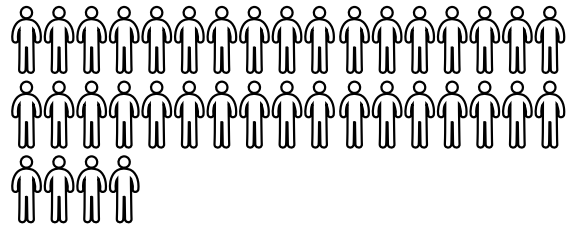
All areas of the building will be sprinklered in compliance to construction type IV. Exterior bearing walls shall be fire rated at 2 hours, and interior bearing walls and timbers shall be fire rated at 1 hour.

### Means of Egress

The maximum travel distance to exit, in compliance to the code, will not exceed 250'.

3,825 is the maximum number of occupants allowed in the building at one time. Based on the maximum occupancy of the building, exit strategies should allow 40 people per exit, 8 doors with 12 foot wide corridors.

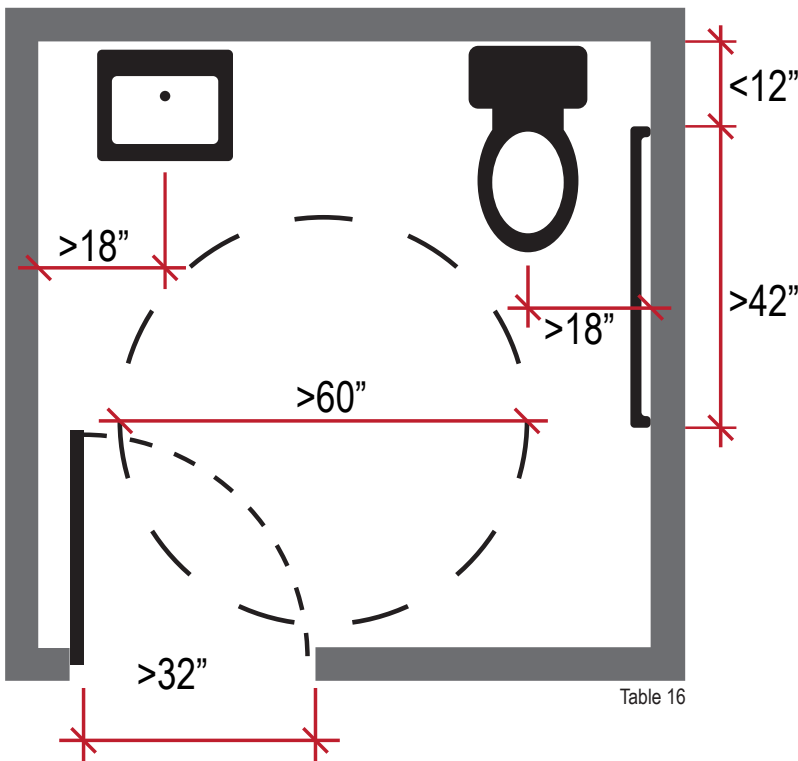
**Maximum Capacity**  = 100 people Table 15



**Proposed Capacity**



## ADA Requirements for Bathrooms



# Research Design Plan

## Design Methodology / Research Methods

### Engaged Action

I will use engaged action to conduct research within the personal setting on qualitative interviews and surveys talking to students, teachers, and other various professional.

### Additional Research Methods

Because ideas can be shared, I will also use ideas from Descriptive, Logical and Modeling and Correlation to conduct the research.

### Design Research

I will use design research to blend the other research done together. I will use charts, graphs, drawings, and digital and physical modeling to explain my outcomes transforming the relationship between interviews and the modeling.



## CASE STUDIES

Existing buildings help make decision for new designs. I will look at current schools, daycare facilities, and libraries to help define the design's program and layout. There are many designs out there; I hope to gain knowledge on best practices and progressive methods of design.



## QUALITATIVE INTERVIEWS

Personal interviews will help to find out what spaces and teaching methods work and do not work for the students and teachers. Increasing my knowledge in current methods of education will better understanding on how to fix the problem. Other questions may be asked as well or further research.

# Design Process Plan Documentation

I will be using design research to do most my continuing work. As a design thesis, I be using both quantitative and quantitative data to solve the design problem. I will conduct in person interviews among teachers, students, and other professional in the education field to find out which types of learning styles work best for that individually person, group, or school. I will also identify what styles, volumes, and qualities of spaces the students, teachers, and other professional are using in their educating process. I will also investigate spatial relationships through case studies and continued reading. I will then take this data gathered and quantitatively organize it to find out how

all this information is useful and blends in to the design. The more we can visualize the data, the more we can easily understand it. I will conduct graphic and written explorations and well as digital and physical models to easily show this. Any positive and negative feedback I get from any of the explorations will in some way affect the final design of the system and school. I am also going to let the design process speak for itself and lead me in decisions as the design develops.

## Project Schedule

The semester will be divided into four parts including some initial research done over winter break. The four sections are: Research and Documentation, Iterate, Develop, and Deliver. The first portion of the design is the qualitative research collecting data from interviews around the area in schools and daycares. This data will transform into qualitative data which will have a direct impact onto the design. The study will also consist of further research into case studies of similar projects around the globe. These studies will ensure well developed programs and quality spaces throughout the design. I will jump start on the layout of the program and further my site research.

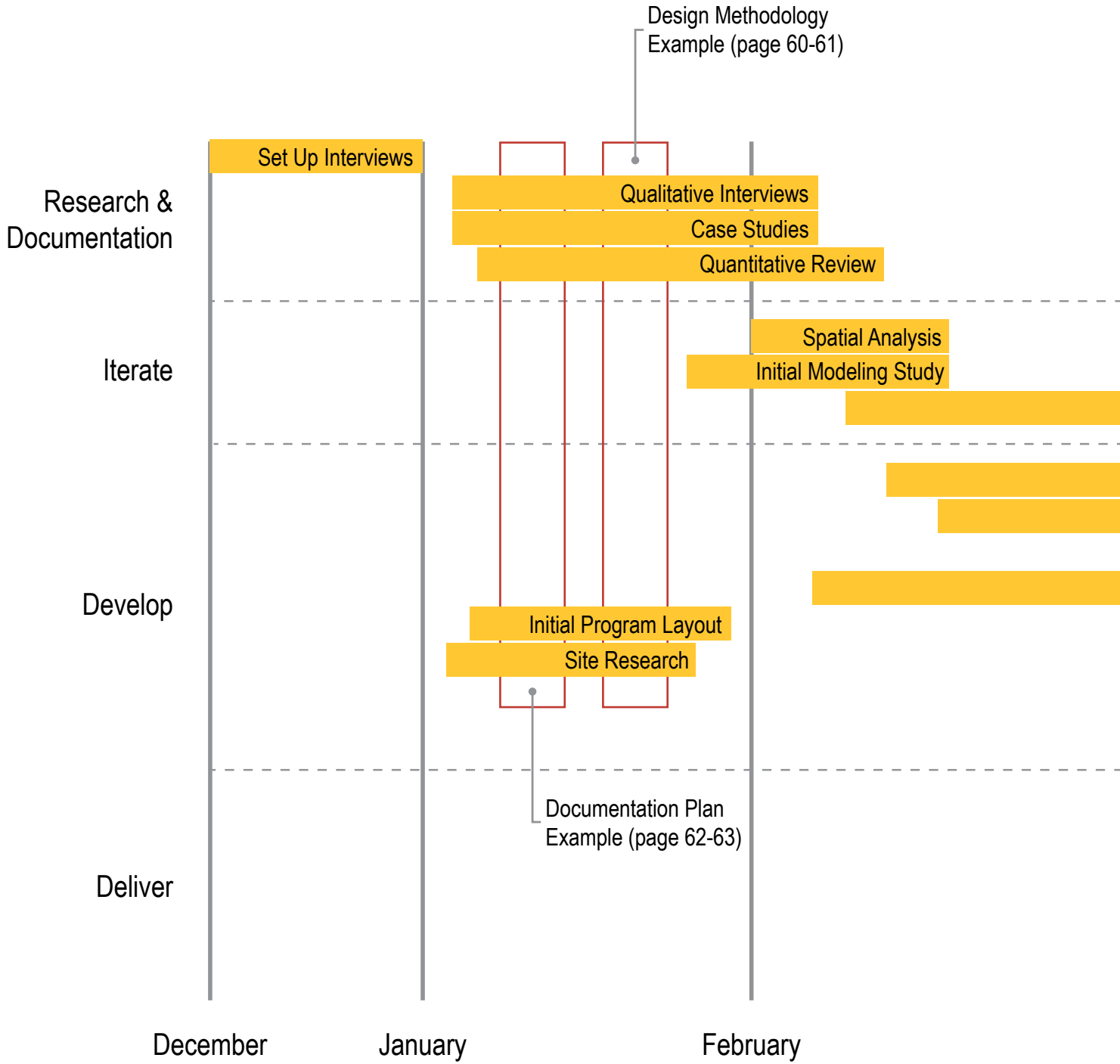
The second portion in the design process is the iterative processes of the work. With all the data collected, I can start to spatially and graphically layout the final program. I will also design iterative model both digitally and physically to layout my ideas gathered from the initial portion of the project. With these models, I will get a good grasp on the form and style of the building.

The develop stage is when I will consult the code and really understand the floor plan, elevation, and details of the design as well as final thoughts on site design. I will also dive into material selection in this portion. This section concludes with feedback from the mid-term review and any changes I might make to the design.

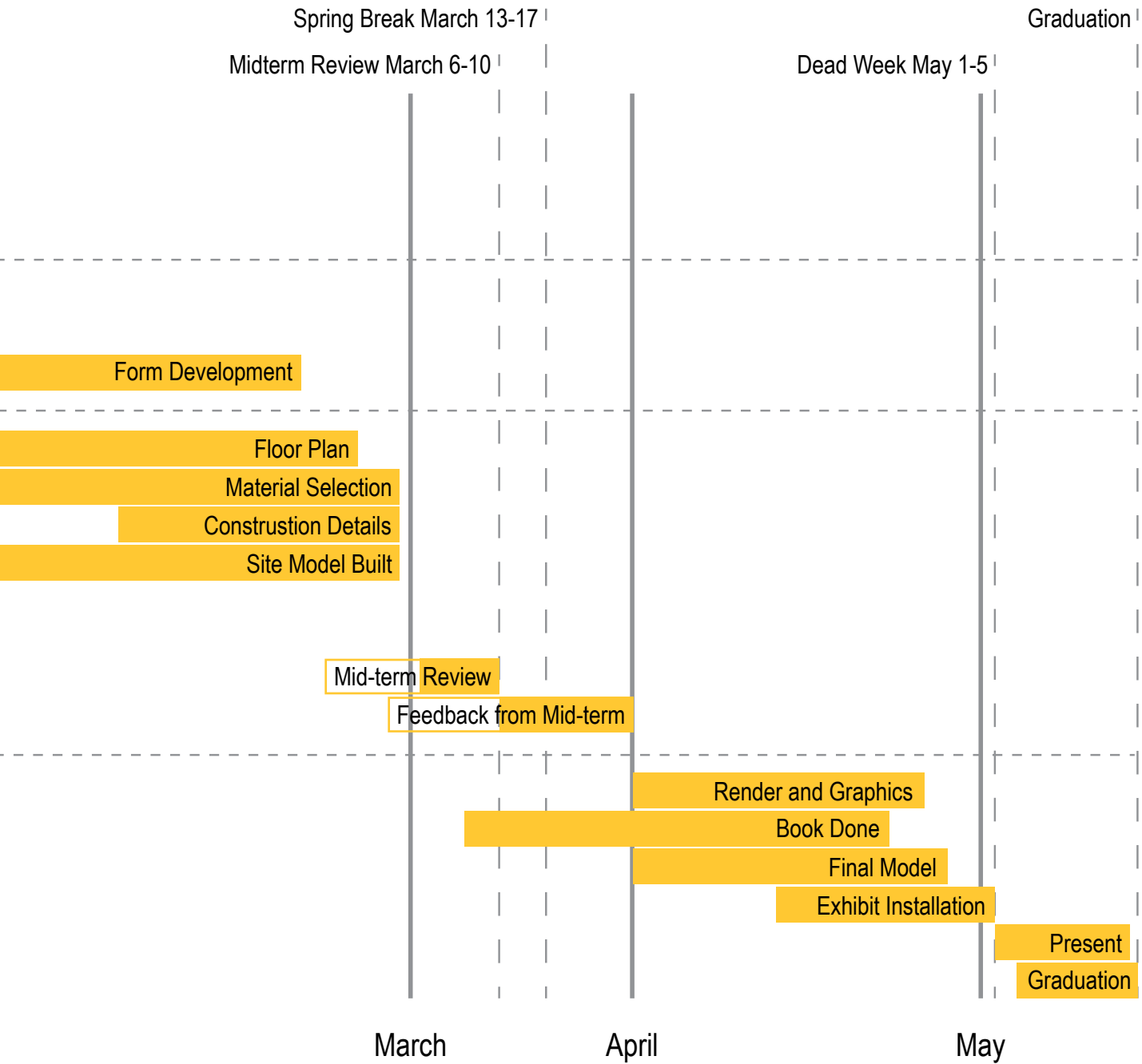
The final stage in the development of the project is the Deliver sections. Here, I will finalize any missing parts while graphically and physically layout all the research, drawings, models, and other various mode of deliverables to completely understand the design and its process. This section will conclude with the final exhibit and formal presentation. Graduation to follow.

