



IN HUMAN

Only architecture that considers human scale and interaction is successful architecture.
- Jan Gehl



IN HUMAN

SIGNATURE PAGE

In Human

A design thesis submitted to the Department of Architecture and Landscape Architecture of North Dakota State University. By Christopher Carter, in partial fulfillment of the requirements for the degree of Master of Architecture.



Primary Thesis Advisor



Thesis Committee Chair

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ABSTRACT

Can we connect children to their environments through architectural scale?

Can we bridge the gap between the designer and the children for which the building is designed for?

Scale has often been a key motivation for many distinguished architects and still to this day there is some muddled confusion about how to achieve aesthetic and design into a cohesive whole. This thesis aims to answer these questions of scale and to give back to the architectural discipline through the process of case studying built forms, building physical iterative scale models of space, and scale based iterative paintings. This is an effort to provide children with scaled relief from overbearing flat and mundane structures that they attend every day and to develop the proper socio-cognitive skills they will need as they continue on their path.

Typology: K-5 Educational Facility

Site: Irwin, Idaho



THESIS NARRATIVE

INTRODUCTION

This thesis aims to utilize architecture as the medium to connect children to their environments and to develop them into social beings. Jan Gehl, a Danish architect and urban design consultant, once said, “Only architecture that considers human scale and interaction is successful architecture.” This interaction, scale versus the human counterpart, is emphasized in this thesis as the key motivating element. The project stretches the boundaries of how we view scale and focuses on creating a collage of texturized pieces that increase reaction and retention to place. To complement these complex surfaces, purity of overall form is employed. The designed school becomes not only a place to learn from its educators, but also a place of unlimited interaction with the building. This form intertwined with interaction strives to develop an epoch in our history. A breathable memory from experience.

Building upon this change, or movement, is to shift from the typical to an atypical educational facility and a chance to foster imagination. The socio-cognitive development and critical reasoning of children is constantly being suppressed by institutions of dulled expression. This project explores and expresses the fluid reality which children live in and are connected to. A welcome departure from strict programs and over generalized traditional pedagogies.

PROJECT TYPOLOGY

K-5 Educational Facility

The purpose of the project is not to define new educational methods of teaching, but to adapt architecture around a singular tested methodology. More specifically the Montessori Method. It involves children initiating their own learning through support from educators in a prepared environment.

USER / CLIENT

- STUDENTS** The main user and client that comes for educational instruction and direction. These students are local children within the city limits that desire or need a different pedagogy of teaching.
- EDUCATORS** Ranging from Kindergarten to Grade 5, and specialty fields these teachers facilitate scheduled activities for the children based on their specific needs and support children through their own unique learning processes.
- PRINCIPAL** The leader of the entire community that makes up the educational facility. Manages major administrative tasks and also supervise students and teachers.
- OFFICE CLERKS** Day to day needs of the administrative office answering phone calls and scheduling meetings.
- OFFICE MANAGER** Handles sensitive documents like student records and also acts a mediator between students, parents and the principal.
- VICE PRINCIPAL** Assists the principal to manage administration and educational conditions of the school.
- CUSTODIAN** Spends a majority of the day cleaning and keeping the school orderly. They also perform small maintenance requirements and repairs and ensure the building is secure.
- COUNSELOR** Assists students with educational, personal, and social goals and development.
- PARENTS** Primary client providing their children with the educational style that they believe fits their child's needs. Frequent visitors for conferences and school functions. Major contributors and donors to the schools budgetary concerns.

PROJECT EMPHASIS

SCALE The most significant aspect of this project is to emphasize the importance of scale with respect to child proportions, ergonomics, and their imagined proportions. This coupled with scale that facilitates the educators as well, will create a myriad of experiences within and out of the proposed enclosure. A museum curated of artistic engaging pieces that have multiple functions.

MATERIALITY Materiality works hand in hand with scale in terms of representation and sensory exposure. Textures and different material representations can enhance the scale of space for the children while providing durable surfaces.

PROJECT GOALS

The main priority of this thesis project is to develop a working model of an educational facility that creates a multitude of shared experience across all users. To exceed expectations where others have only attempted a design of such grandeur or failed because of budgetary concerns. To connect children on a deeper level to their environment/s and develop them into social beings and unique individuals. This model can serve the realm of architecture as an idea that translates across cultures and creates connections between educators students and parents as a holistic interpretation.

Simpler goals of the project include defining comfortable spatial properties for all to share and to develop a finely tuned efficient enclosure. All aspects of the final design are to compliment each other in a harmonious fashion.

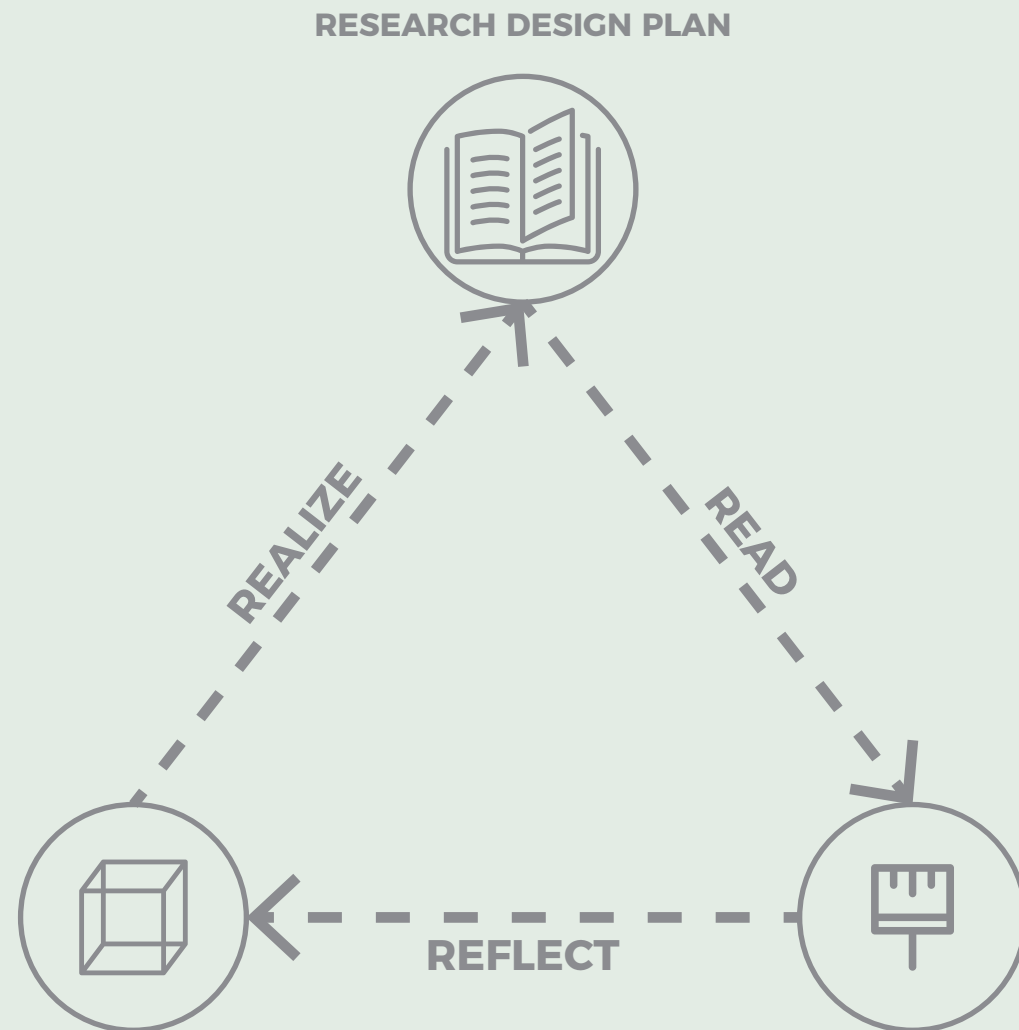
PROJECT JUSTIFICATION

Two years ago my sister had her first child, a boy. Until very recently, I have always loathed children and found them annoying and pesky. I think some of the bonds I have developed with my sister's child have created an empathizing view of children and sparked interest in how they understand their physical environments. I have had the pleasure of watching him grow and adapt to this environment even though the objects he continues to play and interact with are out of scale.

This continued interest reminded me of the schools I attended as a child, and schools I have visited as a young adult. While some are more successful than others, most of the architecture is heavily designed around efficiency and revolves around classical design methods. This type of architecture creates a poor connection for children and designed to push them in and out of classrooms and move between hallways in efficient single loaded corridors. As most of their time is spent in their respective classrooms justifications can be made towards efficient corridors, however the design should foster different forms of social interaction. How much different might you be as a person if your educational facilities offered a physical connection to your enclosure?

An interest, throughout my education and life experiences, has been formed around how people interact with space. I have always contemplated why we don't take more classes revolving around the psychological impacts that we create for humans, as we design space that humans interact with on a daily basis. More importantly, scale for adults has been learned, through one avenue or another, so designing for children, who are still grappling at some of these concepts, became a fit. I believe that also pushing my comfort boundaries on developing space for children, who I am still not comfortable with, will increase my empathy and cultivate sympathy from my own past experiences into the needs and feelings of children. This coupled with my ability to conceptually and graphically display past work, will enhance the overall final presentation.





DESIGN METHODOLOGY

The design methodologies chosen revolve heavily around an iterative process. The stepped process will be to review topical literature, interpret the literature through a medium (scale based painting), and then to develop space models based upon the iterative painting. This process will then rinse and repeat until a desired outcome is achieved. The methodologies include design, modeling, descriptive, and interpretative research.

DESIGN DOCUMENTATION

Project documentation will take place in the form of written /drawn, photographed, and digital means. These pieces of the whole, will be compiled into an 8.5" x 11" booklet in partial fulfillment of my Masters of Architecture. More specifically, the programs and tools that will be used to enhance or compile the information are as follows:

INDESIGN	Compile the final document and presentation material
AUTOCAD	Develop 2D site and plan drawings
REVIT	3D Modeling
PHOTOSHOP	Drawing enhancement
ILLUSTRATOR	Drawing enhancement and line work clean up
3DSMAX	3D modeling and rendering for perspectives
GOOGLE DRIVE	Storing and backup of data
EXTERNAL HARD DRIVE	Personal backup of all data recorded
CANON EOS	Record images of physical models

PROJECT SCHEDULE

The coming semester for spring 2017 will not be taken lightly as along with thesis research, I will also be attending three additional seminars. Therefore, time management will be the key to producing a polished final project. Daily documentation and backup will also take place as I cannot afford to lose any work along the way. Moreover, typical steps in completing a design project will be completed. Pre-design with site selection and confirmation, followed by schematic design with typology refinement. Final drawings will be completed during the design development phase along with any presentation materials needed.



RESEARCH PAPER

Old Spaces, New Details: An Analysis of Children's Scale and Ergonomics

Children are constantly subjected to a world that is scaled outside their body. Pens are too large to fit in their hands, chairs molded for a thirty-year-old's back, and ceilings reach three times their total height. This ill-proportioned physical space affects their cognitive, social and emotional development. While modern buildings and building codes attribute space designed for children, they do not comply with the scale, experience, meaning, and ergonomics derived from a child's physical environment.

According to the Center for Disease Control and Prevention (CDC), the definition of a child is between the ages of 4 to 11 ("CDC - Parent Information - Children (Approximate Ages 4-11)," n.d.). During this period, children undergo large changes in their habits and behavioral tendencies. They also receive some type of formal or informal education and further develop their socio-cognitive abilities. Defining an age group impacts the estimation of scale for the referred environment. The intent is not to mock or reflect negatively on the impact of codes and modern buildings, but to build upon, and increase value, so that children and adults alike can share a common and reflective experience through scale and meaning.

Scaling Back

Scale is often a difficult concept for children to grasp. Consider a child playing with a two foot tall block tower and then placing a one foot tall plush animal alongside it. If the child were to introduce a three inch toy car, how does that influence the play scene? Does it change the interaction? Christopher Boffoli, a fine art, commercial and editorial photographer, commented in his artist's statement that, "as a child you live in an adult world that is out of scale with your body and proportions. And you constantly exercise your imagination around a world of toys that are further out of scale" (Boffoli, 2015). There is a common disconnect between the adults designing children's environments and the children for whom the spaces are designed for.

Scale is defined in various ways across many professions. A psychologist may refer to scale as a range of values for measuring and

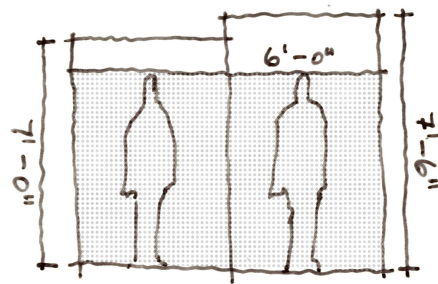


fig. 1

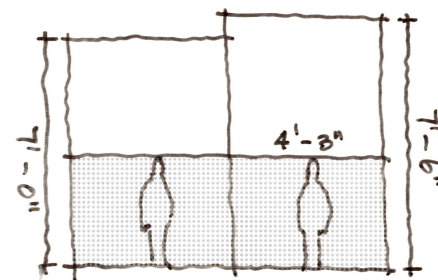


fig. 2

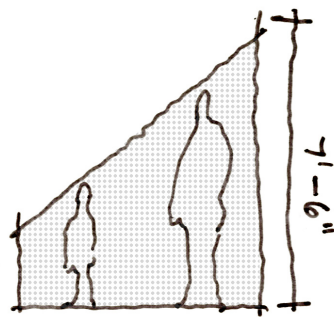


fig. 3

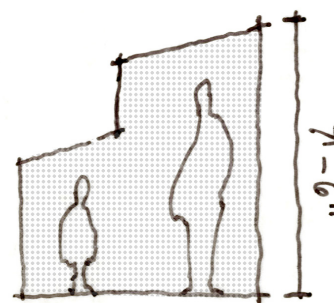


fig. 4

grading, while a cartographer will represent a scale ratio in reference to space. For example, a large scale map of 1:50 represents a small area of land, while a small scale map of 1:100,000 represents a larger region. According to Scott Bell, “people refer to scale as the relative size of a space, large space=large scale, small space=small scale.” (Bell, 2002). Using Bell’s definition of scale, we can relate the context of children in an adult sized environment within the context of building code limitations.

Codes and building standards are put in place for the purpose of providing safety for its occupants. These standards protect against potential hazards due to fire, structural collapse, and deterioration of the building. Unfortunately, codes prevent a shared experience of space across users of different heights (parents and their children). The International Code Council (ICC) states that:

Occupiable spaces, habitable spaces and corridors shall have a ceiling height of not less than 7 feet 6 inches (2286 mm). Bathrooms, toilets rooms, kitchens, storage rooms and laundry rooms shall have a ceiling height of not less than 7 feet (2134 mm). (Council, 2011)

Let’s consider a ten year old child (fig. 1) with a height of 4’-3” and an adult male (fig. 2) with a height of 6’-0” standing within these limitations. To the adult, this space may represent an intimate enclosure providing a sense of security and safety, while for the child this space may evoke slight fear and a sense of awe. Building codes, not unlike tax regulations, have exceptions which allow for grey area interpretation. According to the ICC:

If any room in a building has a sloped ceiling, the prescribed ceiling height for the room is required in one-half the area thereof. Any portion of the room measuring less than 5 feet (1524 mm) from the finished floor to the ceiling shall not be included in any computation of the minimum area thereof. (Council, 2011)

Utilizing this exception, spaces are developed so that a child could foreshadow similar emotional connections to that of an adult (fig. 3). The child can vary the experience of a space simply by moving closer or further away from the juxtaposing ceiling. This does not resolve the issue of shared experiential space in its entirety, however it complies with current codes. A different tact could be made to create mirrored spaces that the adult and child could share together (fig. 4). This option

serves both participants. The diverse ceiling heights begin a language of spatial variances and offer participation within the buildings dynamism. This ceiling layout draws inspiration from fort-like structures that many children are accustomed to.

Fort building is a common practice among children across the world, whether it’s constructed from snow, branches and brush, or sofa cushions and blankets. This type of behavior suggests a private more intimate connection with their surroundings. A sense of place and proportion in an out of scale world, a private habitat away from a watchful eye, and a space for imagination. Scaling a building down can provide children with a wandering sense of playful connection, while staying within code limitations and creating shared experience between adults and children. Within respect to the outcomes of this analysis, it is important to remember, the main priority of a building should be an enclosure that provides safety from hazards and the ability to extract occupants in an efficient and timely manner in lieu of disaster.

Built-in Meaning

Children have limited experience compared to that of an adult. They have not yet been corrupted by their environment and still hold some values of innocence. Although some can be pampered and possessive, they are more or less harmless. Adults, to the contrary, are tired of common things that might entice children. Architecture for children should reflect the fluid reality in which they live. Buildings should not be restrictive on its occupants and provide space that inherently builds upon new and past learned experience.

Around the age of four, children begin their first large conversion phase into a formal education. This transition can be difficult, even for the more gregarious child. Building design should reflect characteristics of their natural home environment as to nourish their development. EEK Architects explains that:

One strategy is to reduce the perception, and perhaps the reality, of the school as a monolithic, uninviting structure and institution. Creating an environment that is closer in scale to familiar residential environments can help. Metaphors of houses, neighborhoods, villages, and public spaces drawn from neighborhood and urban design can help inspire an environment that successfully and progressively scales up from the individual to the larger learning community. (EEK Architects, 2016)

Rather than just metaphors of classrooms (“houses”) as scale based objectives, schools should also offer familiar materials that connect children to the building. Brick, wood, vegetation, glass, and color. Harwood Elementary, part of West Fargo Public School Districts, is a prime example of an institutionalized building that touches on the aforementioned points, however ignores the validity of them. The building exhibits a flat roof structure with a proportionally thin and uninviting entrance. During Fargo’s notoriously stark winters, the structure begins to sink into its surrounds and becomes completely engulfed by the gray skies. In contrast, Langston Hughes Elementary school in Chicago tackles these points holistically. Board formed concrete planters with ample vegetation, a large open glass entrance, and varying brick textured walls. The building itself becomes a learning experience. Thoughtful design evokes conversation between the child and their physical environment, influencing the built environment they meaningfully connect to.

Ergonomic Design

Children often behave poorly, in terms of adult approval, when they are faced with what they perceive as undesirable space. For instance, a child will see a long corridor as an ideal running path, whereas an adult finds the corridor to be an efficient connection between adjacent rooms. A couch, to a child, represents a place to hide behind, jump upon, or crawl underneath. To the adult it may simply be a space to socialize, relax, or indulge in entertainment. Ergonomics play in an important role in the way we design spaces around children to encourage a desired behavioral response, while remaining an efficient, comfortable, and safe enclosure.

Activity and spatial requirements for children are much higher than that of an adult. They are a means to help expel energy during the day of a growing pupil. Childhood education has a standard of 35 square foot of usable classroom space per child (Council, 2011). This space is roughly double the size of a play pen. Spatial constraints placed on children deteriorate their social construct and ability to work in group settings (Stoeklin & White, 2003). Regrettably, this has been adopted by most developers and designers as a standard of quality.

Over the past three decades there has been significant research on the impact of the 35 square foot standard across several continents. It outlines the differences in tendencies between social and aggressive behavior. Gary Moore has researched child care standards exhaustively

and suggests that:

Space allowances for child care centers shall be based on 100 gross square feet per child. This space allowance is intended to provide primary child activity areas (separate spaces for infants under two years of age), sleeping areas, kitchens and eating areas, bathrooms, sick bay, laundry, etc., as required for the full functioning of a quality child care center. (Moore et al., 1996)

Space of this magnitude, may be overzealous. Several research studies have shown that spaces above 50 square feet per child of undifferentiated space can lead to random behavioral patterns (Moore et al., 1996). Though some of Moore’s proposals are outdated, there is merit in his research.

Alain Legendre, a researcher for the French National Center for Scientific Research, has found new evidence related to stress and children’s physical environments. He assessed stress in cortisol changes of 133 children (18-40 months) across eight day care centers on the influence of environmental factors (Legendre, 2003). Randy White and Vicki Stoeklin suggest that:

An increased cortisol level is considered a good biological marker of stress, and in particular stress related to psychological distress. The literature on the physiology of stress during childhood shows the importance the regulation of the hypothalamic-pituitary-adrenocortical system, which produces cortisol, as it can affect other areas of development, including physical growth, behavioral outcomes, memory and cognitive process, and immune functioning (Stoeklin & White, 2003).

The research found that a minimum of 54 square feet per child is required to reduce stress levels in children. Legendre also expressed that adequate space is primarily important for children between the ages of two to three. This is perhaps because of their verbal impairment and difficulty in expressing themselves. This research is impactful because it focus on measurable science and not on adult observed behavioral patterns.

