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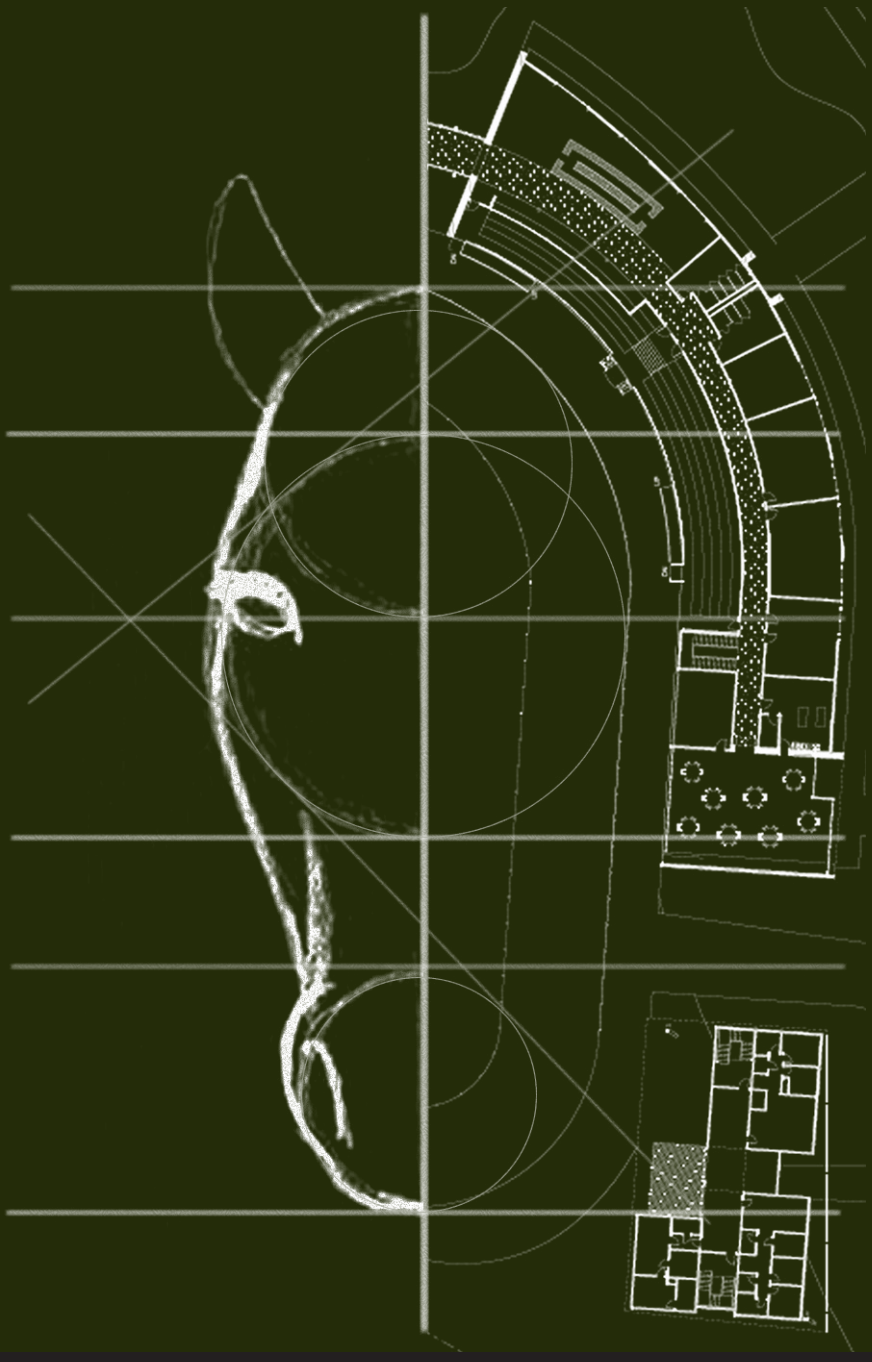
ON TRACK



INTEGRATED EFFICIENCY FOR EQUESTRIAN ARCHITECTURE

ANTHONY SCERBO
GRADUATE THESIS DESIGN STUDIO | ROGER WILLIAMS UNIVERSITY | SAAHP
SPRING 2014

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ON TRACK

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ANTHONY SCERBO
GRADUATE THESIS DESIGN STUDIO
ROGER WILLIAMS UNIVERSITY
SAAHP
SPRING 2014

SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS
FOR THE MASTER OF ARCHITECTURE DEGREE

STEPHEN WHITE, AIA
DEAN OF SCHOOL OF ARCHITECTURE,
ART & HISTORIC PRESERVATION

HASAN-UDDIN KHAN
THESIS ADVISOR

ANTHONY SCERBO
STUDENT

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ELLENVILLE, NEW YORK
[41°45'51.53"N 74°27'51.59"W]

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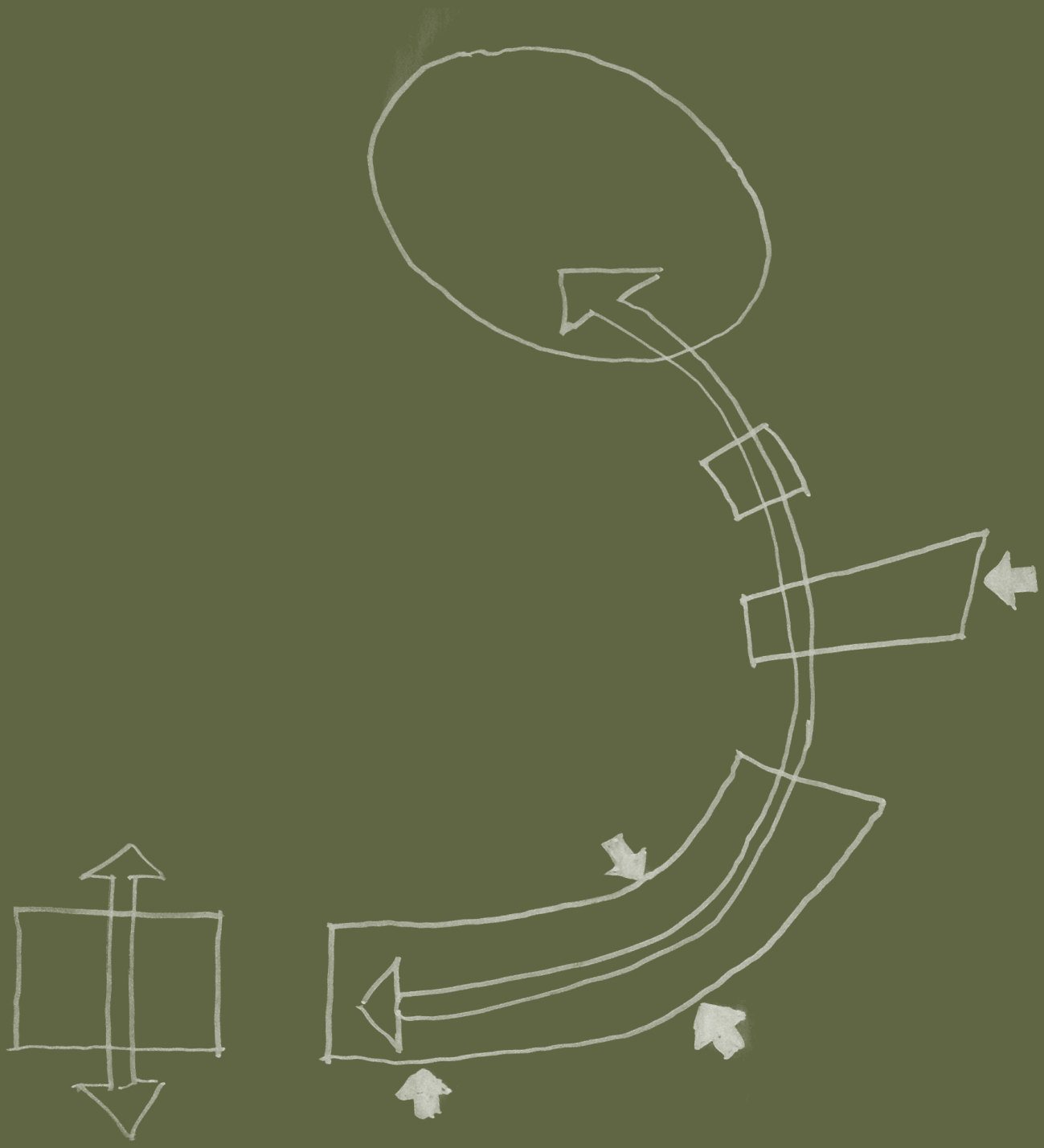
INTRODUCTION

INTRODUCTION

The semester spent preparing this graduate thesis document was the culmination of my studies at Roger Williams University. Under the direction of Professor Hasan-Uddin Khan, this project has evolved from a mere idea with an initial thesis into a body of work which embraces a new, more harmonious thesis than the original. The project focuses on a site in Ellenville, NY which was chosen for its geological history and damage done to rural land during the series of hurricanes in the recent years. The program was chosen based upon local study of land use and the surrounding vernacular culture within the context.



PROBLEM STATEMENT

CONNECTIVITY
PURPOSE
MEANING
EFFICIENCY
STEWARDSHIP

PROBLEM STATEMENT

One of the biggest issues facing equestrian architecture is that of temporal stagnancy, in which each building situated on a site has a singular use. This could lead to a large portion of site being wasted on rarely used spaces, which could otherwise house more functional program, as well as deterioration without proper attention.
The spaces which are activated by use must adhere to practical use for human, horse and vehicle, paying close attention to those spaces where they intersect with one another. As always, site consideration is of high importance, as equine needs are vast and vary depending on the breed of horse and practices desired. The site must also be engaged so that the footprints of both horse and man are minimal to deter degrading the quality of land.

CONNECTIVITY

The project shall aim to actively connect the facilities within the program as an integral part of the local ecology within the area and blend the relationship between building and landscape. By connecting the building system with the natural landscape, a focus can be drawn on the interaction between the two to develop a symbiotic relationship that aids the amenities provided by the facility and removes a system of interventions within the site. Thus, the building connects as a biomimetic part of the existing system that negates the impact traditional buildings have on their site.

PURPOSE

Primarily, the purpose of the project is to create a series of building typologies that focus on importing traditional styles and functions and transmuting them such that the buildings become efficient within the site and help mitigate waste of site space; thus, exporting a new system of building typologies that focus on low impact design in regard to frequency and building use. By establishing a system that works efficiently and cohesively, the project may further its purpose to become a proponent of sustainable building tactics within the region, which is widely affected by the same issue.

MEANING

While building technology will provide a partial link to the site, the meaning of the project is derived from the program function as an equine facility within an agricultural area. The human and equine elements are of elevated importance within the site and engage the site and all natural processes.

EFFICIENCY

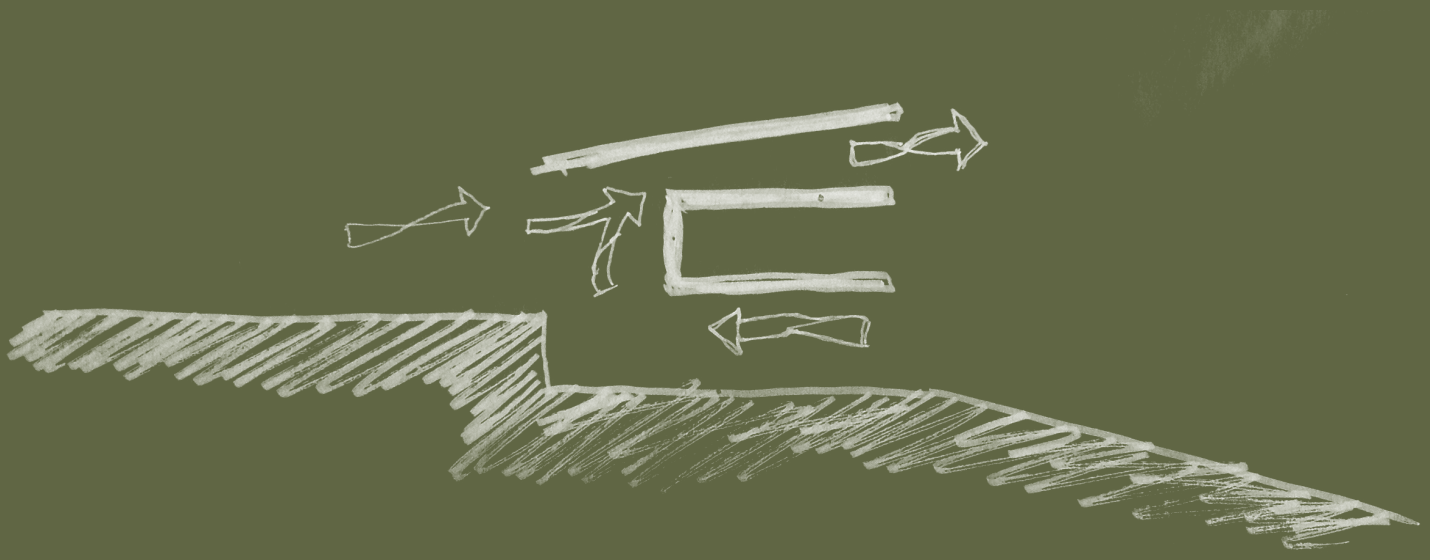
As previously stated, the focus of the project is an efficient building design that reflects the natural landscape. The aim is to use and deal with what is already existing on the site in a pragmatic way to help the natural processes that must occur both for equine activity and daily biological processes in the environs. By examining the needs of the local surroundings and those of the human element on the site, another symbiotic relationship can be developed to minimize the effects of building on the site.

STEWARDSHIP

By engaging the property owners, a sense of the land may be developed and expanded upon to help further the design process in a productive manner. Having visited the site and having seen the current landscape, an analysis was started that will be further examined with consistent communication with the property owners so that building designs reflect the desires of the owners, the technologies of the architect's training, and most importantly, the needs of the site.

"In the global era in which we live, the polar forces of interconnectedness and specialization have created an environment for which no one takes specific responsibility and in which narrow dimensions of environmental problems are studied to the exclusion of integrated, holistic thinking."

-Claudia Dinep



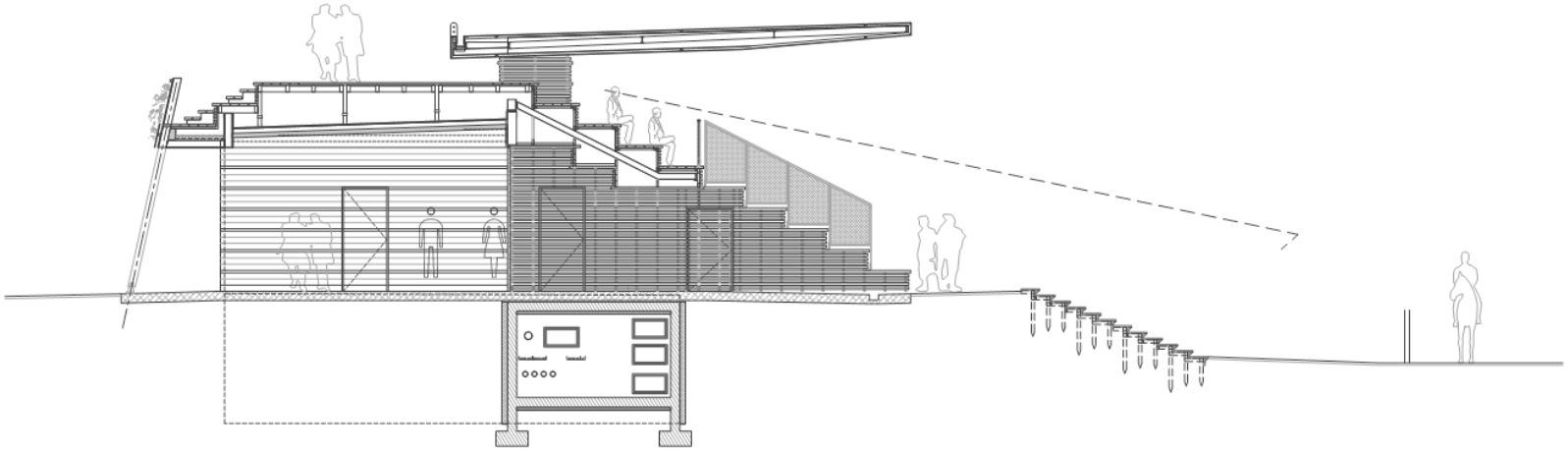
PROJECT STATEMENT

PROJECT STATEMENT

Through innovative building design, there shall be an architecture to exist within the environs of an equestrian facility that utilizes the most of the structures provided. This project aims to take the required buildings both by client preference and use in Ellenville, NY with regard to practical use and create a system of architectural principles which enable flex use within singular spaces. The architecture will respond to the way in which people can use the space by providing a framework of compatability and adaptability. Buildings and facilities will be designed to intergrate themselves into the site harmoniously, minimizing site impact and providing beneficial services to all parties involved.