# Detailed Project Schedule

Table 17

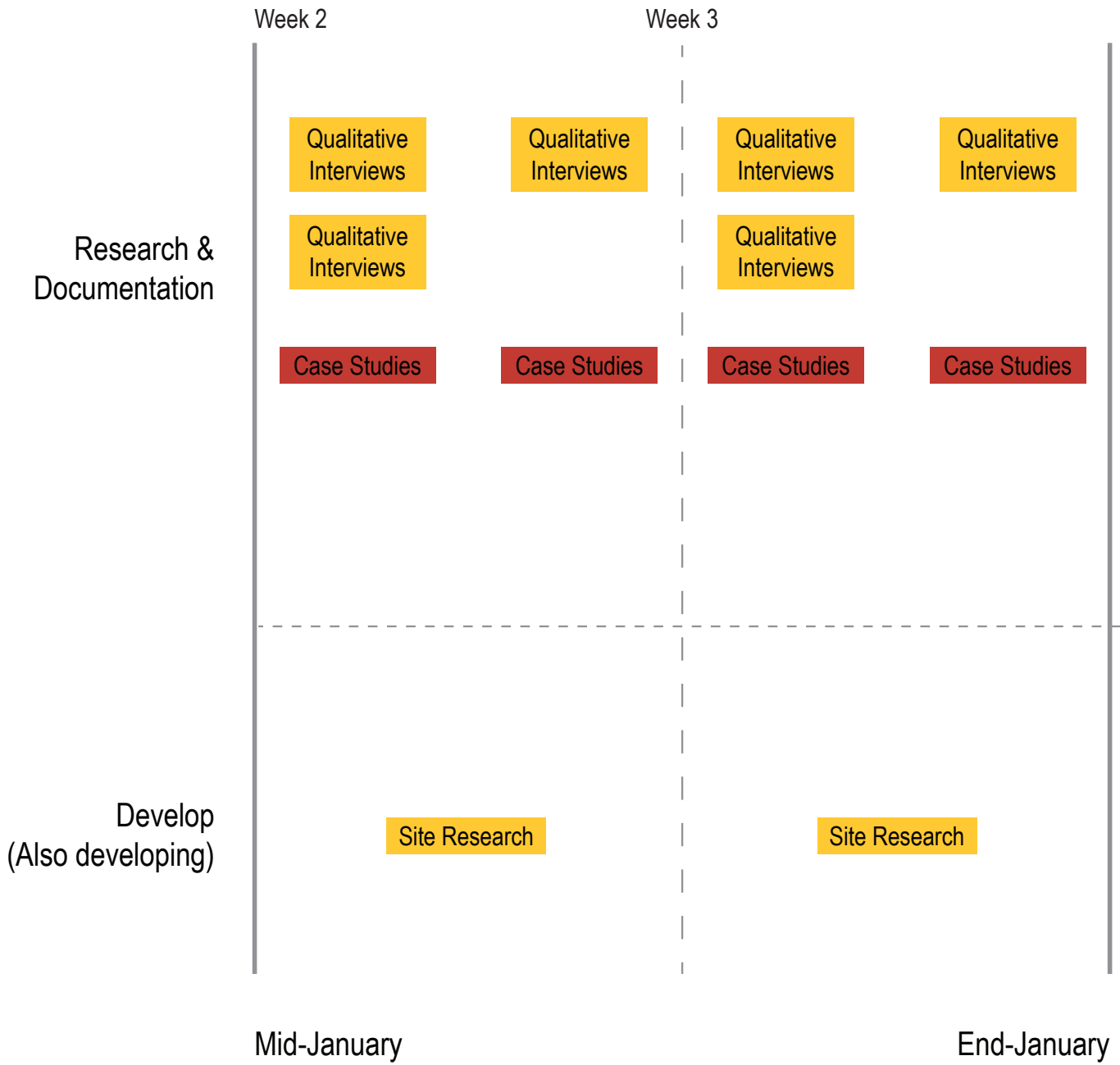






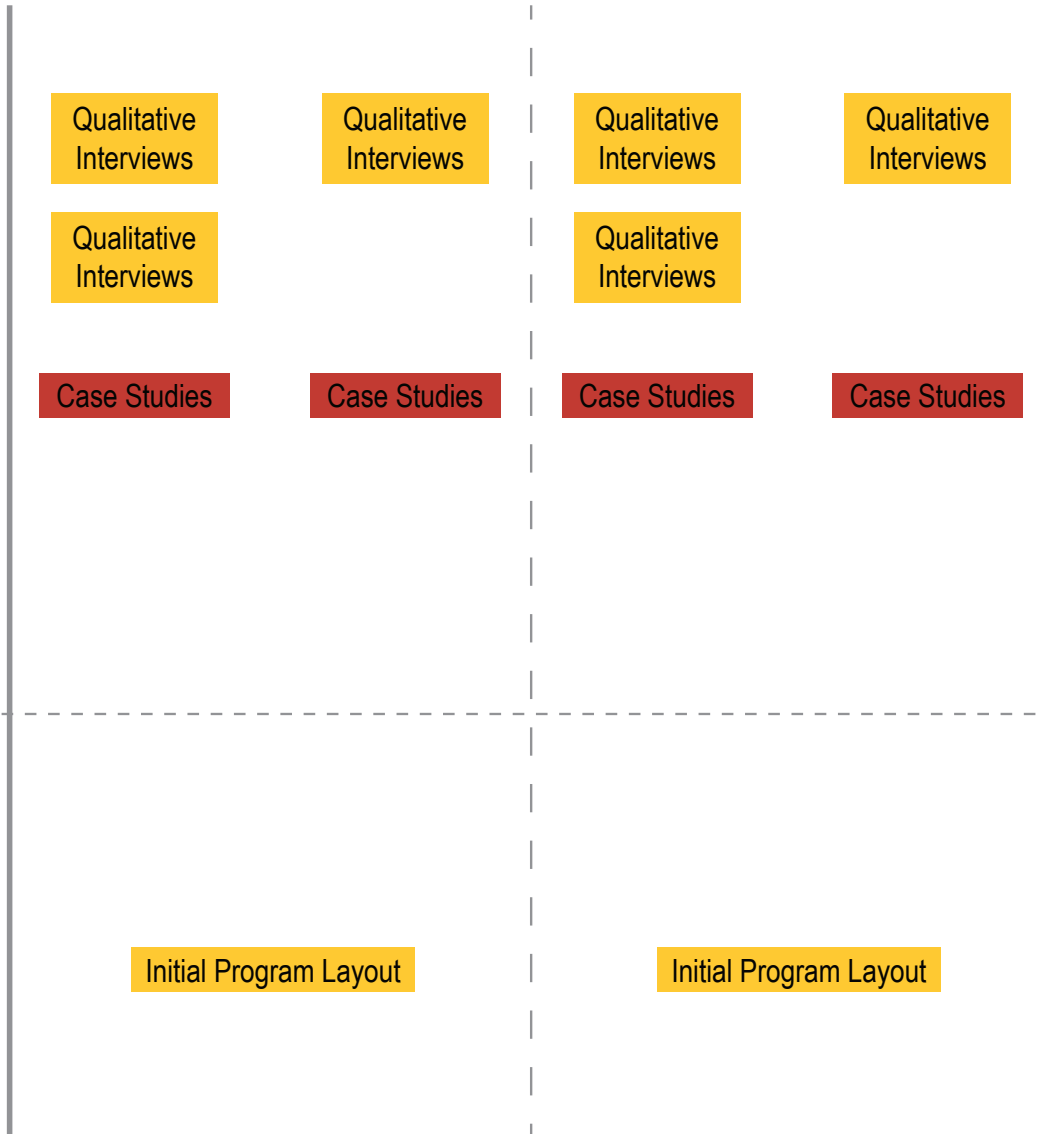
# Plan for Design Methodology / Example of Research Month

Table 18



Week 4

Week 5

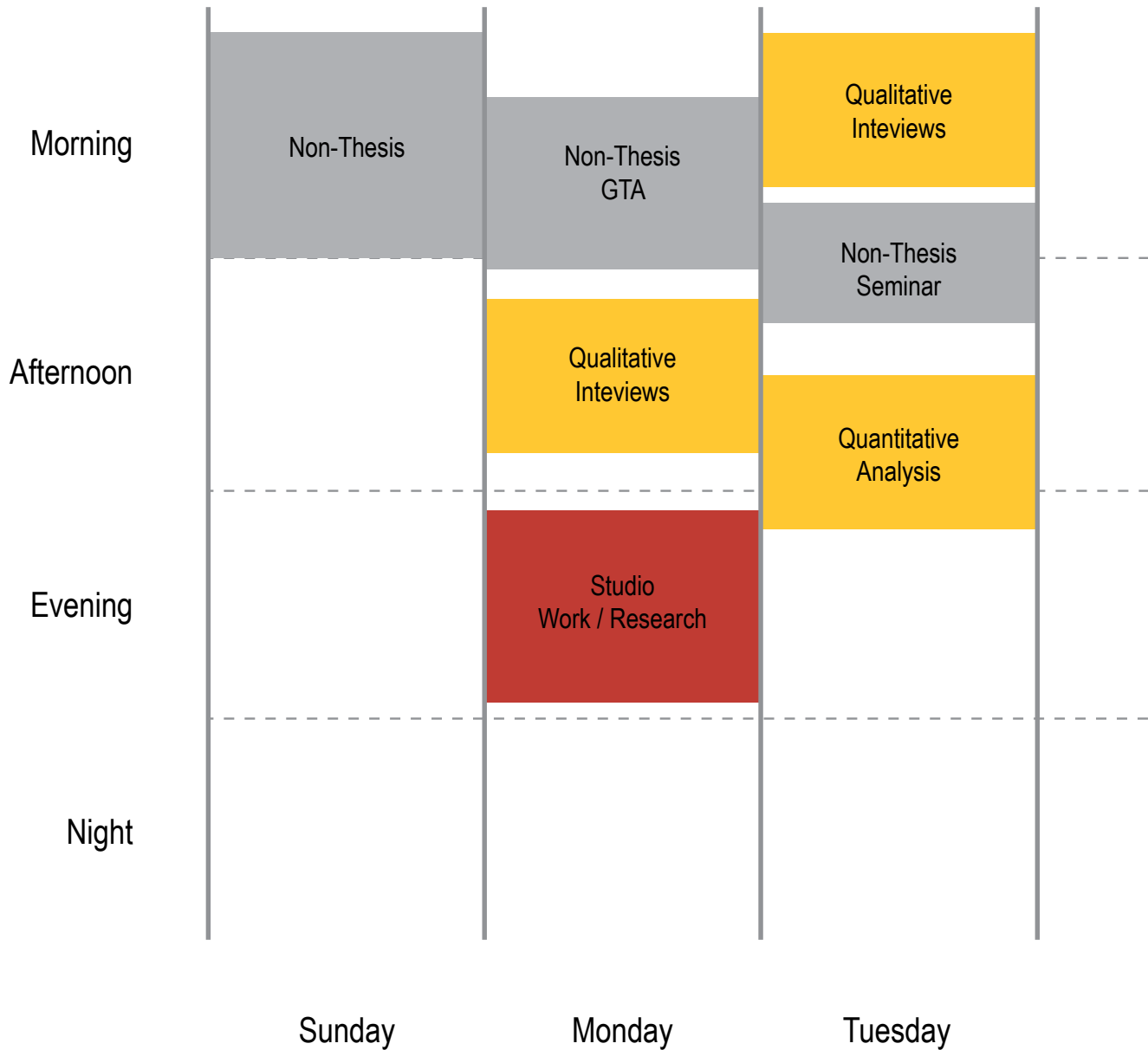


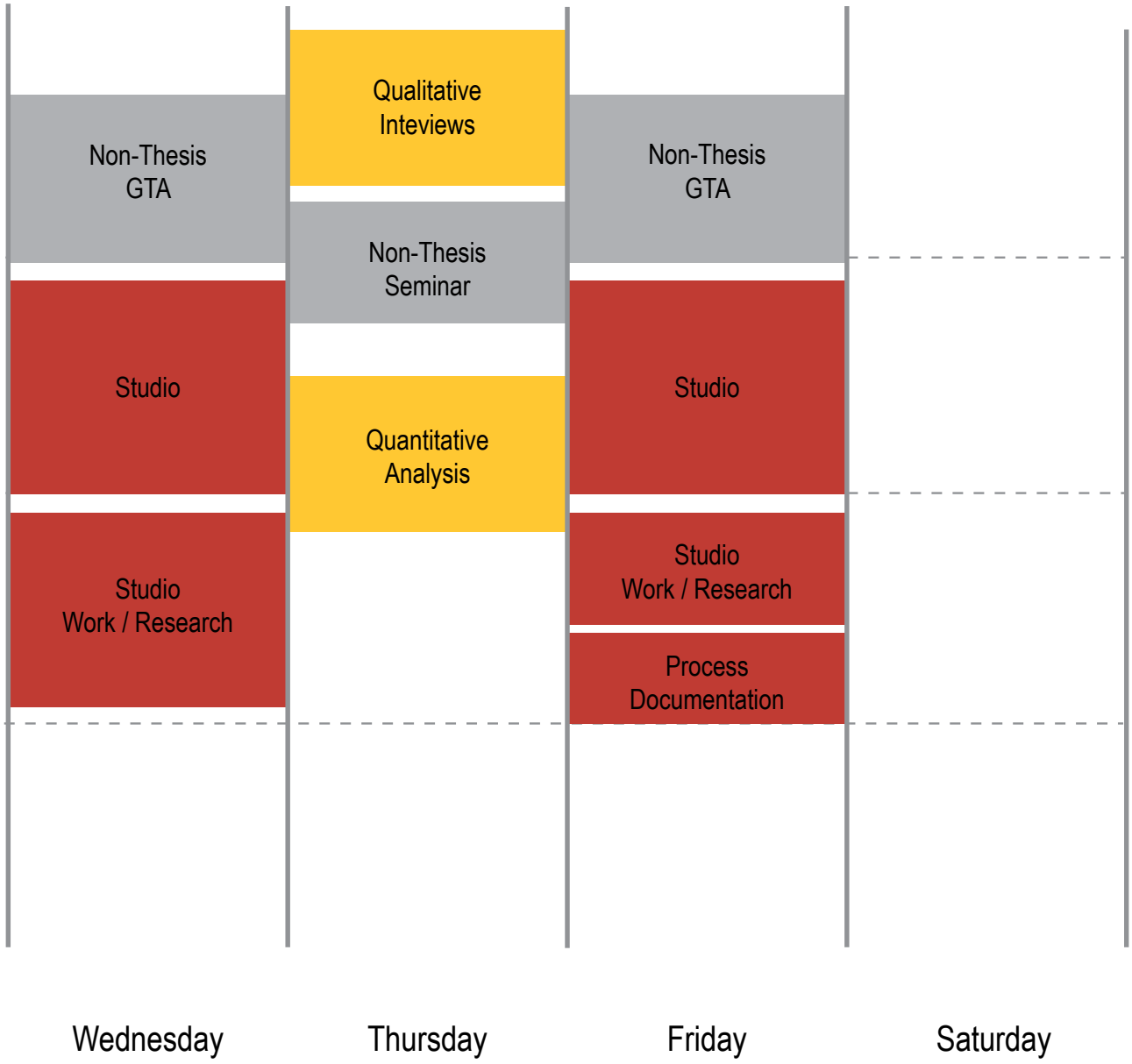
Begin-February

Mid-February

# Documentation Plan / Example of Research and Documentation Week

Table 19









# THESIS PROCESSES & DESIGN SOLUTION

**Process Documentation included throughout the following three sections.**

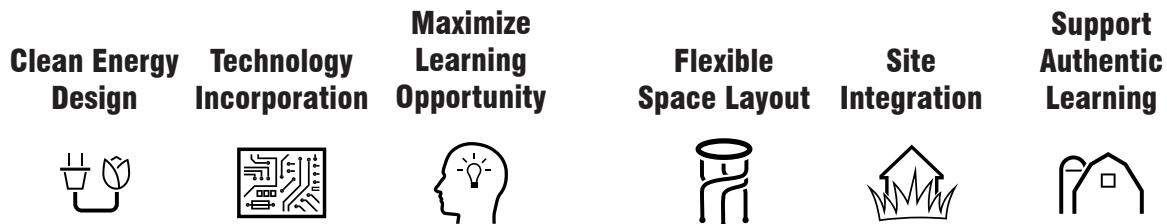
*“We discovered that education is not something which the teacher does, but that it is a natural process which develops spontaneously in the human being.”*

*-Maria Montessori*

# **PERFORMANCE ANALYSIS: RESPONSE TO GOALS AND PROJECT EMPHASIS**

# Goals & Emphasis

As all processes change over time, so did the underlying thesis question. Over the course of the semester, the shift from six goals to six brought on new ideas, concepts, and a more clear destination for the project. Previously, the six goals were the following:



The great shift to the following four goals are detailed on the next page. For the revised goals, new ideas, though related to the original, are summed up in the resulting paragraphs:

*Blending architecture with landscape is not a new feature in design. For the Montessori schooling system, directly relating the natural world into the school's methods of teaching is crucial for the development of children. This thesis aims to connect the Montessori ideals and a specific site using an iterative method catering to the child's memory, experience, and the ability to explore freely.*

*The campus is designed for children ages 3 to 12, set up in multi-age groupings for peer learning, uninterrupted blocks of work time, and guided choice of work activity, as the Montessori system adopts. Dr. Maria Montessori believed that teacher, child, and environment create a learning circle for the child while encouraging the independence they need to prepare themselves for the world of adolescence.*

*By creating artificial space for a Montessori school, the designer must be aware of the needs of the people occupying the volume and the needs around them. The program, though, changes culturally and locally. In central MN, a specific site was chosen to indulge the needs for this region giving children the ability to maneuver through the site's landscapes in a real and experimental way.*

These goals are summed up in the next sections of the book, as the process for research and design were mingled together to for one large process to encompass the overarching theme of the project to create a well balanced design.