Several organizations have endorsed an enlarged square foot per child as a standard of quality. The Unified Facilities Criteria for Child Development Centers requires a minimum of 45 square feet (“Document Library - Navy CNIC E-Library,” 2014). The American Academy of Pediatrics has set a minimum of 42 square feet of usable floor space per

child with a preferred 50 square feet (Caring for Our Children, 3rd Edition, 2005). If all of these highly regarded organizations have accepted a larger minimum footprint, where did the 35 square foot standard originate? White and Stoeklin suggest that, “There is some speculation that it has its origins in health department studies that elementary school children need a minimum of 35 square feet per student to prevent the spread of communicable diseases in the classroom (Stoeklin & White, 2003).” Irrespective of its origins, it’s important to design spaces that develop the behavioral and socio-cognitive skills required for continuous transition into adulthood.

Conclusion and Findings

Overall, the findings are consistent with the relation of space (scale) and ergonomics within respect to children. A child desires spaces they can explore and develop within. Probing of the environment engages their senses and advances their growth and maturity. Variances in spatial heights and widths creates a dramatic and experiential space with little to no behavioral problems. Variations of spaces are also achievable with current code regulations.

Meaning and experience are derived from familiar places and textures in relation to context. It is important how a child connects with their surroundings and builds significance and a familiar sense of place. Development of socio-cognitive skills require a universal standard of 50 square feet per child. This can introduce long term projects into classrooms that do not need to be dismantled daily. Not only does this allow for flexible activities, but it can help behavioral problems as well. Children often need to shift into private and secluded spaces when they are overwhelmed or agitated. Taking into account these points, it is important that safety is intertwined with these design considerations.

Further investigation would require a personal study into built forms and an observable and verbal explanation of interior space. Research of local cultural customs, traditions, and climate would inform proper design decisions. Further development based on children’s sense of personal desire and point of view, will result in a better understanding of how modern buildings and codes do not comply.

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PRECEDENT ANALYSIS



Groupe Scolaire Joséphine Baker

ARCHITECTS: Dominique Coulon & associates

LANDSCAPE: Bruno Kubler

LOCATION: La Courneuve, France

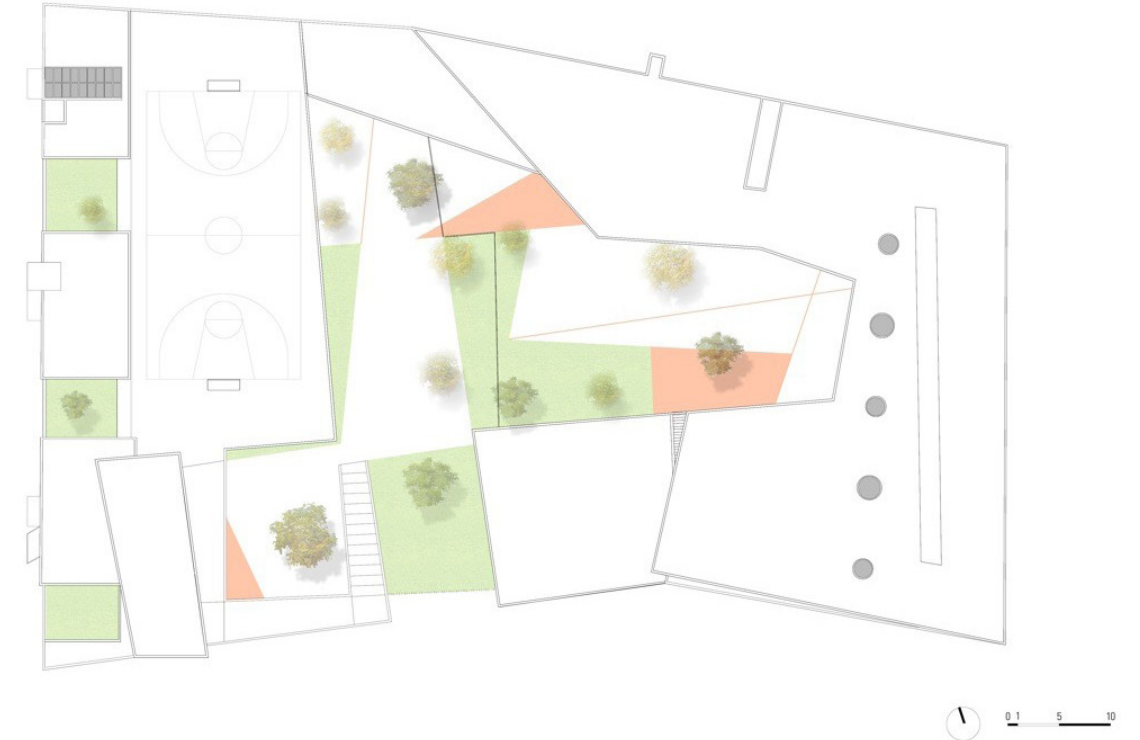
AREA: 21,325 sqft

BUILT: 2010

From the architect:

The project is part of the very subtle town planning scheme adopted by Bernard Paurd, in an attempt to pull together the different signs and traces that are superposed on the site like the various writings on a palimpsest. The scheme reorganizes the neighborhood on the basis of the right-angled intersection of two historic axes, one leading from Paris – from the Saint-Michel fountain – to St Denis' Cathedral, the other starting from the cathedral and heading towards St Lucien's church. This crossing of X and Y axes highlights the surfacing of various traces - ruins of a Gallo-Roman necropolis stand where the scarred landscape bears witness to the demolition of the 'Ravel' and 'Presov' blocks of flats, dynamited on 23 June 2004. As if the map had marked the territory with a tattoo.





CONCLUSIONS

An important thing of note, is the primary use of the color orange. Although modern lines and whites signify a cooling effect during the winter or the summer, here the architect has brought in the color to complement design in an effort to warm active spaces in and outdoors. In terms of overall form and line work, it shares contextual relationship with its post-modern brethren. Hard angles working in parallel to as if to complement one another and develop an illusion of full enclosure. The composition to the adult trained design eye is beautiful, however to the child, the interior spaces feel dull and too clean. Children often want to make an environment their own by adding collaboratively to it with projects, however I feel that there is little to no imagination left. This project has some adequate examples of space layout and excellent form in modernity, but I think maybe, an organic model would be better suited to match a child's wandering excitement.





IKC Zeven Zeeën

ARCHITECTS: Moke Architecten

LANDSCAPE: N/A

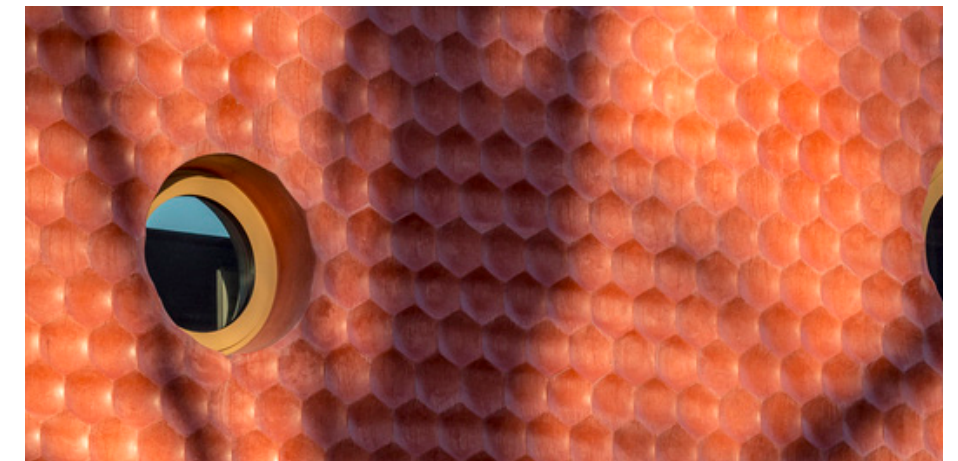
LOCATION: Amsterdam, Netherlands

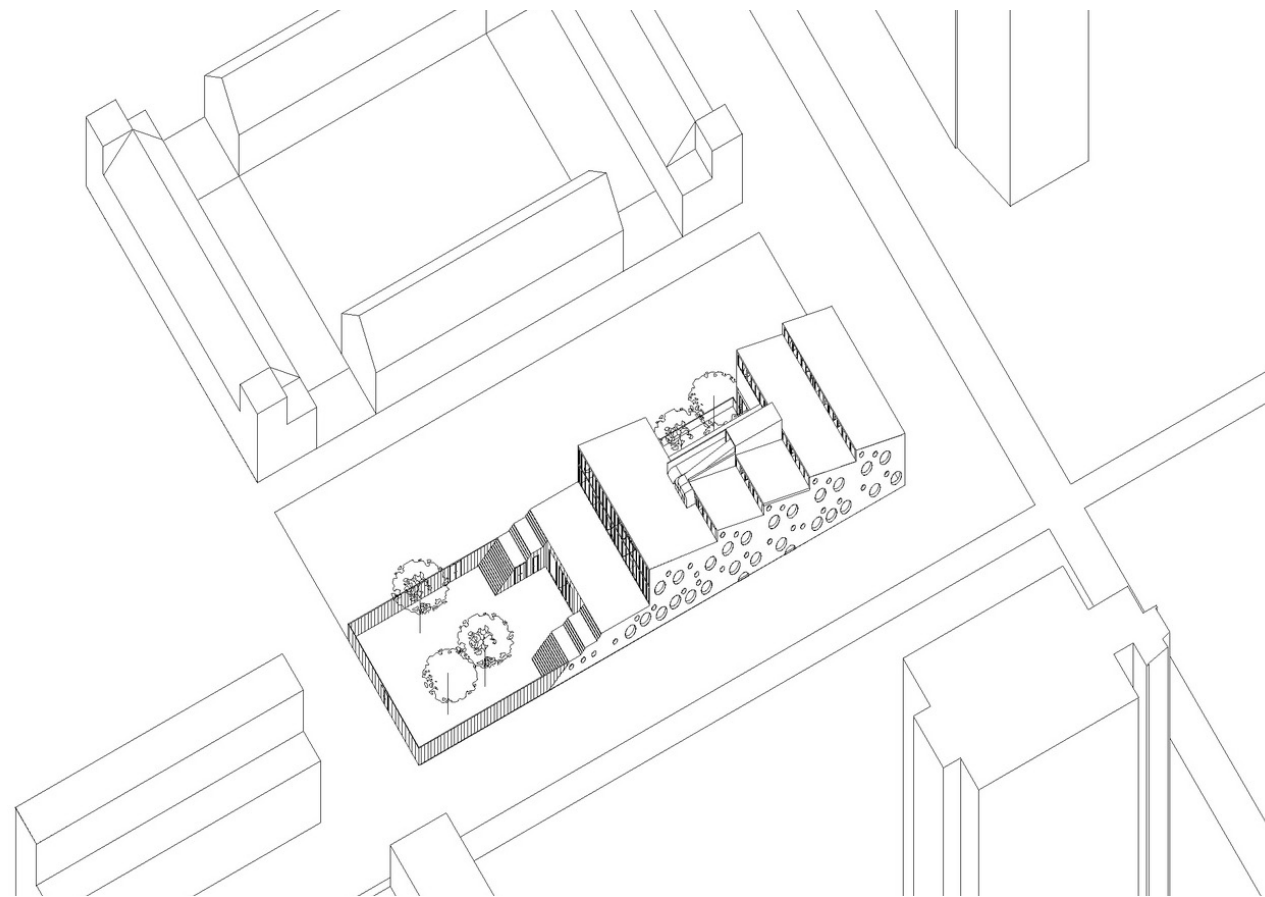
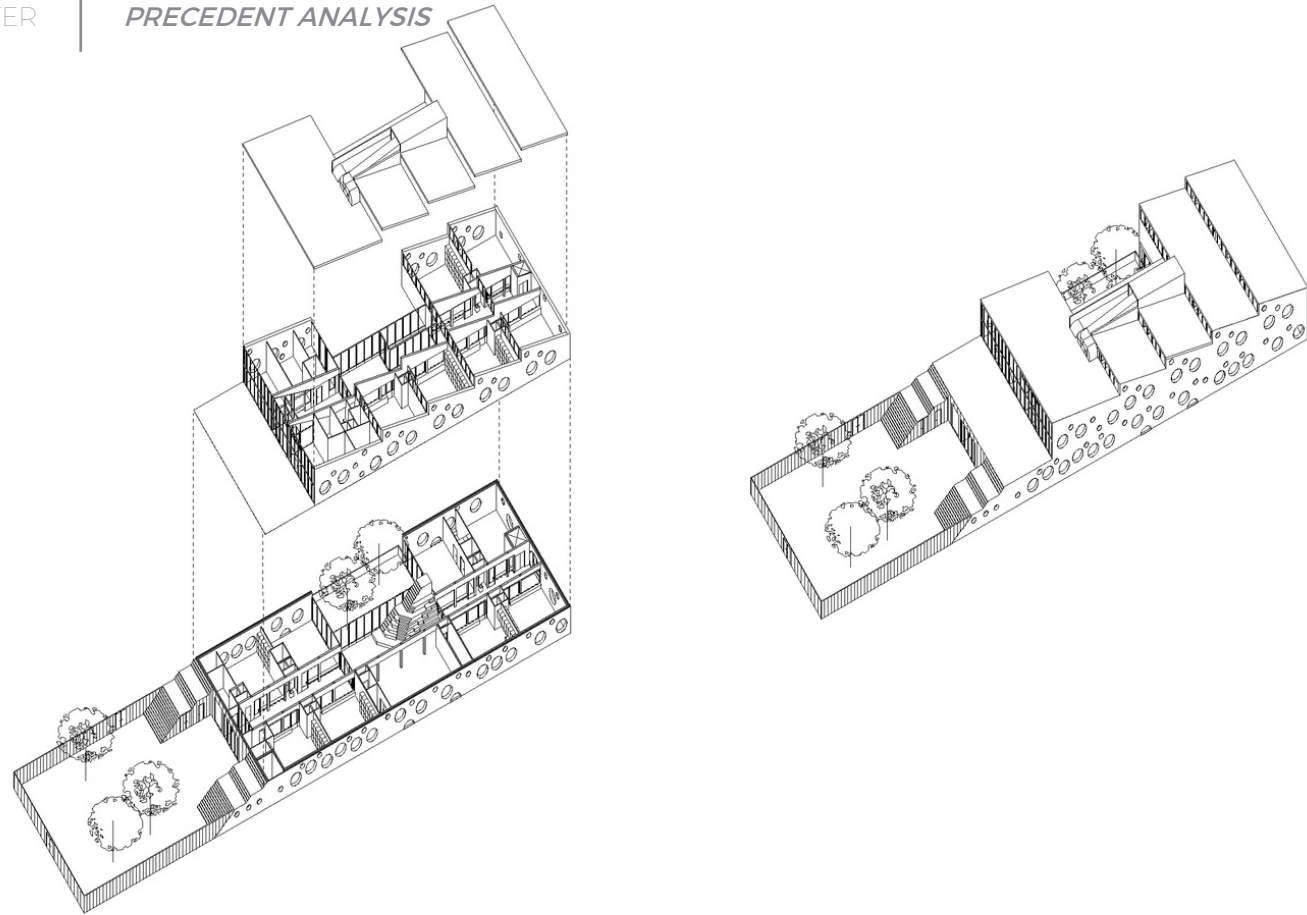
AREA: 6561 sqft

BUILT: 2015

From the architect:

Growing up in an energy neutral school with round windows.





CONCLUSIONS

In contrast to the kindergarten in France, the form is explored through modern and organic tactics. The round windows along the street front facade offer a playful interpretation of what might be happening on the interior and they also fit well within the rural domain. The shed roof which accords across the site allows for dynamic interior development and natural lighting. The facade to the north is glazed to allow diffused lighting and provide unfiltered views to the exterior. To top it off, the building is carbon neutral. As with the school in France, the color orange is highly dominant and dominant in its character as well, however the school again lacks an ability for children to react to the building itself. This is a fine example of a shell, but a more expressive model is needed to fully accommodate children and their needs within an educational setting.





Kindergarten in Guastalla

ARCHITECTS: Mario Cucinella Architects

LANDSCAPE: Marilena Baggio

LOCATION: Guastalla RE, Italy

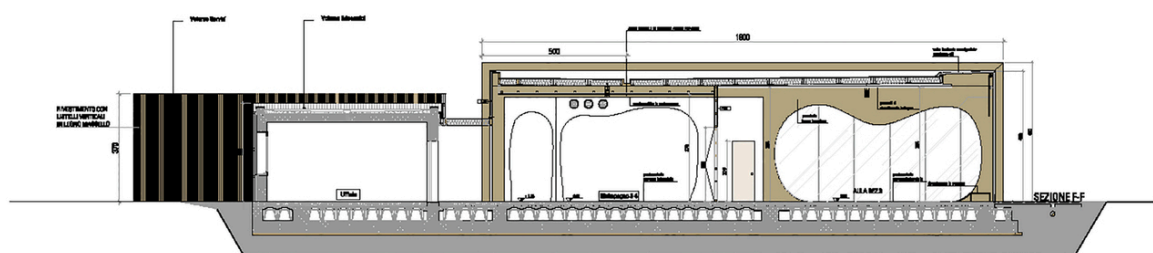
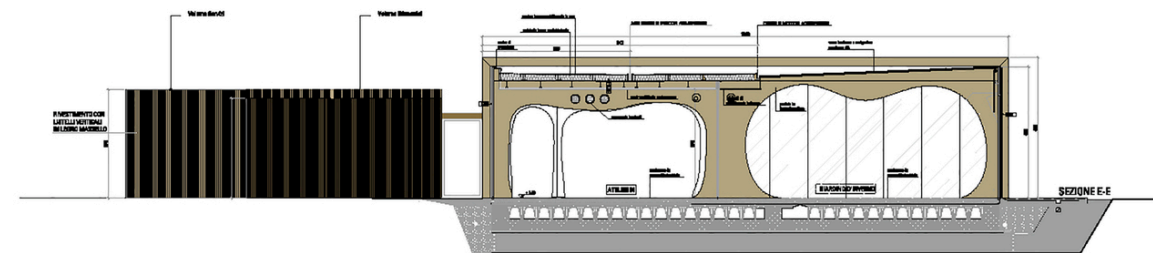
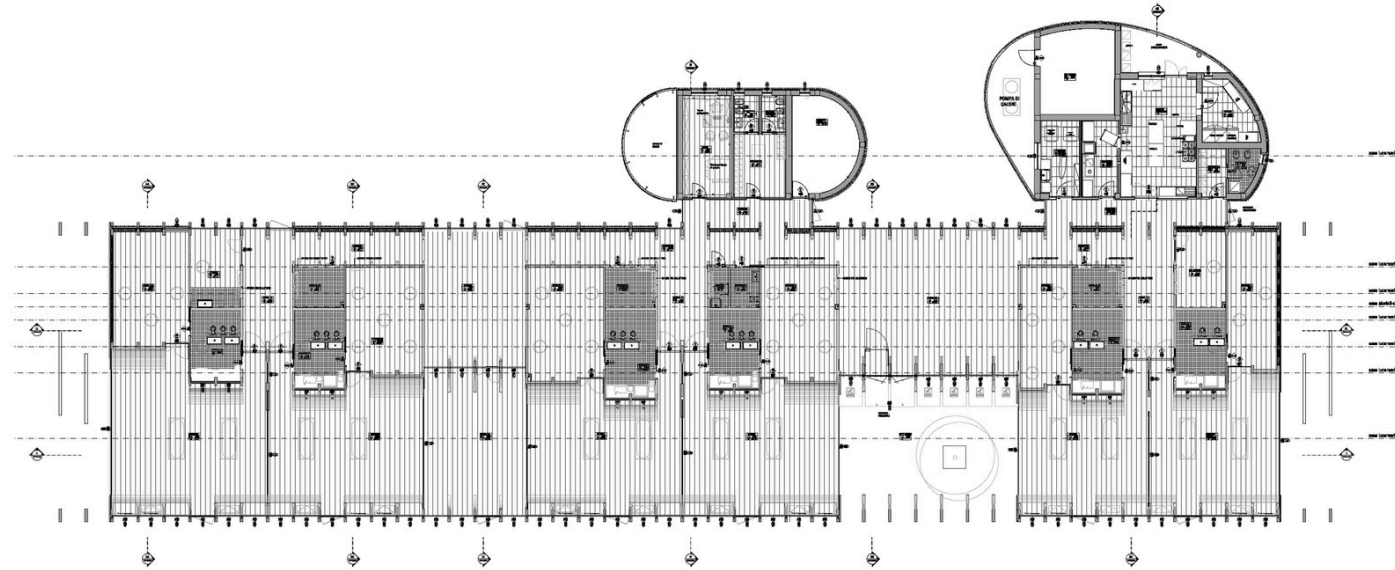
AREA: 4,593 sqft

BUILT: 2015

From the architect:

MCA project is thought to stimulate the child's interaction with the surrounding space according to a vision of "teaching" in which nothing is left to chance, from the distribution of educational areas to the choice of materials of construction, up to the integration between indoor and outside space.