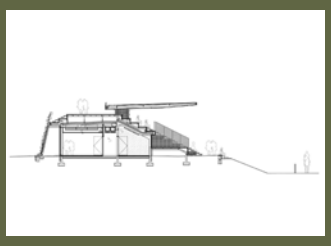
PRECEDENT ANALYSIS

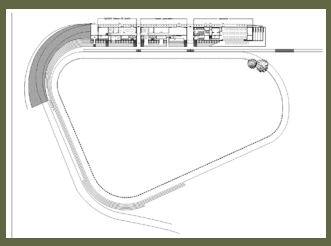
Architects: Joly&Loiret
Location: Fontainebleau Forest, France
Client: Communaute De Communes Fontainebleau-Avon
Area: 2,000 sqm + 25 H Landscaping
Value: 9.3 M€ (Inc. Terraces and Landscaping)
Date: Completion 2012 (Phases)
Design Team: Evp (Structures), Alto (Energy and Environmental Consultant), Forgue (Quantity Surveyor) Map (Landscape), Urbatec (Civil Engineer)

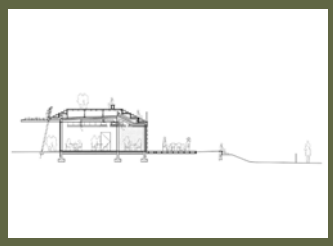


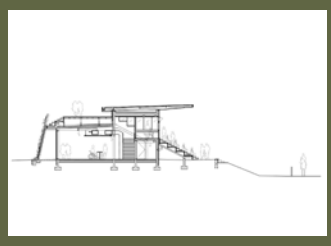
PRECEDENT

LE GRAND STADE





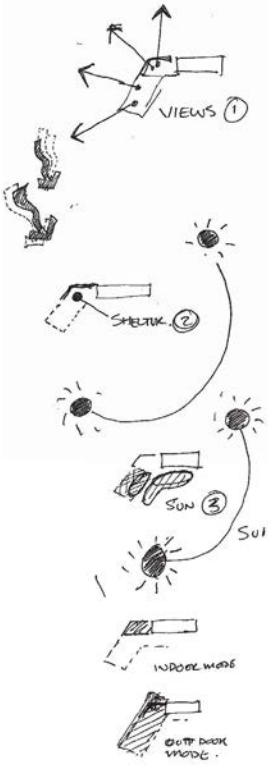


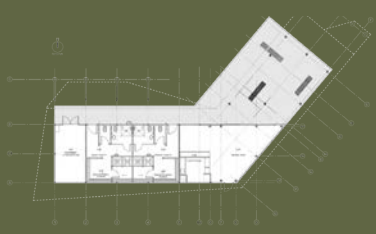


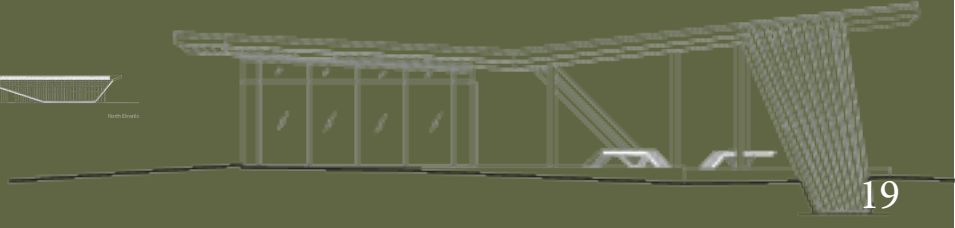
PRECEDENT

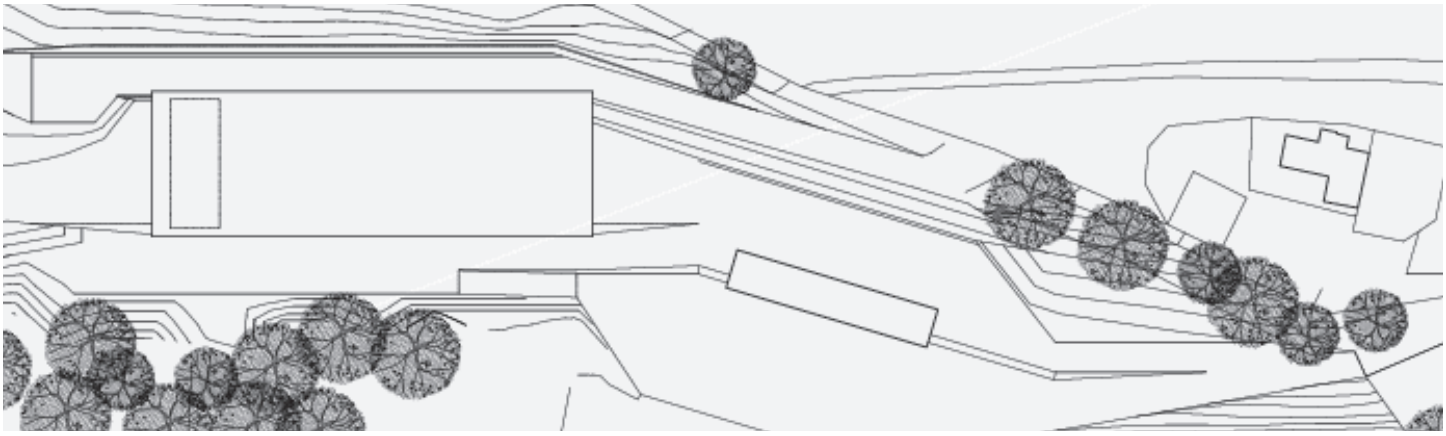
VISITOR CENTRE FOR EQUESTRIAN & MOUNTAIN BIKE

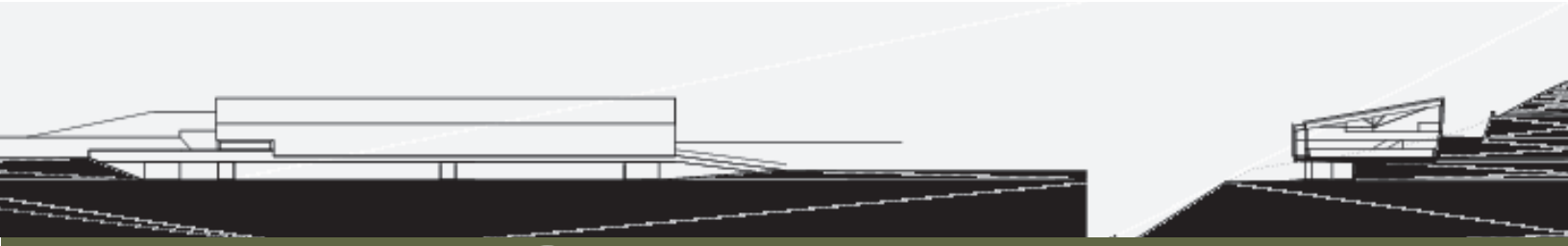
Architects: Jasmax
Location: Paremoremo, Auckland, New Zealand
Architects: Euan Mac Kellar, Mark Craven
Project Year: 2011
Project Area: 250 sqm
Photographs: Simon Devitt, Mark Craven





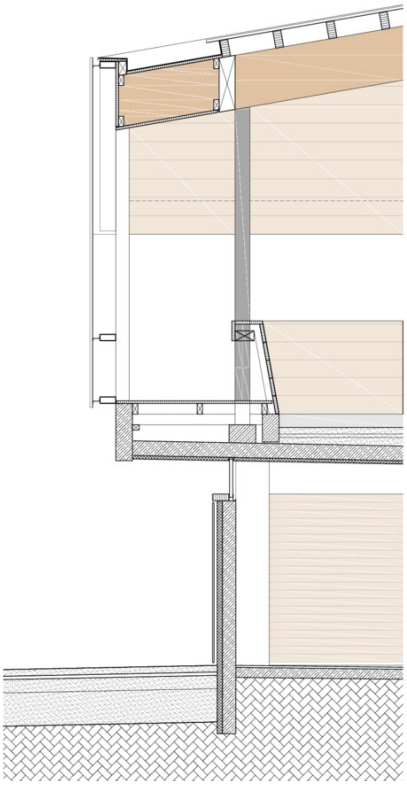


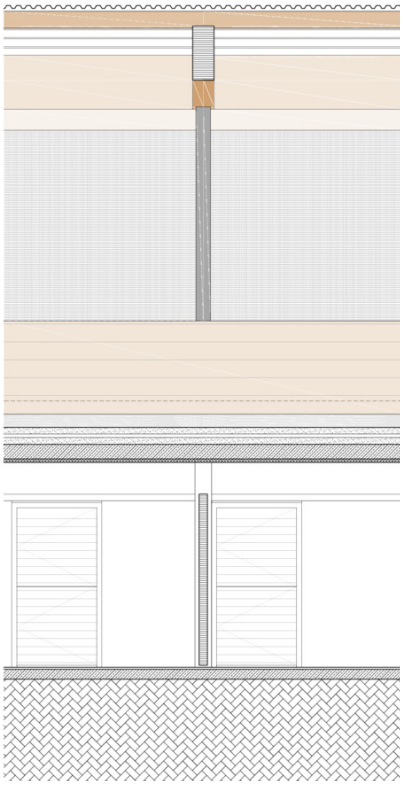


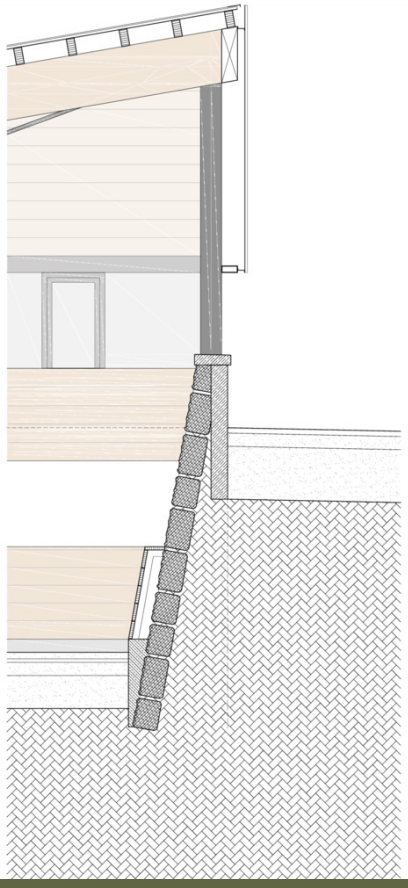


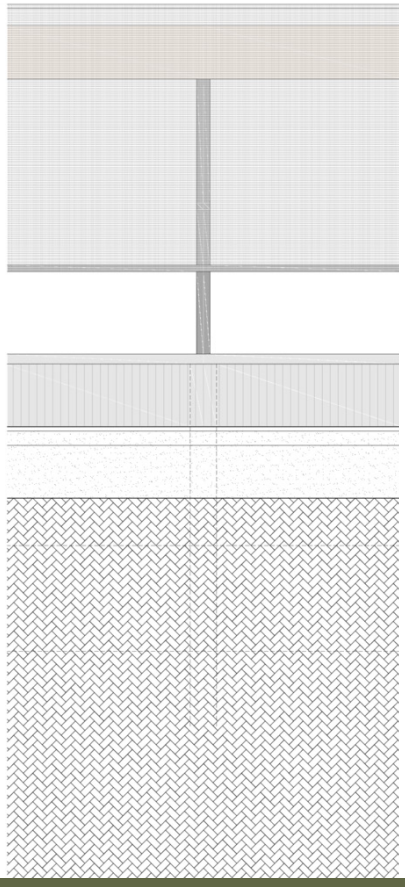
PRECEDENT

REITARENA STUBAI







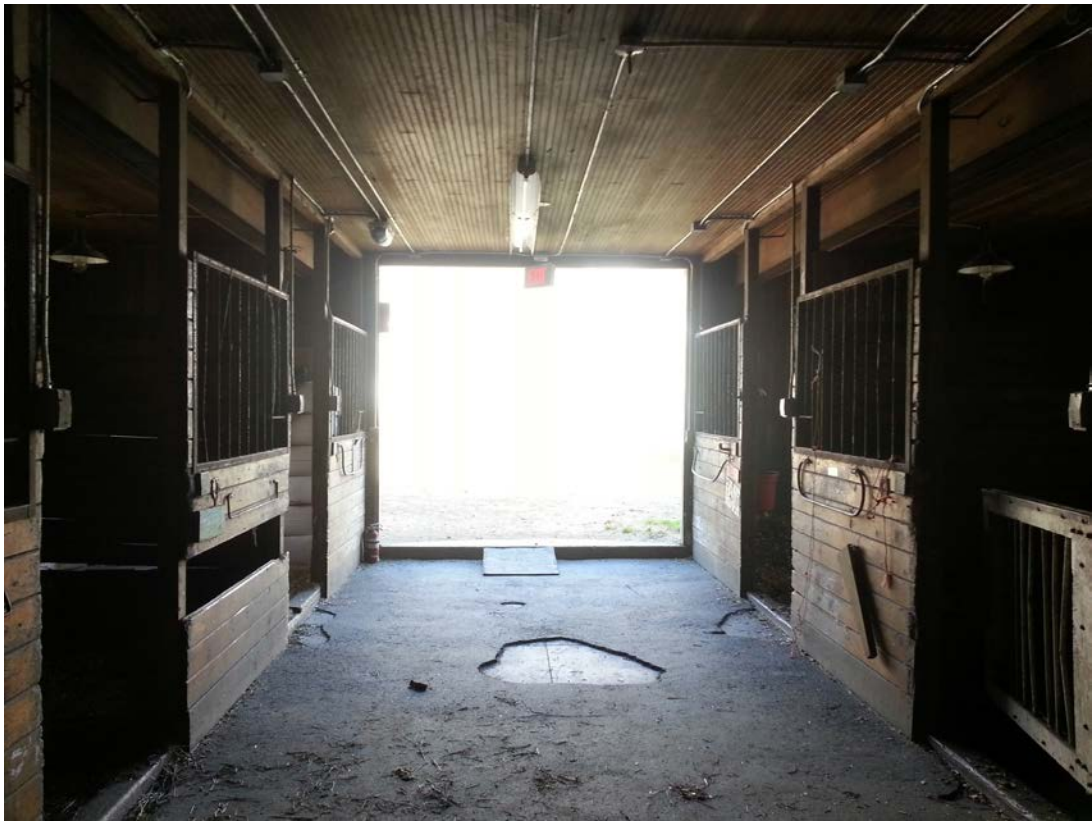


Architects: AO Architekten
Location: Fulpmes, Austria
Architect: AO Architekten
Project Year: 2011
Photographs: Peter Fiby

PRECEDENT

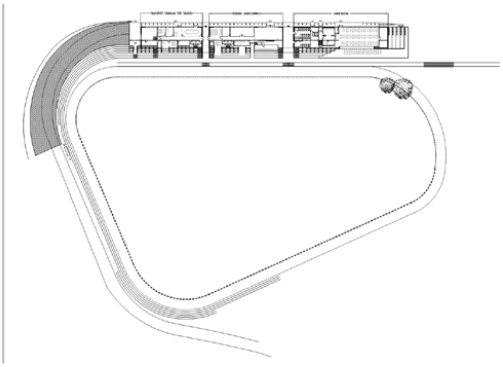
THE GLEN FARM

Architects: Unknown
Location: Portsmouth, Rhode Island, USA
Landscape Architect: Frederick Law Olmstead



LE GRAND STADE

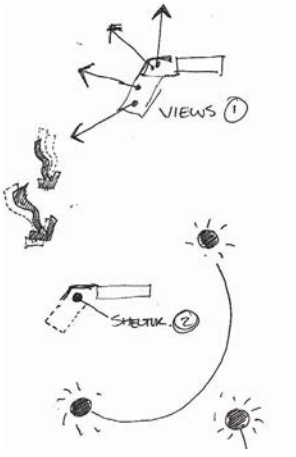
Major influence came from this project by Joly & Loiret in regards to geometries. While they drew influence from the traditional hippodrome, the path of the track inspired a similar geometry that would use the path of the sun to aid the riders. The smallest of the turns was oriented to minimize the distraction to riders. The relation to the natural topography informed the radial patterns of the turns which was important to the site in Ellenville, NY as well.