# Revised Project Goals



Blend architecture into the landscape while minimally impacting the visual heaviness of the site.



Design a school that meets and exceeds the needs and goals set out by the American Montessori Society fostering to memory and experience.



Develop a design that is site specific through an iterative process.



Maximize opportunity for child-based learning by giving the children indoor and outdoor spaces needed to explore, learn, and grow

*“Education is a natural process carried out by the child and is not acquired by listening to words but by experiences in the environment.”*

*-Maria Montessori*

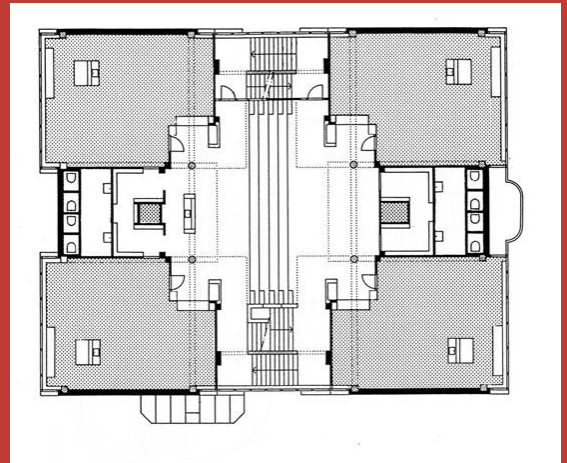
**PERFORMANCE ANALYSIS:  
RESPONSE TO THE  
TYPOLOGICAL  
& PRECEDENT RESEARCH**



**Noted Elements from the Project:**  
Spatial hierarchy  
Central gathering space  
Warm Materials  
Inviting spaces  
All areas can be used for seating



Photography: Addison Godel  
Architecture: Herman Hertzberger

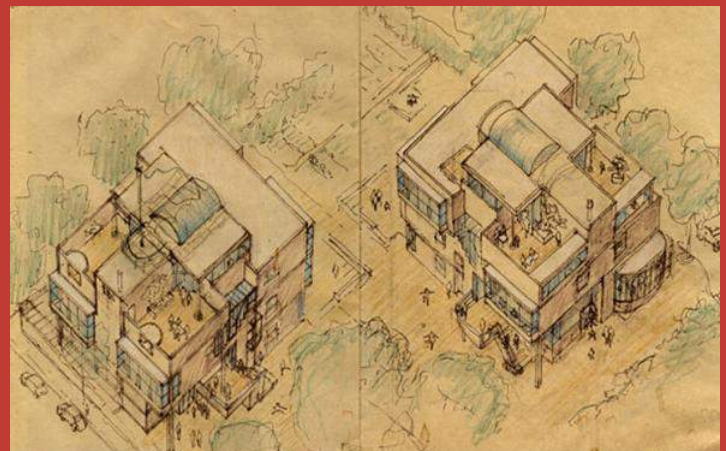


# APOLLO SCHOOLS - MONTISSORI SCHOOL and WILLEMSPARK SCHOOL

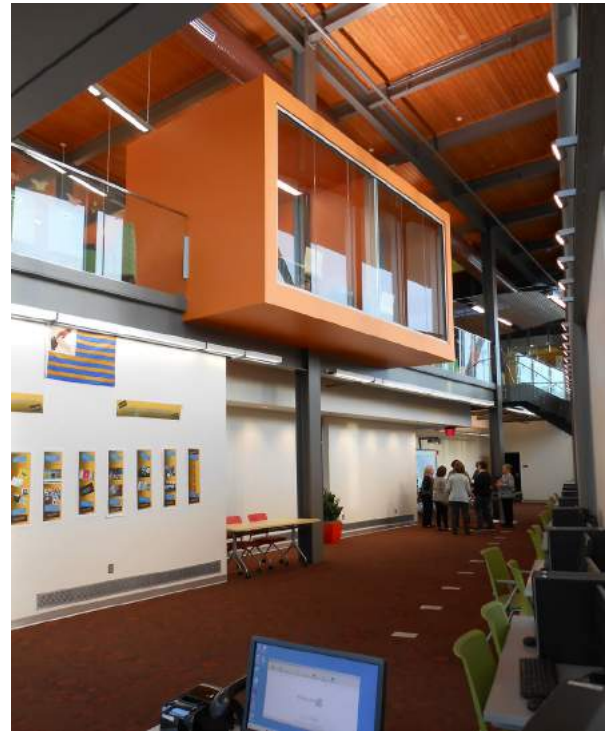
*Amsterdam, Netherlands*

Architect: Herman Hertzberger, AHH  
Typology: Montessori School

*“Apollo schools are interesting in that they suggest an opportunity to develop a community between two schools with different pedagogical approaches.”*

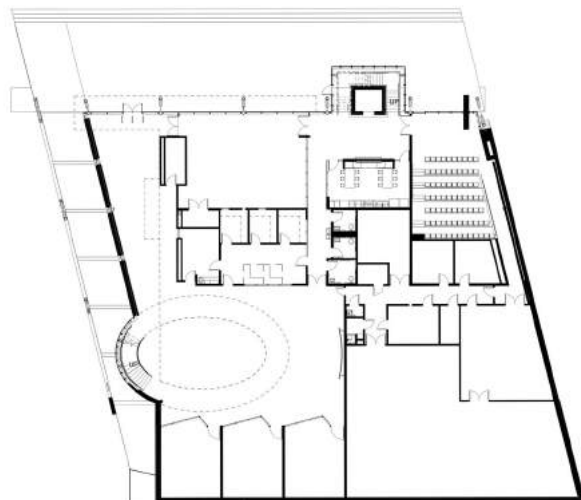
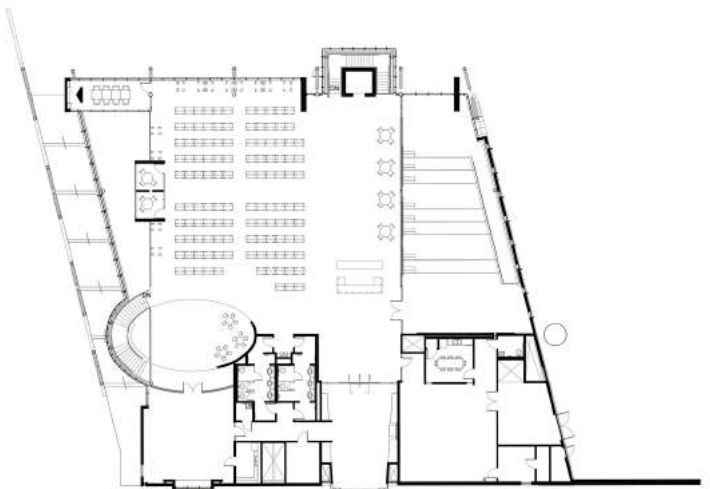






**Noted Elements from the Project:**

- The building is a teacher, land as teacher
- Site as educational experience
- Playground without equipment
- Nature and imagination combine to great adventure
- Open to Site
- Maximizes light and views



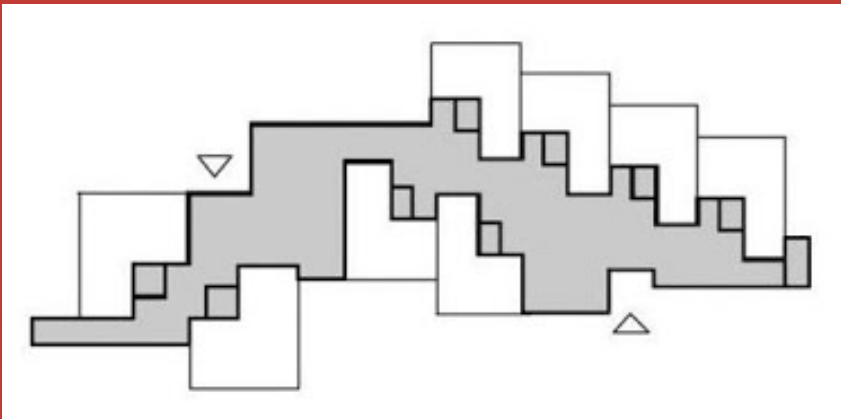
# CALS CHILDREN'S LIBRARY

*Little Rock, Arkansas*

Architect: Polk Stanley Wilcox Architects  
 Typology: Children's Library

*“Community-embedded,  
 supportive learning center”*





### Noted Elements from the Project:

- School as house, school as city
- Adequate space for the collective use
- Relationship between classroom and circulation space
- Varying leveled classrooms
- Control of visuals
- Central Circulation

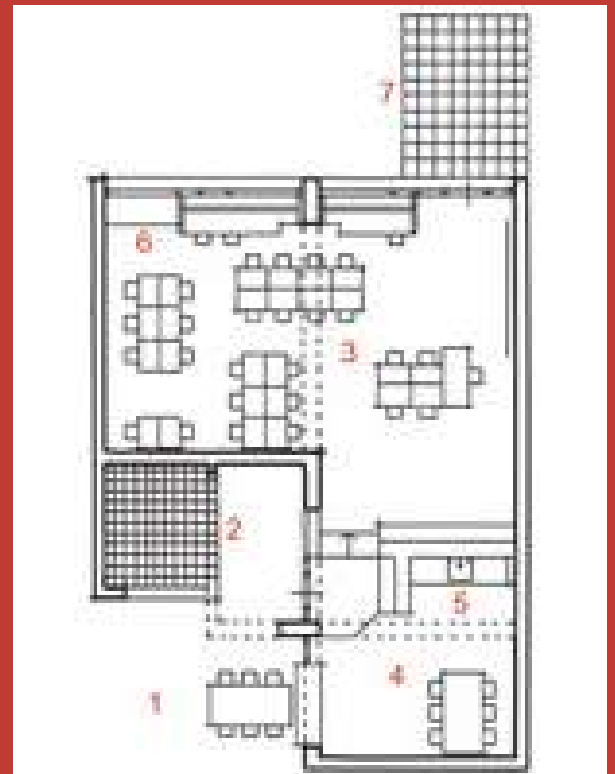
# MONTESSORI SCHOOL

*Delft, Netherlands*

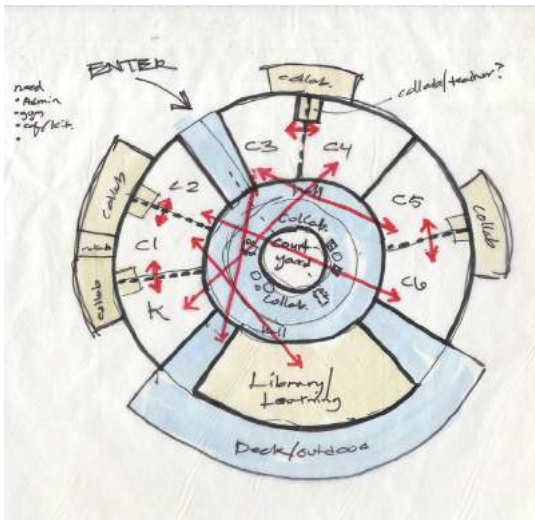
Architect: Herman Hertzberger, AHH

Typology: Montessori School

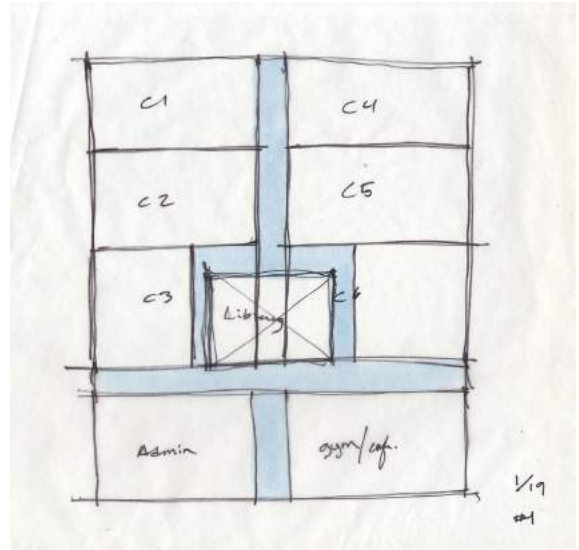
*“Scale- familiarity, a natural empathy with the first universe of children: the house.”*