CONCLUSIONS

The form is highly expressive almost as if a full wood block was carved into with a router. A playful expression with the curves and beautiful modern lines in plan, section, and elevation. The built in seats for children are a nice addition as the strong connection to the exterior even with the large interior mirror that reflects back the outside no matter what angle you approach it. In terms of colored expression, the space feel very neutral within its surrounding and in terms of adult impression this is beautiful, however a lack of color almost makes the space feel as if we are lost within the woods. I think this expression with modifications of the other two precedents could develop a highly sophisticated approach to the development of a kindergarten center that is scaled and playful within respect to the children's needs and safety.



PROGRAMMING



PROBLEM STATEMENT

FUNCTION

Since scale and ergonomics play a large role in child development, the project must cater to sense of place and create a separate identity within the active spaces.

Since a large traffic thoroughfare runs adjacent to the site, the design must provide, at all times, constant supervision during recess periods and before and after school.

ECONOMY

Since the type of pedagogy taught will influence private and public functions, the project must follow a specific teaching method to maintain an efficient flow throughout the structure.

FORM

Since the project maximizes square footage per student, the project should be designed to the maximum amount of flexibility per interior space.

Since the local landscape offers beautiful vistas of mountain ranges, rivers, and plains, the project should be designed to capture these views and be reflected within the overall form.

TIME

Since the population of the school will grow overtime, the design must be flexible to expansion without loss of overall form, function, and economy.



SPACE LIST

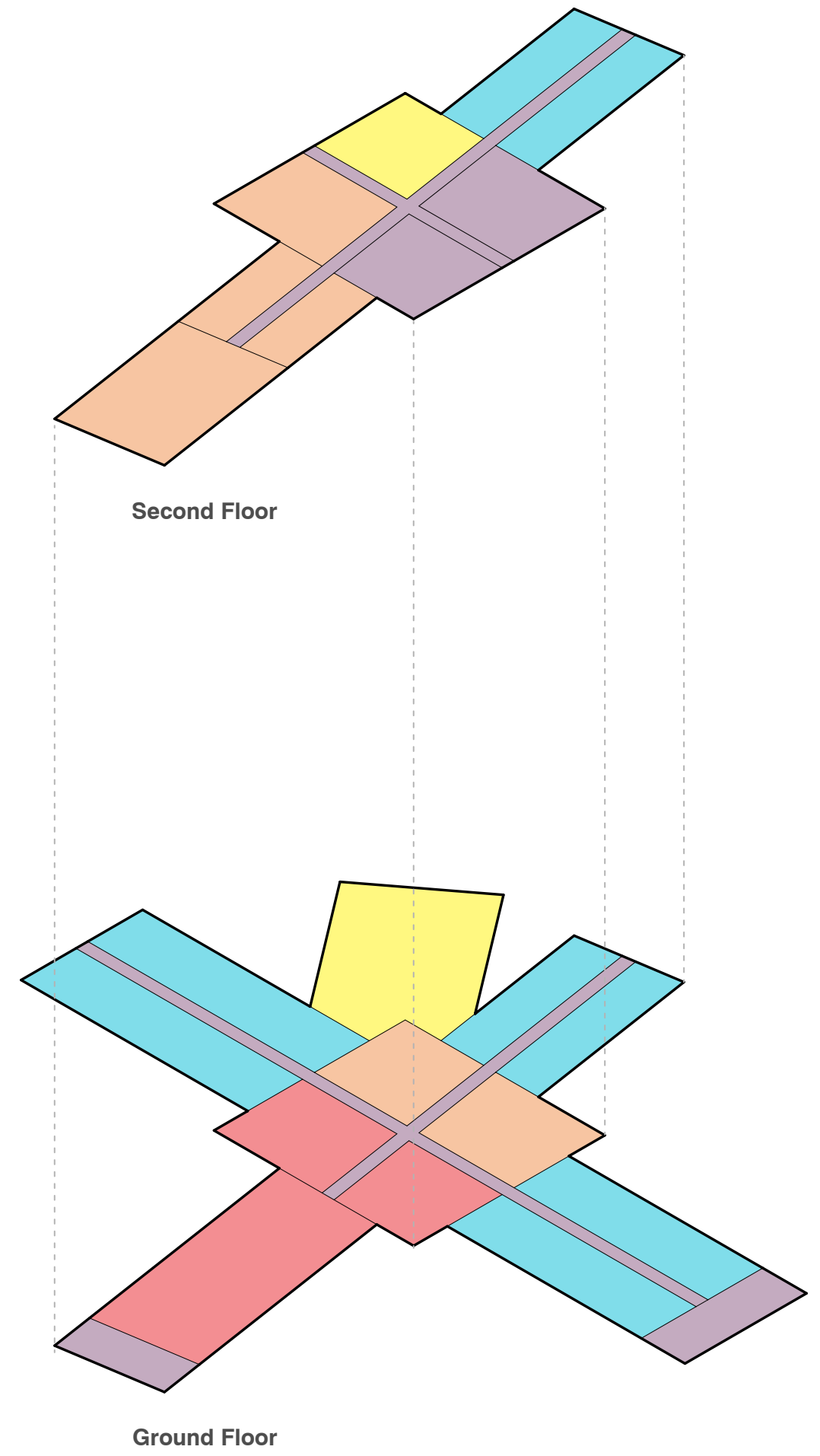
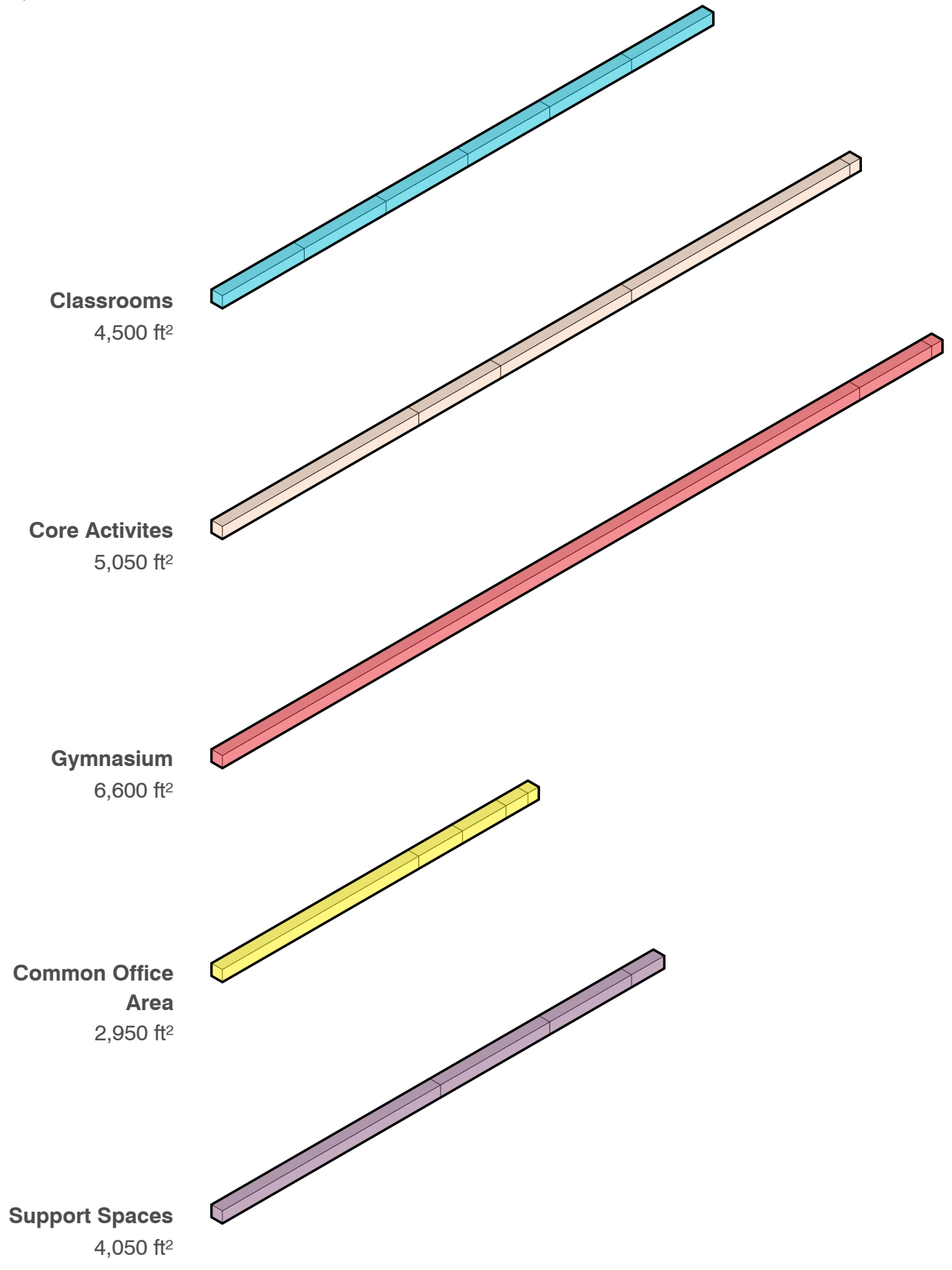
Function	People	Capacity	No. of Units	Area/ Unit	Net Area	Net Area Subtotal
CLASSROOMS						
Kindergarten	10-13	15	1	750	750	
First Grade	10-13	15	1	750	750	
Second Grade	10-13	15	1	750	750	
Third Grade	10-13	15	1	750	750	
Fourth Grade	10-13	15	1	750	750	
Fifth Grade	10-13	15	1	750	750	
Subtotal	60-78	90				4,500
CORE ACTIVITES						
Cafeteria	20-26	36	1	1,800	1,800	
Art / Theatre Room	10-13	15	1	750	750	
Computer Lab	10-13	15	1	1,200	1,200	
Library	20	40	1	2,000	2,000	
Storage			3	35	100	
Subtotal	60-72	106			750	5,850
GYMNASIUM						
Gym Floor	16	220	1	5,840	5,840	
Locker Room	5-8	16	2	330	660	
Storage			1	100	100	
Subtotal	21-24	236				6,600
COMMON OFFICE AREA						
Open Office	3	15	1	1,800	1,800	
Private Office	1	3	3	150	450	
Teacher Lounge	4	8	1	400	400	
Conference Room	6	8	1	200	200	
Storage			3	35	100	
Subtotal	14	34				2,950
SUPPORT SPACES						
Mechanical			2	500	1,000	
Restrooms	2	6	4	187	750	
Circulation		15	1	400	2,000	
Storage			3	100	300	
Subtotal	2	21				4,050
Gross Building Area						23,950

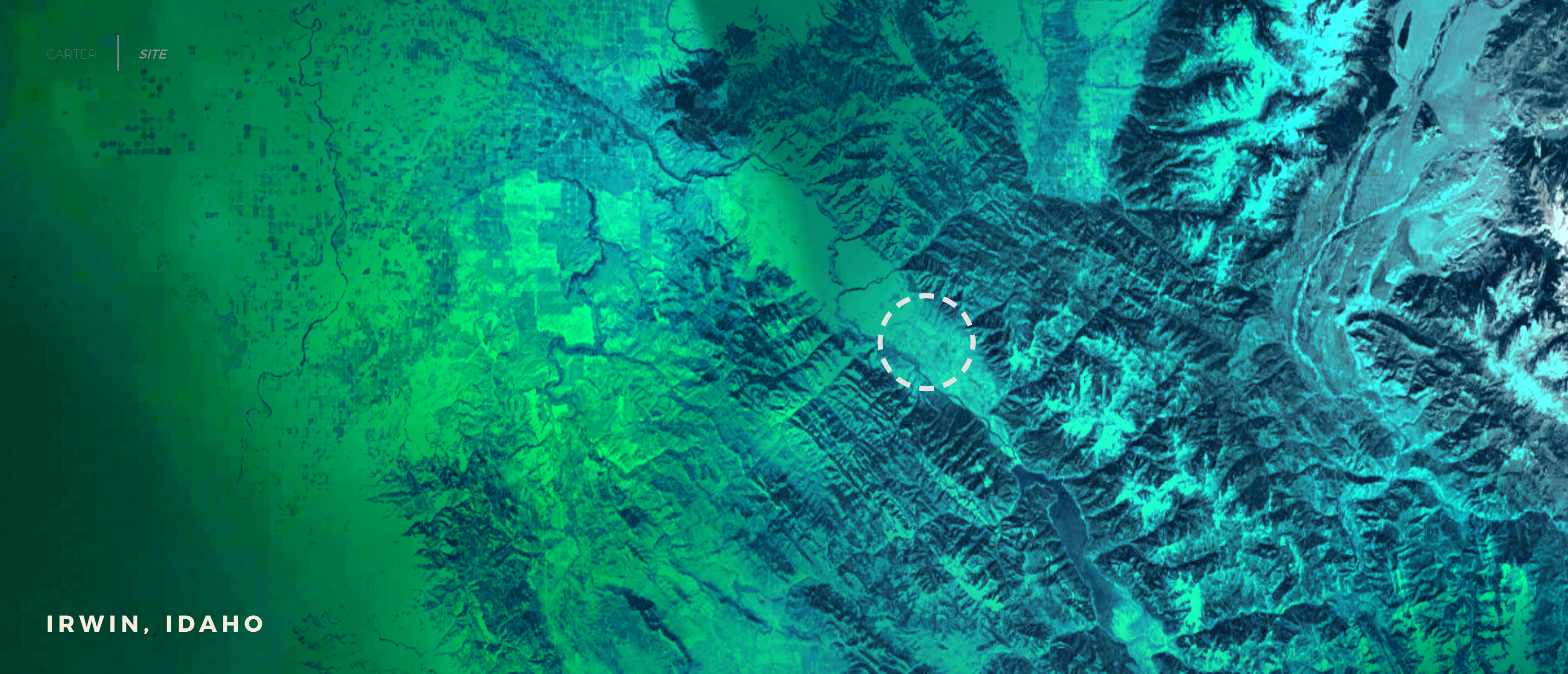
BUILDING AREA SUMMARY

Space Name	People	Capacity	Net Area	Net:Gross	Gross Building Area
Classrooms	60-78	90	4,500	0.50	9,000
Core Activites	60-72	106	5,850	0.50	11,700
Gynamsium	21-24	236	6,600	0.50	13,200
Common Office Area	14	34	2,950	0.50	5,900
Support Spaces	2	21	4,050	0.50	8,100
Subtotal	157-190	487			47,900

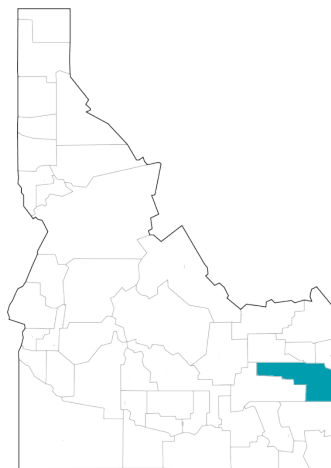
LAND USE REQUIREMENTS

Land Use Area	People	Gross Building Area	Floors	Building Footprint	GAC	Gross Building Area
Elementry School	190	47,900	2	35,925	25%	143,700
Parking	20	7,600	1	7,600	70%	10,857
Subtotal	190	55,500		43,525		154,557





IRWIN, IDAHO



POPULATION

220

MEDIAN AGE

52.4

HOUSEHOLDS

71

MEDIAN INCOME

\$42,813

MALE

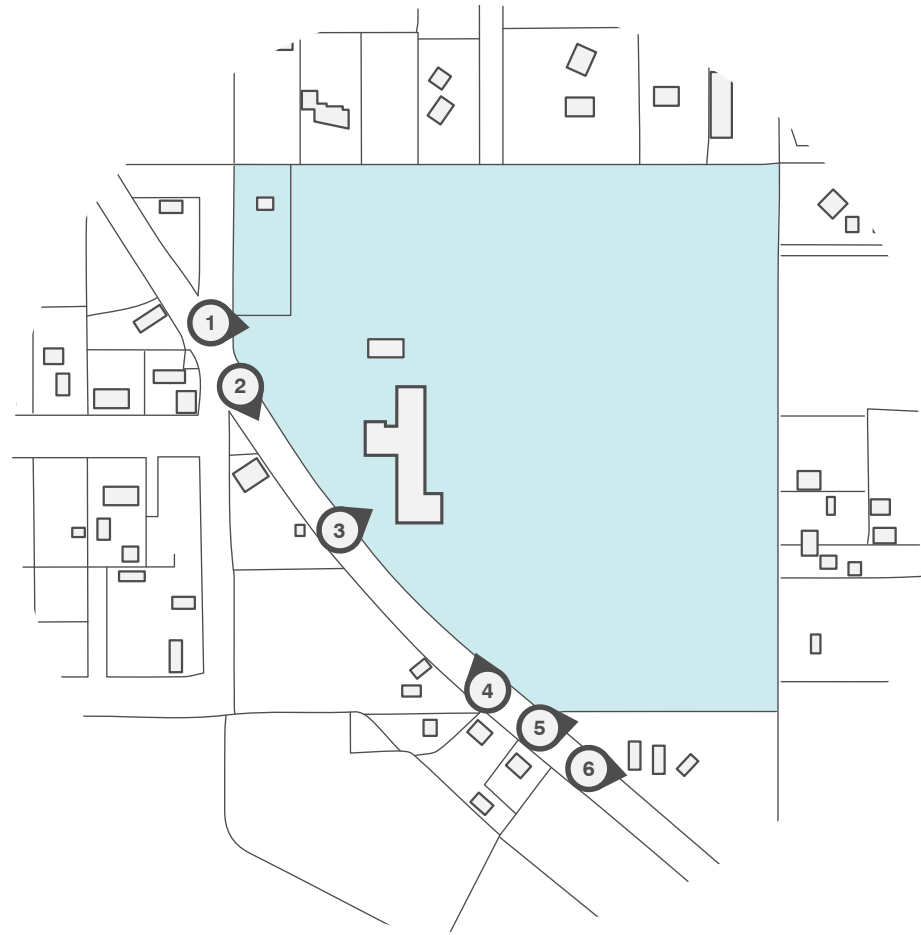
51%

FEMALE

49%

SITE OVERVIEW

Situated in the heart of the Swan Valley, Irwin, Idaho offers some of the most beautiful vistas around. The valley hosts a variety of wildlife including the black bear, bald eagles, cougar, wolverine, the pine marten, and the gray wolf. The snake river runs parallel along the western city limits continually rated as the best wild trout fishery in the lower 48 states. Grand Teton National Park is located 60 minutes away with nearly 310,000 acres of protected land. Irwin, with only a total population of 220 people, holds that small town charm and dusty saloon feel. The city is located within Bonneville County and it's closest metropolis area is Idaho Falls, Idaho. The racial diversity consists of 98% Caucasian people.



① North Looking East



② North Looking South



③ Looking East



④ South Looking North East



⑤ South Looking East

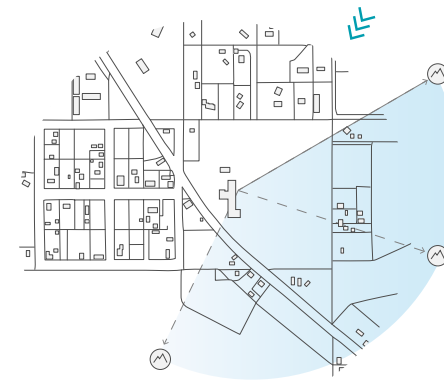


⑥ South Looking South East

Site Analysis:
Views across site

This site, which is situated along Highway 26, currently hosts Swan Valley Elementary School. The school is roughly 20 feet tall with a long audio and visual barrier of planted trees running around the perimeter. The buildings facade is made up mainly of red brick. There are two single story sheds also located on the premises which share a similar color palette of the main building. All views to the south and south east are beautiful with several different mountain peaks. Even on the coldest and grayest days of the year will leave you with spectacular sights.

Owner	Swan Valley School District
Site Square Footage	1,439,309
Property Status	Exempt
Tax Code	006-0000
Address	3389 Swan Valley HWY



WIND AND VIEW

Because Irwin, Idaho sits in the valley between two mountain ranges, it has a variety of weather conditions. The prevailing wind direction typically flows south west with secondary winds directions moving north east. All views in the valley are beautiful, but the most significant are the peaks of Baldy Mountain, Mt. Baird, and Red Ridge.



VEHICULAR TRAFFIC

Highway 26 splits the city in two and runs north to south. This Highway brings in most of the outside visitors and provides a stop on the way down to the Palisades or a trip to the city of Idaho Falls. Other roadways within the city are underdeveloped consisting of gravel.

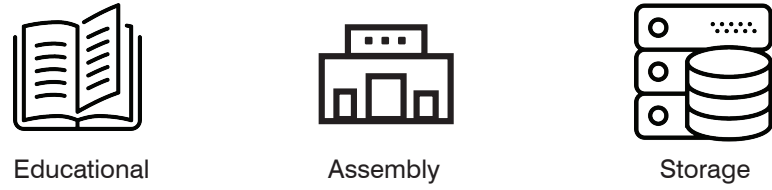


LAND DEVELOPMENT

They are few business within the city as the population is too small to accommodate large corporations. The major industry within Irwin resides around commercial farming and small boutique shops for visitors. One centralized city park sits just south west of the site with a large open grass field and setup for baseball games.