GEOMETRY

VISITOR CENTRE

Site orientation was a concern of the architect as the visitor center had to be placed on the site that allowed for the most optimal views and shade. Since the site in Ellenville is sloped, there are opportunities for great views south. While the sun is good for its natural heat during the winter, the summer sun could be detrimental to the housing of horse. The visitor center uses the focus of shelter corresponding sun orientation to provide ample space away from the sun. Roof structure and orientation were influenced from this project.

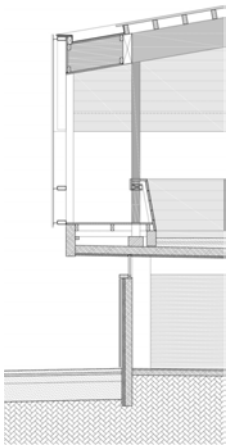


ORIENTATION

PRECEDENT

REITARENA STUBAI

This horse arena in Austria was similar in site nature to the site of this project as there was sloped land with program that required flatter terrain. The solution here was to stack program to minimize site deformation and take advantage of natural elevation levels. Reitarena Stubai places the stalls for the horses underneath the covered arena. This also creates a unique experience on the path of travel for the horses to the spaces where they practice.



ORGANIZATION

THE GLEN FARM

The Glen Farm is where Roger Williams University students practice on the Equestrian team. I had the pleasure to visit and tour the site, noticing that there was very similar program on site which the client desired. The layout of the paddocks were an inspiration in terms of their layouts. One of the barns had been suited for cattle with private outdoor stalls attached to the indoor stalls. The client wished to have these for easy release of the horses on days of nice weather. The rural masterplan also helped shape some of the sequences that I had designed for the site in Ellenville, NY.

PROGRAM

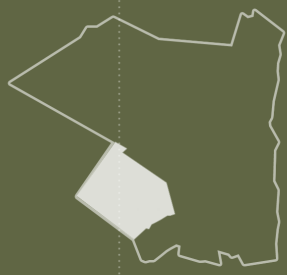
ANALYSIS

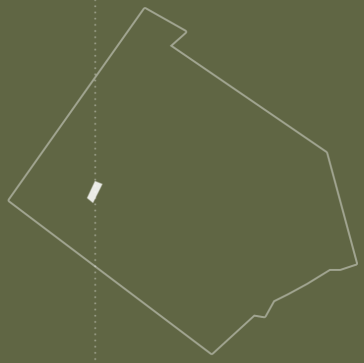
PRECEDENT:	LE GRAND STADE	VISITOR CENTRE
ARCHITECTURE	Low profile, landscape intergrated buildings with contemporary style.	Folly styled pavilion with geometric gestures.
SITING	Lateral procession of space, front to back. Wide set site with parking on front side.	Situated at entry of site as a focal point for trails. Serves as an welcome facility for the site.
CLIMATE	Seasonal changes with cold winters and hot summers.	Very harsh summers, mild winters. Need shelter from sun during summer months.
MATERIALS	Mainly wood finishes with earth as a medium. Outdoor benchs blend into hillside.	Wood slats with concrete walls. Encased with glass curtain walls.
TOPOGRAPHY	Differentials in terrain, ameliorated by bridges and overlapping paths.	Flat site at building, rest of site is sloping land for trails.
LAYOUT	Large property with more public areas streetside and guest areas secluded.	Sparse use of land to preserve nature aspects. Few structures located at arrival of site.
PARTI	Blending of building and landscape, seamless flow of nature and architecture.	Welcoming gesture for arriving guests.
CIRCULATION	Incremental circulation paths, very horizontal once in main spaces.	Simplistic in and out circulation, most space is outdoors.

PRECEDENT

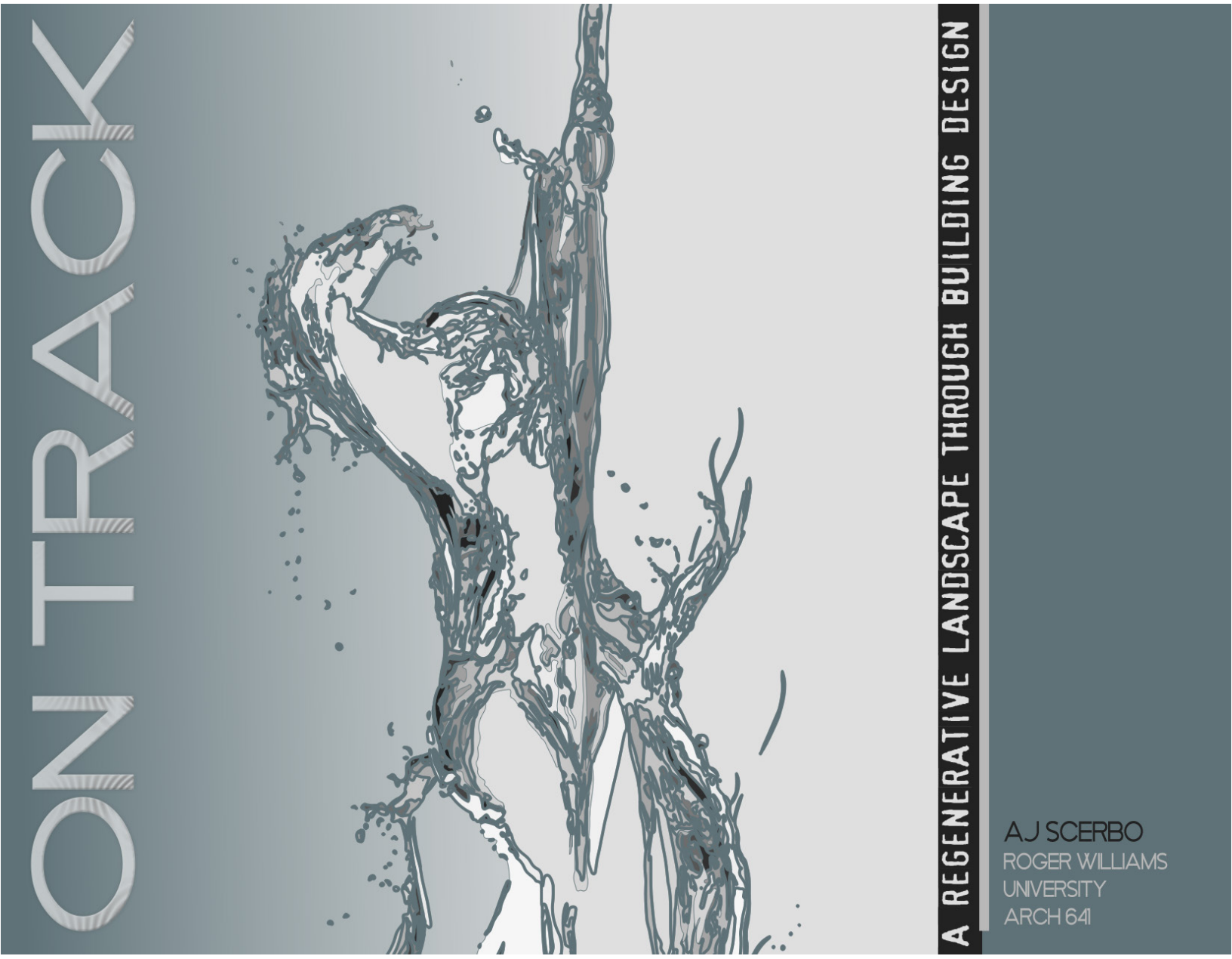
REITARENA STUBAI	THE GLEN FARM	: PRECEDENT
Contemporary style with a very clean finish. Less agriculture, and more of a business show.	Large stonewall buildings with coastal architectural influence.	ARCHITECTURE
Grouped together toward front of site. Use terrain challenge as advantage for layout practice.	Situated away from the main road, and down the a private road away from the residence.	SITING
Very cold winters, mild summers. Country side air benefits.	Cold wet winters, hot breezy summers. Humid conditions year round.	CLIMATE
Wood encased steel members with a concrete foundation. Some walls use stone at base.	Stonework for buildings. Wood and metal for outdoor stalls.	MATERIALS
Differentials in terrain, ameliorated by bridges and overlapping paths.	Slightly sloping terrain. Gradual enjoy for horses given natural conditions.	TOPOGRAPHY
Stacked program with stables below and arena on top. Stepped levels of program.	Barn facilities organized around current parking lot. Small walk to polo field.	LAYOUT
Rectangular blocks placed on a sloped site. Arena plays off slope with roof and section.	Impressive barn structure for a wealthy patron.	PARTI
Staggered circulations, different paths at different elevations with few links between	Circuituous but grouped in one area. Outdoor transitions.	CIRCULATION

ANALYSIS





SITE IDENTIFICATION



PREVIOUS THESIS TITLE PAGE

SITE SELECTION

This site was primarily selected based upon the natural events of the area, having been affected by the recent disasterous hurricanes that affected the northeast. The property spans from the road down to Cape Pond which experienced a change in water level due to a dam breaking and letting water out. The original intent of this project was to create an architectural typology within the landscape that would help restore the natural water systems on and off site as responsive architecture. This changed once a better problem facing equestrian facilities rose.

ELLENVILLE MUCH ALARMED.

ITS CITIZENS AFRAID THAT THE CAPE POND RESERVOIR WILL GIVE WAY.

MIDDLETOWN, N. Y., June 15.—The inhabitants of the neighboring village of Ellenville are greatly alarmed lest they may be overtaken by a disaster similar to that which destroyed Johnstown, and indeed their situation seems to be a critical one. Their neat and thrifty little village of about four thousand inhabitants is situated in a narrow valley at the foot of the Shawangunk Mountain range, through which valley flow the upper currents of the Rondout Creek and the traffic-burdened waters of the Delaware and Hudson Canal. The Beerkill Stream, one of the principal affluents of the Rondout Creek, is a mountain torrent that has its rise near the Sullivan County line and flows swiftly eastward into the Rondout Creek at Ellenville.

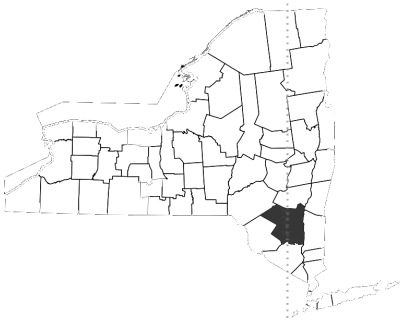
At a point two miles from Ellenville, on the Beerkill Stream, there was formerly a small natural lakelet, known as Cape Pond. Some years ago the Delaware and Hudson Canal Company bought the pond, and, by building a dam 430 feet long at the outlet, enlarged the body of water to a lake covering 300 acres, thus converting Cape Pond into a large storage reservoir for the canal, to be drawn upon when ordinary resources fail.

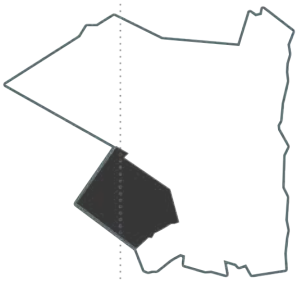
The alarmed citizens of Ellenville have united in a petition to the officials of the Delaware and Hudson Canal Company asking for the removal of the dam. They illustrate the peril of the situation by the statement that whereas the Conemaugh dam was 14 miles distant from Johnstown and only 300 feet above the natural level of the river, the Cape Pond dam is within 2 miles of their doors and is 900 feet above the level of their valley.

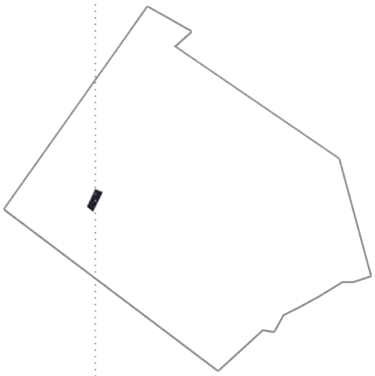
The dam which threatens their destruction, they say, is an old and leaky wooden structure that is seen to be utterly unsafe at a glance. The danger which imperils their lives and property also imperils the lives and property of thousands of others in the narrow valley of the Rondout Creek below them.


638 ft


Ulster Heights Rd
52
Ulster Heights Rd
Dover Rd
Brandy Brook
Cape Rd
52
Irish Cape Rd
Irish Cape Rd
Irish Cape Rd
Kortright Rd
Irish Cape Rd





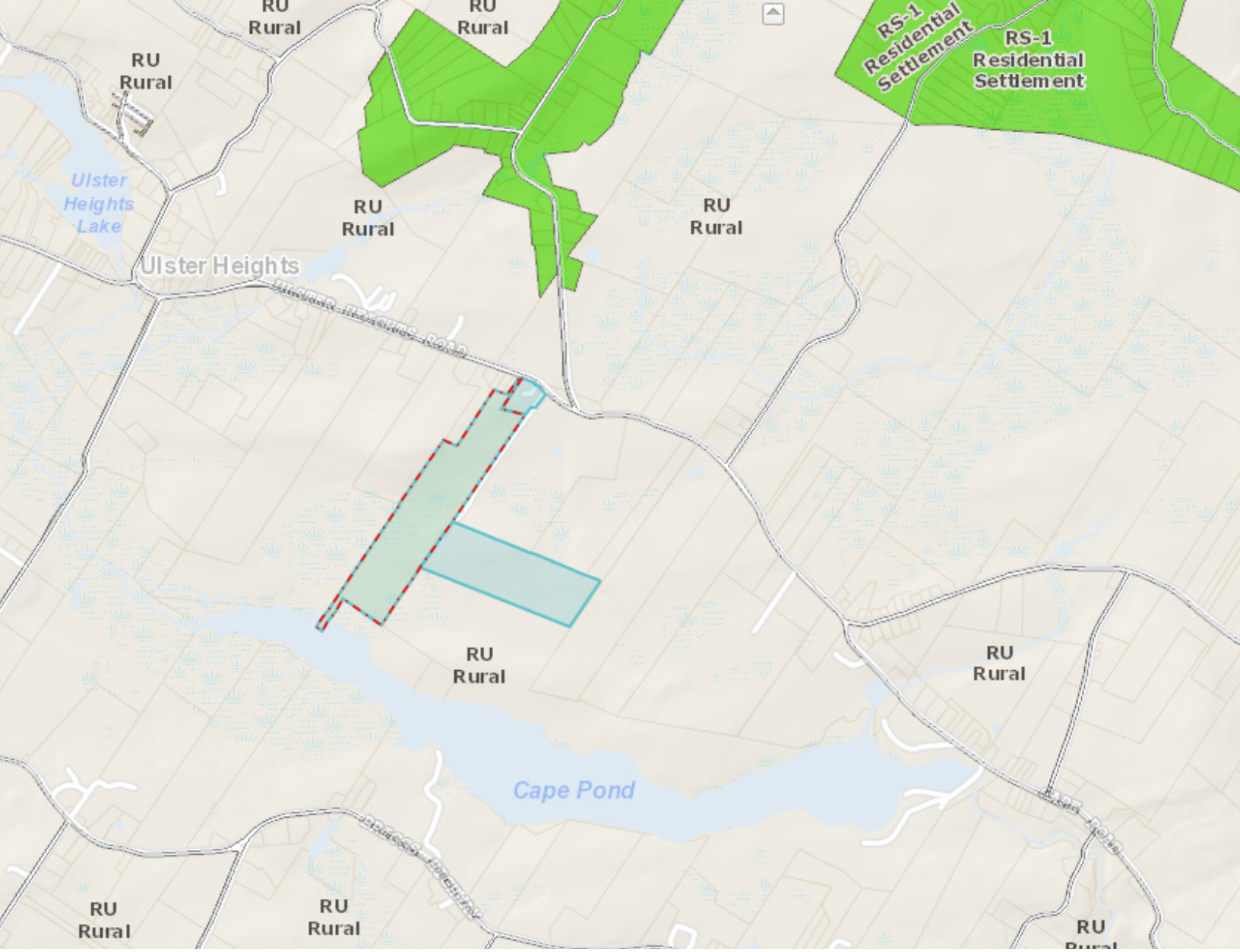


SITE LOCATION

Situated within Ulster County outside the town center of Ellenville, New York, the selected site is nestled within an undulating landscape. The property is long from a north to south orientation, with the main used portion of the site located on Ulster Heights Road containing two access points. The current owners of the estate are those involved in the equine business, ferrying in particular (the application of horse shoes). The site had recently been affected by Hurricane Irene in 2011.