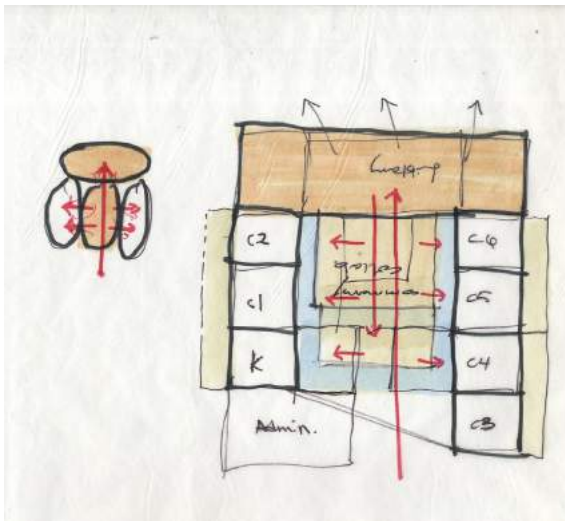
# Plans Developed Based on Case Studies



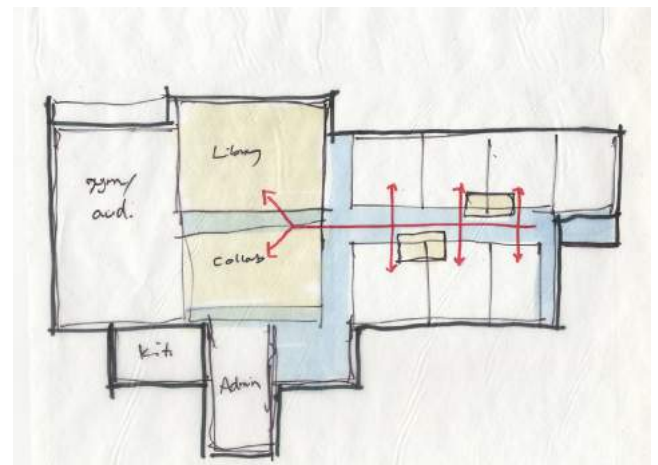
1/19 Central Core / Interior Space Relationship



1/19 Central Core / Proximity from Library to Classroom



1/20 Linear Progression



1/20 Modern Traditional School Layout



*“Our aim is to draw people into this beautiful landscape, to enhance one’s experience of nature through all five senses, and to allow nature itself to inspire in us an experience of awe.”*

# GRACE FARMS

*New Canaan, CT*

Architect: SANAA

Typology: Community Center

## Noted Elements from the Project:

Relationship to Site

Transparency of Indoor and Outdoor

Organic Flow of Spaces

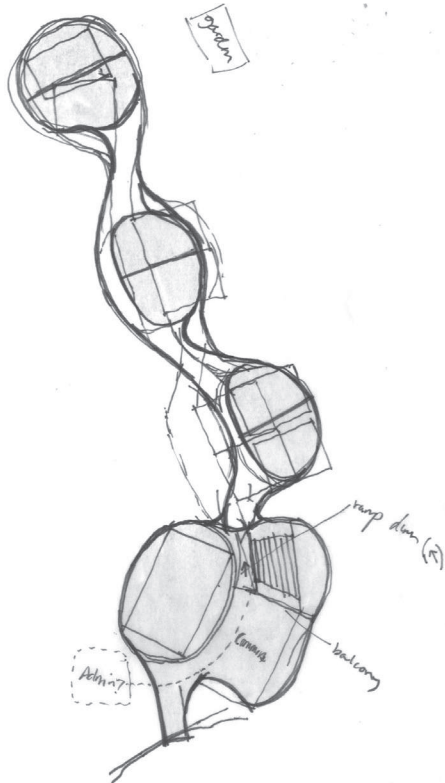
Visibility

Natural use of Materials



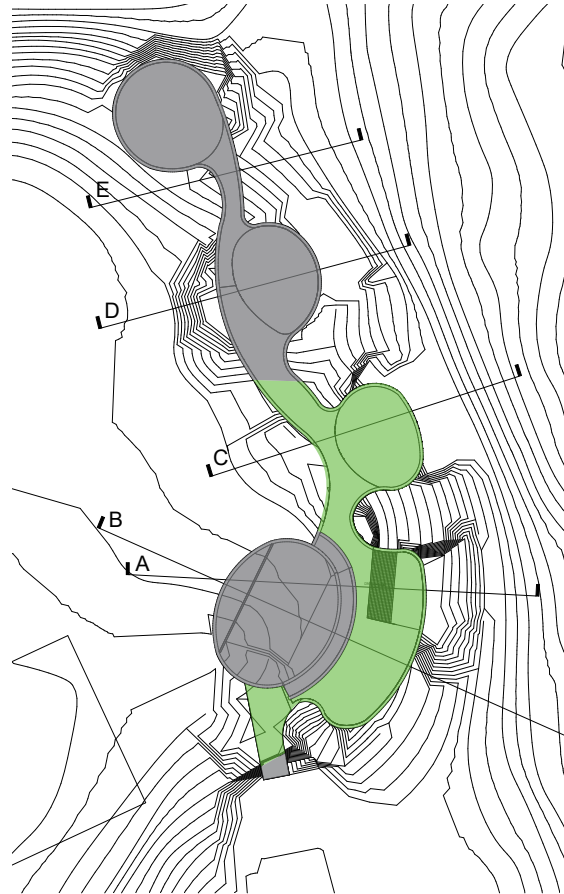


# Plan Derived from Grace Farms



3/5

Fluidity of Plan



3/6

Metal Roof / Green Roof Relationship



3/7

Early Rendition of Fluid Plan in Site

# Typological: What is Montessori?

The Montessori Method of education, developed by Dr. Maria Montessori, is a child-centered educational approach based on scientific observations educating children from a young age to adulthood.

A Montessori child is one who is naturally eager for knowledge. He or she is capable of initiating learning through a thoughtfully prepared learning environment, touching values the human spirit through the development of the whole child—physical, social, emotional, cognitive.

Though Montessori is not trademarked, there are a number of qualities that make

up a Montessori school. These include (1) multi-age groupings that foster peer learning, (2) child directed work, and (3) uninterrupted blocks of work time as well as (4) scientifically designed didactic materials based on age range and difficulty.

The teacher, child, and environment create a learning triangle. The classroom is prepared by the teacher to encourage independence, freedom (within limits), and a sense of order. The child, through individual choice, makes use of what the environment offers to develop himself, interacting with the teacher when support and/or guidance is needed.



Elementary 1 Classroom



### **Multi-age groupings**

Multi-age groupings enable younger children to learn from older children and experience new challenges through observation. Older children reinforce their learning by teaching concepts they have already mastered, develop leadership skills, and serve as role models. This mimics the real world, in which individuals work and socialize with people of all ages and dispositions. In this case, the classes are broken up as follows:

*Primary: ages 3-6 (PreK - Kindergarten)*

*Elementary 1: ages 6-9 (1st-3rd grade)*

*Elementary 2: ages 9-12 (4th-6th grade)*

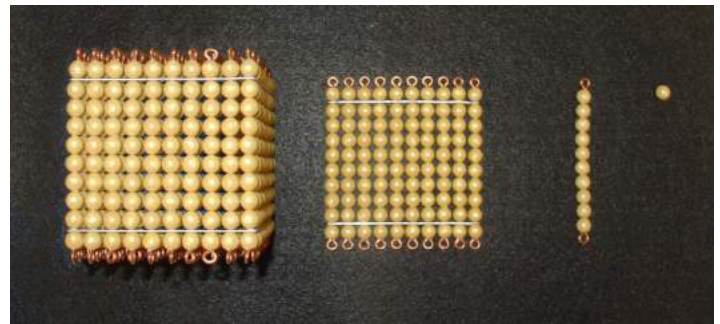
### **Child Directed Work**

Dr. Montessori observed that children experience sensitive periods, or windows of opportunity, as they grow. Montessori education supports children in choosing meaningful and challenging work of their own interest. While this is sometimes seen as an undirected mess, students learn how to be intrinsically motivated with sustained attention and developmental responsibility to oneself and others. This child-directed work is supported by the design and flow of the Montessori classroom, which is created to arouse each child's curiosity. Also, this design provides the opportunity to work in calm, uncluttered spaces either individually or as part of a group.

### **Blocked Work Time**

Respect for individuals is crucial in the learning process. During the work period, students are given time to work through various tasks and responsibilities at

their own pace without interruption. To paint a picture, this involves selecting an activity at his or her own skill level, performing the activity for as long as there remains interest, cleaning up the activity and returning it to the shelf, then selecting another activity. The teacher's role in this time is monitoring the student and providing individual and small group



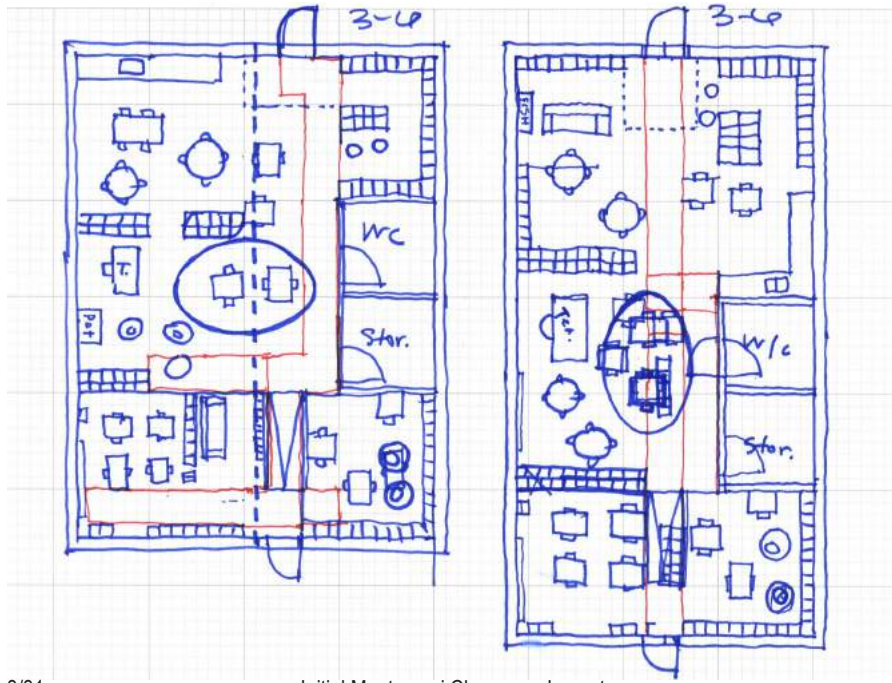
Classic Golden Beads as Used in the Montessori Classroom

lessons. The uninterrupted work period facilitates the development of coordination, concentration, independence and order, and the assimilation of information.

### **Classroom Materials**

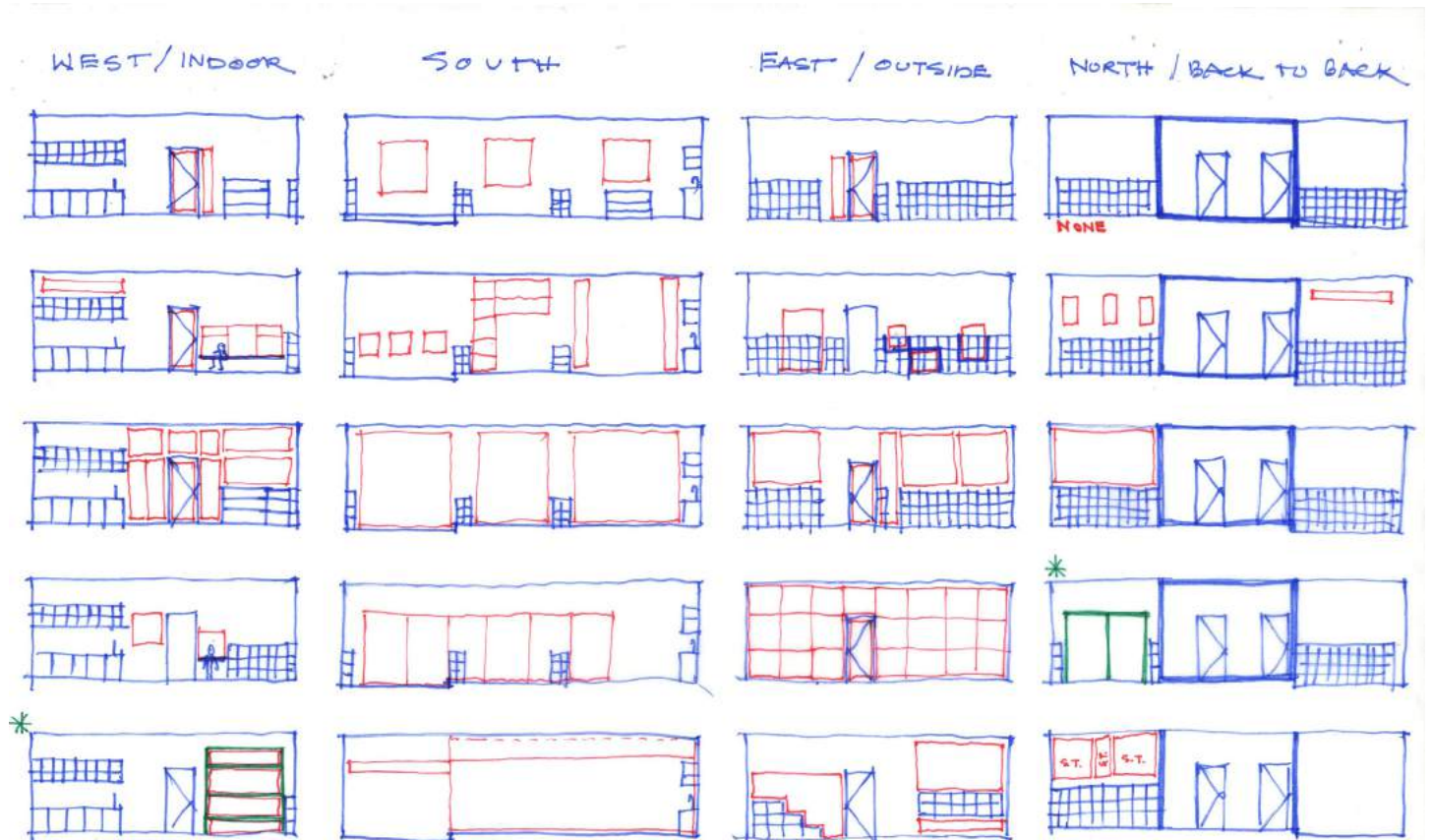
The classroom materials have a hands-on approach to learning and are scientifically designed to evoke a student with a way of assessing progress and correcting mistakes, independent of the teacher. Montessori's distinctive learning materials each teach a single skill or concept. The concrete materials start abstractly and introduce concepts that become increasingly complex.