IBC 2012 + ADA

Occupancy Type:



Means of Egress:

Stairways: 7ft
Main Components : 5ft

Construction Type:

Type II B

* construction requires 0 hrs fire rated protection unless heavy timber is used for roof construction and secondary associated members shall be 1 hr.

Max Building Height / Stories:

Height: 75ft
Stories : 3

Occupancy Load:

Accessory storage areas, mechanical room	300 gross
Assembly without fixed seats	7 net
Classroom area	20 net
Excercise rooms	50 gross
Kitchens	200 gross
Library Reading Rooms	50 net
Library Stack area	100 gross
Locker Rooms	50 gross
Stages and platforms	15 net

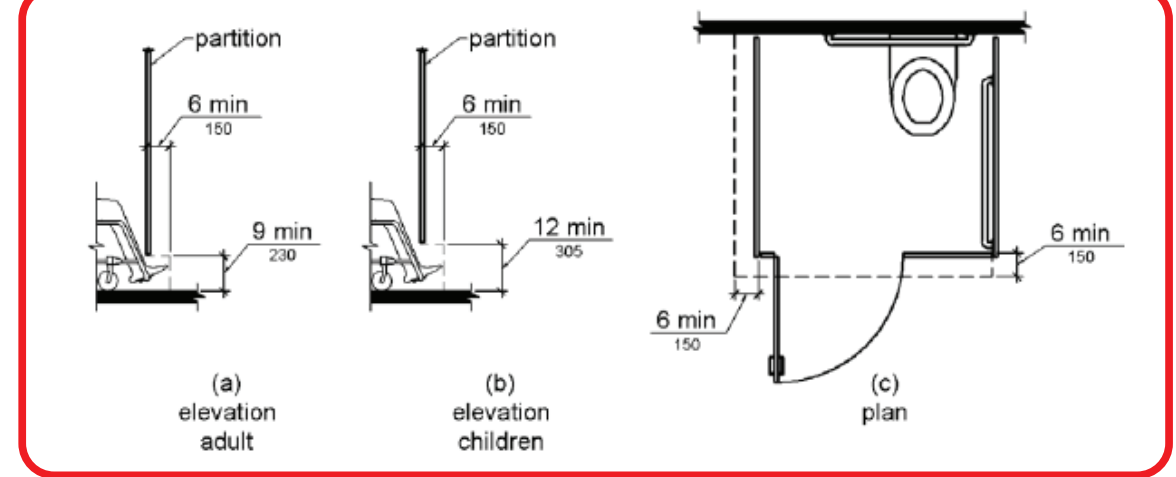
Allowabe Area Factor (sqft):

A - 1	34,000
A - 2	38,000
E	58,000
S - 1	70,000

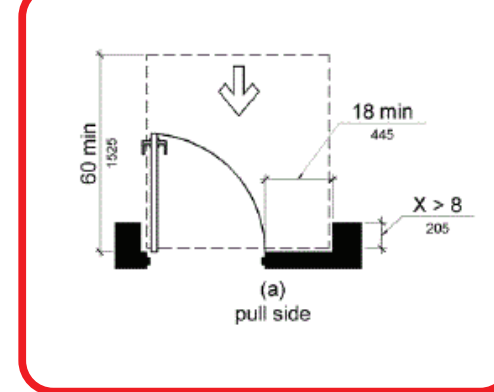
Water Closets Ages 5-12:

Water Closet Centerline	15 in.
Toilet Seat Height	15 in.
Grab Bar Height	25 in.
Dispenser Height	17 in.

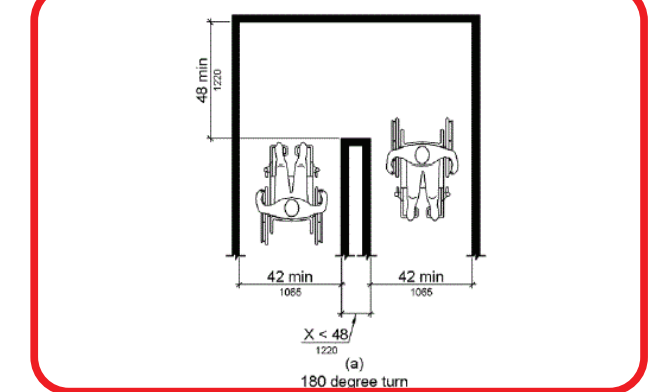
ADA Stalls:



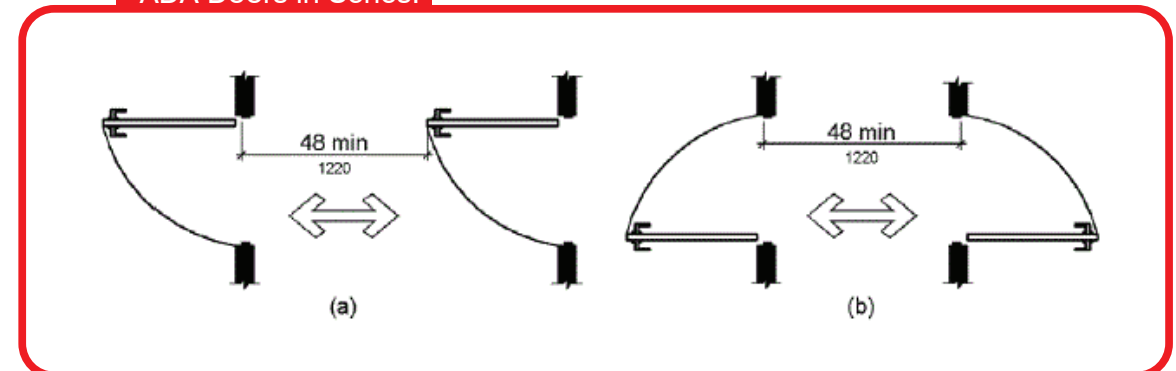
ADA Door Widths:



ADA 180 Degree Turn:



ADA Doors in Series:





RESEARCH DIRECTION AND DEFINITION

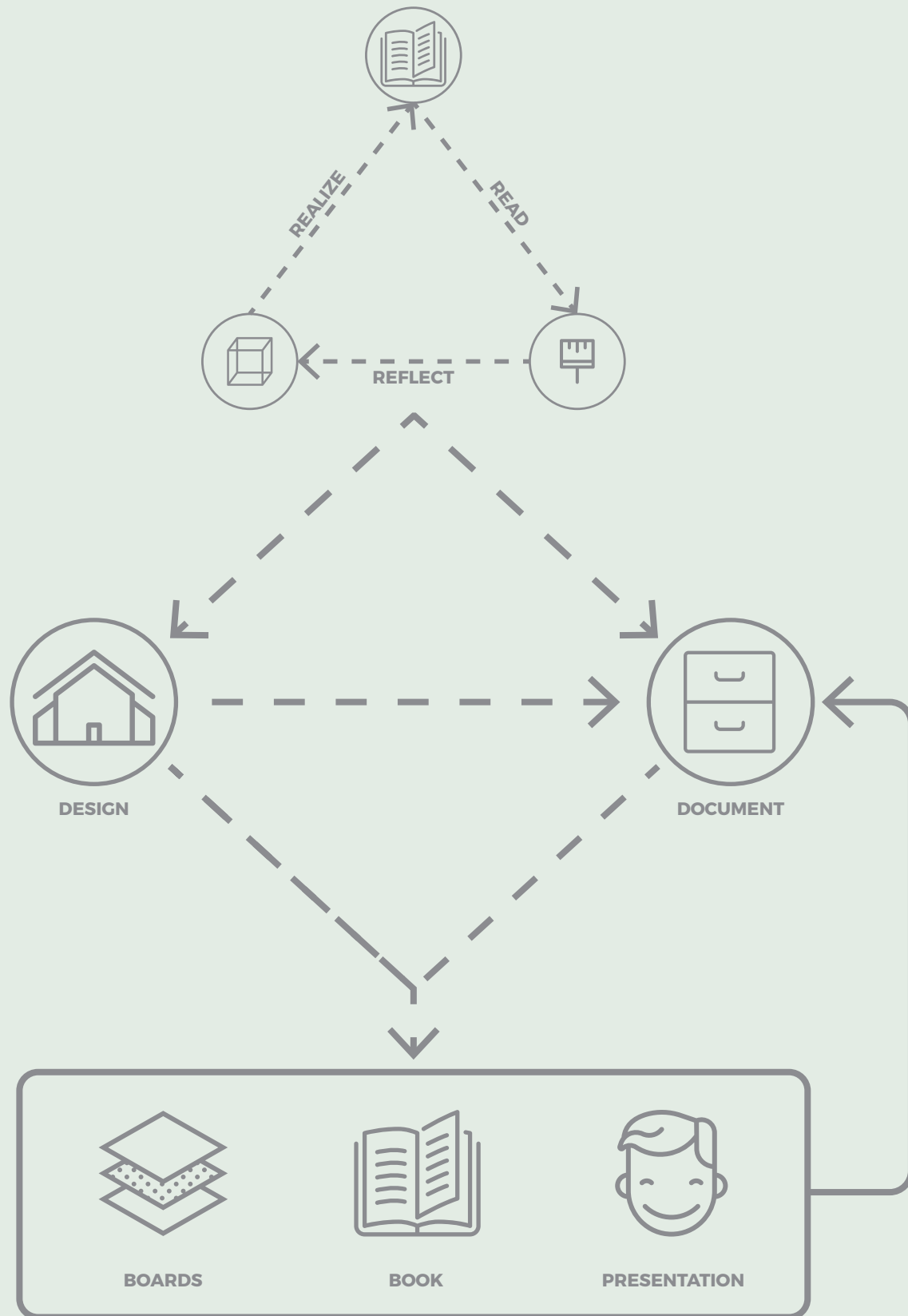
DESIGN RESEARCH As the thesis problem is directly correlated to a final designed output, this is the main framework which the thesis hinges upon. The goals of the project rely heavily upon this becoming the most successful aspect, as it is important that the research contributes back to the architectural discipline.

MODELING RESEARCH Undertaking scale as the holistic thread between spatial encounters within the enclosure, several small scale spaces need to be realized. This research method, in combination with iterative products, will develop a further understanding of how children and adults interact and work together within a defined space.

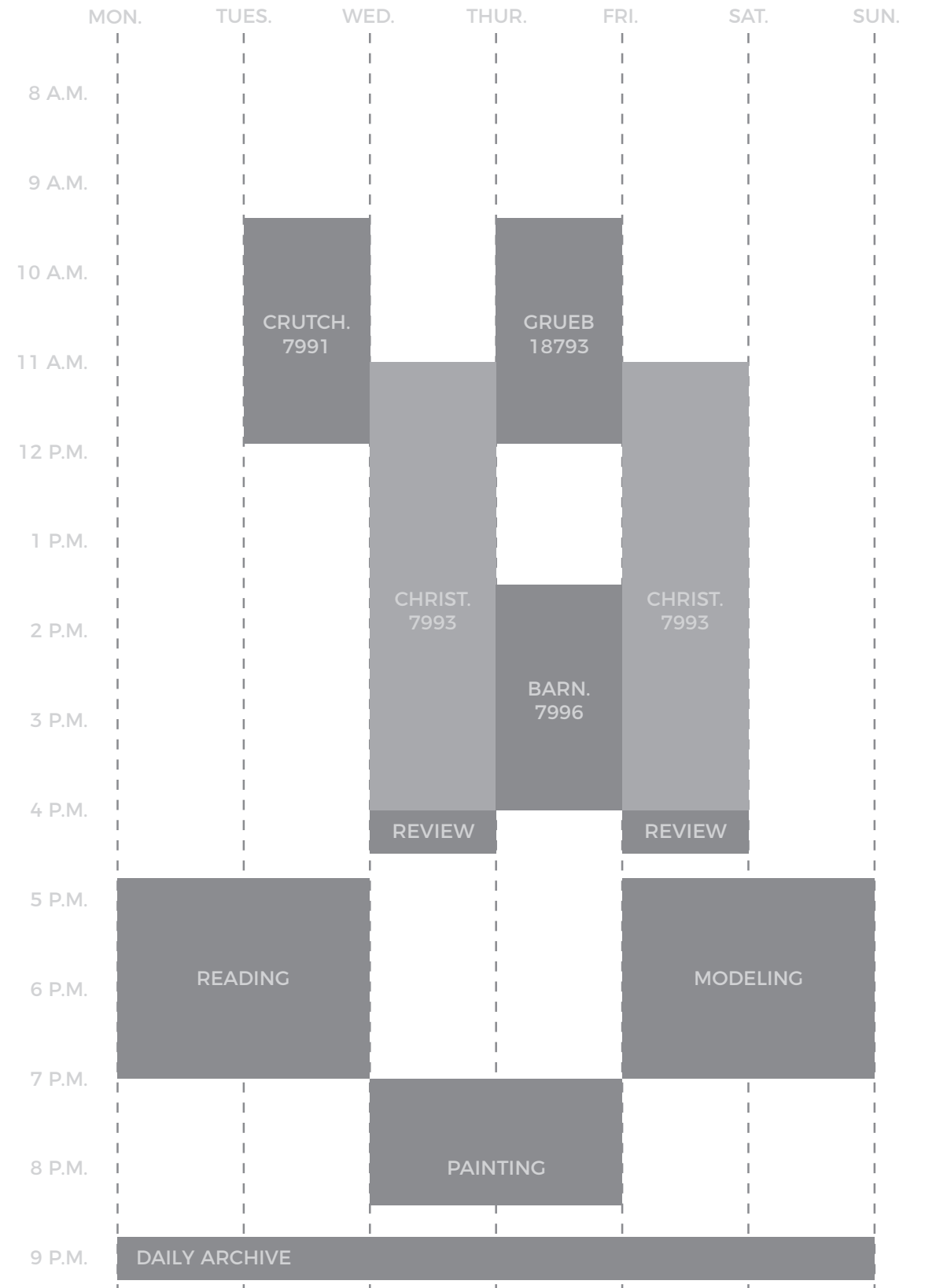
DESCRIPTIVE RESEARCH Case studies of other built forms will be important to draw influence from when designing the final product. Specifically, understanding the spaces and lines drawn by others and determining a scale of which to place them. A minimum of twelve exhaustively researched case studies will be performed that are not only limited to the thesis specific typology, but are informed by scale as the design influence.

INTERPRETIVE RESEARCH Interpreting literature on scale and psychological space factors also plays a large importance in the design decisions that will manifest as the final product. Tentative to the project, was an idea to interpret topical readings through scale based paintings. Children often find difficulty expressing themselves with words, however with art we can express ourselves freely. Dependent on the reading, paintings will use different mediums and brush sizes to reflect an idea. These paintings will then be interpreted through iterative scale models. This process will be repeated until the idea is realized.

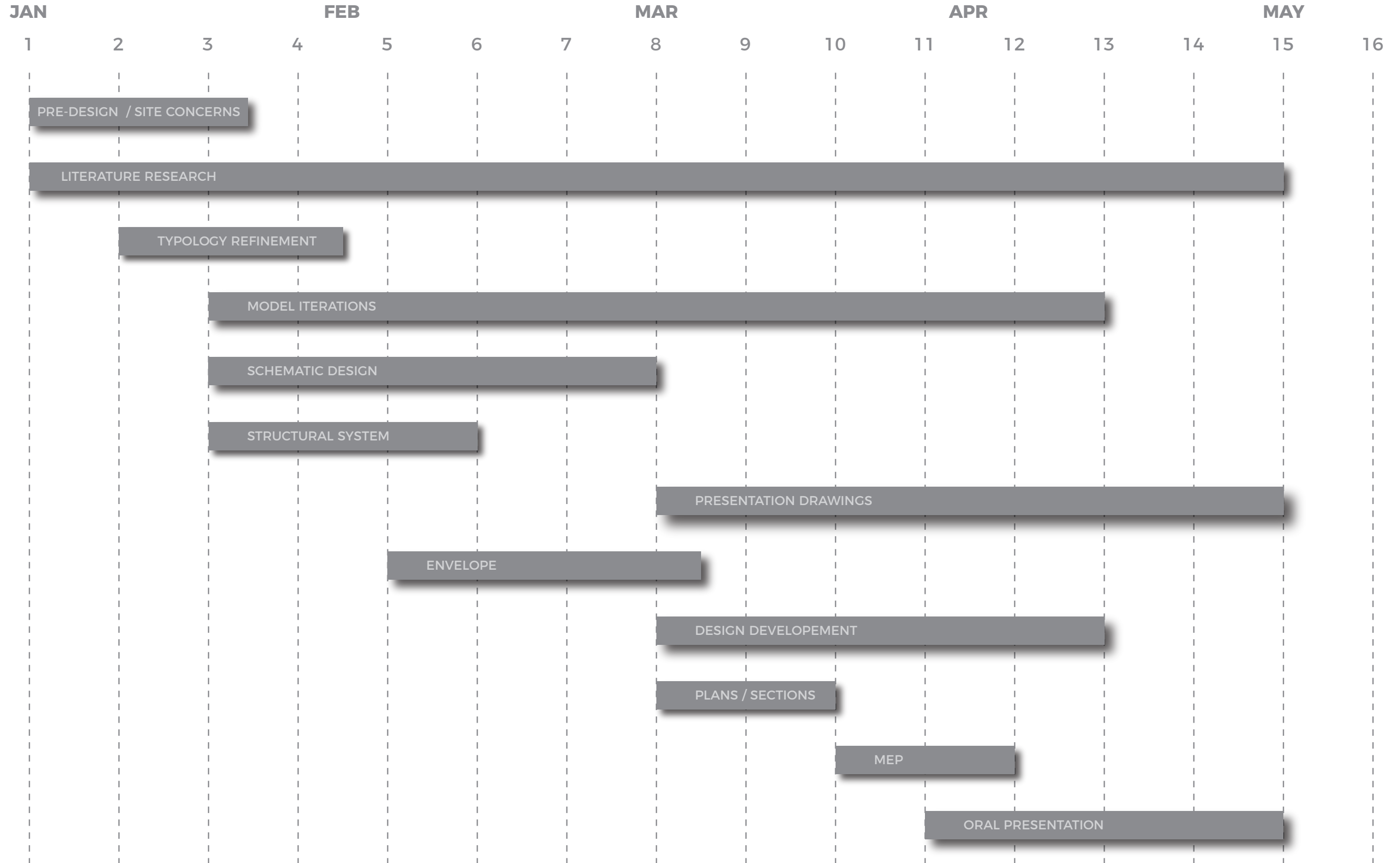
PLAN FOR DESIGN METHODOLOGY AND DOCUMENTATION

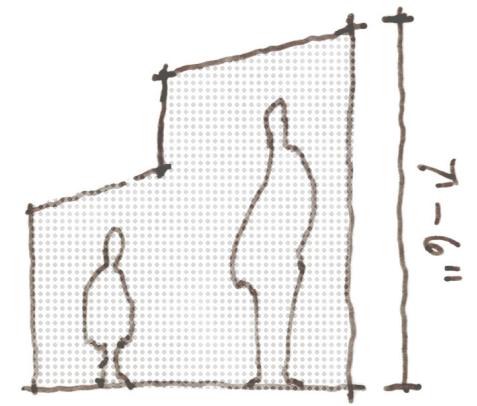
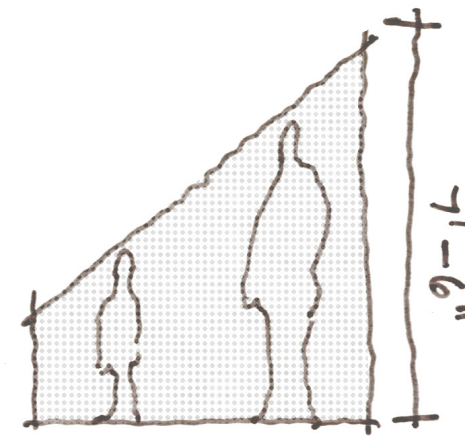
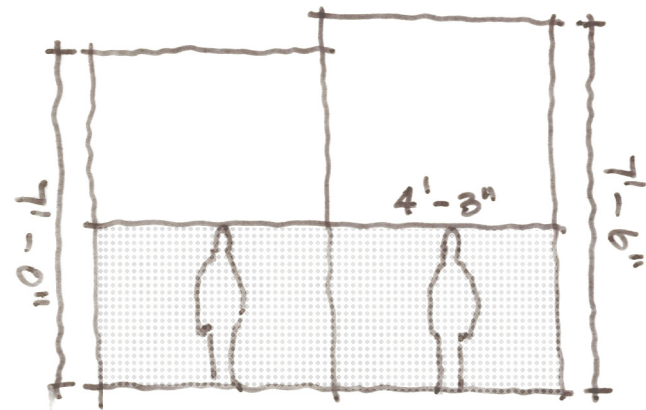
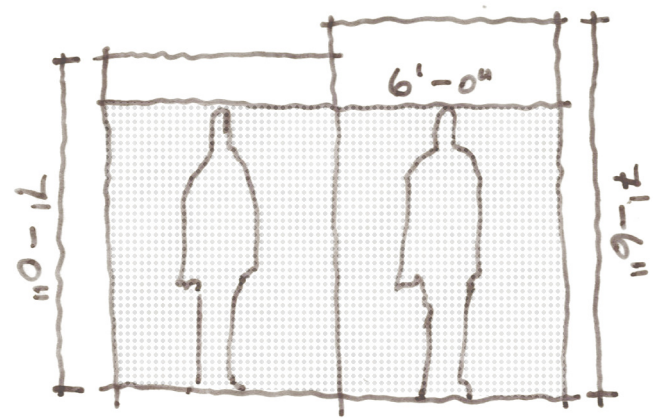