ZONING & BUILDING CODES

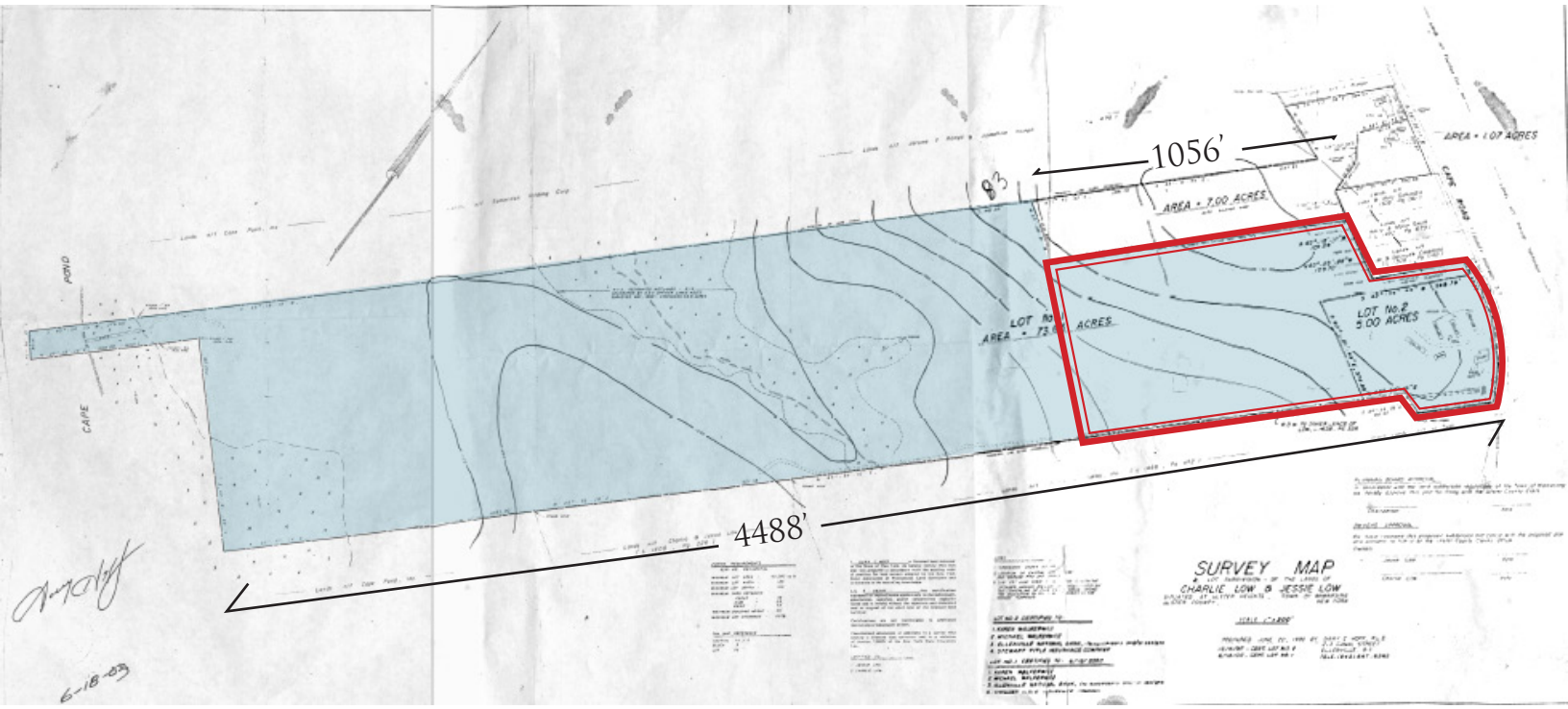
The most important part of building code for this particular project are the chapters on fire detection and suppresion due to the animals and shelters involved. Though not entirely needed, this project followed International Building Code with the added accessibility parameters set forth by the American Disability Act for those areas pertaining to site guests and potential temporary residents.



Through phone discussions with the Ulster County Planning Department and information provided by their website, it was gained that the site falls within a rural property class. The use of land for equestrian facilities falls within the approved building codes as long as all buildings are built within the correct fashion of achieving permits prior to construction. The only concerns Ulster County issued whilst on the phone was if the facility would need off-site parking, which was not applicable to this project. All properties owned fall within the Rural class and are able to be built upon for equestrian use.

Status: Active
Roll Section: Taxable
Swis: 515689
Tax Map ID #: 74.3-3-36.100
Property Class: 322 - Rural vac>10

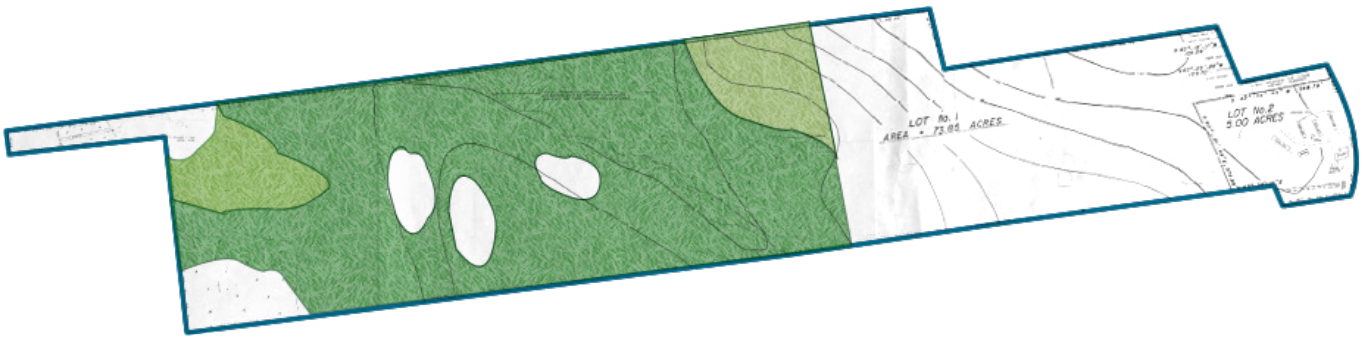
Site: RES 1
In Ag. District:No
Site Property Class: 322 - Rural vac>10
Zoning Code: -



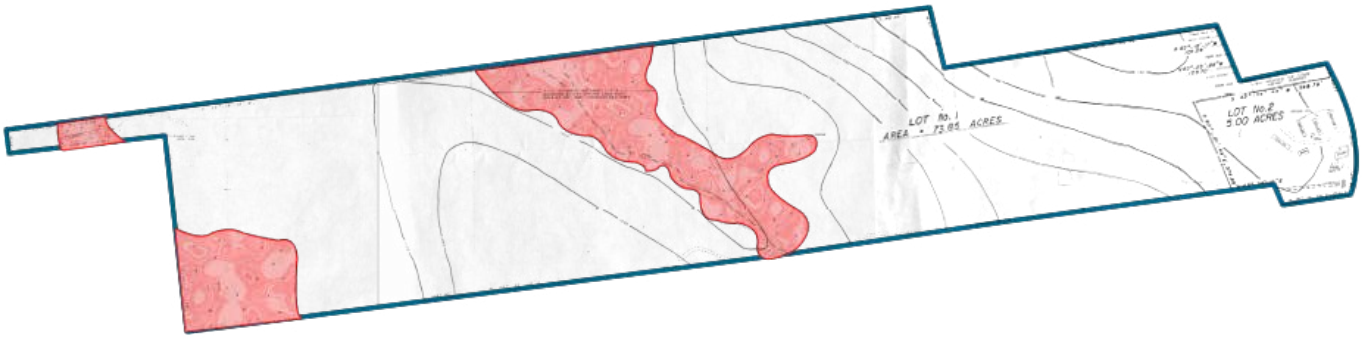
SITE CONDITIONS

The site spans from an elevated road at the north end to a lower wetland near the south. The site itself is situated on a series of three sloped conditions, one of which affects the main portion of the site; however, the current property owner has already started constructing a retaining wall in the northern slope. The different elevations may allow for different building levels to integrate into the site and become earth sheltered depending on the chosen program for that area.

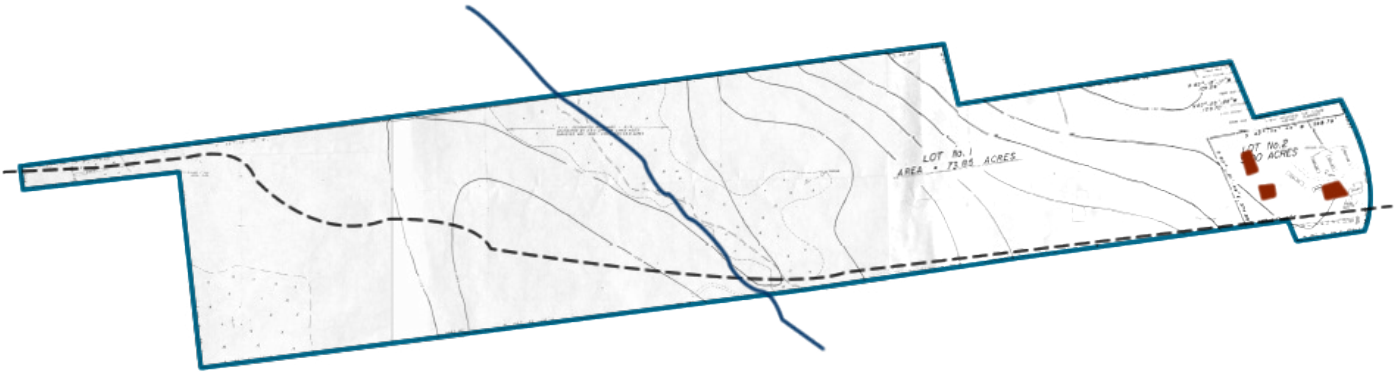
DEDICATED LANDS



WETLANDS



EXISITING CONDITIONS



WETLANDS

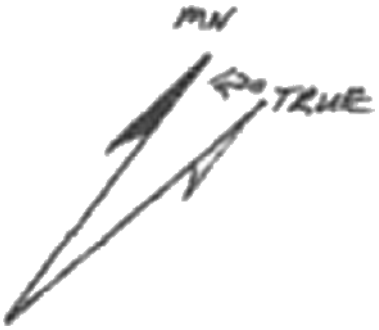
DEDICATED WOODS (T1)

DEDICATED WOODS (T2)

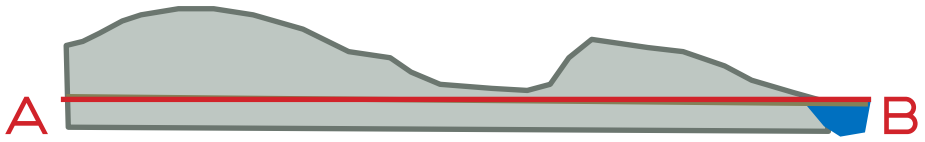
STONE WALL

STREAM

EXISITING STRUCTURES




A
SLOPE DOWN
SLOPE DOWN
SLOPE DOWN



TOPOGRAPHY

A majority of the site is sloped from the northwest down to the southeast, however, there is a small flat land area where the clients have already started some work to make a practice area for the horses. Site slope was a major concern while designing this project, making sure that the natural watershed pattern was maintained or improved for the better. The building designs incorporated the natural topography to both aid in horse care as well as landscape maintenance.

SITE PHOTOS

A

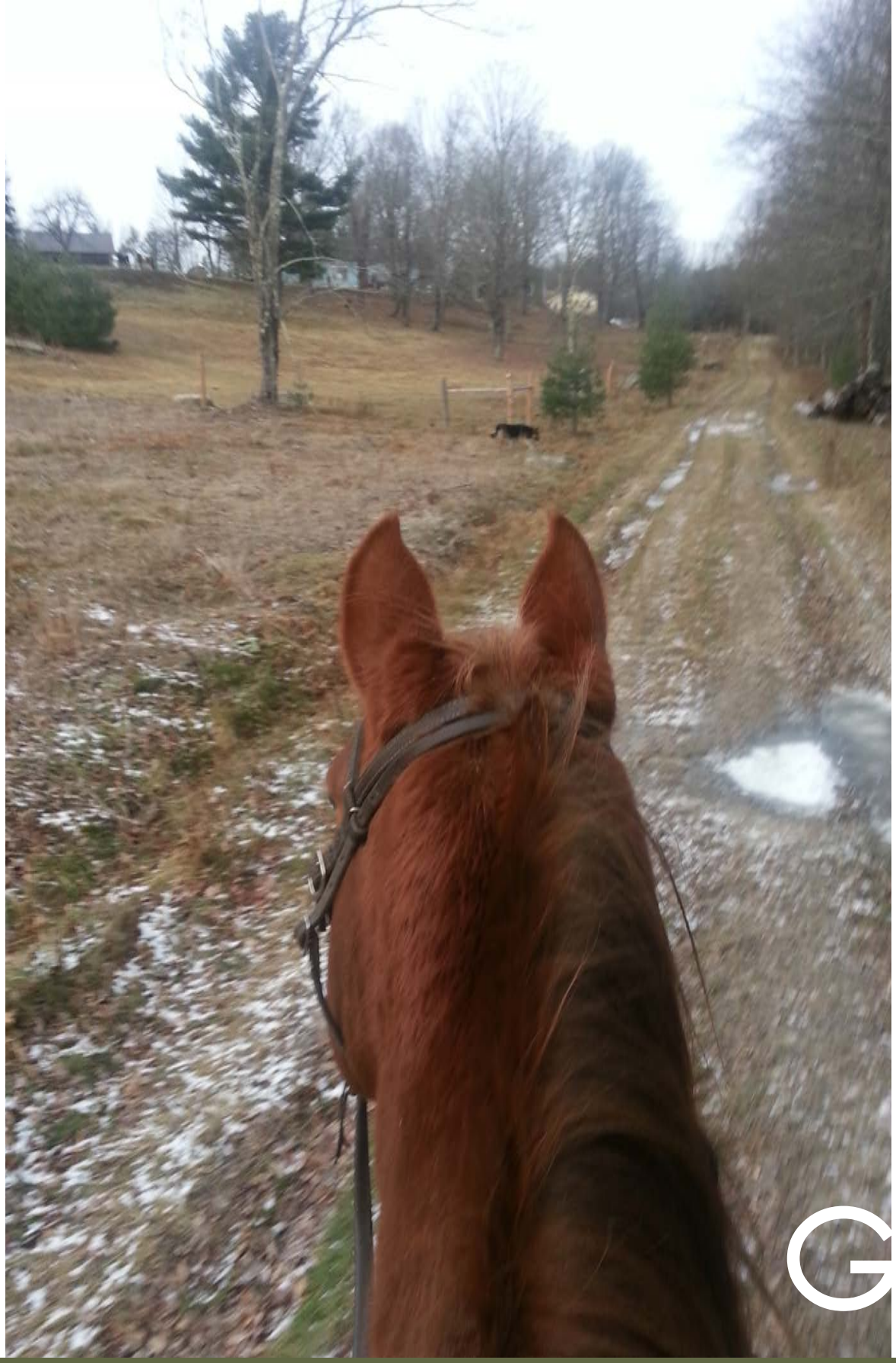
B

C

D

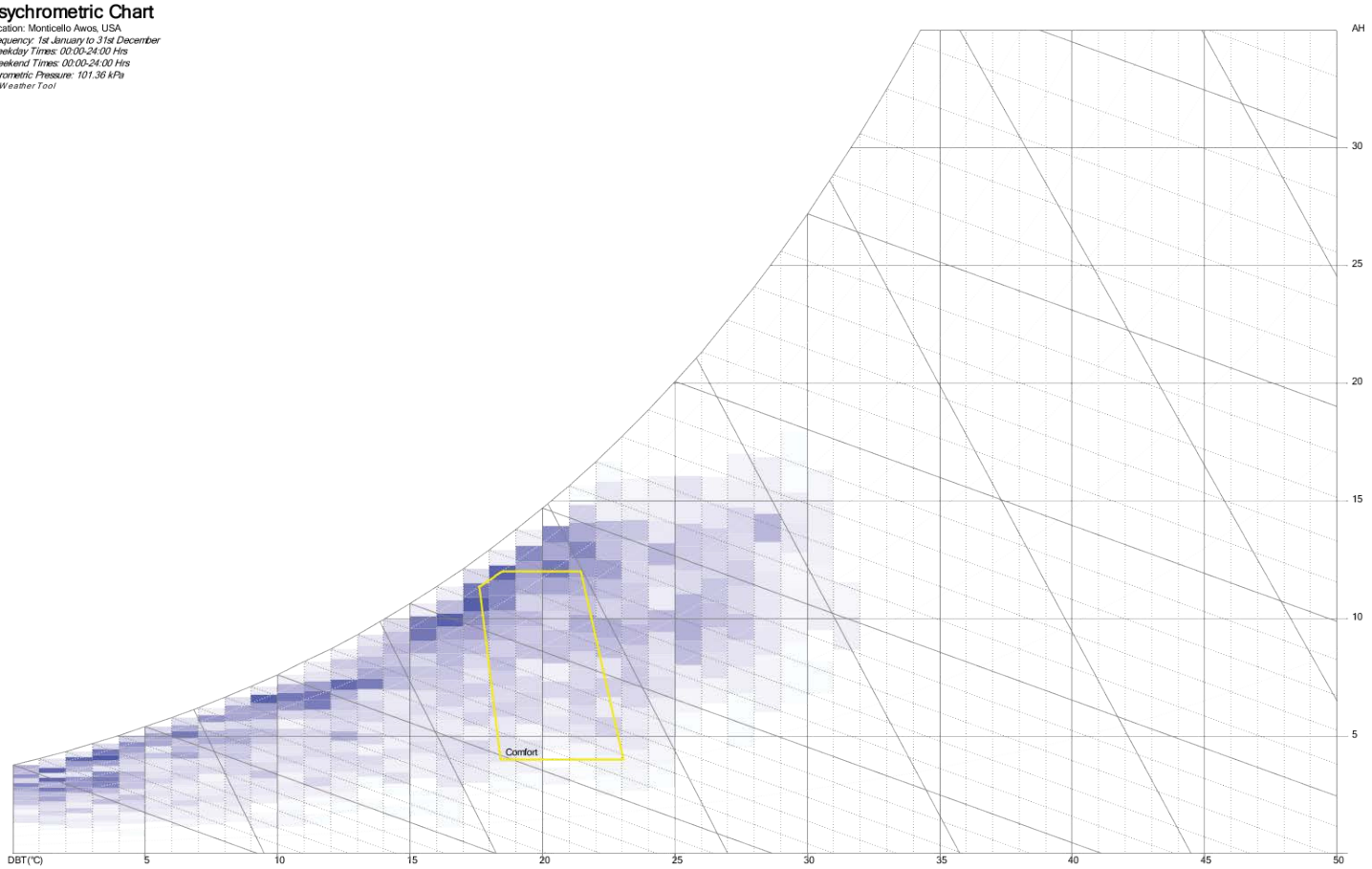
E

SITE PHOTOS



Psychrometric Chart

Location: Monticello Awos, USA
Frequency: 1st January to 31st December
Weekday Times: 00:00-24:00 Hrs
Weekend Times: 00:00-24:00 Hrs
Barometric Pressure: 101.36 kPa
© Weather Tool