# Typological: Classroom Layout



3/31

Initial Montessori Classroom Layout



4/4

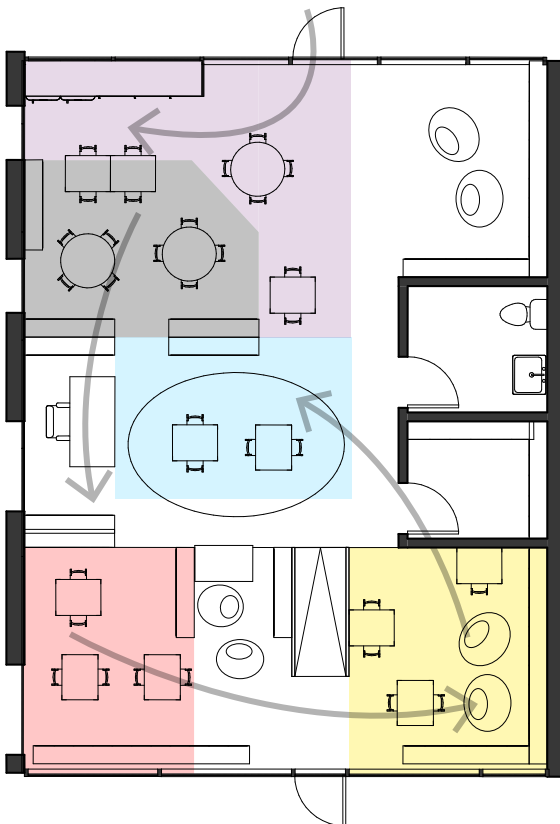
Elevation Study  
Transparent / Solid Reference

# Final Classroom Layout

As all areas of the classroom are accounted for, a highly effective color coordination system organizes the space and materials. This color system stays continuous throughout the years, so finding specific tools are simple and organized. As thoughts of the children and teachers are organized, so is the classroom.

Progression of space is also a necessity, linking appropriate space near one another (i.e. Botany near Practical Life with a sink for easy clean up). As the children progress in learning, so does the classroom. It is set up in a linear fashion to create a path through the space.

- (Yellow) Language
- (Blue) Geometry/Geography
- (Red) Math
- (Green) Botany/Zoology
- (Black) History/Art/Culture
  
- (Purple) Practical Life



3/31 Primary Classroom Layout



3/31 E1 / E2 Classroom Layout

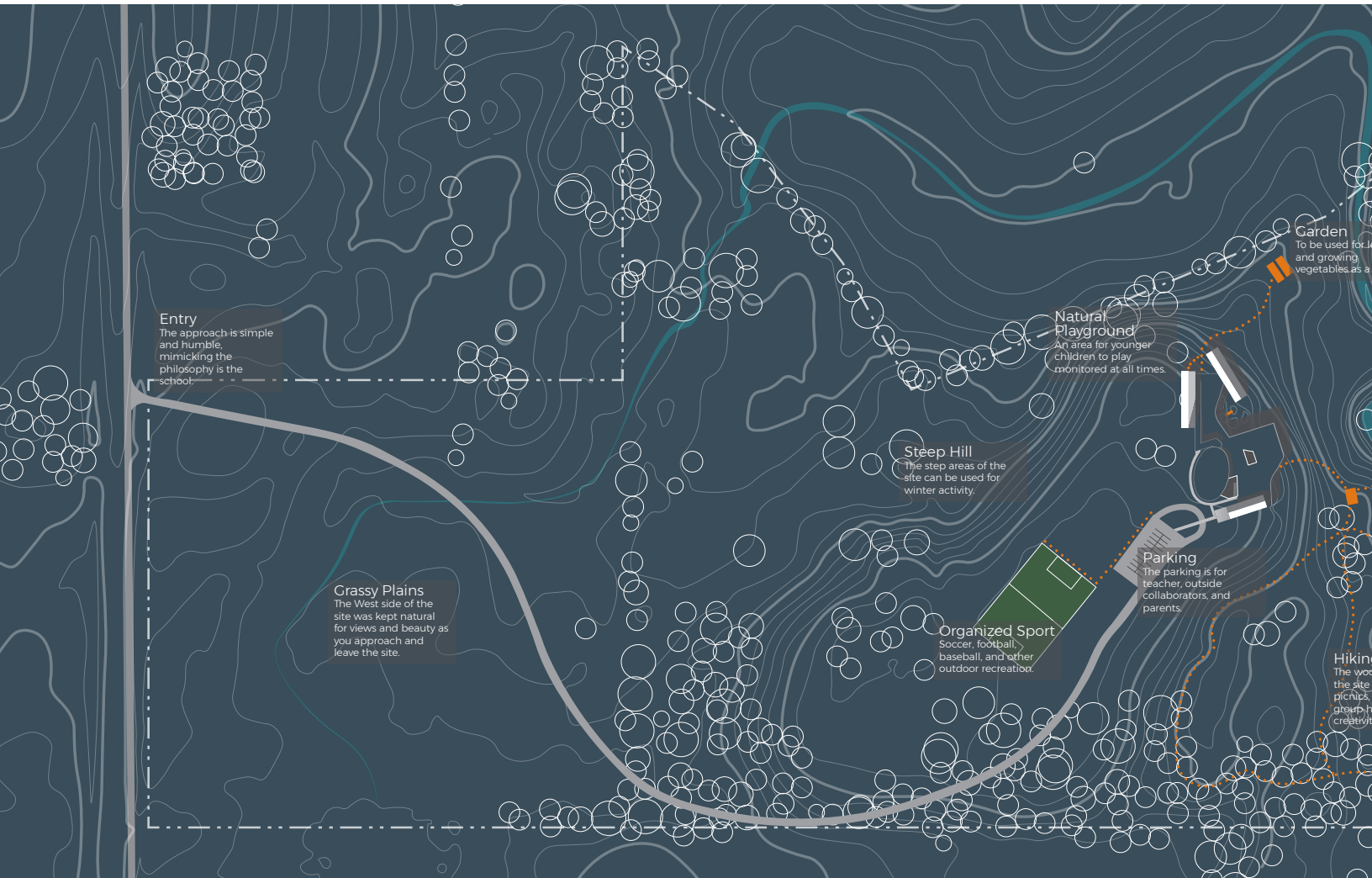
*“Play is a  
fundamental need—  
so much so that  
playgrounds should  
be provided for every  
child, just as schools  
are.”*

*-Theodore Roosevelt*



# PERFORMANCE ANALYSIS: RESPONSE TO THE SITE OR CONTEXT

# Intro to Site Location



## Pin Model



Through a series of study model I was able to show the site matters to the thesis.

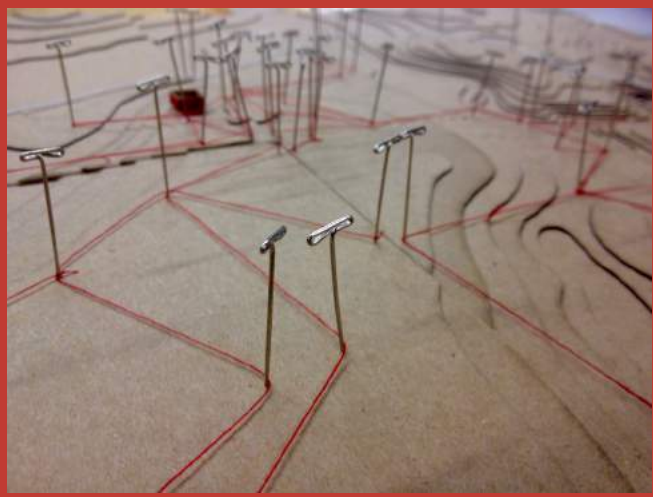
This shows the typical day of student as they might use the entire site.



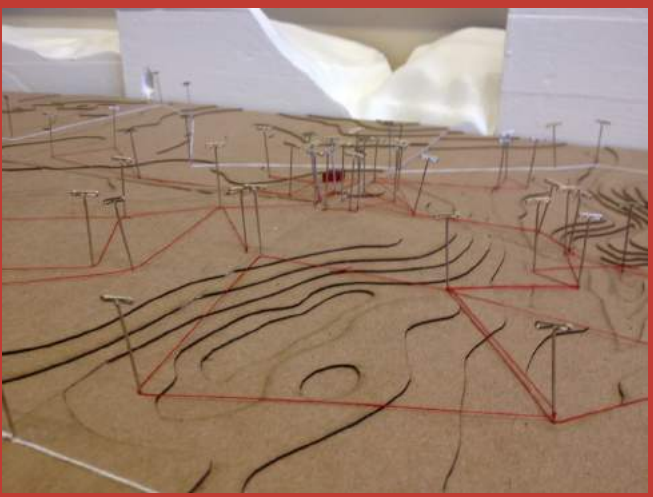
All things to see and explore on the site were important for the education of the children.

Grassy Plains, sledding hills, gardens, hiking trails, outdoor classroom, the creek, natural playground.

The design is laid into the contours of the site as model shows. A series of green roofs make school invisible from entry (that is where the title come in, visibly only seeing the peaks of the school). All these are meant to help develop cognitive powers through direct experience, through, hearing, tasting, smelling, touching, seeing, and movement.



2/17 Congested Area of Site



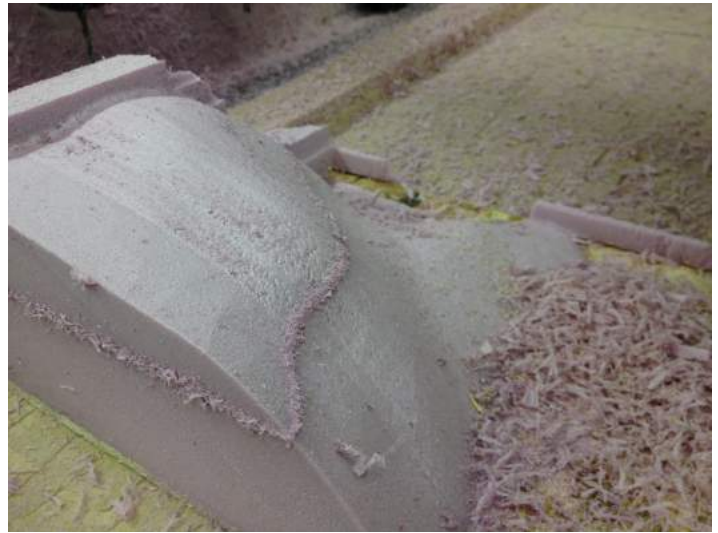
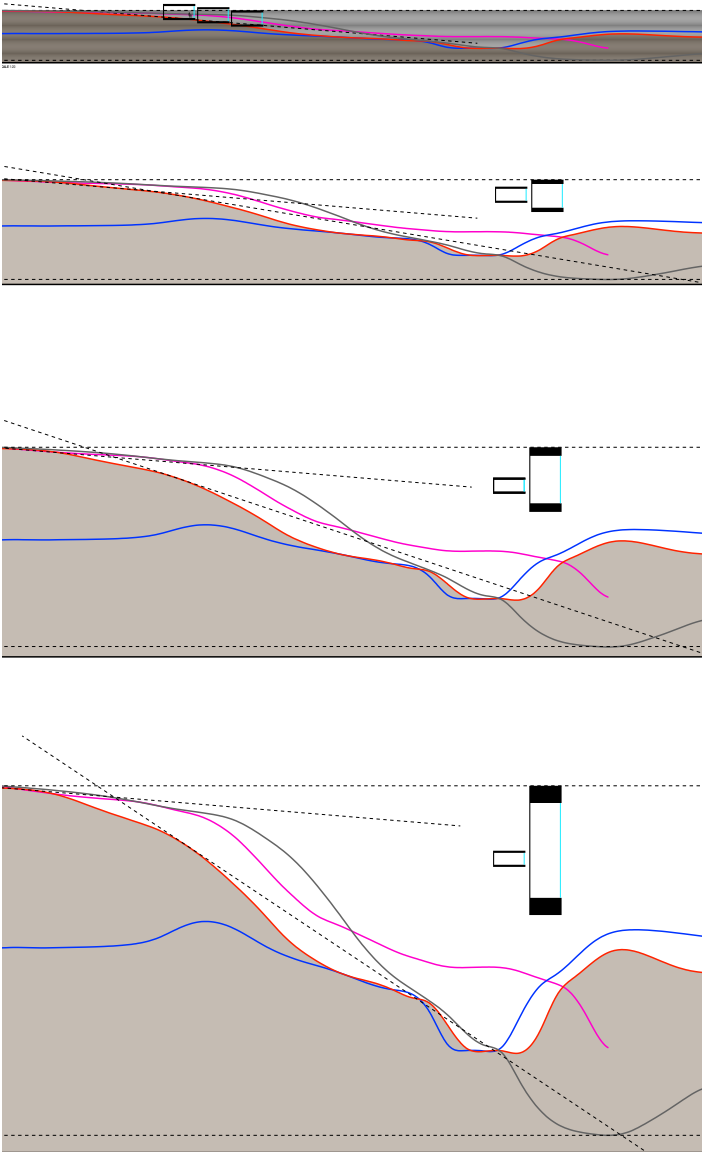
2/17 Steepest Area of Site

# Understanding the Slope

As the children grow, they foster a sense of memory from an experience, especially of natural landscapes. For myself visiting the site, I remember the site being steeper than it actually was looking up the eastern side of the main hill; it appeared grander than the elevation studies showed. This explained that we remember a memory of a site distorted from the actual, much as a child remembers specific events in

the sensitive period, as Dr. Montessori points out.

To help explain this, I represented a portion of the site including the creek and highest point on the site, exaggerating the z-axis by x2, x4, and x8. The bus on the models explains graphically how it is exaggerated.



2/15 Used to study the slope and how a building might interact with the landscape differently and understand the dynamics of the site. On the top right of each section, revealed is the 1:1 section of the classroom as well as the 8:1 section.

2/7 Process of Making Z Axis Models with CNC machine



# Z Axis Models

x1



x2



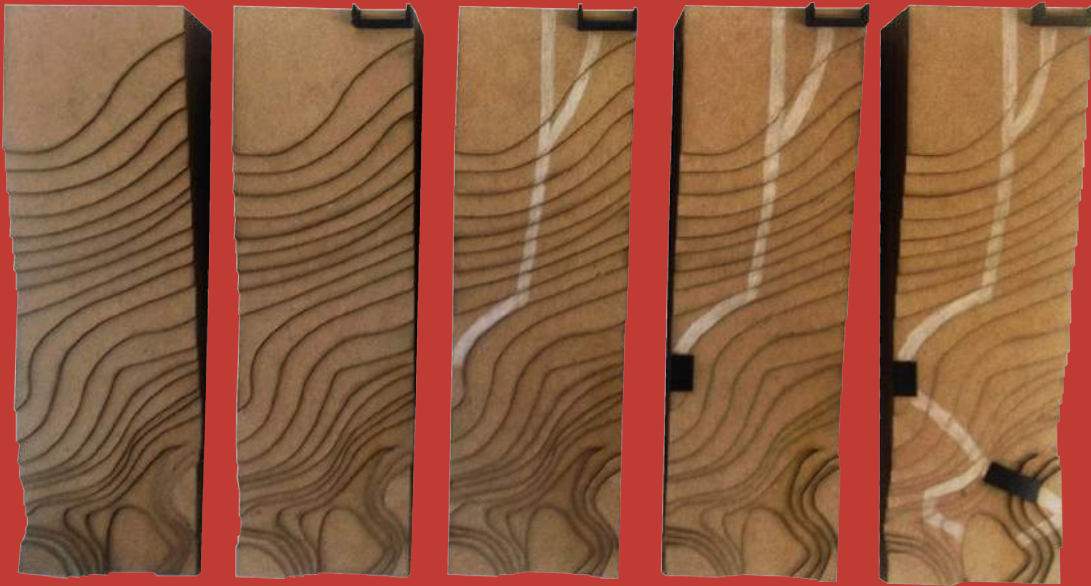
x4



x8



# Experiential Models



3/7

Models showing movement on site using built architecture.