WEEKLY SCHEDULE



PROJECT SCHEDULE





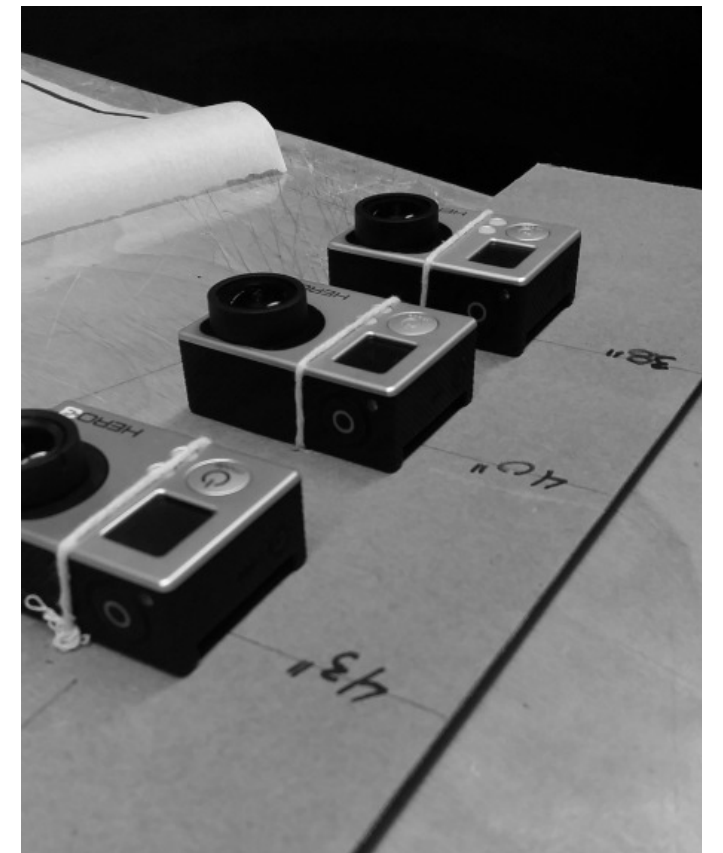
DESIGN SOLUTION

The final design was meant to encompass the aforementioned ideas of scale versus the human and the interaction within that space for children. The design reflects space that is specific to each age group based on a variety of aspects. Most importantly is the development of gross motor skills and the ability to adapt and connect with their surroundings. An interior and exterior space that coexists within an urban context and a housing for health and well-being.

Through these goals a specific set of studies were performed to justify the outcome. These studies included a thorough precedent analysis, sectional model analysis, video analysis, and scale analysis.

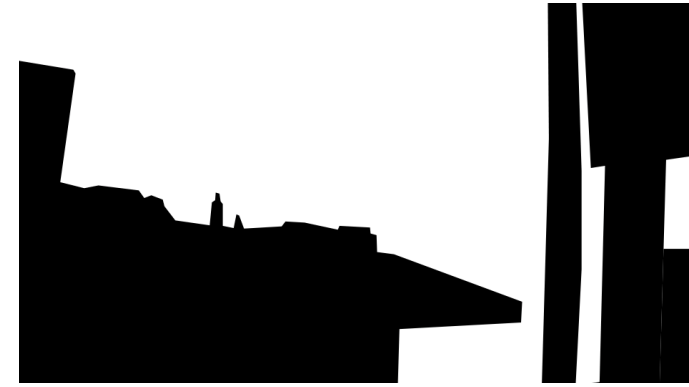
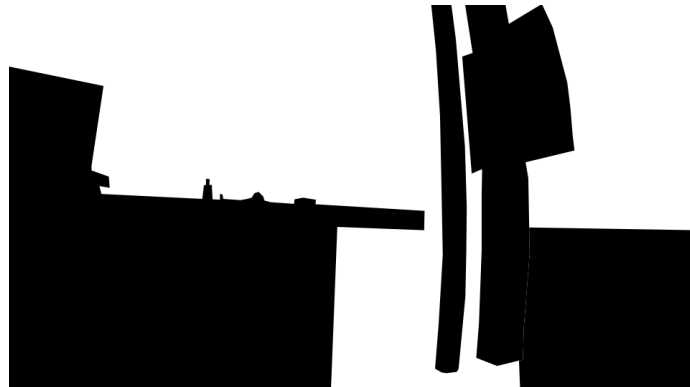
VIDEO ANALYSIS

The first step in my personal research was to assess what spaces children look for within their environments. Without being able to fully integrate into a child's mind, how can we begin to understand their fluid realities? To accomplish this I began a study that uses video cameras to rectify space based on visual heights in order to look for visual clues that children experience that differentiate between adults. I mounted four Go Pro camera's to a sheet of cardboard at different average heights across four ages: A three, four, five year old's , and adults. The next step was to film an interaction with several different everyday objects ranging from stairs, elevators, drinking fountains, restroom's, desks, chairs, and more. Finally, was a chance to review the information I had gathered and analyze this information based on line of sight obscuring space and what space becomes opportune.

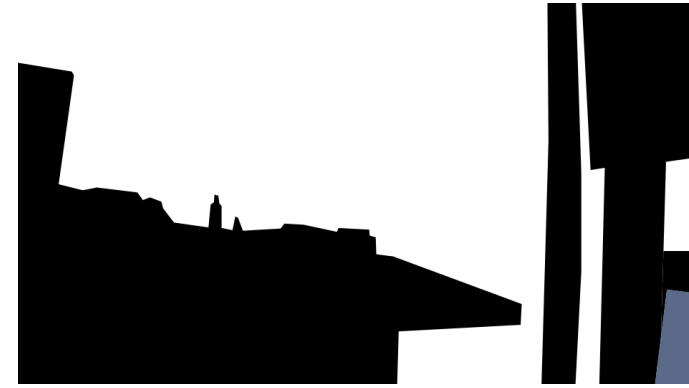
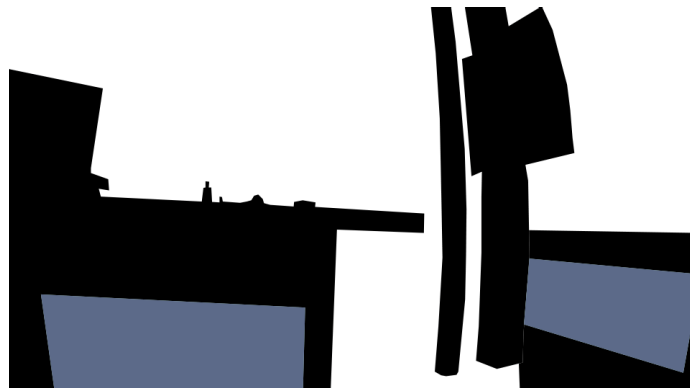




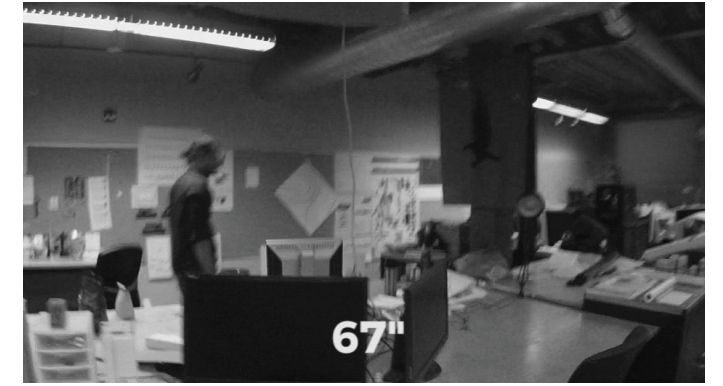
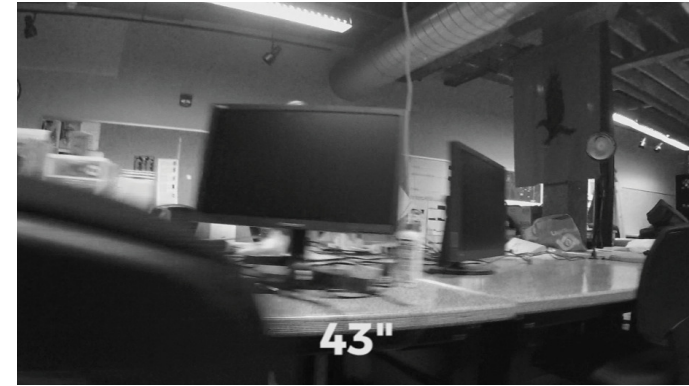
CAMERA FRAMES



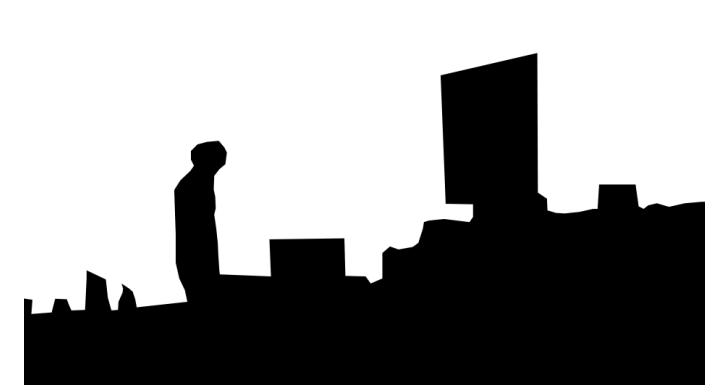
OBSCURED SPACE



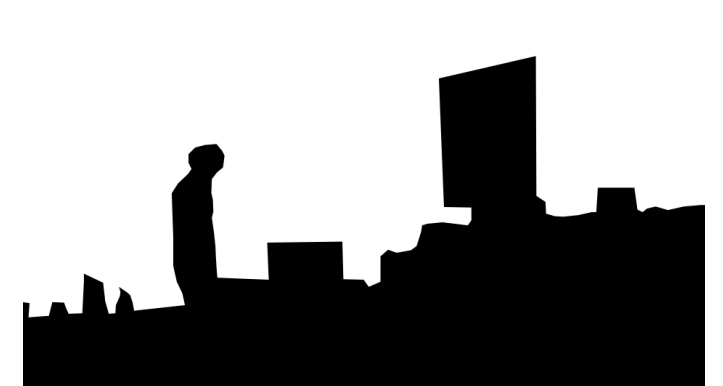
OPPORTUNE SPACE



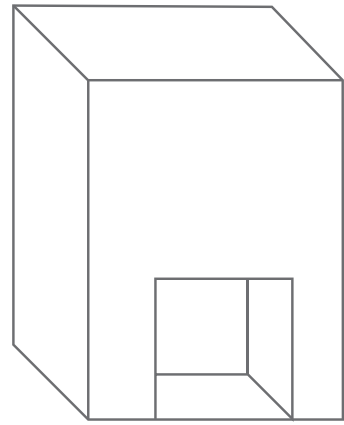
CAMERA FRAMES



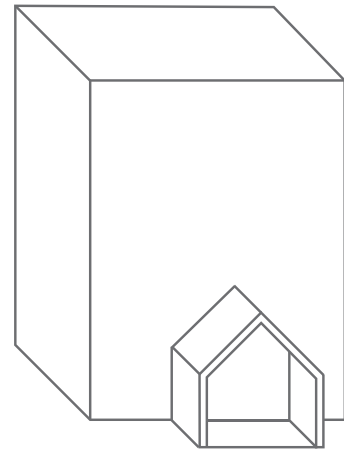
OBSCURED SPACE



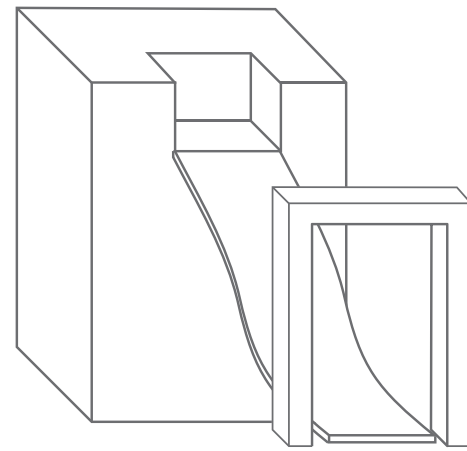
OPPORTUNE SPACE



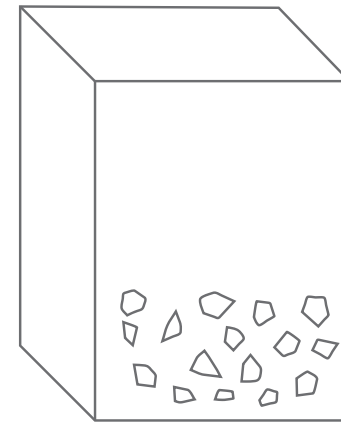
HIDING



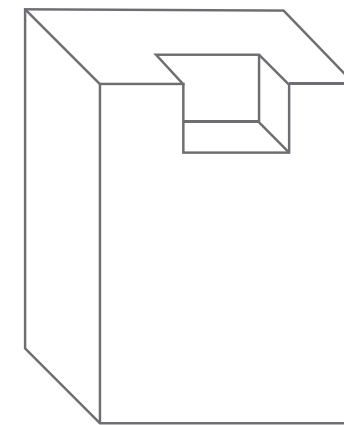
HOUSE PLAY



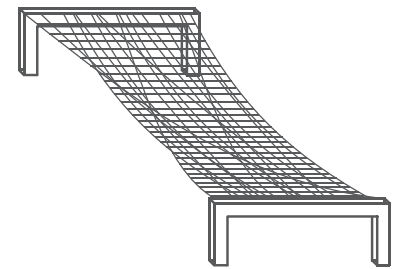
SLIDE



TEXTURE WALL



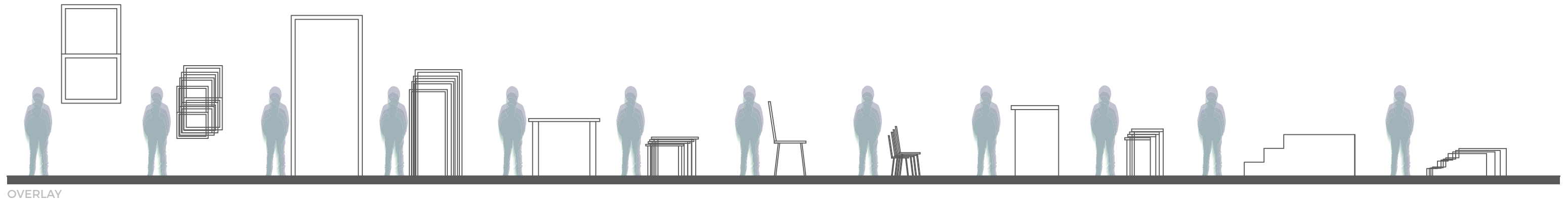
HIGH POINT



MESH

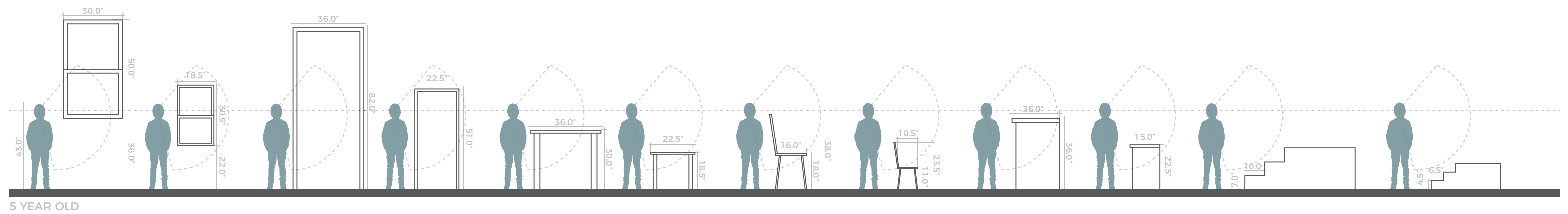
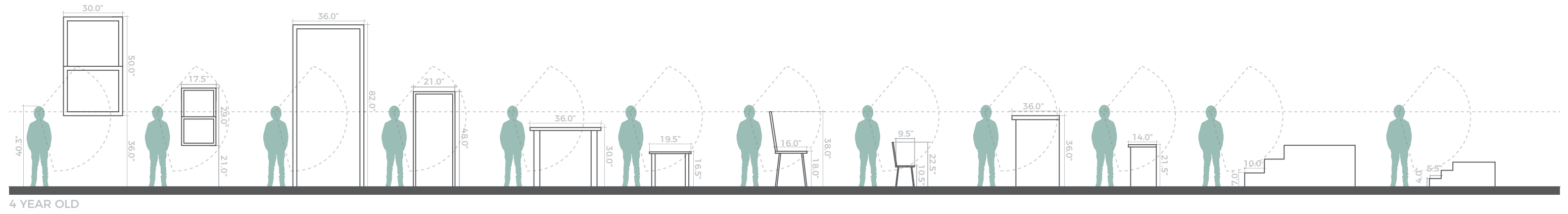
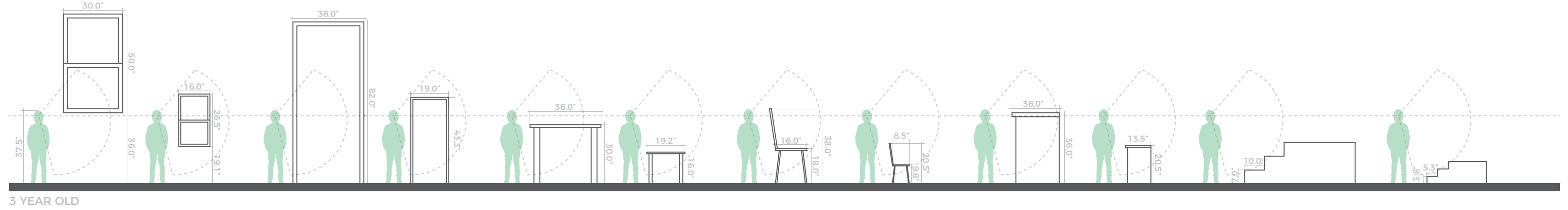
INTERACTION + SCALE

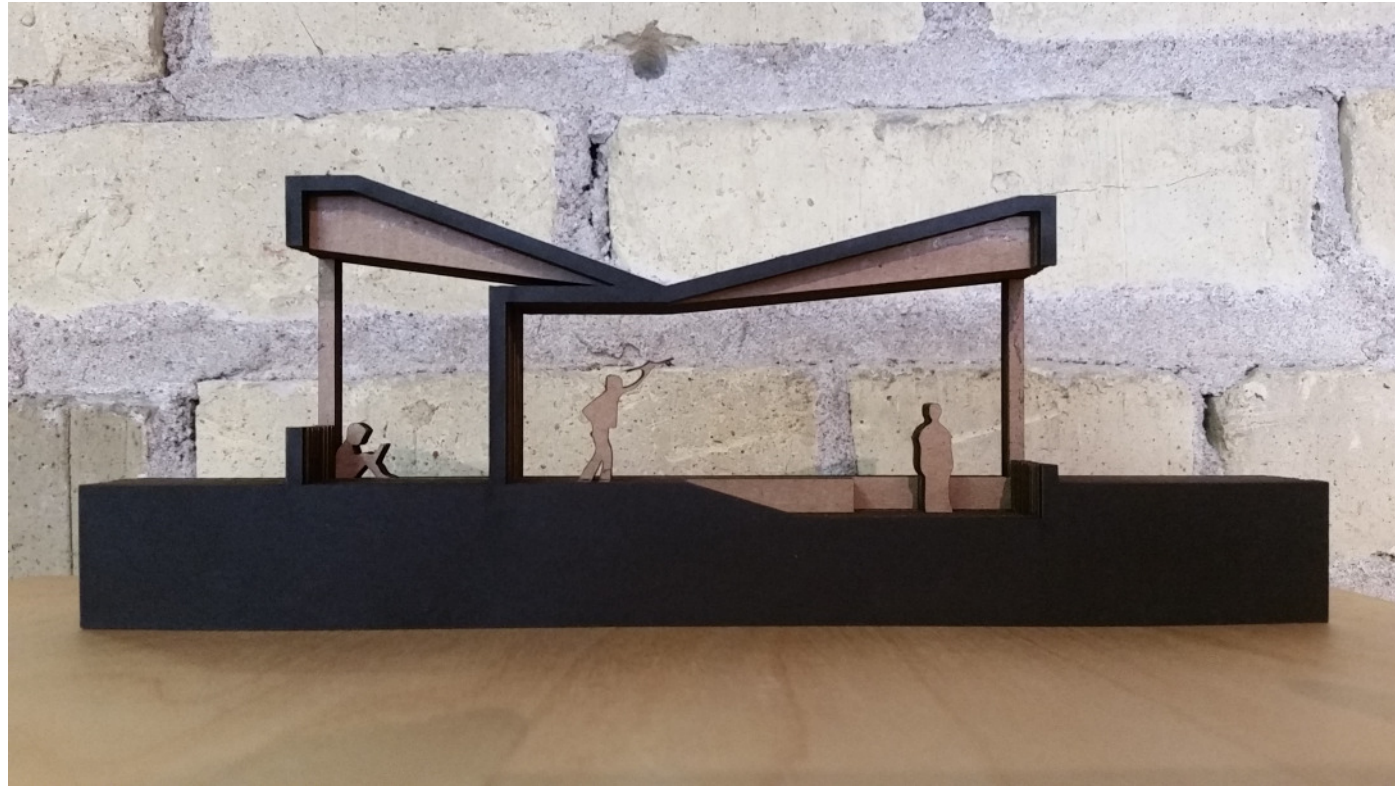
Building upon the video analysis was to analyze what spaces children find opportune moments within. Spaces that feels designed specifically for them. Drawing from personal experience, I chose interactive spaces that could become intertwined with one another into the larger contextual setting of a building. Can chairs become a place to play on top of and hide beneath? How can we shed light on previous ways of using everyday mundane objects? These became the driving questions when moving into the next step of the design process.