COMFORT LEVELS

The level of human comfort within this chart displays a need to primarily heat the facilites as most of the data suggests cold temperatures. Due to the nature of the activity on the site, the comfort level would change from the graphed sedentary condition to a more active condition; however, the sedendtary portion provides ample analysis of the basic conditions. Most of the facilites will be outdoor related which poses an interesting issue about heat especially.

Prevailing Winds

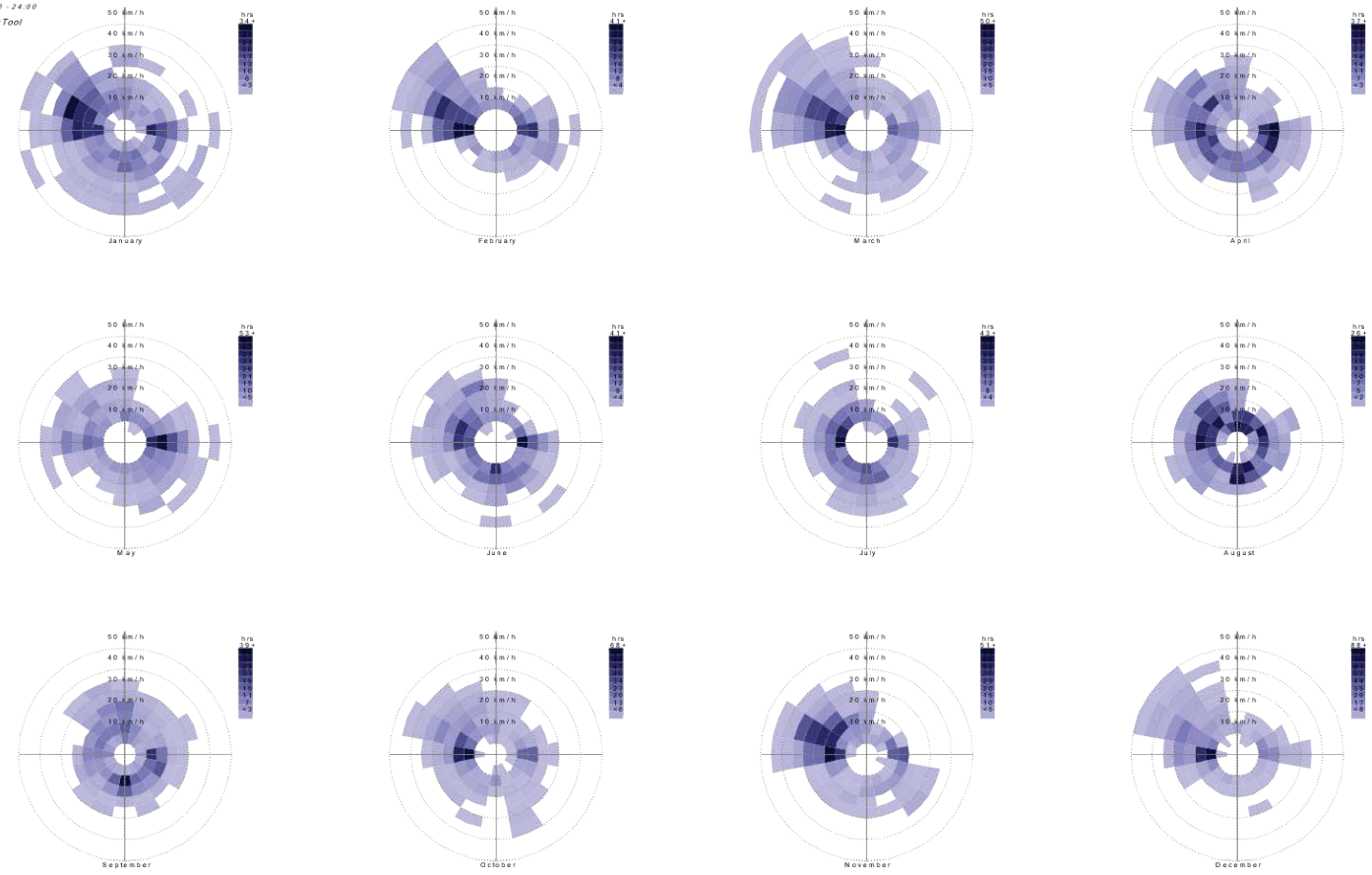
Wind Frequency (Hrs)

Location: Monticello Awos, USA (41.7°, -74.8°)

Date: 1st January - 31st December

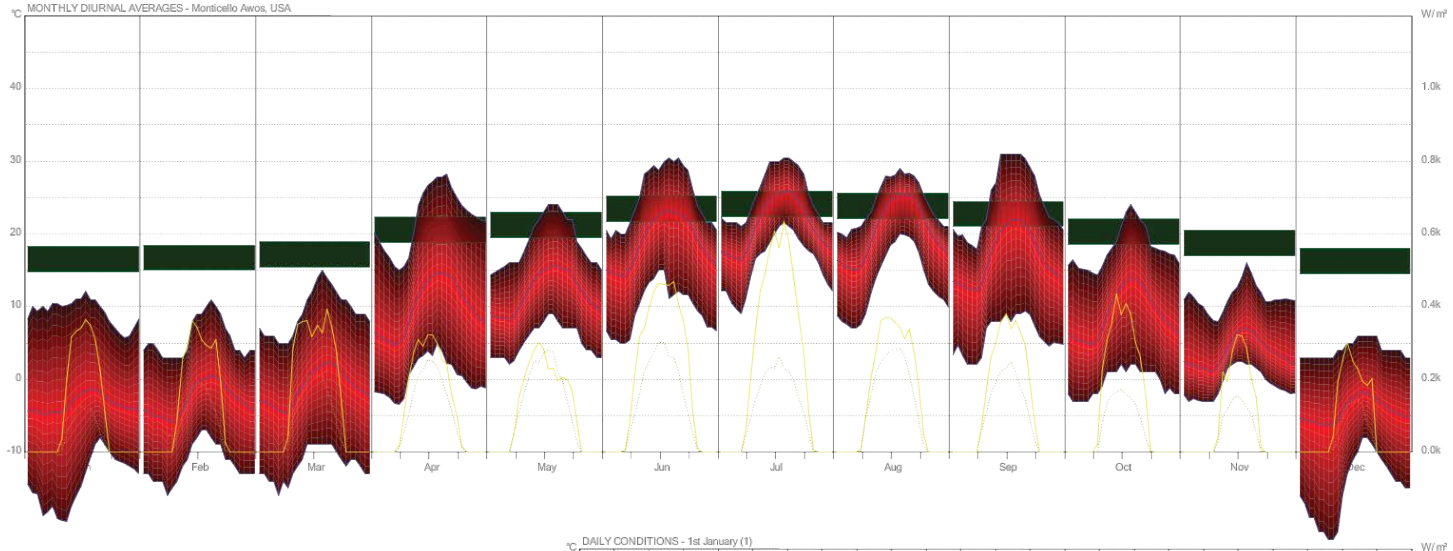
Time: 00:00 - 24:00

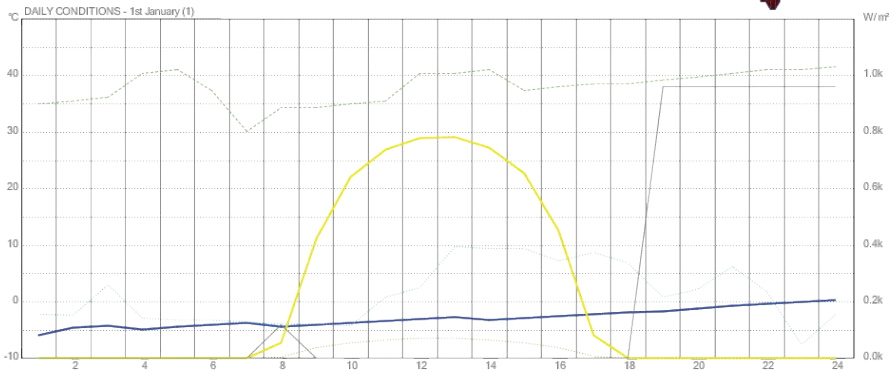
© Weather Tool

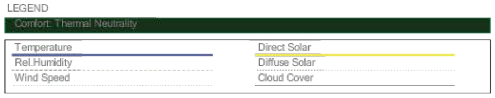


WIND ANALYSIS

According to the wind roses, there are strong winter winds that arrive from the west which would suggest an importance in structure bearing conditions from that direction, as well as, tactics to mitigate such winds for more comfortable outdoor conditons during winter operations. The stronger winds in the summer months arrive from both the south and the east, which may allow for passive cooling systems to be incorporated into the project.

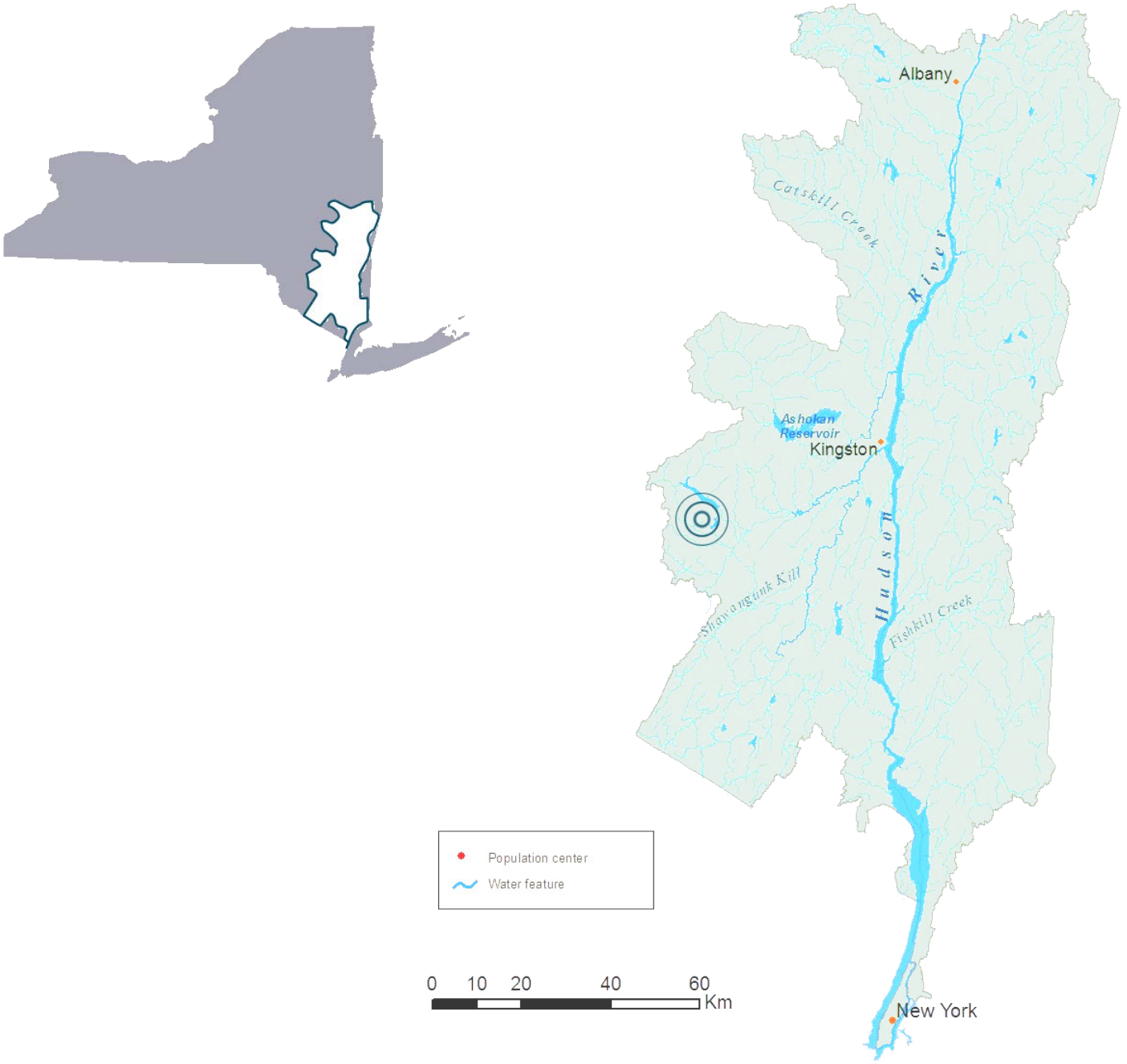

MONTHLY DIURNAL AVERAGES - Monticello Awos, USA
°C
W/m²
40
30
20
10
0
-10
1.0k
0.8k
0.6k
0.4k
0.2k
0.0k
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


DAILY CONDITIONS - 1st January (1)
°C
W/m²
40
30
20
10
0
-10
1.0k
0.8k
0.6k
0.4k
0.2k
0.0k
2
4
6
8
10
12
14
16
18
20
22
24


LEGEND
Comfort: Thermal Neutrality
Temperature
Rel.Humidity
Wind Speed
Direct Solar
Diffuse Solar
Cloud Cover

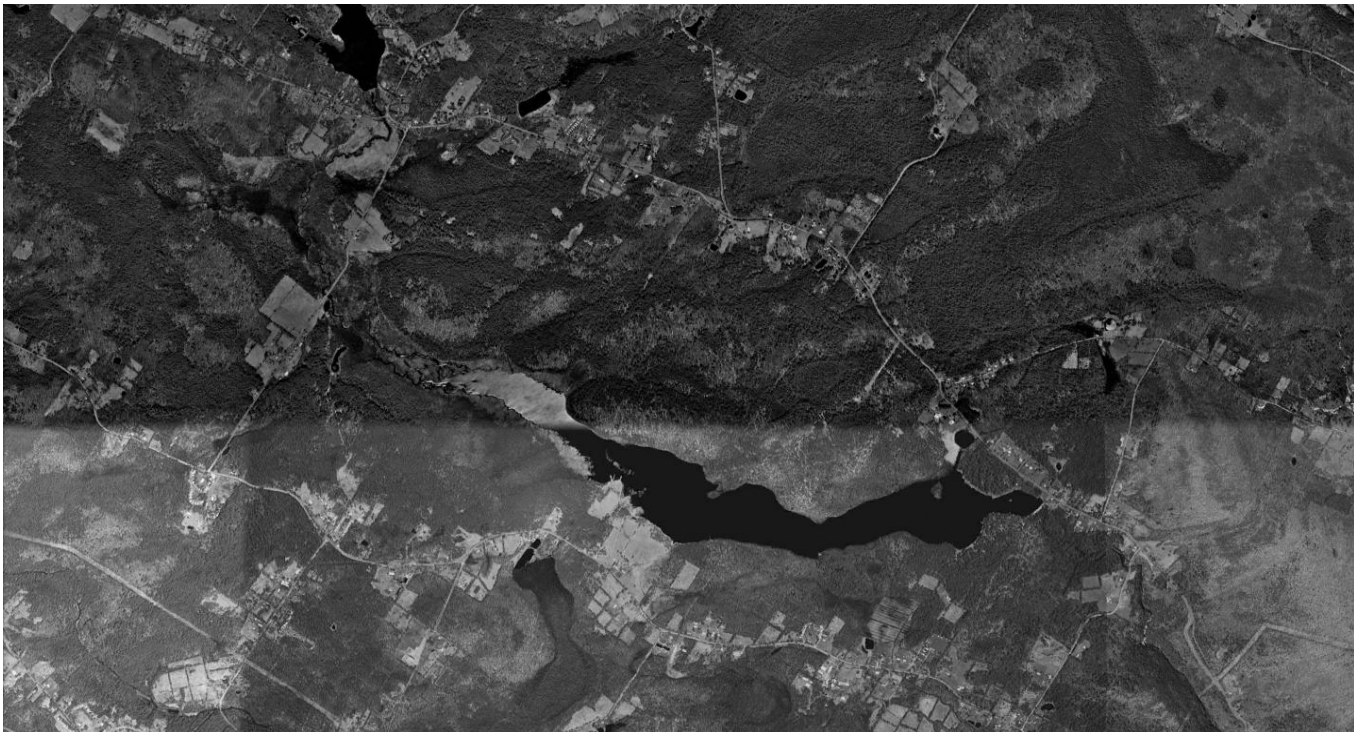
MONTHLY AVERAGES

Data drawn from the adjacent charts inform mulitple facets of the site. The ranges depicted in red allow for an understanding of the range in temperature over each day of the year, showing cold winters and hot summers.The seasonal changes shall be important in the selection of building technologies as well as mechanical systems. Each month displays a manageable level of solar radiation which can be harvested via sustainable technologies and help operate the facility.