Early in the process, I was challenged to ask why I chose this site specifically. To understand the site (in elevation, plan, section, experience, as an educational tool), I performed a series of studies using topography models to show the difference between this chosen site and any other site, rural or urban. This became a very rooted question as the site is contour heavy with lush vegetation, deepening views and large in size.

As the Montessori Method teaches, equipping children in all areas of life is important to the educational experience. The children have the freedom (within limits) to perform tasks at their own pace. For this specific school, the landscape plays an important role in that educational experience.

Through a series of progression models to show the trail of how one might use built architecture to experience the landscape, the study gives credit to show steps how to approach the vast site.

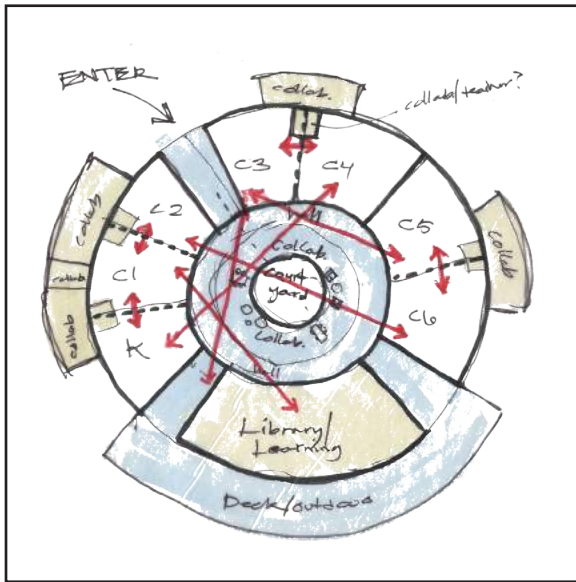


Detail of  
Experience  
Models

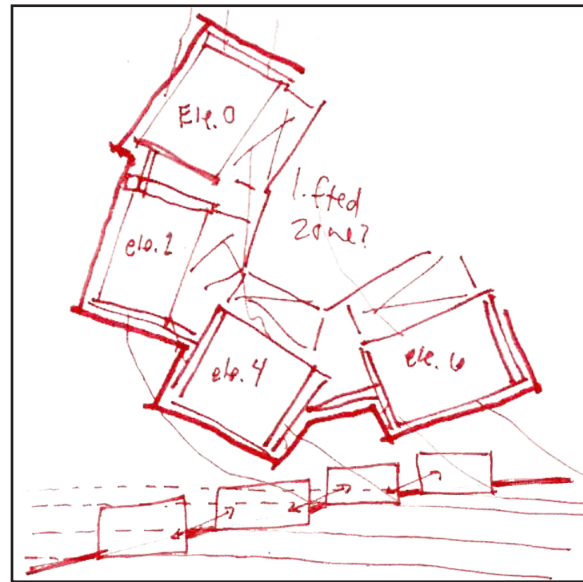
3/7

# Responding to the Site

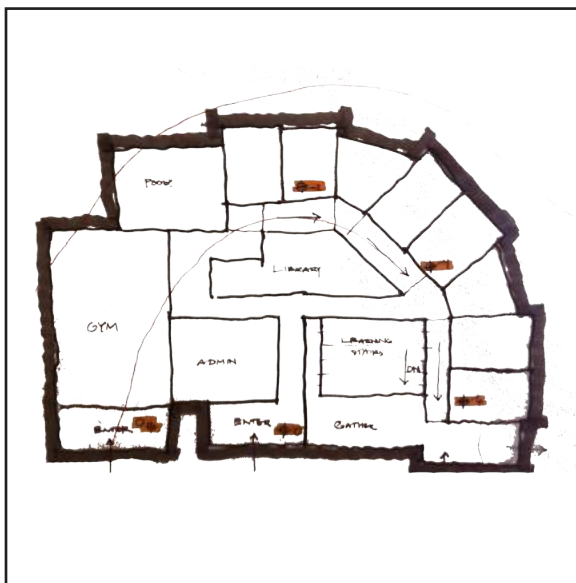
Through the process of an iterative method, design decisions were made from crucial developmental points as discussed in small critique. This process, as shown in chronological order, shifted from working strictly in floor plan to section cut, as the section became as important as the plan to develop the relationship between building and landscape.