SCALE ANALYSIS

Viewpoints and connections with typical everyday objects was a large part of pushing my design forward. The scale analysis (next page) was developed in a way that could determine average seating, viewing, leaning, and generalized spatial heights. This study was done across three age groups from 3-5 year old's. More importantly, these measurements set up the model analysis so that I was not trying to build new information per model and it only became about the design and psychological aspects of the space.





Classroom test A: wrapping the form



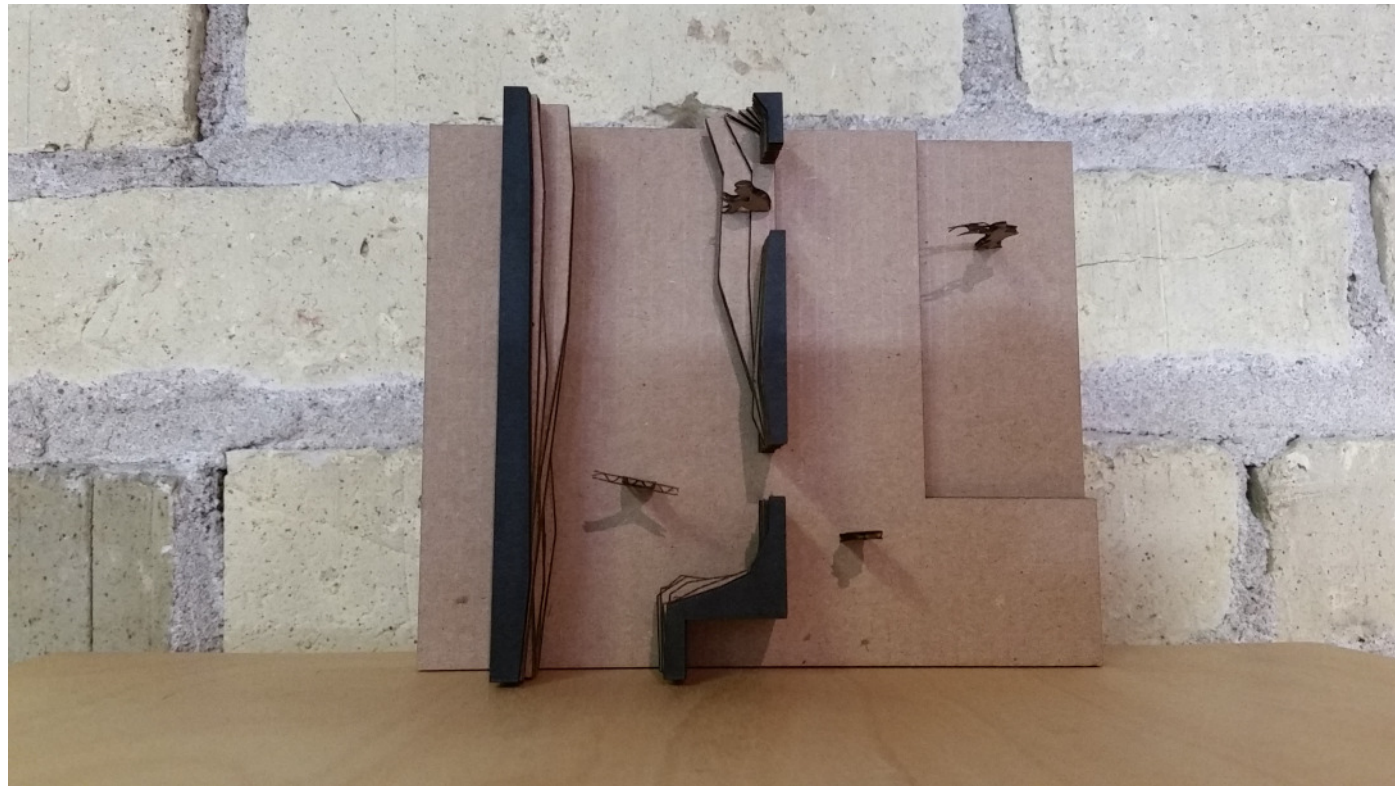
Classroom test B: house within a house

MODEL ANALYSIS

The sectional models served as a way to understand how the space conformed to the child, but also in understanding the overall space of the classrooms and adjacent hallways and their correlation with one another. There were several ideas I wanted to explore however for the sake of time, I narrowed them down to three specific areas of study. Those areas were, varied ceiling heights, space within space, and varied floor platforms.



Classroom test C: fanning the ceiling



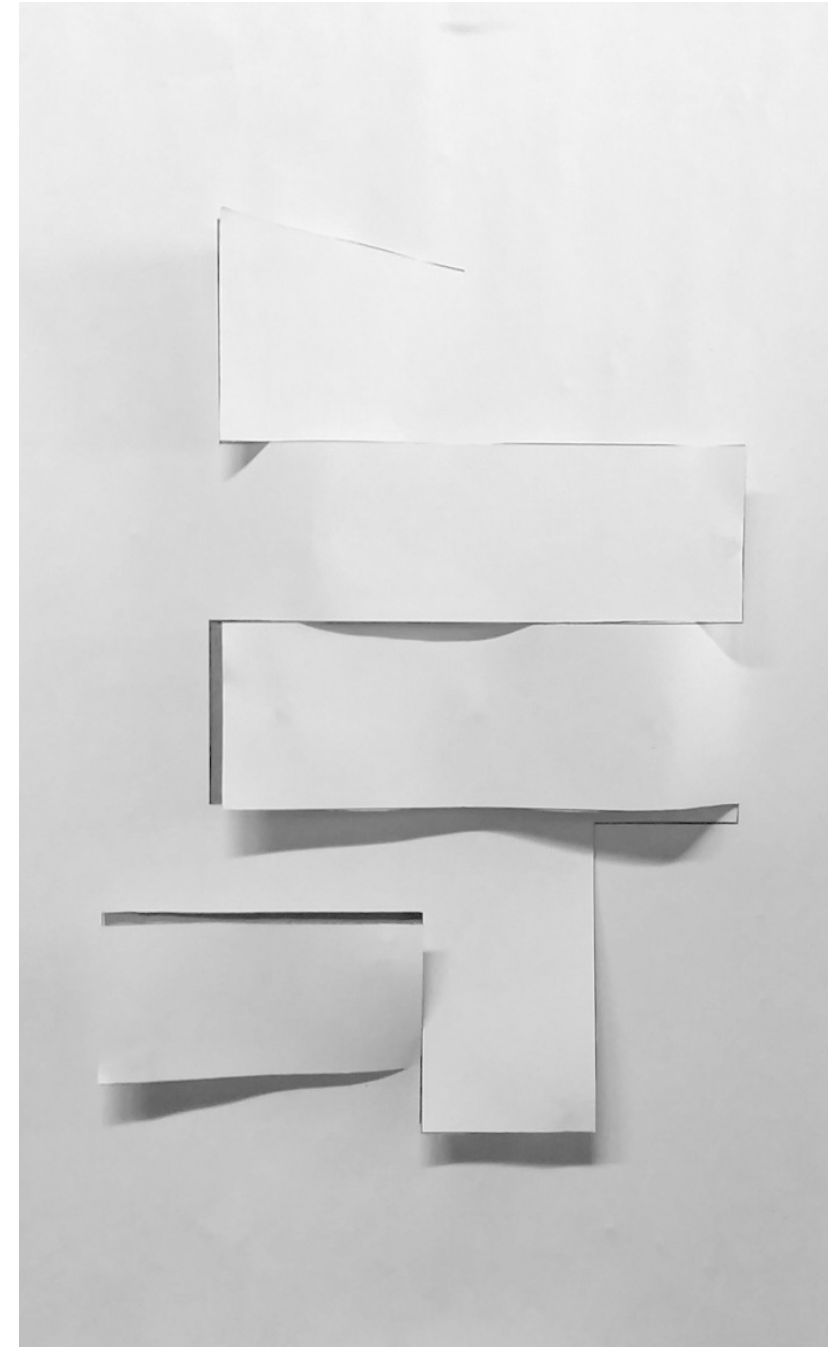
contour wall exploration



play bench with contour wall exploration



line model A



line model B

PRECEDENT ANALYSIS

Initially, ten precedents were reviewed covering a specific set of criteria that would later be adapted and reused within my own work. These categories were then ranked based on their merit and relationship with modern researched methods of children’s development. From this, three precedents became the forefront for the future design which will be discussed in greater detail below. Each project below, although maybe not highlighted in further depth, has had some capacity in shaping the overall design.

	Corning Child Development Center	LeFrak Center at Lakeside	Fukumasu Base and Kindergarten Annex	Hakusui Nursery School	Delft Montessori School	Raa Day Care Center	The Birds Nest	Borneinstitutioner	Children and Family Center
	New York City, New York	Brooklyn, New York	Chiba Prefecture, Japan	Chiba Prefecture, Japan	Delft, Netherlands	Kustagatan, Sweden	Randbolvej, Denmark	Amager, Copenhagen	Ludwigsburg, Germany
	Late Modern	Earth Integrated	Urban	Earth Integrated	Building Focused	Building Focused	Site Focused	Organic	Rural
Spatial Relationships									
Entrys and Exits									
Circulation									
Section / Scale									
Aesthetics (Personal)	<ul style="list-style-type: none"> + functional + varying spatial heights + pleasing material palette - unbalanced form - organicism seemingly from nowhere - hodgepodge of color - lack of varied texturing 	<ul style="list-style-type: none"> + functional + clean color and lines + pleasing material palette + flows from the earth - lack of functional efficiency across two forms - scaled heights for children and teens 	<ul style="list-style-type: none"> + clean exterior architectural line work and form + varying spatial heights + good balance between wood and white - cramped interior spaces - interior wood walls are not functional 	<ul style="list-style-type: none"> - functional - varying spatial heights and areas - pleasing material palette reminiscent of a forest - redundant amount of interior steps - hodgepodge of color - spatial efficiency is weak 	<ul style="list-style-type: none"> + functional / highly efficient and collaborative plan + clean corners + minimal color palette - form is restrictive - lacking ample natural light - lacking multiple textures 	<ul style="list-style-type: none"> + quality of interior space + varying spatial heights + pleasing material palette - form does not complement context - lacking textural qualities - hodgepodge of color 	<ul style="list-style-type: none"> + pleasing material palette + pleasing form - does not complement context - Lacking varying spatial heights - missing textural variance 	<ul style="list-style-type: none"> + highly efficient + varying spatial heights - over colored interior - organicism seemingly from nowhere - out of proportion and scale to a child - columns feel under designed 	<ul style="list-style-type: none"> + functional + good contextual connection + pleasing material palette + balanced form - varied spatial qualities
Color Scheme									



Borneinstitutioner

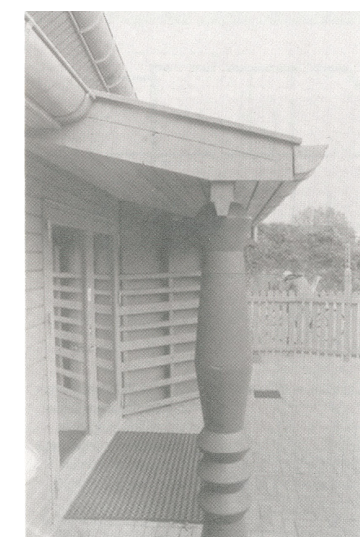
ARCHITECTS: Arkitekttegnestuen Virumgard

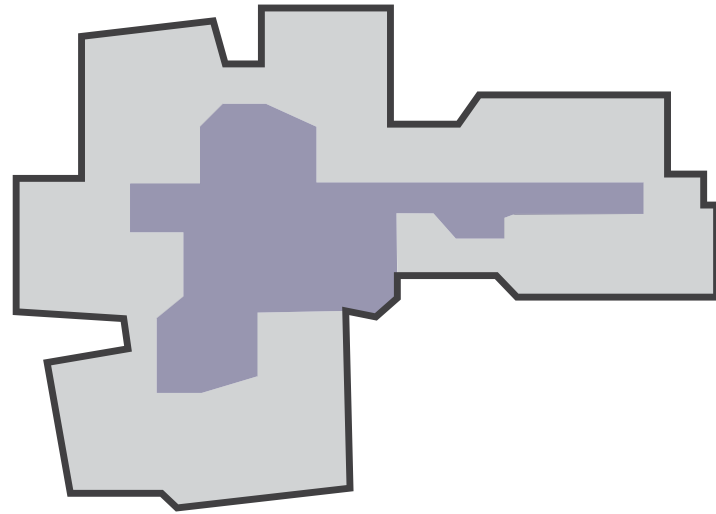
LOCATION: Amager, Copenhagen, Denmark

AREA: 4,188 ft²

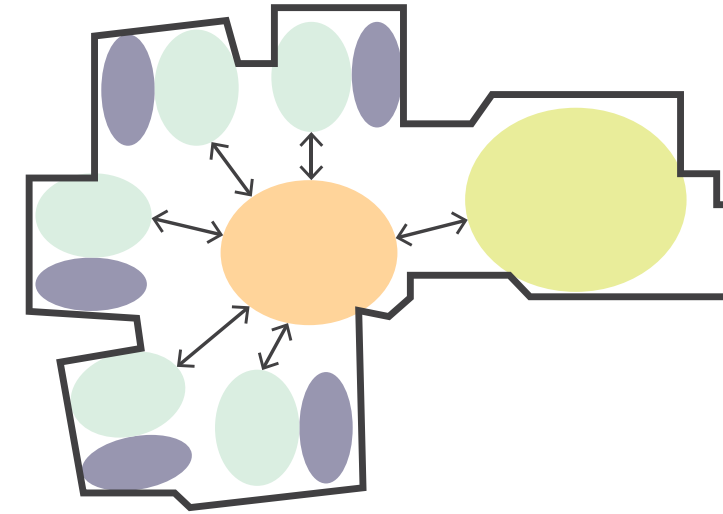
BUILT: 1994

This project was developed with a belief that the center should be in tune with contemporary thinking relating to child psychology to the environment. The architects believed that within this context that the parents would understand this philosophy of thought. The buildings form is slightly organic with two near identical forms attached to a centralized gross motor area. The plan is highly characteristic so that no two spaces or corners appear to be the same. When viewing this project in section, the low eaves provide an area that is safe and quiet, while when the children are feeling more ambitious they can move to the taller gross motor area.

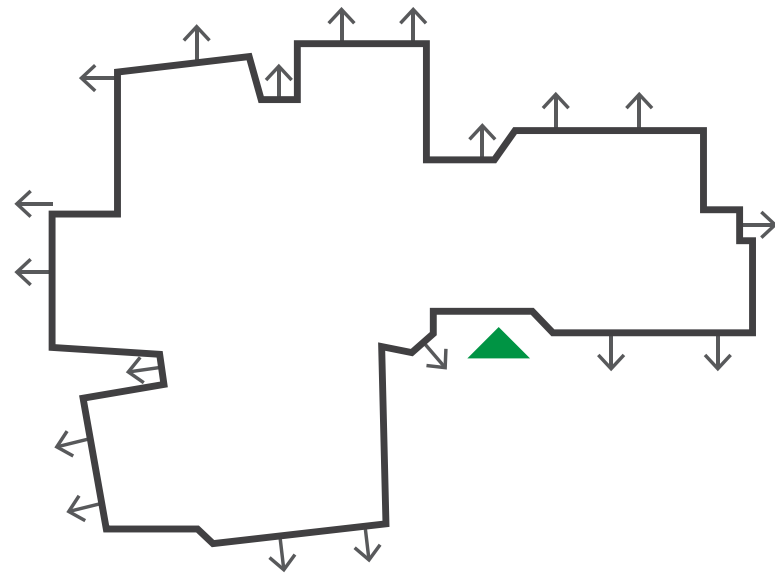




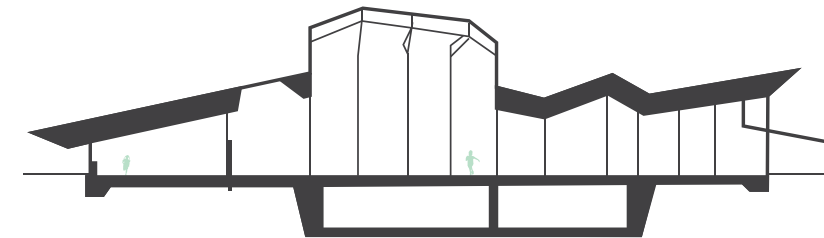
CIRCULATION



SPACE PROGRAMMING



ENTRY AND EXIT



SECTION



Raa Day Care Center

ARCHITECTS: Dorte Mandrup Arkitekter

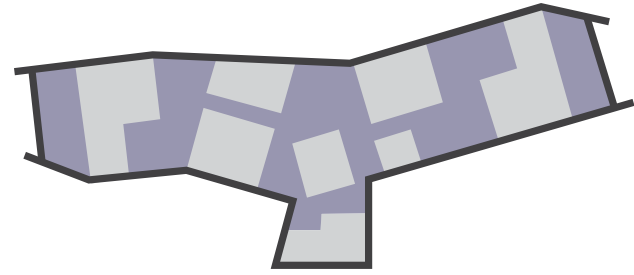
LOCATION: Kustgatan 1, 252 70 Råå, Sweden

AREA: 1,722 ft²

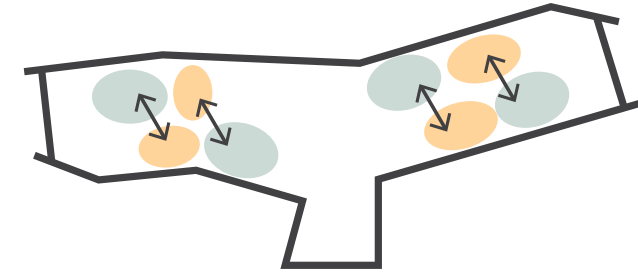
BUILT: 2013

This project was developed with a belief that the center should be in tune with contemporary thinking relating to child psychology to the environment. The architects believed that within this context that the parents would understand this philosophy of thought. The buildings form is slightly organic with two near identical forms attached to a centralized gross motor area. The plan is highly characteristic so that no two spaces or corners appear to be the same. When viewing this project in section, the low eaves provide an area that is safe and quiet, while when the children are feeling more ambitious they can move to the taller gross motor area.