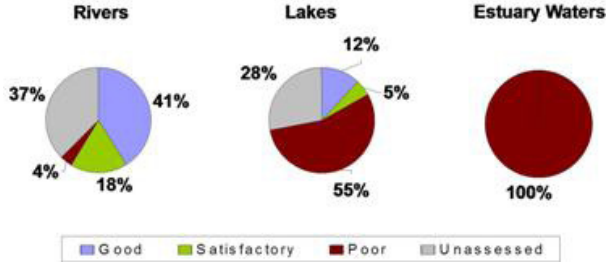
WATERSHED

Water runoff in this area primarily filters through the ground to the Hudson River; however, there is a pond to the south of the site which collects most of the stormwater runoff directly from the site. Currently, the pond is at a low water level due to the recent storm that damaged a nearby dam and caused the water level to change. Satellite imagery from Google show the conditions before and after.



APRIL 1994

SEPT 2013



Good water quality: Fully supports designated activities and uses

Satisfactory: Fully supports designated activities, but with minor impacts

Poor (Impaired): does not support designated activities and uses
Unassessed: Insufficient data available

SCRIBA

PARENT MATERIAL: Loamy till dominated by sandstone, with lesser amounts of limestone and shale
NATURAL DRAINAGE CLASS: Somewhat poorly drained
AVAILABLE WATER STORAGE IN PROFILE: Very low (about 1.2 inches)

MORRIS

PARENT MATERIAL: Loamy till derived from reddish sandstone, siltstone, and shale
NATURAL DRAINAGE CLASS: Somewhat poorly drained
AVAILABLE WATER STORAGE IN PROFILE: Very low (about 1.3 inches)

LACKAWANNA

PARENT MATERIAL: Loamy till derived from reddish sandstone, siltstone, and shale
NATURAL DRAINAGE CLASS: Well drained
AVAILABLE WATER STORAGE IN PROFILE: Very low (about 2.4 inches)

SWARTSWOOD

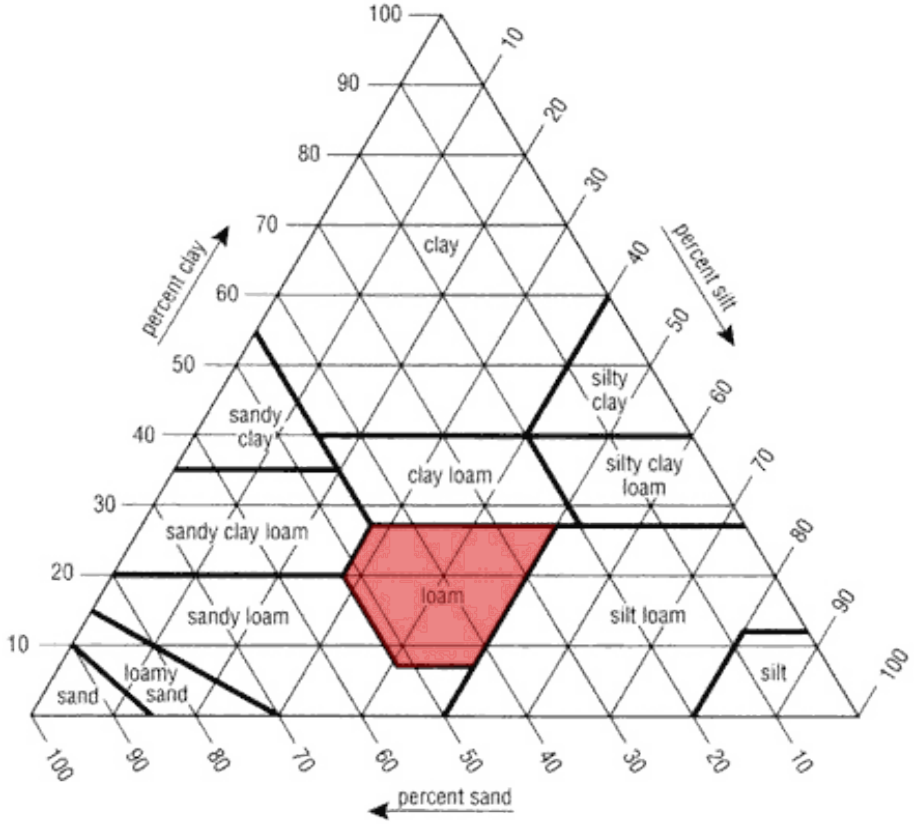
PARENT MATERIAL: Loamy till derived mainly from quartzite, conglomerate, and sandstone
NATURAL DRAINAGE CLASS: Moderately well drained
AVAILABLE WATER STORAGE IN PROFILE: Very low (about 2.0 inches)

WELLSBORO

PARENT MATERIAL: Loamy till derived mainly from reddish sandstone, siltstone, and shale
NATURAL DRAINAGE CLASS: Moderately well drained
AVAILABLE WATER STORAGE IN PROFILE: Very low (about 2.4 inches)

WURTSBORO

PARENT MATERIAL: Loamy till derived mainly from acid quartzite, conglomerate, and sandstone
NATURAL DRAINAGE CLASS: Moderately well drained
AVAILABLE WATER STORAGE IN PROFILE: Very low (about 2.3 inches)



SCRIBA / MORRIS - VERY BOULDERY SOILS, GENTLY SLOPING

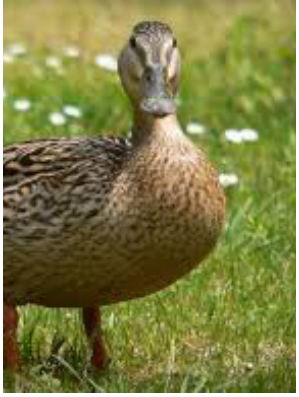
LACKAWANNA / SWARTSWOOD - VERY BOULDERY SOILS, MODERATELY STEEP

WELLSBORO / WURTSBORO - VERY BOULDERY SOILS, GENTLY SLOPING

SOIL CONDITIONS

A large portion of the site consists of gravel related soils, some more permeable than others. While it had started as a concern about site feasibility, it became a desirable feature once building locations began to be informed by the soil conditions. The well-drained areas helped the full-cycle sustainability feature built into the project. The more rocky areas became a better pad area and foundation for the main buildings on the site.

FLORA








FAUNA

VERNACULAR ARCHITECTURE

Most of the architecture within the area is not well maintained or immense in structure. Majority of the surrounding context is similar to what is on site with small residences; most bungalow style or ranch style in nature. Mostly toward the Village of Ellenville there are more rowhouse style store-fronts and a handful of apartments. More common are the surrounding camping sites for those of Jewish faith which lends itself to a more rustic wood construction.

MORGAN RESIDENCE

Renovated from an existing structure, this residence shows a style familiar to the area with a contemporary intervention of steel structure and metal cladding. The new entryway acts both as cover from the climate and as a water funnel to channel runoff down into the cistern below.

LOCAL ARCH.

ALBRECHT RESIDENCE

This residence is new construction that focused on the weather conditions, using styles and technologies to deal with the colder winter season. The larger glazing to the south helps the thermal mass heat the house passively while there are geothermal pumps beneath the house. The sloped metal roofs help deal with snow accumulation and dissipation. Wood siding is common in the area, along with many barn-like characteristics which were employed.

DOMUS STUDIO

NEW PALTZ, NEW YORK

CONVERSATION

In late November of 2013, I had the pleasure of visiting the site to gain insight as to the client's needs and aspirations for the land. Bryan Milewski and Jessica Deer were gracious hosts who were able to show me the extents of their property by means of walking, an all-terrain vehicle, and even as far as to place myself on horseback to truly experience the program I would be designing. The land has been owned by Bryan's father for many years, expanding to neighboring lots once they had become readily available. As seen before, the land extends beyond the focus of this project, providing ample space for trails to be created in the future. Conversation about the project continued throughout the development and planning phases as well as a few consultation moments on final design decisions.

NEEDS

It was discussed that the site would need the essentials for maintaining and operating a space for horses, ensuring they had the proper stable space as well as outside paddocks. Thus, a sensible rural master plan for the site was the first step in laying out the spaces in an efficient manner for use. The major spaces required were the stables, indoor arena and outdoor track. The existing barn on site is dilapidated in nature and not suited for many horses. A service barn would be needed to house all the equipment used to maintain the lands as well as potential storage for trailers. The largest need being a plan that would use the context of the site and its topography to minimize site work needed.

DESIRES

As for aspirations, it was mentioned that it would be a great opportunity to include areas for learning. Some temporary housing would be mutually beneficial for visiting riders, as well as students from nearby schools and universities who wish to learn about agricultural and equestrian themed proceedings. Hospitality was a common theme with the goals for the project, attempting to appease those who visit the site and allow for them to have an enjoyable and pleasant experience throughout. Creating a welcoming site plan and landscape that is not only visually appealing but also highly functional was an important consideration.