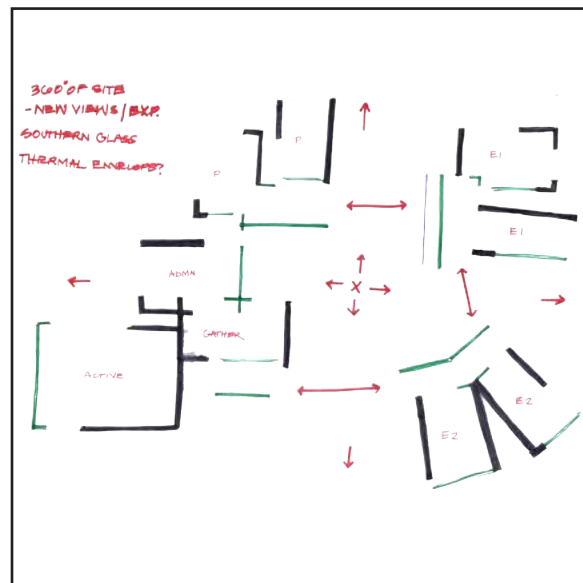
W2 Interior Space Relationship



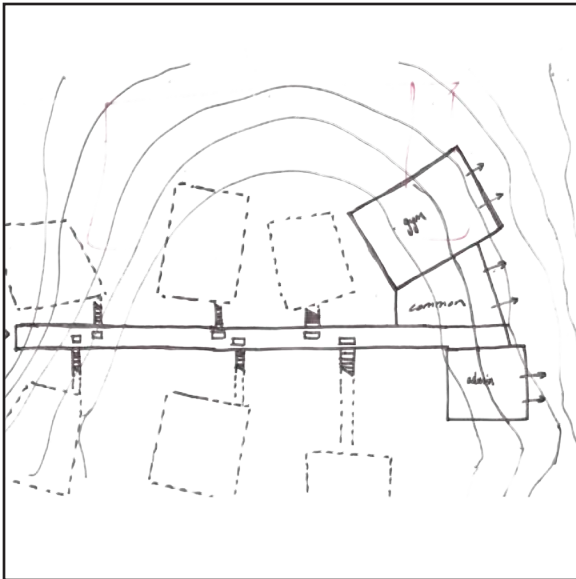
W5 Classroom Organization



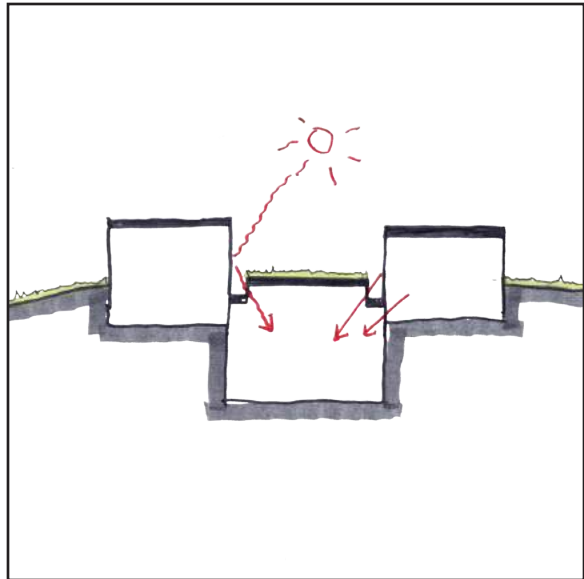
W8 Elevation of Classroom



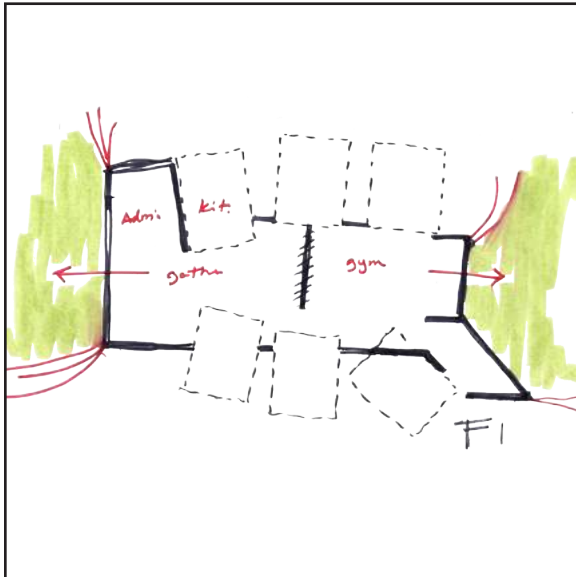
W8 Views from Interior Space



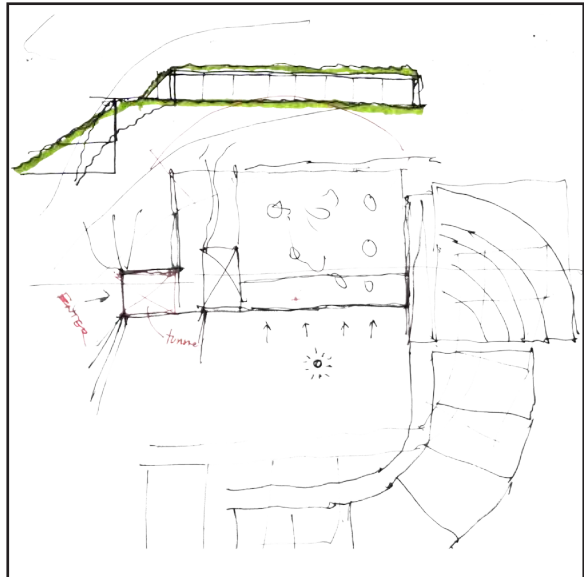
W8 Spinal Organization



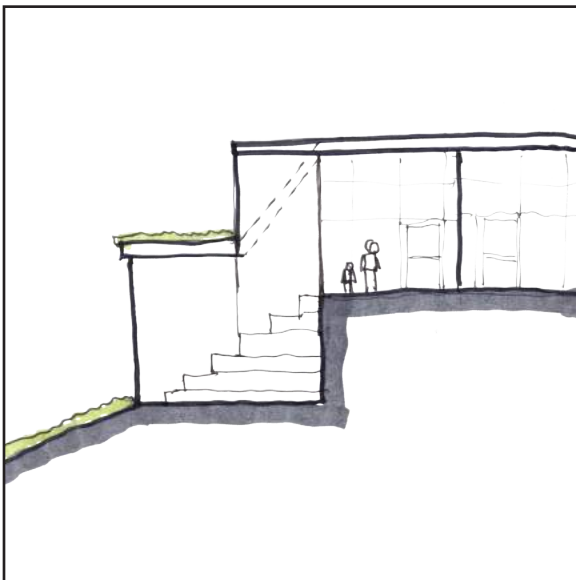
W8 Early Sun Study



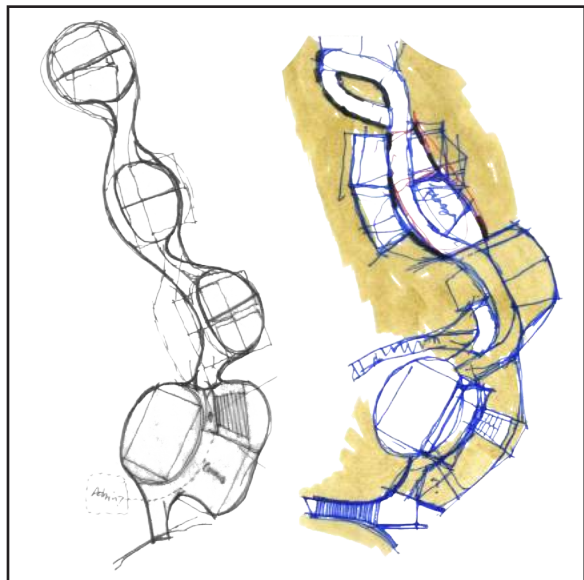
W8 Partially Submerged Plan



W9 Plan following Contours

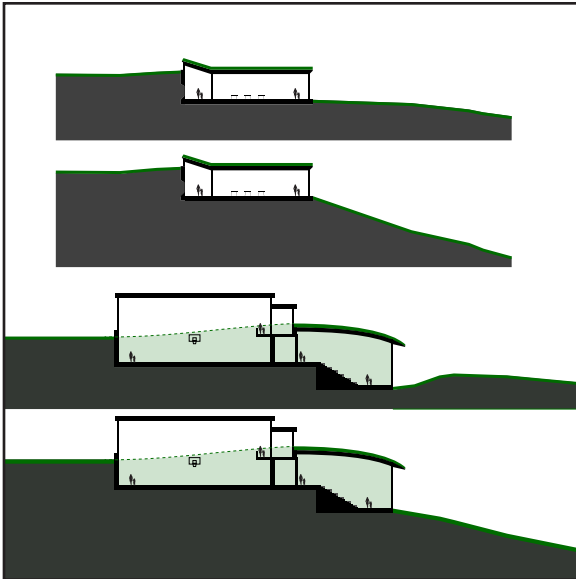


W9 Begin Section Studies

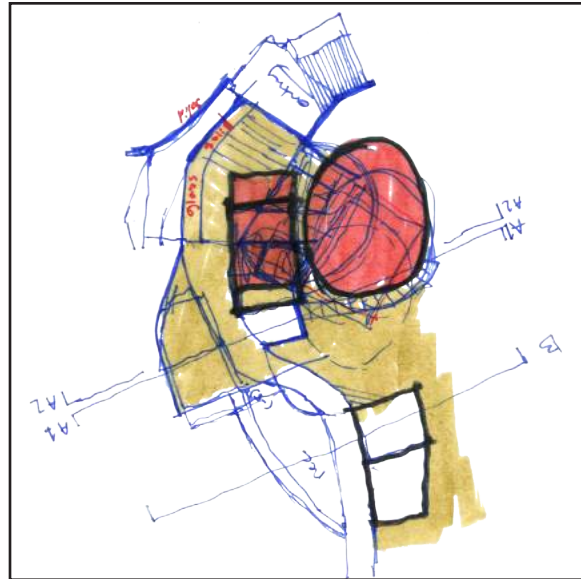


W9 Fluidity of Plan

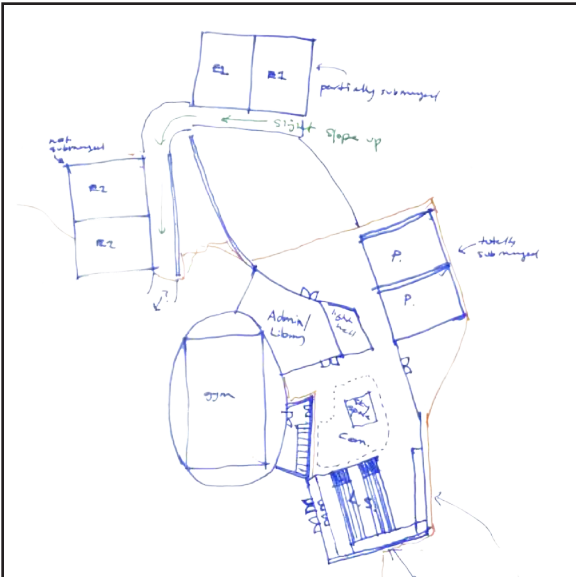




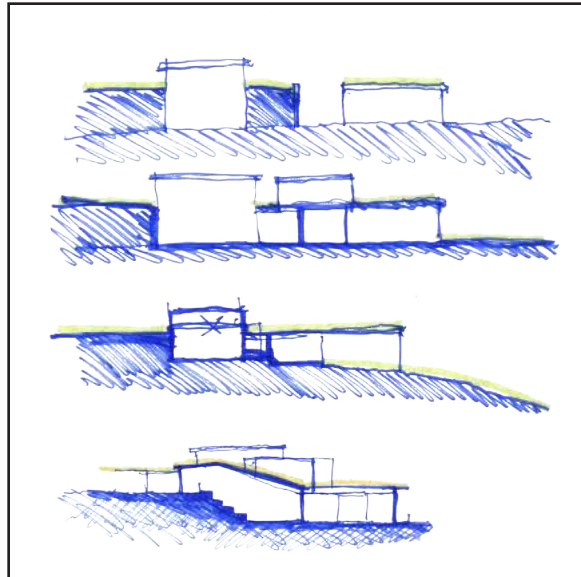
W9 Primary Section Relationships



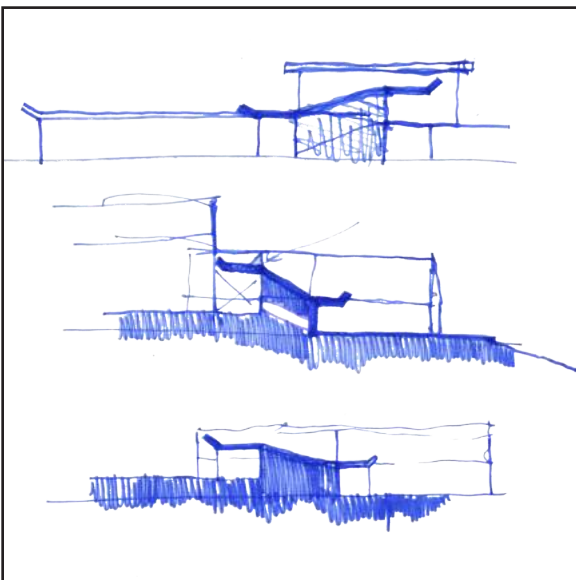
W10 Mixed Idea Plan



W9 Final Plan Development

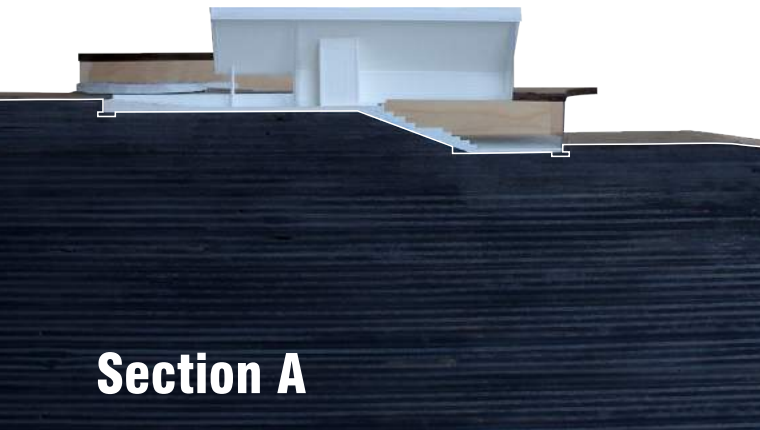
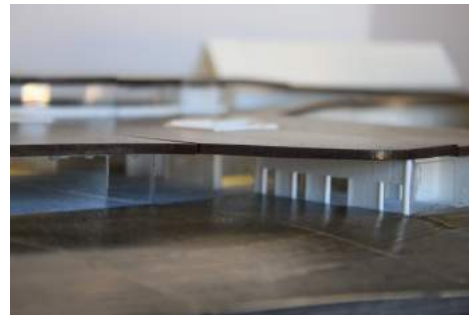


W12 Final Sectional Relationships



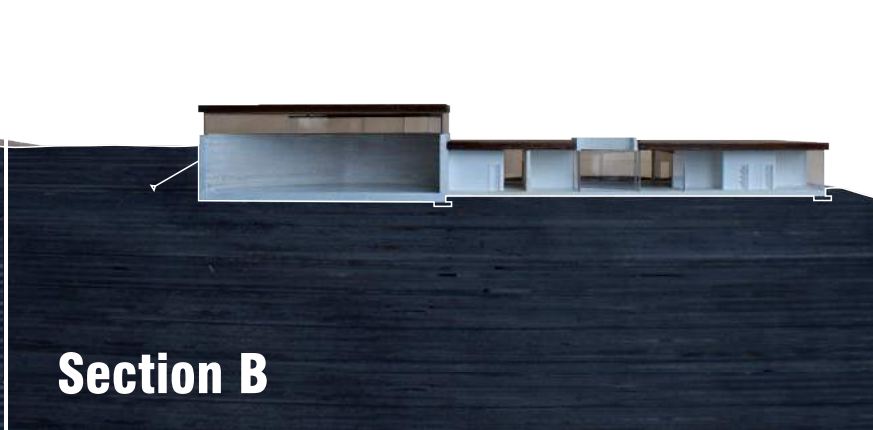
W12 Hallway Indoor/Outdoor Relationships

# Full Section Model



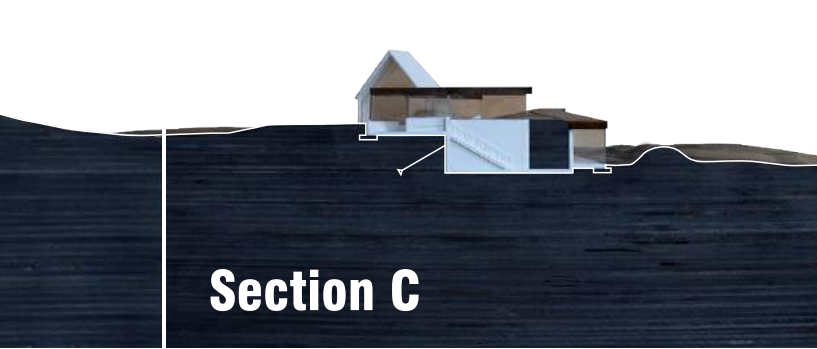
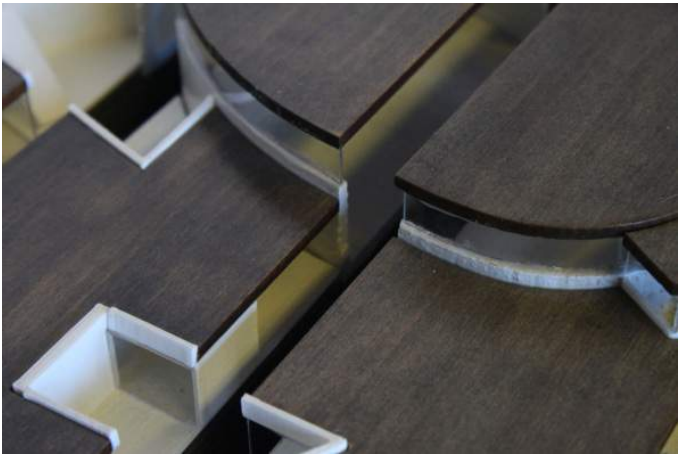
**Section A**

Entry Condition / Learning Stairs  
Relationship to Contour



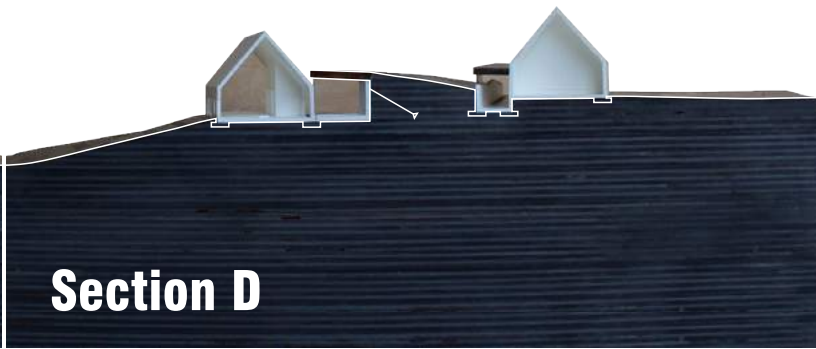
**Section B**

Main Level in Relationship to Gymnasium  
/ Shows Skyframe



**Section C**

Access from High to Low Elevation / Hall to Natural Playground



**Section D**

Classroom and Hall to Ground Relationship



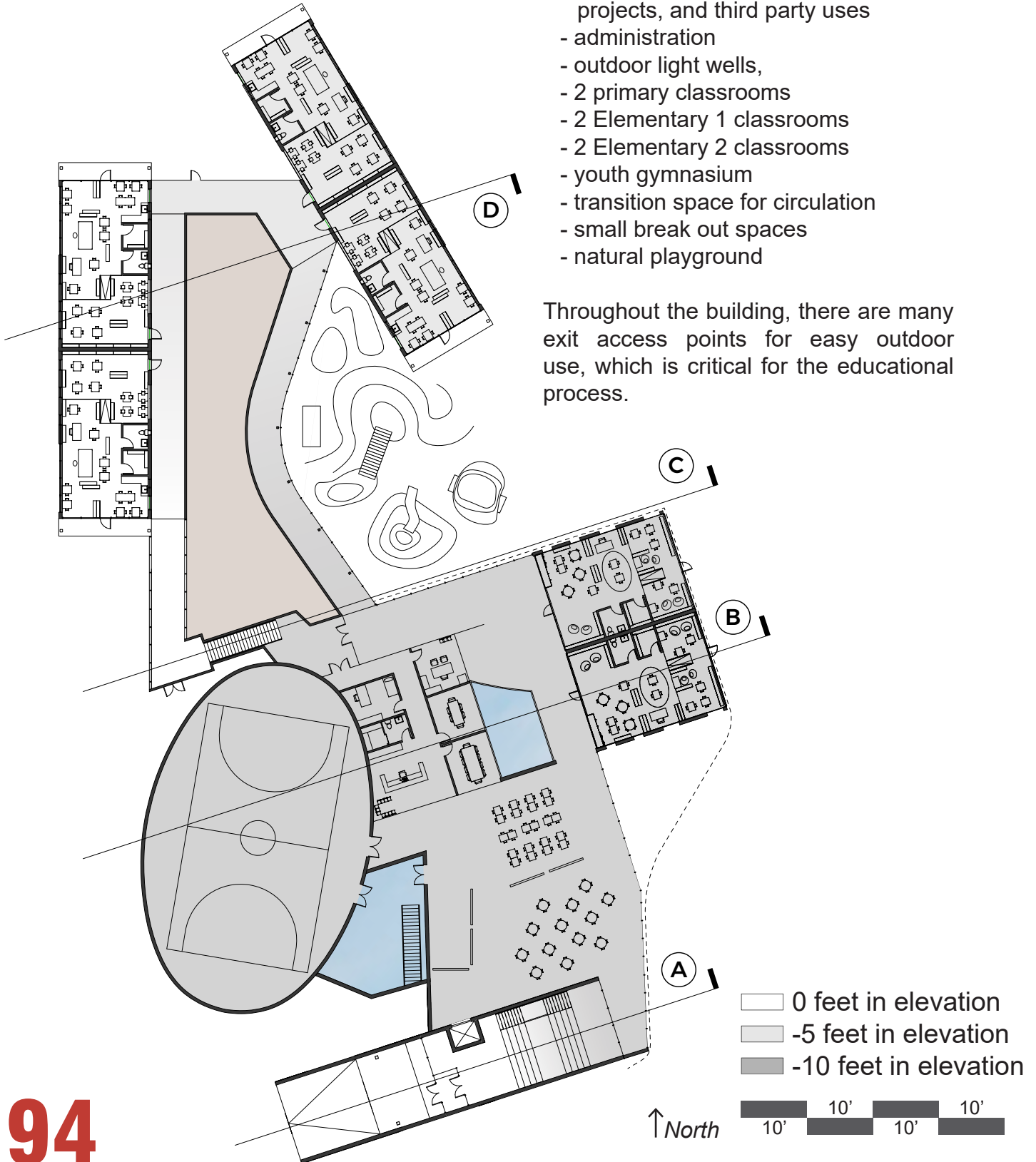
# Floor Plan

The floor plan shows the relationship of spaces to each other, making visible the linear progression one child might take throughout the years at the school.

Included in the school:

- entry condition
- learning stair case for large group assemblies
- a commons area for lunch, larger projects, and third party uses
- administration
- outdoor light wells,
- 2 primary classrooms
- 2 Elementary 1 classrooms
- 2 Elementary 2 classrooms
- youth gymnasium
- transition space for circulation
- small break out spaces
- natural playground

Throughout the building, there are many exit access points for easy outdoor use, which is critical for the educational process.







## Entry / Start

Time of day: 9:00am

As a seed begins small and submerged underground, so does a young child as he or she begins school. At the school, an immediate step underground to the main floor is necessary for the learning process. This teaches the children to be humble and giving.