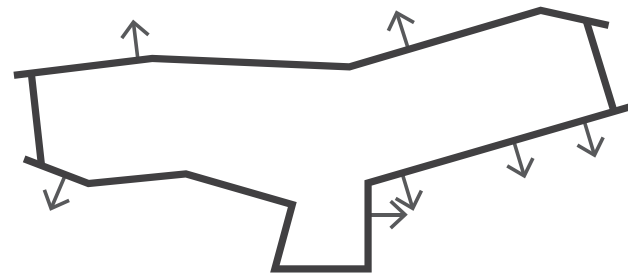




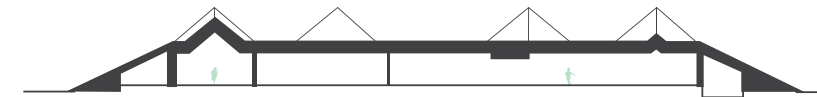
CIRCULATION



SPACE PROGRAMMING



ENTRY AND EXIT



SECTION



Delft Montessori

ARCHITECTS: Herman Hertzberger

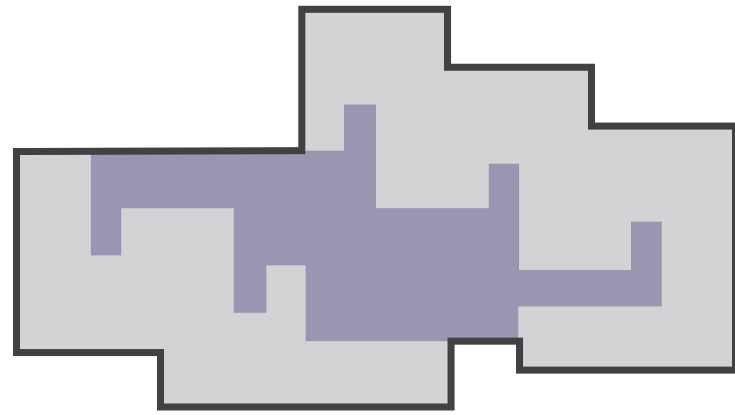
LOCATION: Delft, Netherlands

AREA: Constantly expanding

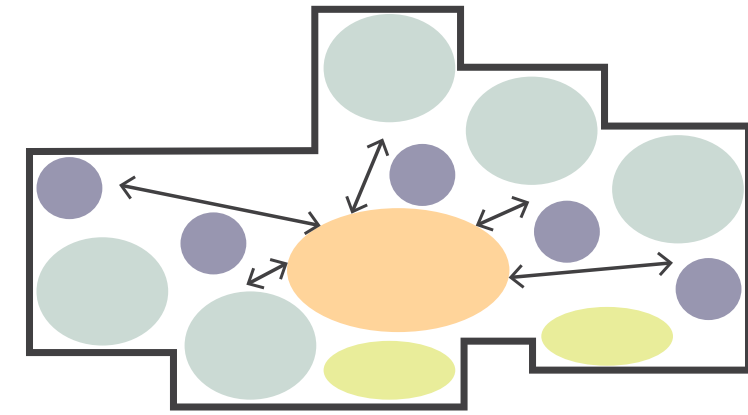
BUILT: 1960

Delft Montessori School was designed as a four classroom school which was phased for expansion. This expansion was originally underestimated in the original design. The idea of the plan and arrangement was to have a hall that follows along a series of L-shaped classrooms each with its own skylight to emphasize the main classroom entrance. The interior was also meant to resemble that of a street, with each classroom having its own front porch delineating the space between the private and public zones.

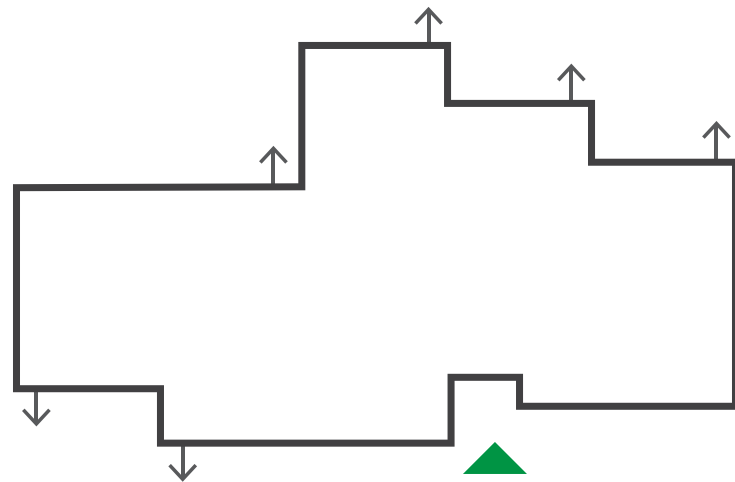




CIRCULATION



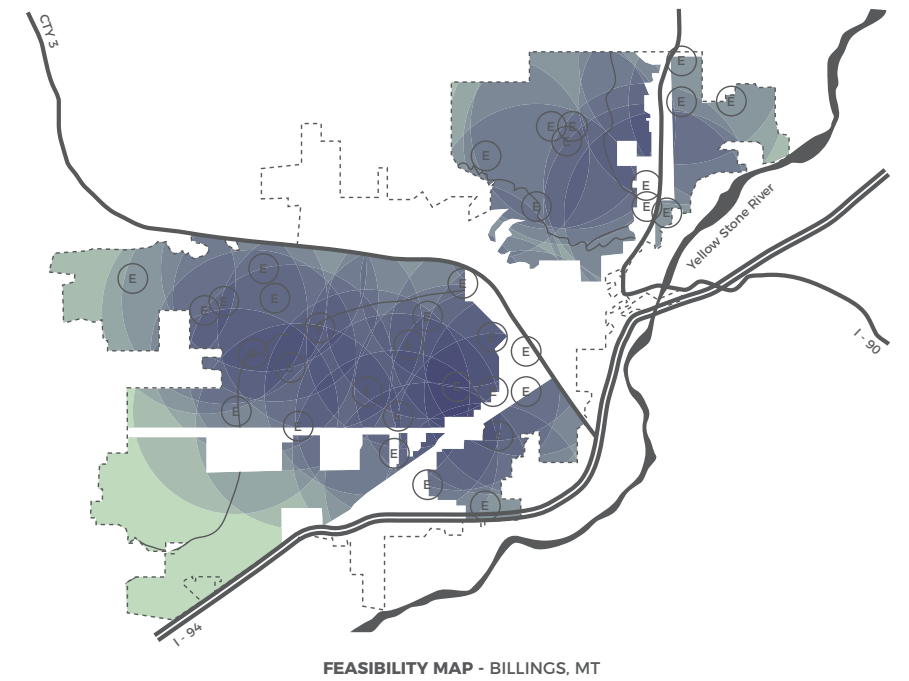
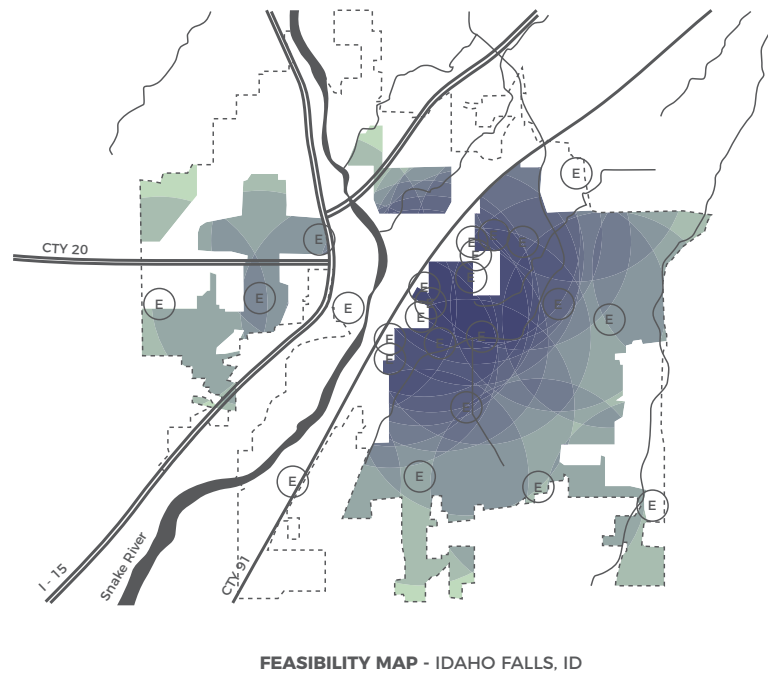
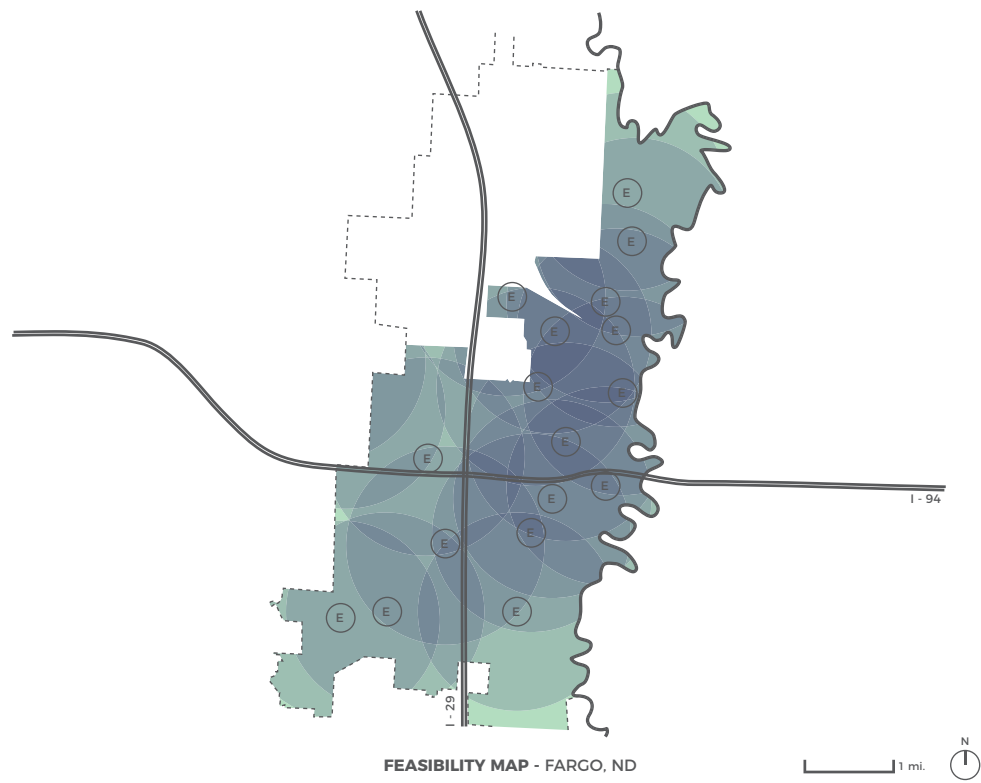
SPACE PROGRAMMING



ENTRY AND EXIT



SECTION



SITE ANALYSIS

Three sites were considered when determining the home for the new child development center. The purpose of the new structure was to act as a model that could be used and adapted based on its specific site. To ensure that this process would be fluid, the sites above represent areas that contain a water feature, harsh temperature climates, flat urban sites, and populations consisting of between 60-120 thousand people.

IDAHO FALLS, IDAHO

POPULATION
58,691

MEDIAN AGE
32.4

HOUSEHOLDS
32,505

MEDIAN INCOME
\$46,813

MALE
48%

FEMALE
52%

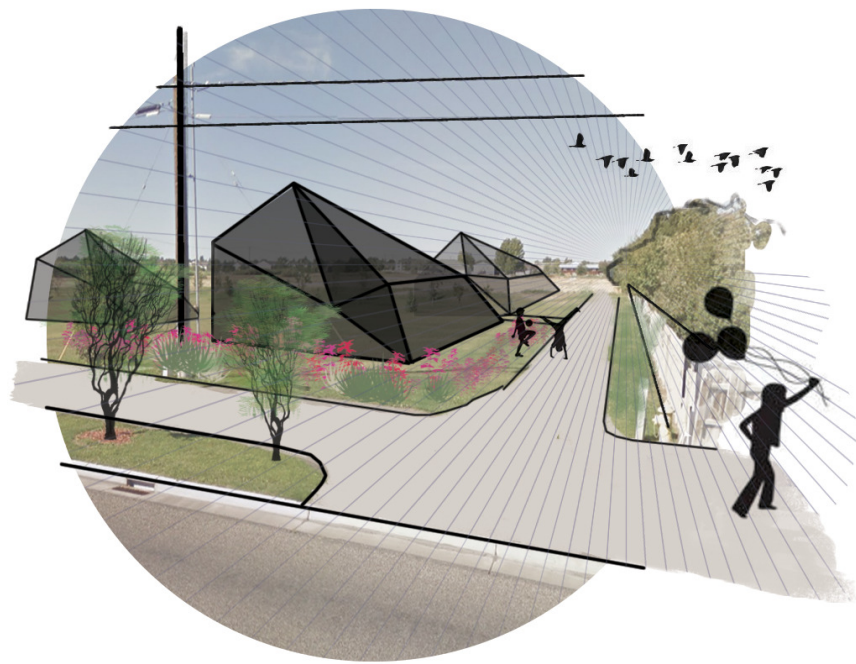
SITE OVERVIEW

Located in Bonneville County, Idaho, Idaho Falls is the largest eastern city in Idaho. Idaho Falls metropolitan area has a combined population of over 140,00 people according to the 2010 census bureau.

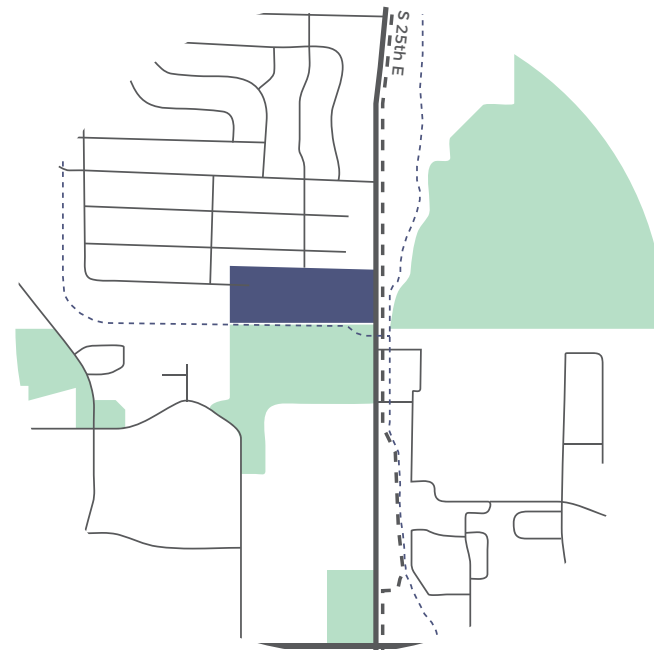
With its extraordinarily close connection to nature, Idaho Falls is an excellent city for outdoor-recreational sports. The city also contains a strong economy, historic, and cultural traditions that provide a rich way of life for its residents.

SITE MAPS

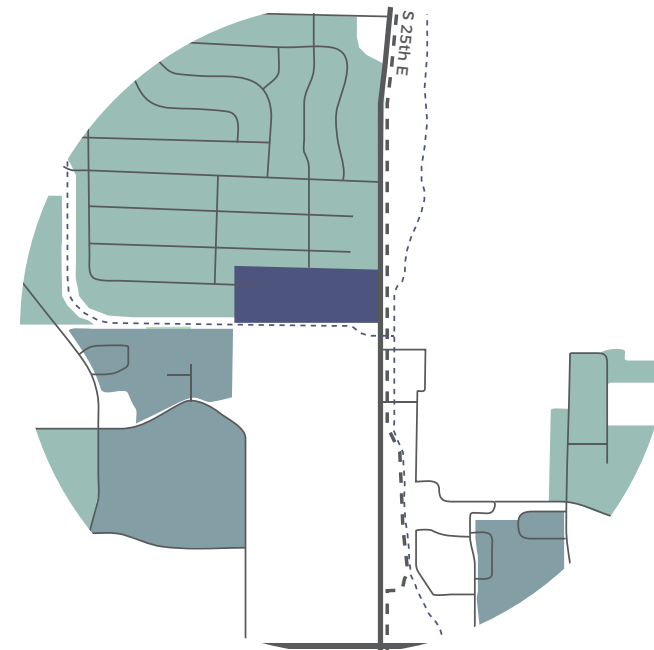
From the three sites previous, Idaho Falls was chosen based on feasibility, juxtaposition with a college, and residential closeness. The connection to the college was of the utmost importance, as the college would be able to train professionals within the child development center. Students and professionals would be allowed to enroll their own children for care and it would be open for public enrollment.



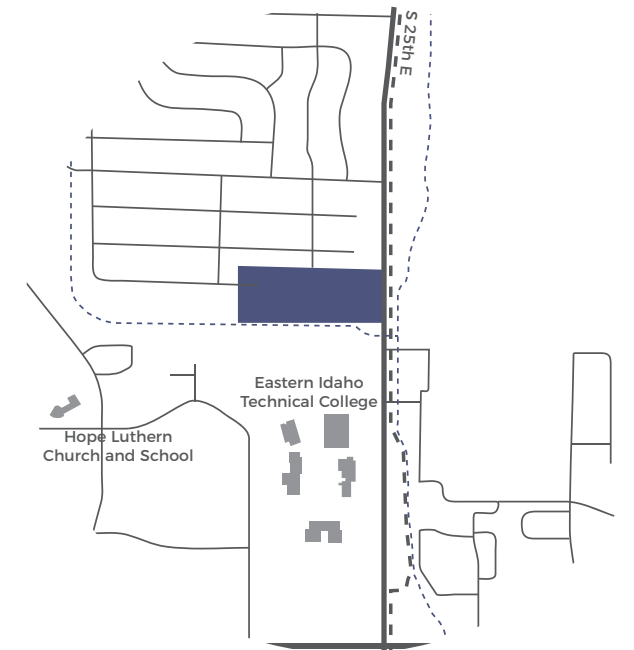
IDAHO FALLS SITE PERSPECTIVE



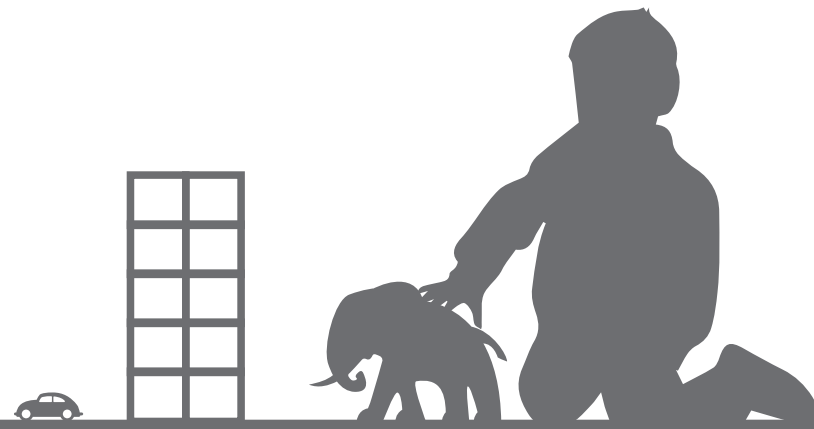
GREEN SPACE AND PEDESTRIAN PATHS
1 mi.



RESIDENTIAL
1 mi.

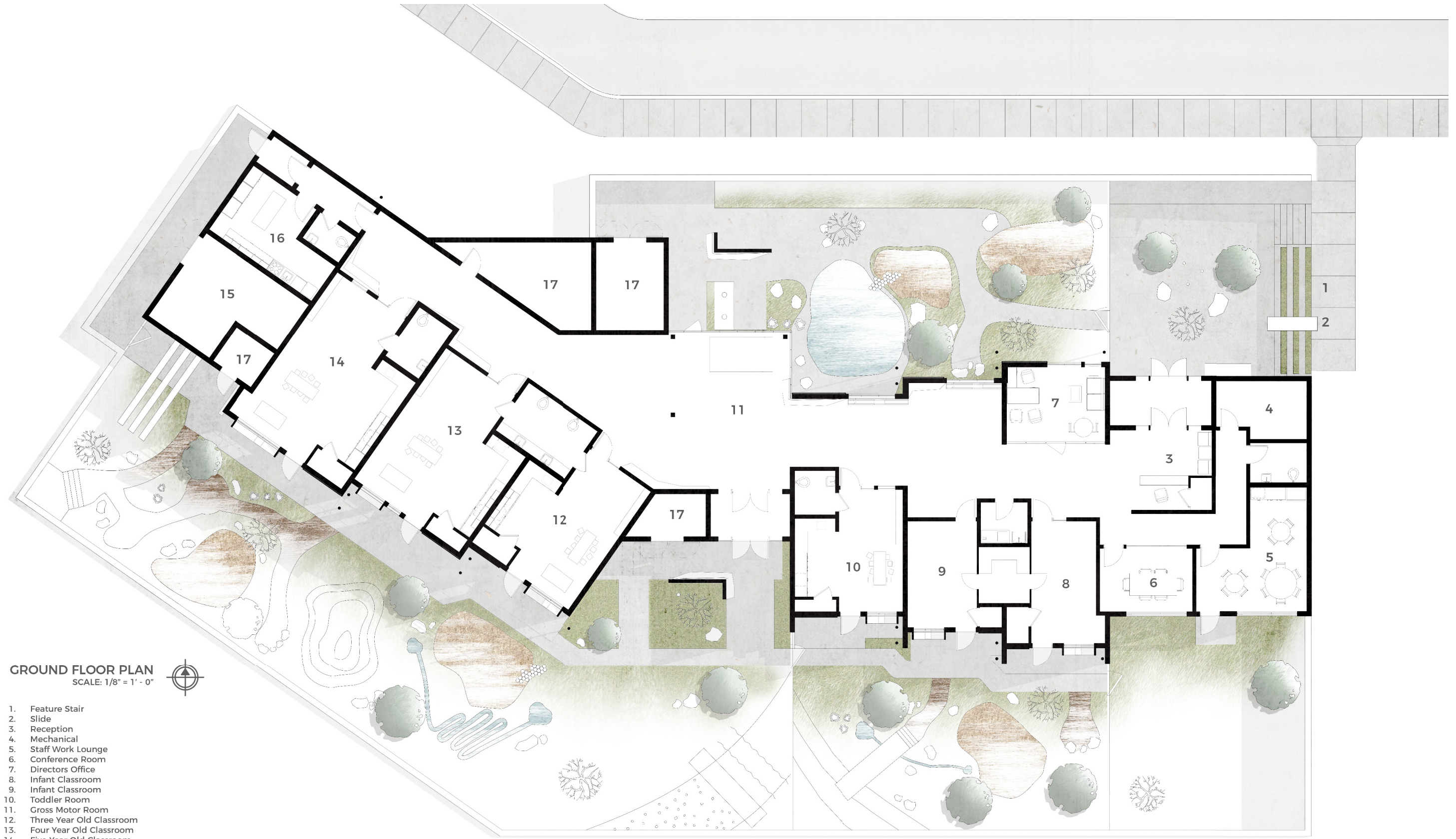


STREET GRID AND IMPORTANT BUILDINGS
1 mi.