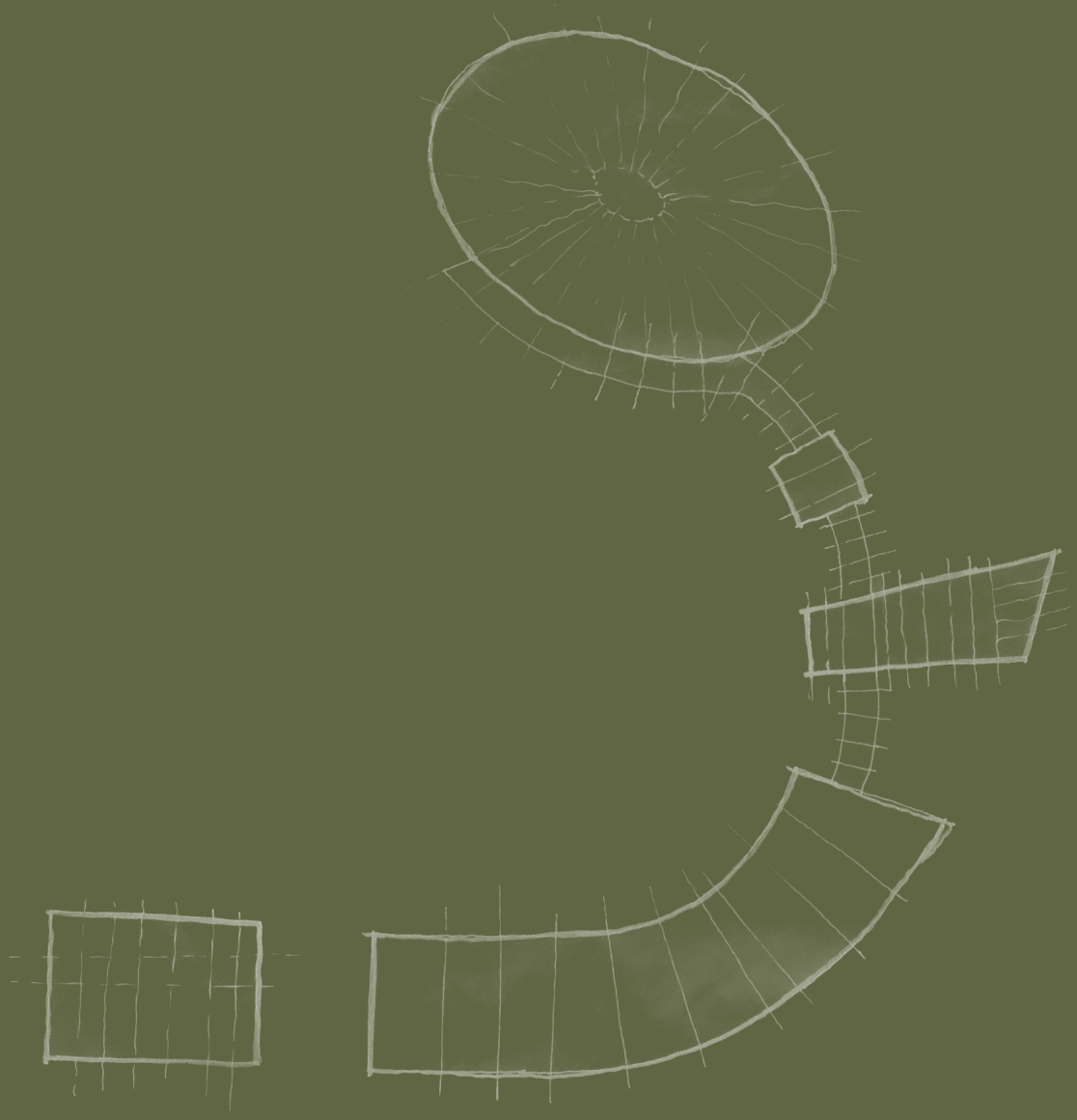
CLIENTS

BRYAN MILEWSKI

OWNER OF SILENT W HORSESHOEING

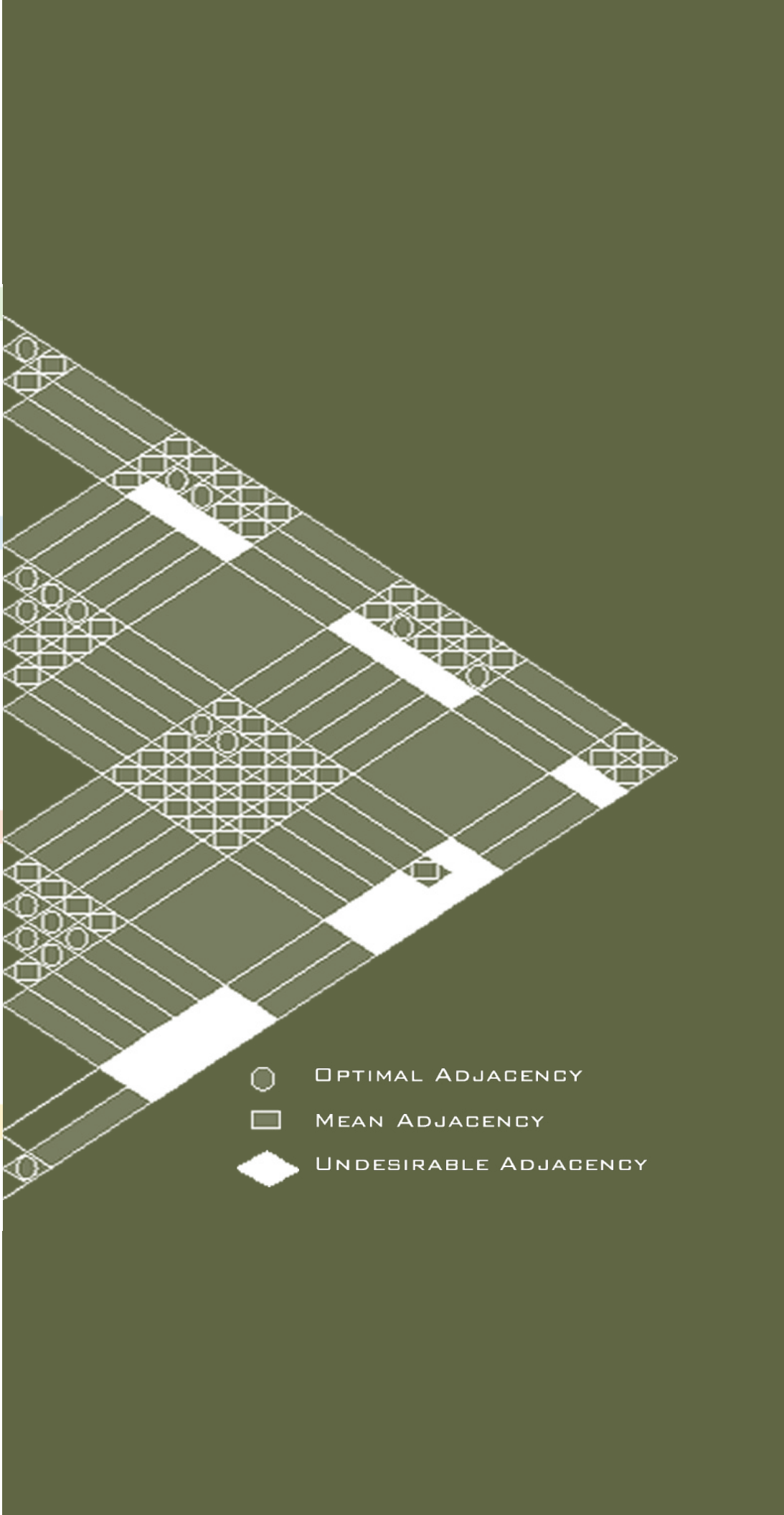
JESSICA DEER

CO-MANAGER OF SILENT W FARM
B.S. EQUINE PROFESSIONAL



PROGRAM OUTLINE & AREAS

Agriculture
Hay Fields (Quarter Rotation)
Feed Storage
Mech. Storage
Total
Equine Outdoor
Outdoor Arena
Paddock
Shelter
Trails
Training / Trott Pen
Total
Equine Indoor
Riding Arena
Stalls
Wash Room
Tack Room
Quarantine Stall
Total
Residential
3 bdr House
Car Storage



PROGRAM ADJACENIES

While laying out the masterplan of the site, it was important to consider the relationship of the program in terms of their use and their known characteristics. Site wind conditions and topography played a major role in the layout of program areas due to the nature of horses and the odors and waste they produce. Horses also need land to roam which is not too difficult to travel. Since the main objective of this project was that of efficiency, the main areas of the program were grouped together for ease of use and easy site maintenance. Some program was moved closer to the residence areas at request of the client, such as some paddock areas for injured horses so that they are closer for monitoring and care.

Equestrian Facility Program

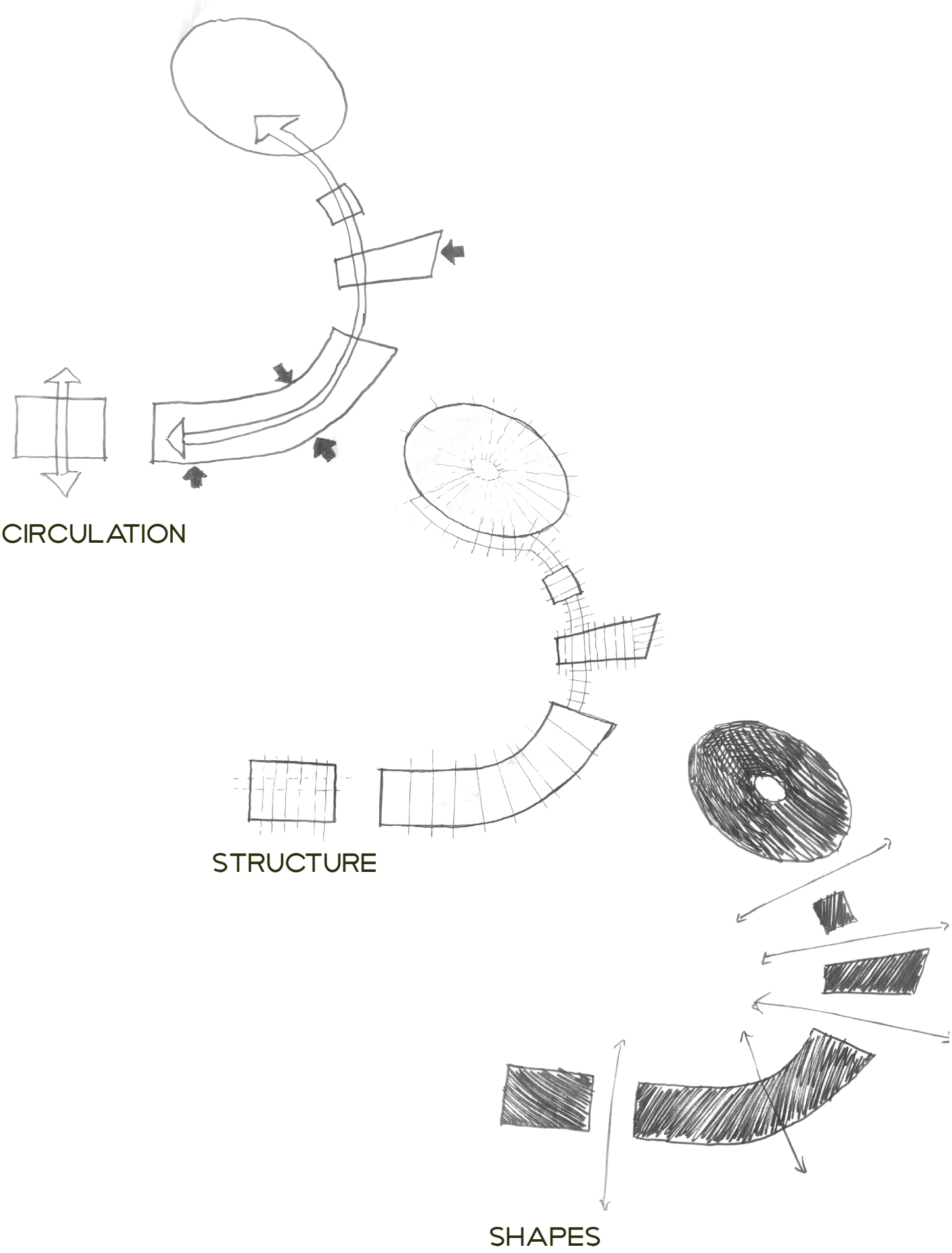
Program	SQ FT	QTY	Total
Agriculture			
Hay Fields (Quarter Rotation)	600	3	1,800
Feed Storage	500	1	500
Mech. Storage	1,000	1	1,000
Total			3,300
Equine Outdoor			
Outdoor Arena		1	
Paddock	3,000	4	12,000
Shelter	350	6	8000
Trails	2,000	4	8,000
Training / Trott Pen	500	2	1,000
Total			29,000
Equine Indoor			
Riding Arena	8,000	1	8,000
Stalls	250	12	3,000
Wash Room	400	2	800
Tack Room	300	1	300
Quarantine Stall	250	2	500
Total			12,600
Residential			
3 bdr House	1,500	2	3,000
Car Storage	450	4	1,800
Total			4,800
TOTAL			49,700