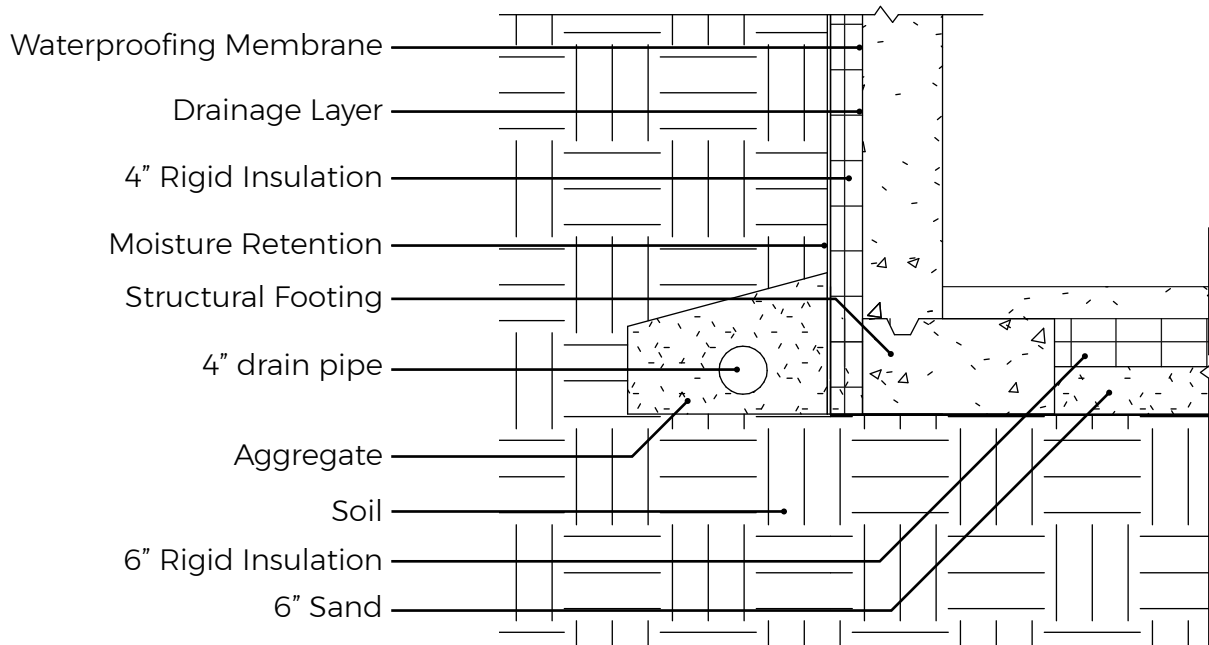
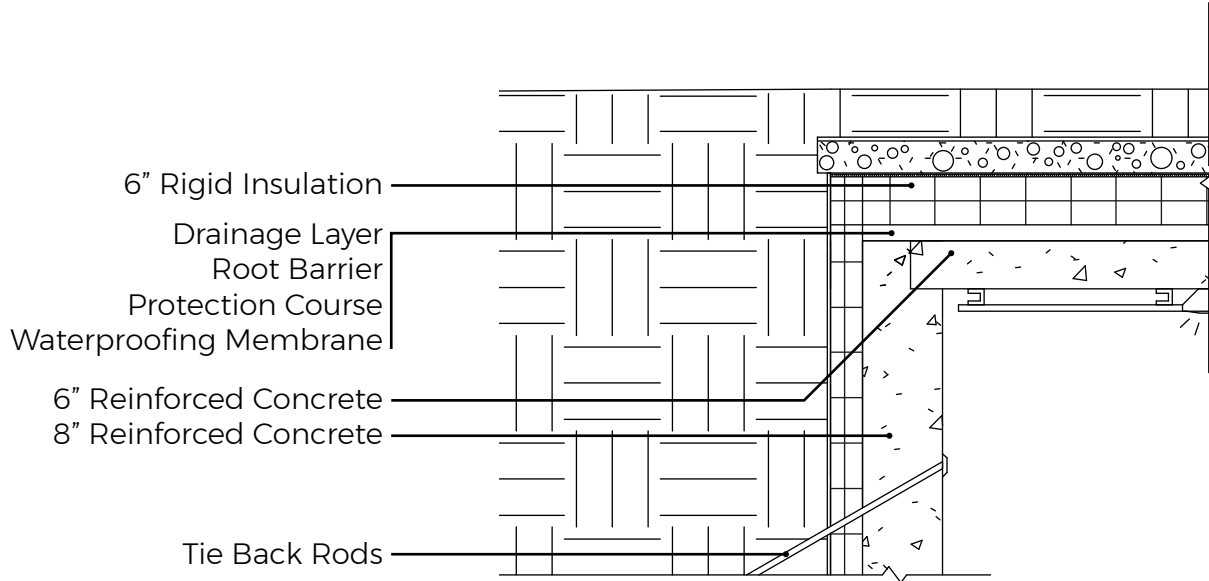


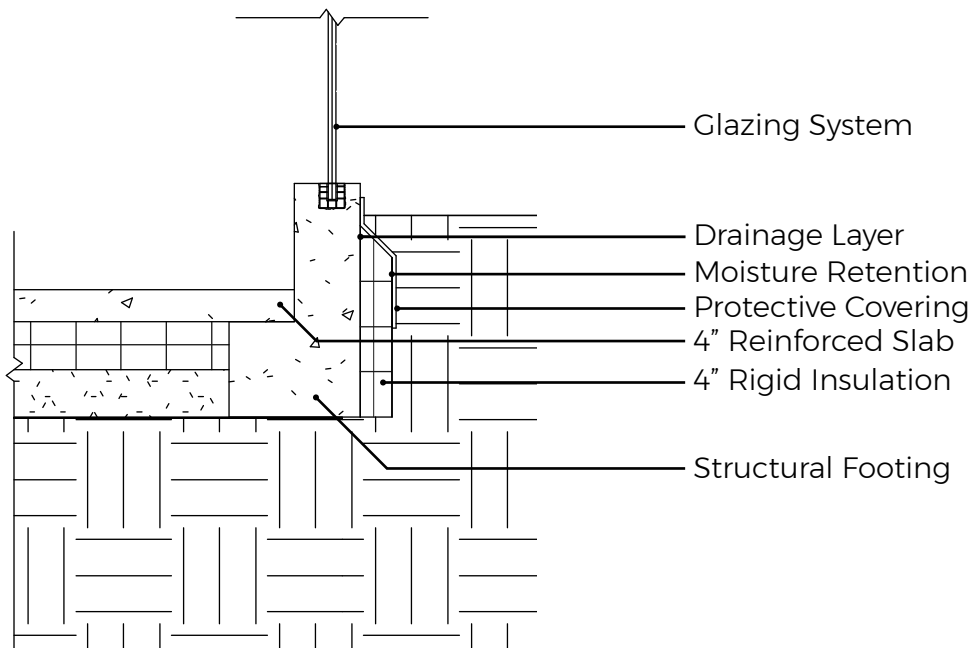
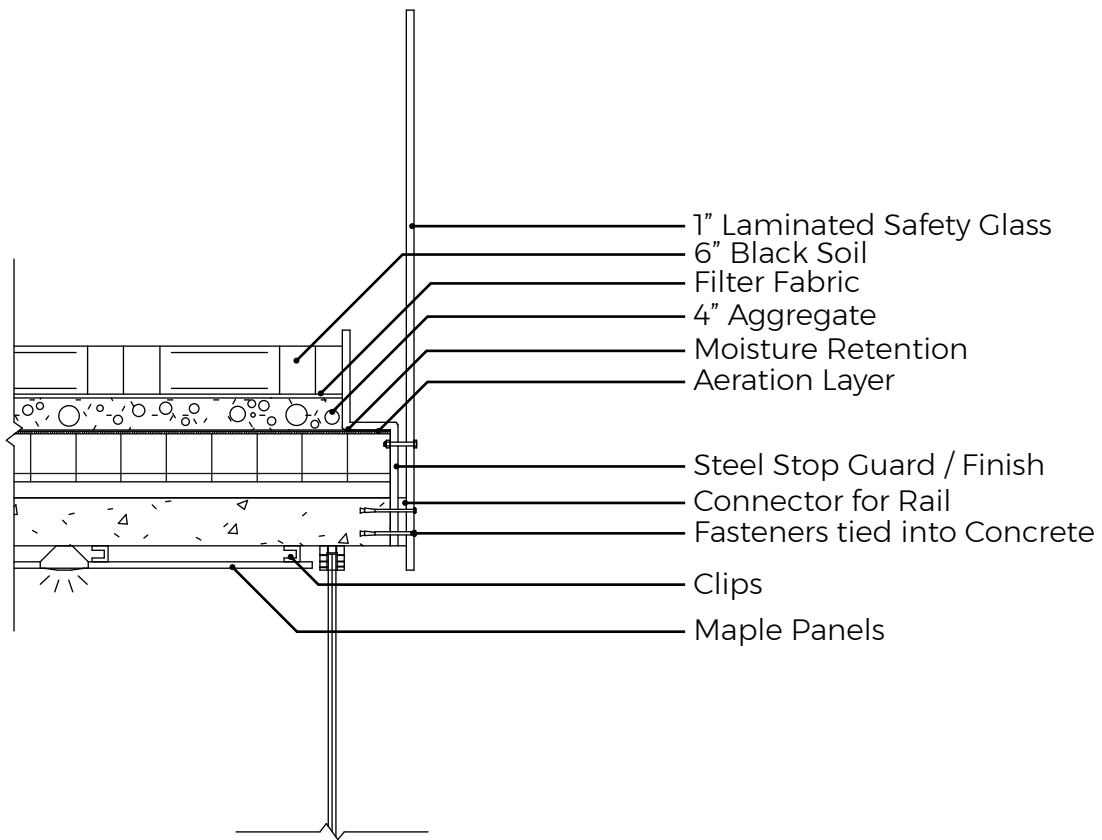
## Transition / Learn / Imagine

Time of day: 9:00am

Because of the program, all areas of the school may be used for learning, including indoors and outdoors. Specific zones for monitored outdoor play are shown in the natural playground. Small monitored group areas may include access to the river for a biology lesson, gardening, sledding, hiking, organized sports, and others.

# Typical Details in School







View from East looking toward School





# Final Project Solution Documentation

Thesis Show Boards (concepts reproduced in previous section)





M. Arch Thesis Design by Alexander P. Jansen

**Description of Thesis**

Blending architecture with landscape is not a new feature in design. For the Montessori schooling system, directly relating the natural world to the school's methods of teaching is crucial for the development of children. This thesis explores the role of an iterative method of learning, the child's learning experience, and the ability to explore safety within limits of safety and rigidity.

The project is designed for children ages 3-5. It will include large groupings for learning, individual desks for work, and quiet spaces for work. Each teacher, child, and Montessori room learning center for the child prepared by the teacher, while arranging the experience they meet in a place.

By creating an outdoor space for a Montessori school, the designer must be aware of the needs of the program including the volume and the needs around them. The program through various outdoor and study in Montessori, the specific design for the school, the needs of the program, the ability to respond through the site, landscape in a real and experiential way.

**Project Criteria**

1. Blend architecture into the landscape while minimally impacting the visual beauty of the site.
2. Design a school that meets (and exceeds) the needs and goals set by the AMS (American Montessori Society) fostering primary and experiential.
3. Develop a design that is site specific through an iterative process.
4. Maximize opportunity for child based learning by giving the children:
  - the proper indoor and outdoor spaces they need to explore, learn, freedom to explore the site within a safe environment.

**The Meaning of the Site**

The program and experience that can be provided in the landscape of a hillside, in a sense, is a direct result of the site's topography and the way it is used. The site is a hillside, and the program is designed to be a part of the landscape, not just a building on a hillside.

**START LISTEN TEACH**

**ITERATIVE DESIGN**



**FLOOR PLAN**



**Elementary 1 Classroom**

The above image shows the existing building area of the school. The building is a large, open-plan structure with a high ceiling and large windows. The building is situated on a hillside, and the surrounding landscape is a mix of grass and trees.

**MAIN DETAILS**

WALL TO GREEN ROOF, GLAZING TO GREEN ROOF, WALL TO FOUNDATION, GLAZING TO FOUNDATION

**PRIMARY CLASSROOM**

**E1/E2 CLASSROOMS**

**WHAT IS MONTESSORI?**

Montessori is a method of education that is based on scientific observations of children's natural development. It is a child-centered approach that emphasizes the child's role in their own learning. The method is based on the work of Maria Montessori, an Italian physician and educator who developed the first Montessori school in 1907.

**WHAT IS EDUCATION? A Look Into Our Current Education Models**

Education is the process of acquiring knowledge, skills, and values. It is a fundamental part of human development and is essential for the well-being of individuals and society. Current education models vary significantly in their approach to learning, with some emphasizing rote memorization and others focusing on critical thinking and problem-solving.

**STUDY MODELS**

Study models are used to analyze and understand different educational approaches. They provide a framework for comparing and contrasting various models of education, allowing researchers and practitioners to identify strengths and weaknesses and to develop more effective educational practices.








# Thesis Appendix

## Reference List

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## Previous Design Studio Experience

### 2013 Fall / Joan Vorderbruggen / Tea House Moorhead, MN

As an entry level studio, I learned basic concepts and processes that were to guide me through the education process introducing craftsmanship, hand drawing, spatial relationships, and presentation skills.



**2014 Spring / Cindy Urness / Dance Studio Moorhead, MN / Dwelling Cripple Creek, CO**

In this studio, I learned to switch from hand rendering to digital methods of design. This opened up a whole new world making the possibilities endless in my mind. I also took hold of the design of small living.

**2014 Fall / Ronald Ramsey / Shaker Barn New Labanon, NY / Private Residence “Agincourt”, Iowa**

History and architectures can sometimes go hand in hand. For this studio, the underlying importance is this relationship. Both project challenged me to look at historical accounts to design relevant architecture for a specific time period and location.

**2015 Spring / Malini Srivastava / Tower and Bridge Fargo, ND**

This studio was the turning point for my educational career taking hold on broad concepts to specific areas in design. Using an iterative process, the design gave me confidence in my final design which was presented in a public setting at the Fargo downtown library.

**2015 Fall / Bakr Aly Ahmed / High Rise Studio San Francisco, CA**

It was this course that challenged me to think about brand new concepts and criteria that are necessary to design a high rise in the San Fransisco area. Working with a partner for part of the project challenged me to coordinate in the research portion of the design, while I was on my own for the design development and the final result.

**2016 Spring / Malini Srivastava / Design+Build Studio Fargo, ND**

As the most memorable studio taken in my academic career, this studio taught me the most real world problems that are feasible to be built using a real budget and client. From master planning to spatial layout and foundation details to replatting the lot allotted for the project, the design for the four Passive Houses were designed to be built complete with construction documents and a green light with the energy modeling software used to legitimize the project.

**2016 Fall / Malini Srivastava / Solar Decathlon Studio, Itasca, MN**

There were three portions to studio, each bouncing off one another. The first, creating a wearable artifact meaning to distort reality in some way led to the second portion of a wall system that responds to the first portion. The third and final portion of the project allotted in the design on a Solar Decathlon house concept. As this last fragment was a partner project, coordination, quick, authentic design, and the ability to tie in many factors into design were gains from this studio.

**2017 Spring / Mike Christenson / Thesis Studio Alexandria, MN**

Branching from all the previous studios in my academic career, this studio captured all my knowledge learning thus far and challenged me to cerate a design thesis that is inspiring for myself, but also for the readers of this book. The studio pushed me to take a simple idea and transform it in 8 short months into a complete, final design based on a series of criteria that guided the project.





## **Personal Identification**

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