FINAL DESIGN DOCUMENTATION

The final design is meant as a iterative model that can be used and adapted depending on the clients needs and budgetary concerns. This project, just like any other shall continue to be worked on through my future career as a way of reassembling the disconnect between adult design and children's space. The images depicted from now until the end of the book are not meant as a comprehensive final design, but as a lens into how we can view space that can foster imagination.



GROUND FLOOR PLAN
SCALE: 1/8" = 1' - 0"



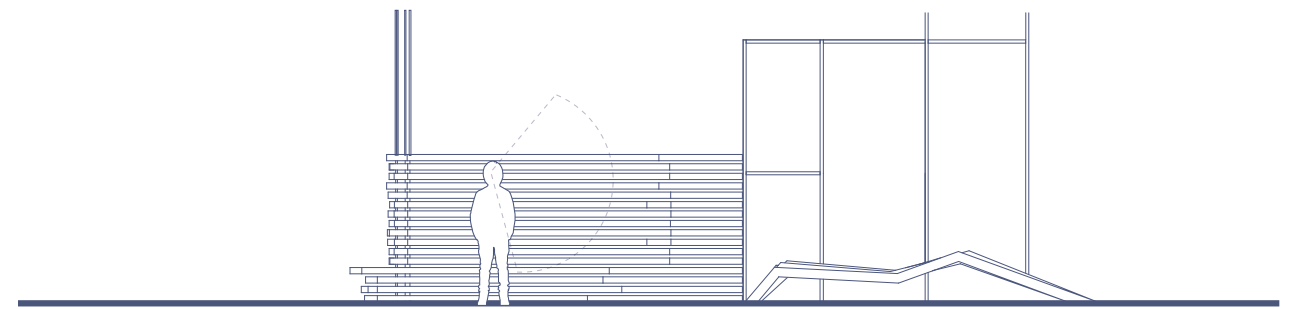
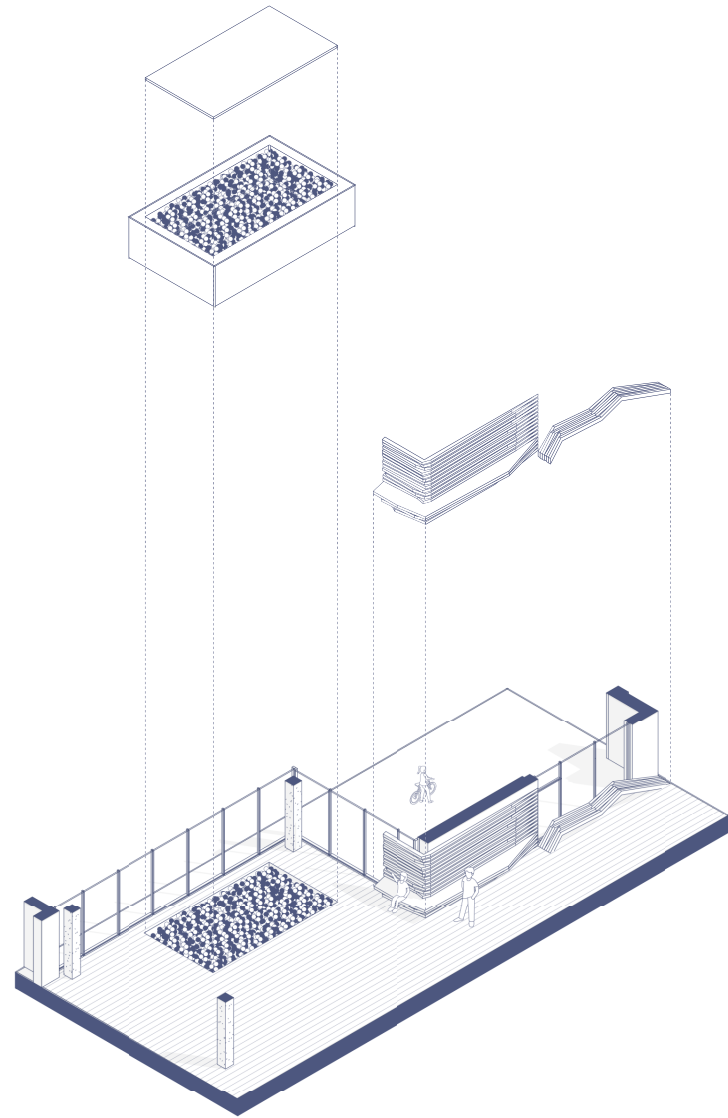
- 1. Feature Stair
- 2. Slide
- 3. Reception
- 4. Mechanical
- 5. Staff Work Lounge
- 6. Conference Room
- 7. Directors Office
- 8. Infant Classroom
- 9. Infant Classroom
- 10. Toddler Room
- 11. Gross Motor Room
- 12. Three Year Old Classroom
- 13. Four Year Old Classroom
- 14. Five Year Old Classroom
- 15. Mechanical
- 16. Kitchen Preparation
- 17. Storage



Entry Condition looking south at gross motor area



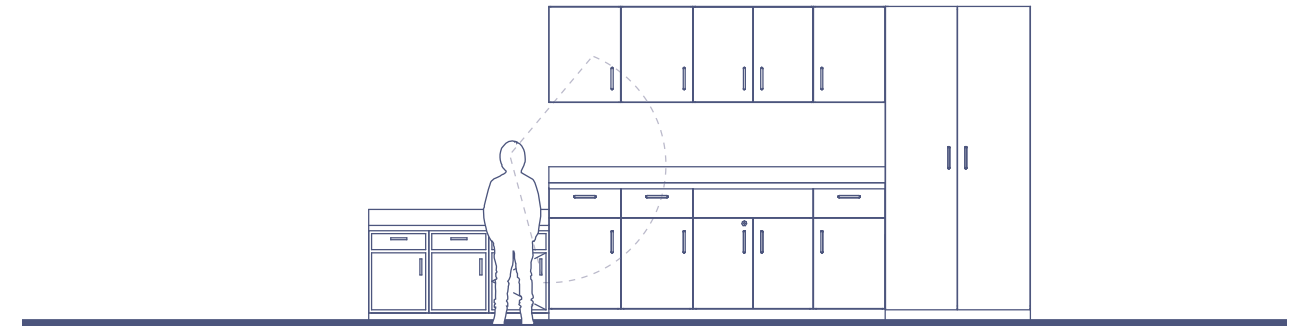
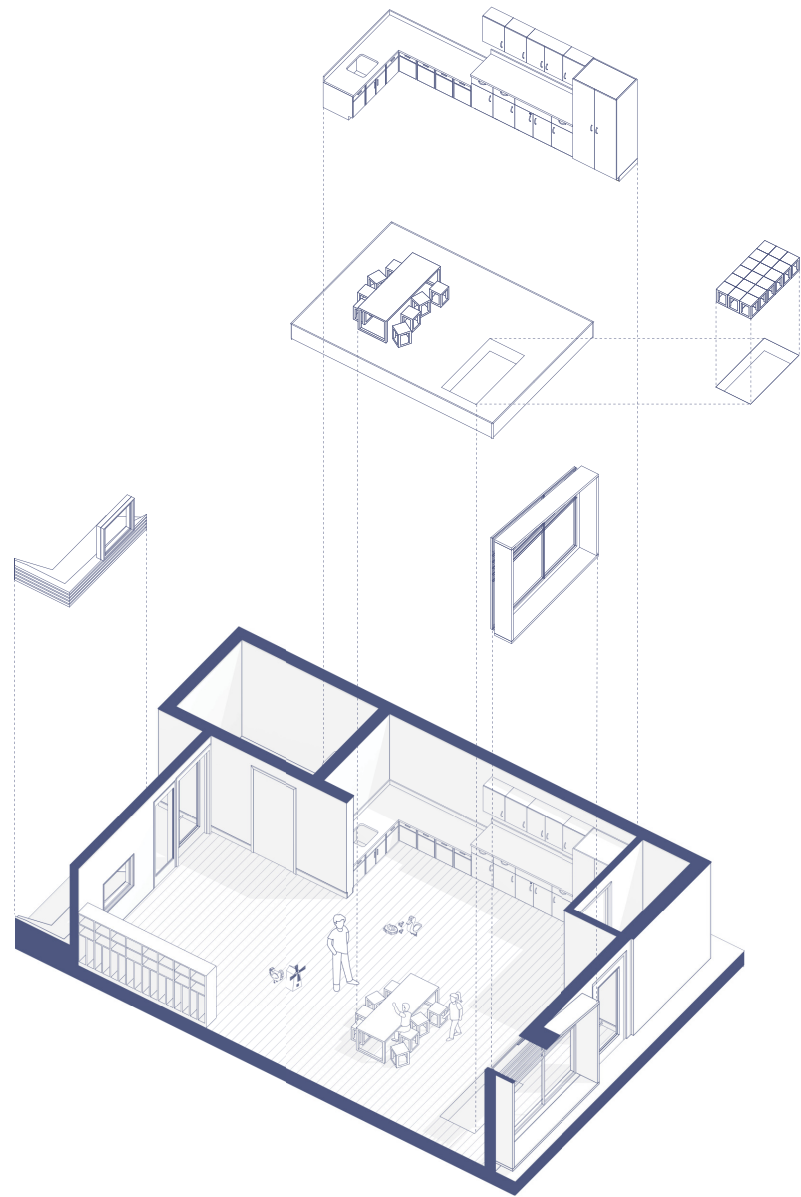
Gross motor area



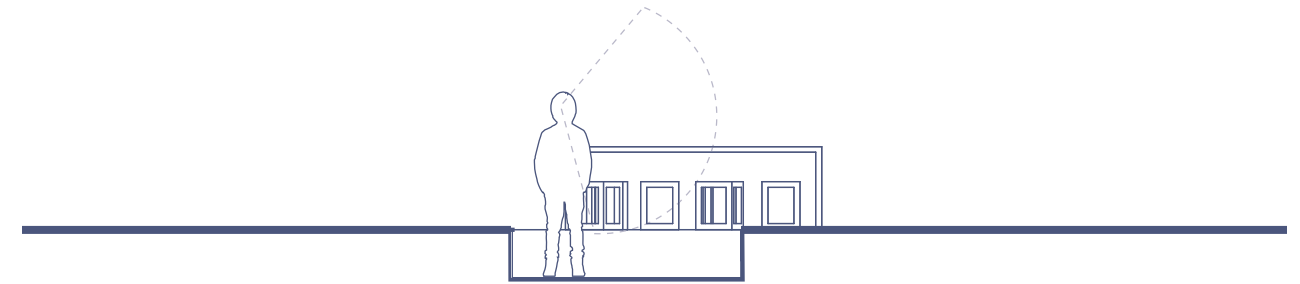
PLAY BENCH W/ CONTOUR WALL



5 year old classroom



CLASSROOM KITCHENETTE



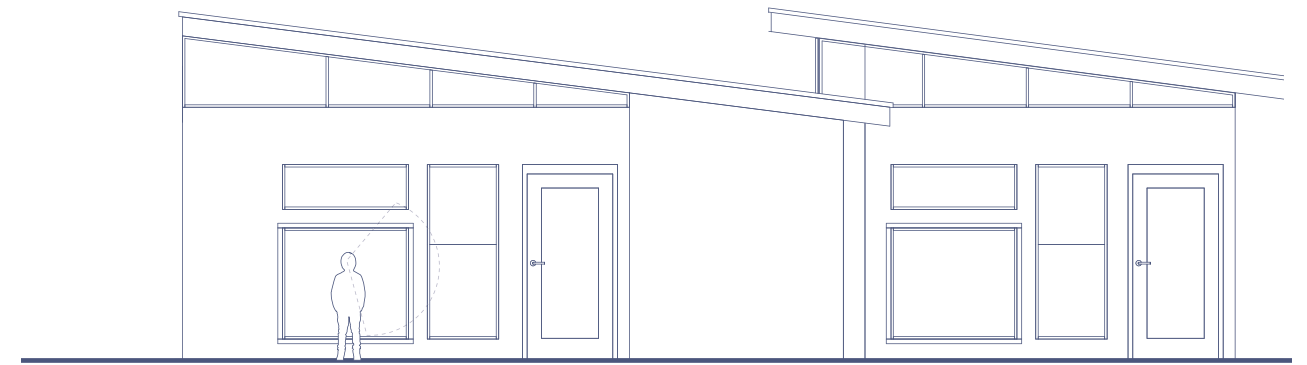
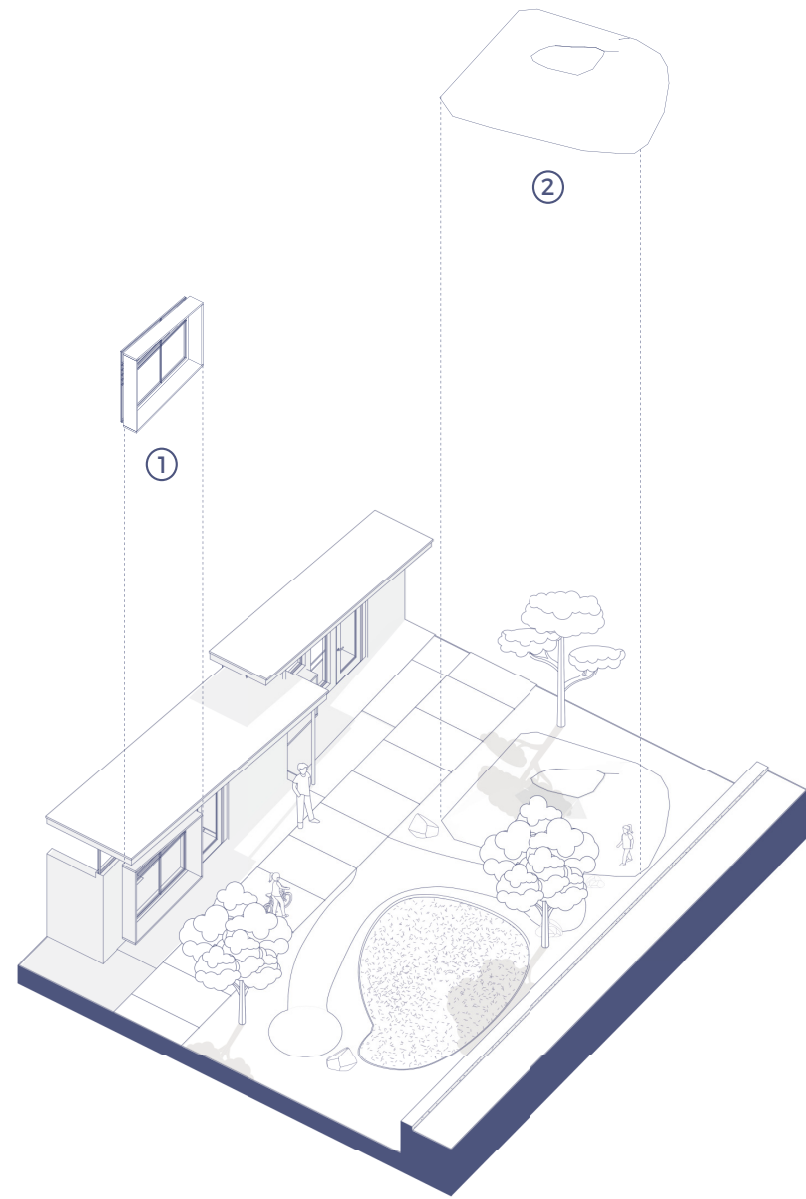
CLASSROOM SEATING



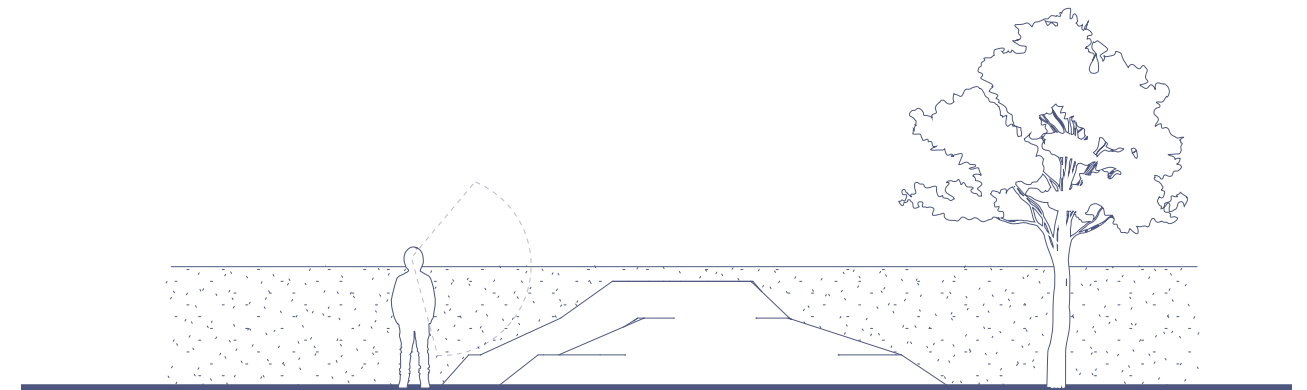
CLASSROOM ENTRY



South play yard looking north at 4 year old classroom



EXTERIOR FACADE



PLAY MOUND



CHRISTOPHER CARTER

email: chris2carter5@gmail.com

phone: 406-600-7426

hometown: Detroit Lakes, MN

PREVIOUS STUDIO EXPERIENCE

2011 Fall Cindy Urness / Tea House Fargo, ND

The Tea House project began a hands on conceptual approach to design with a strong emphasis on learning the basic skills of drawing and painting. The project required the entire semester, half spent on site consideration and placement, with the second half planning the structures.

2012 Spring Joan Voderbruggen / Dwelling Marfa, TX / Dance Studio Fargo, ND

This semester was arranged around learning to work with a variety of students to help further my teamwork skills. This was not only to develop my own personal work, but to also help to develop the group model and work within your partners constraints.

2012 Fall Steve Martens / Fire Department Granite Falls, MN / Living and Learning Center Minot, ND

This semester really pushed the boundaries of how I understood structure and forced me to think about the details pragmatically and differently.

2013 Spring David Crutchfield / Johnson Wax Labs Racine, WI / NDSU Library Steel Competition Fargo, ND

Concrete and steel have always been my two favorite building and structural materials and this semester allowed me to pursue different ways of blending and molding the two materials together harmoniously.

2013 Fall Don Faulkner / High Rise San Francisco, CA

The first half of this project was spent working with a group project with the latter and final design alone. This semester taught me constraint, dedication, and built valuable time management skills that have helped me finish my furthering years on time.

2014 Spring Cindy Urness / Homeless Shelter and Low Income Housing Oakland, CA

This semester was spent working in San Francisco, CA while continuing my education through Skype. I learned to manage my time wisely while completing weekly tasks for my studio project.

2014 Fall Mark Barnhouse / Water Treatment Lab Ulen, MN

This semester was focused on completing a comprehensive design project that would be displayed in its final form as a movie. I had very little experience with movie making before this semester and now feel completely comfortable with the software involved.

2015 Spring Mike Christenson / Thesis Idaho Falls, ID

It was wonderful to be fully immersed within a project that I was interested in and to have the freedom to pick how my schedule would be arranged. At first, this was a difficult task, setting up the work to be done for the rest of the semester. However, through many successes and failed attempts I believe that the thesis I designed represents the skills and knowledge I have gained from my five years at NDSU and will be extremely helpful for my future career and personal development.

APPENDIX

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