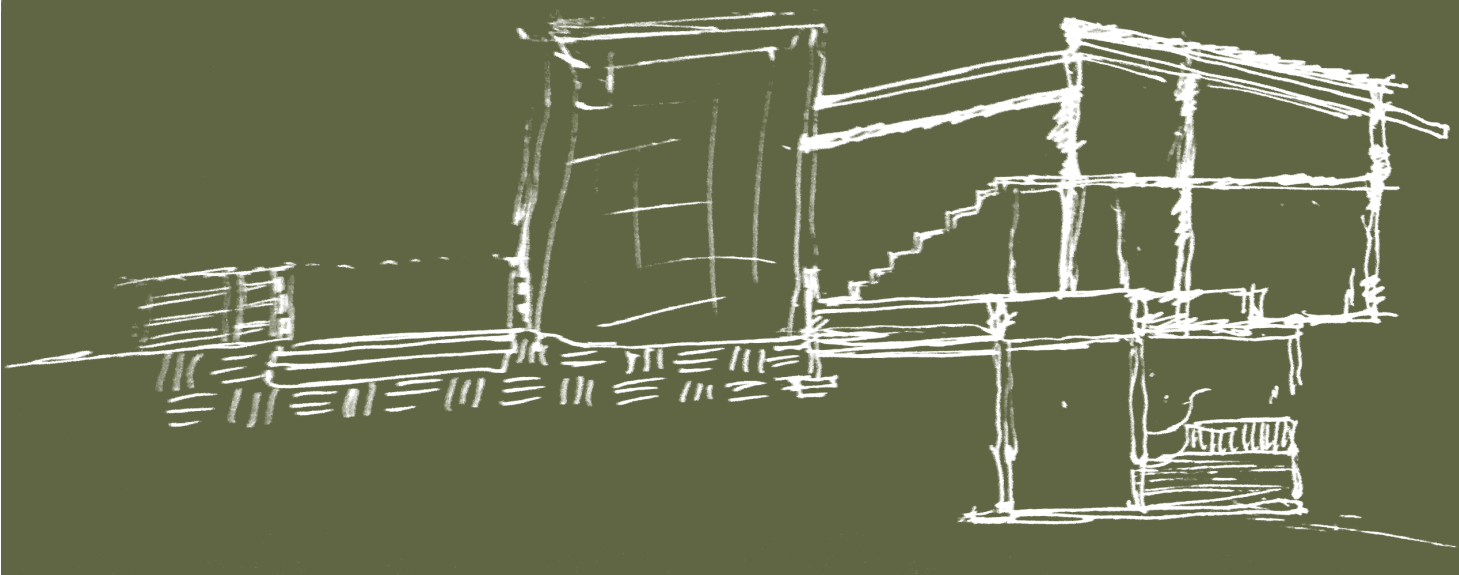

PADDOCK
PADDOCK
PADDOCK
PADDOCK
STALLS
RIDING ARENA
STORAGE
RESIDENCE
PADDOCK
PADDOCK
RIDING ARENA
PADDOCK
PADDOCK

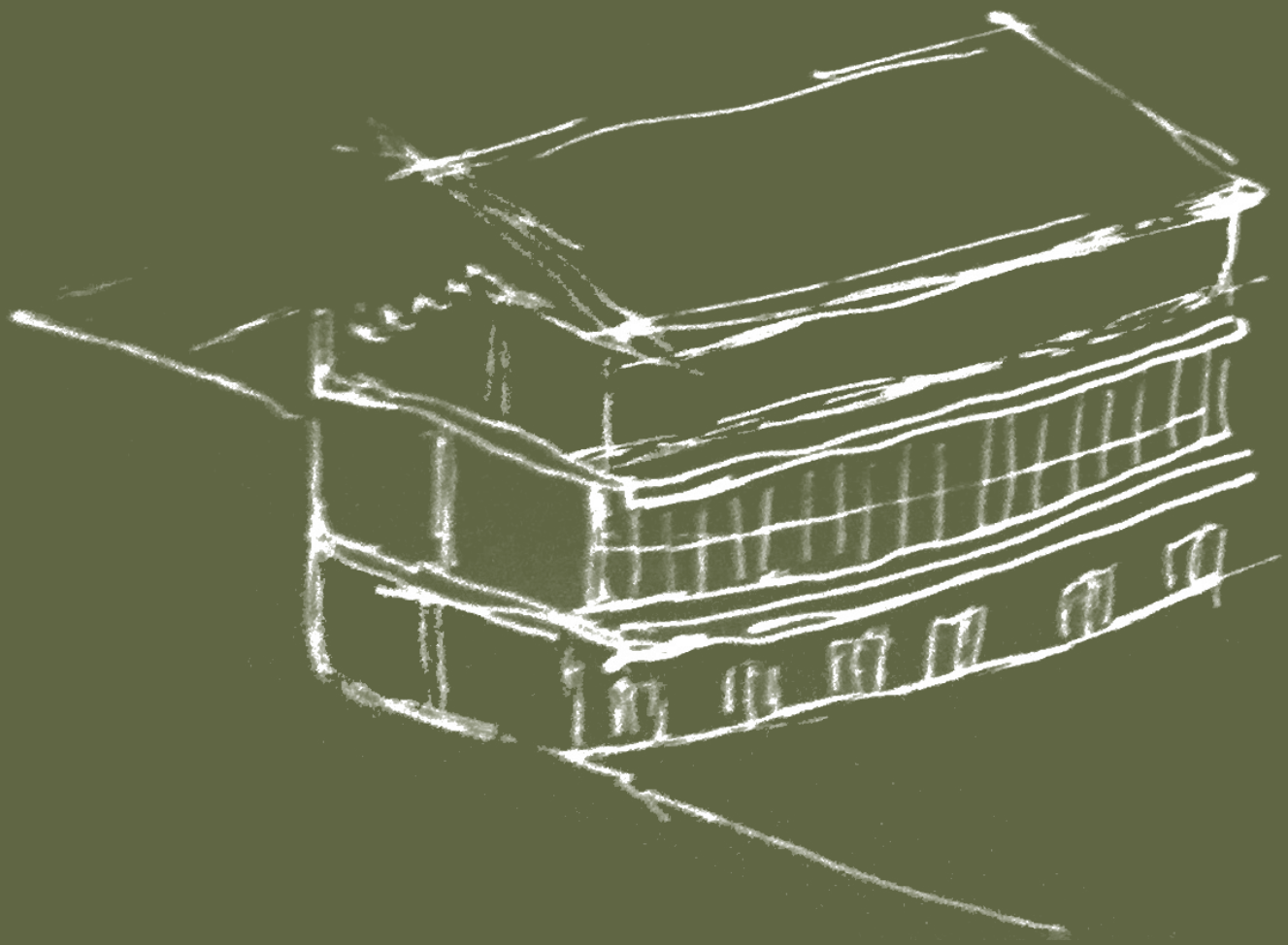
DESIGN & PROCESS

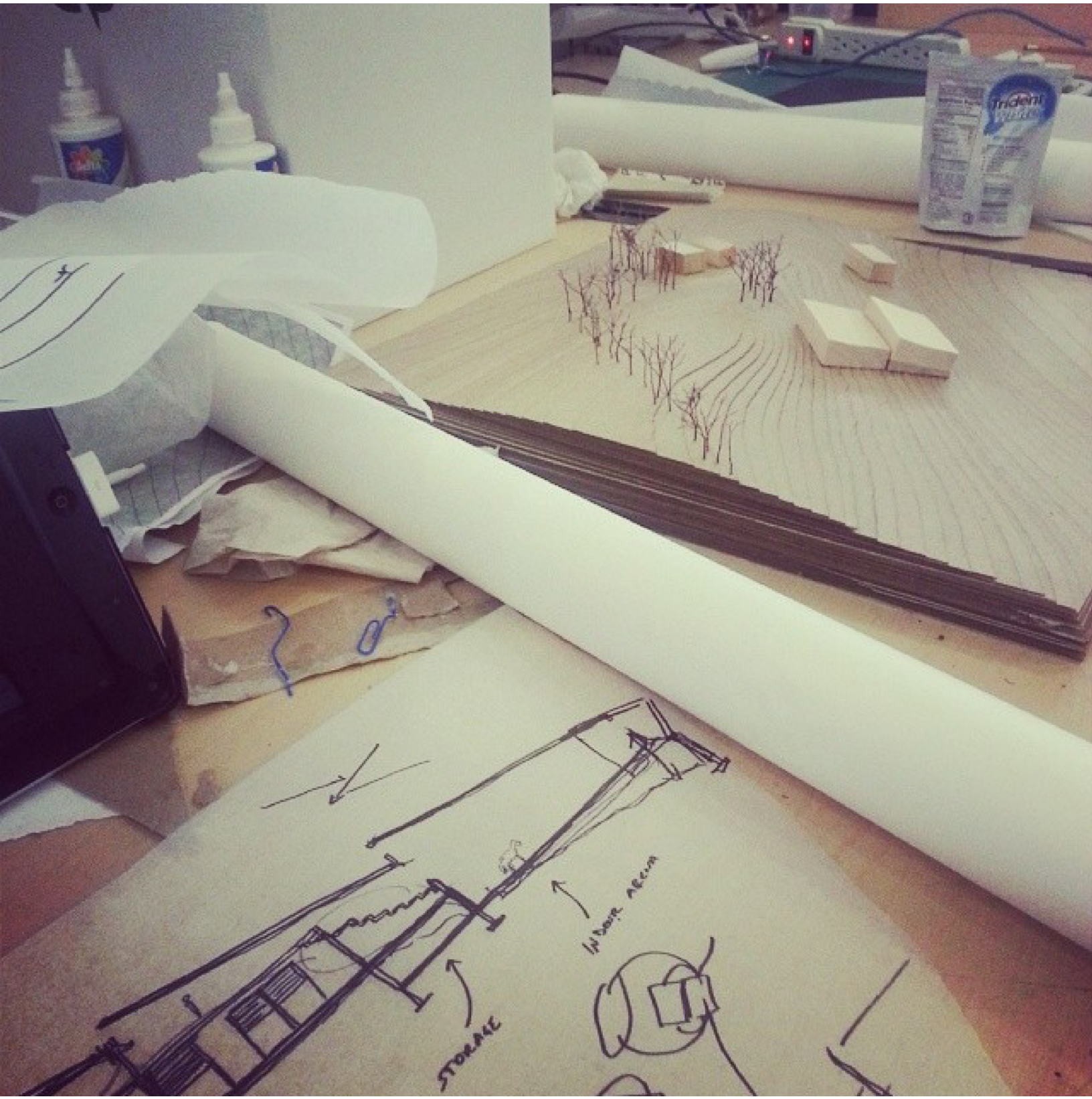
SKETCHES


INDOOR ARENA
BOARD
ENTRY
STABLE + VIEWING
TEMP RESIDENCE
POND TO DEAL WITH RUNOFF/DRAIN

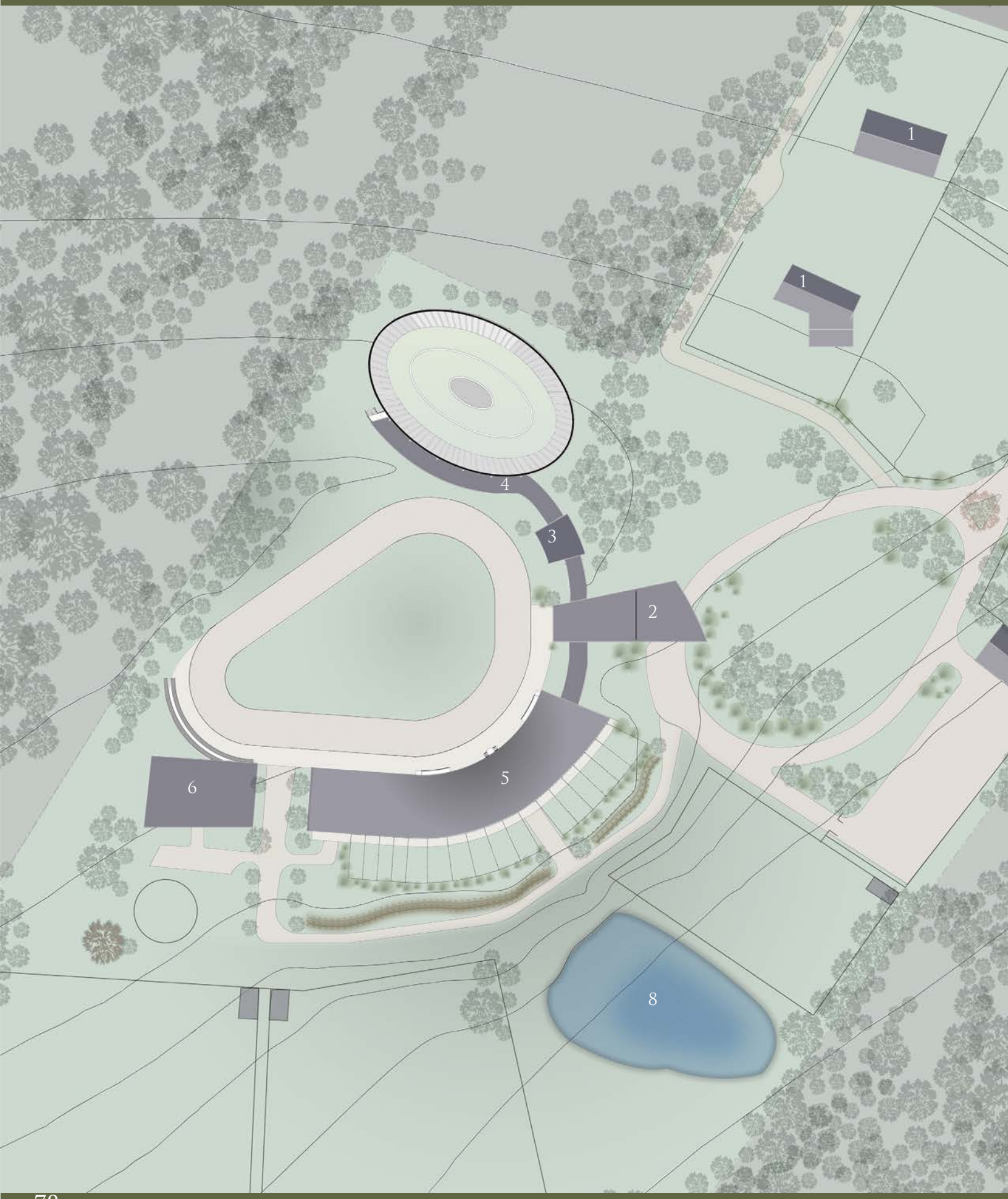

CIRCULATION
STRUCTURE
SHAPES

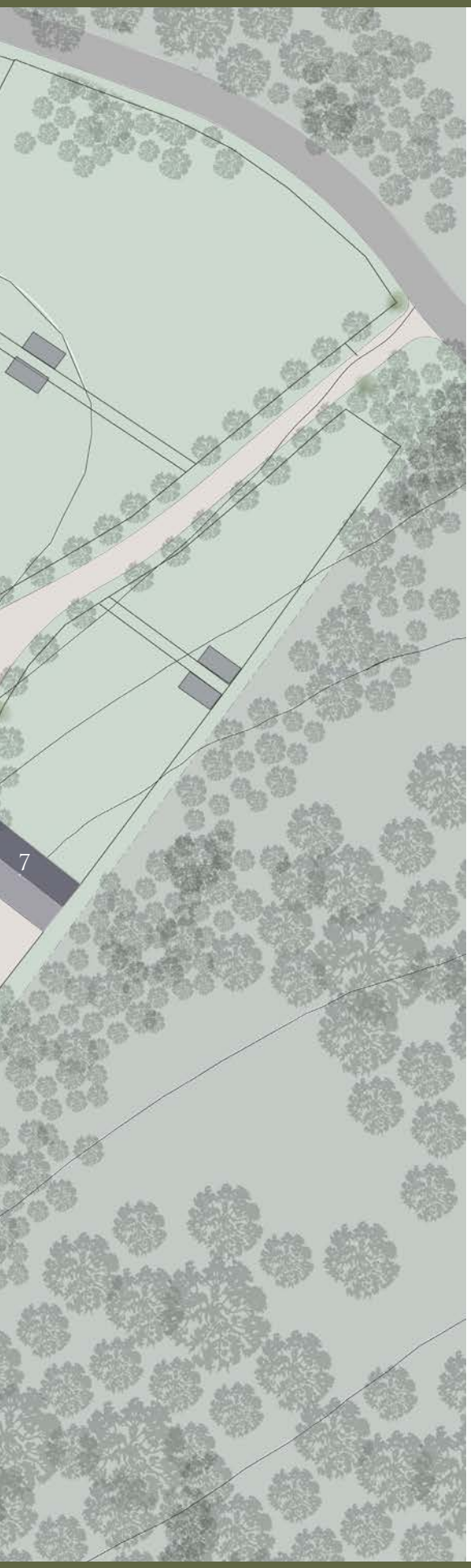





STORAGE

PROJECT DRAWINGS


1
1
4
3
2
6
5
8



SITE PLAN

OVERALL

The masterplan of this site was derived from both the existing use on the site and the topography, which influenced the sequence and understanding of building placement. The new structures are situated at the northern portion of the site due to the wetland conditions and dedicated forestery of the rest of the site. The client wished to relocate the houses to the western lot, which they also own, and wished for this design to take up the remaining space. The arrival on site is granted by a promenade of trees before entering a gracious rotary both elegant for guests and highly functional for service vehicles. Parking is provided in the lot adjacent to the storage barn, which also functions as an extra paddock when not in use. Permeable pavers provide traction for vehicles softer terrain for horses. The fire pond to the south offers an intermediate collection area for runoff as well as water element for the site.

LEGEND

1 - CLIENT RESIDENCE
2 - ENTRANCE HALL
3 - VIEWING PAVILION
4 - INDOOR ARENA
5 - MAIN BUILDING
6 - TEMPORARY HOUSING
7 - SERVICE BARN
8 - FIRE POND

SITE ACREAGE:
Total - 78.8 acres
Use in view - 35 acres

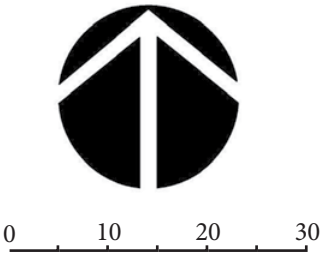

A
7
8
B
B
9
C
6
10
12
D
11
13
16
15
14
1
A
D

FLOOR PLAN

UPPER LEVEL

LEGEND

1 - TEMPORARY HOUSING
2 - ANIMAL CARE AREA
3 - BEDDING & FOOD STORAGE
4 - STALLS
5 - TACK ROOM
6 - ENTRANCE HALL
7 - INDOOR ARENA
8 - INDOOR ARENA SEATING
9 - VIEWING PAVILION
10 - OUTDOOR TRACK
11 - OUTDOOR TRACK SEATING
12 - BAR & LOUNGE
13 - RESTROOMS
14 - GATHERING SPACE
15 - PREPARATION KITCHEN
16 - EVENT SPACE




A
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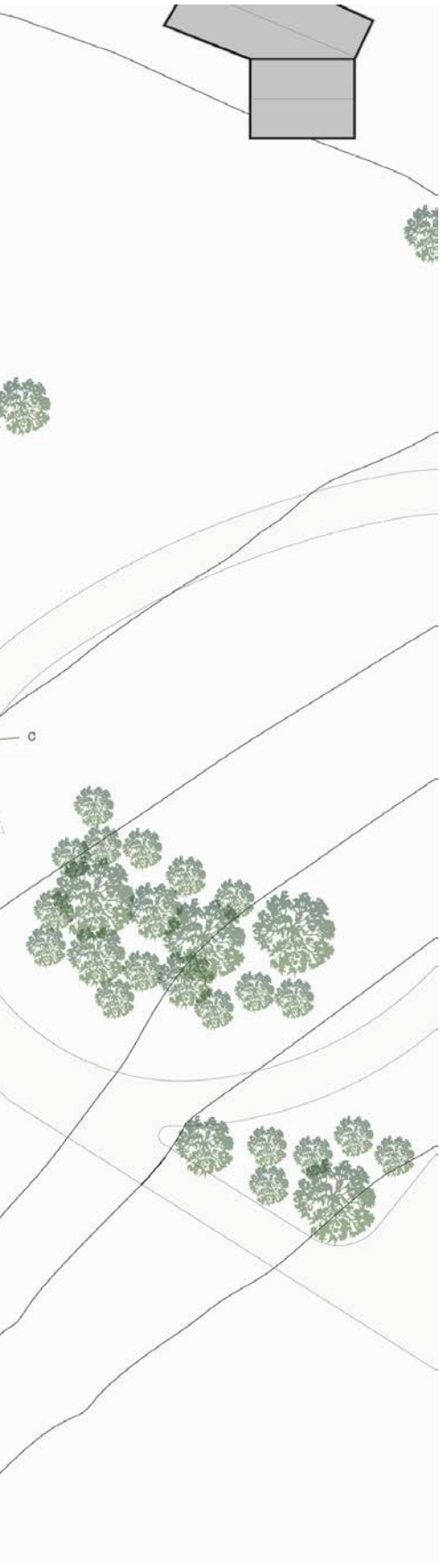
FLOOR PLAN

LOWER LEVEL



LEGEND

1 - TEMPORARY HOUSING
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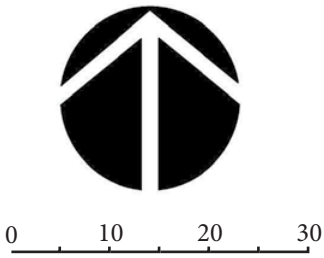

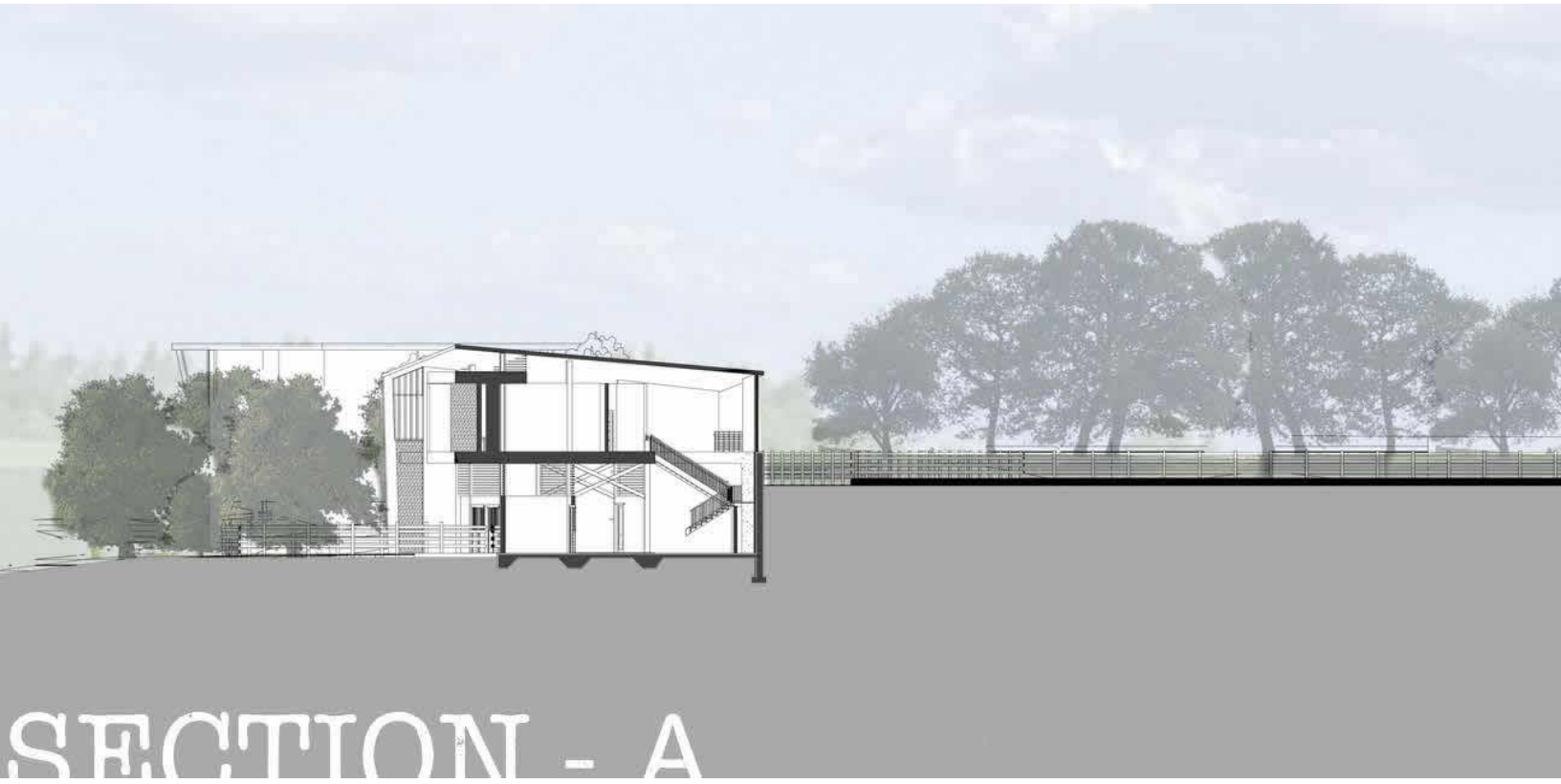

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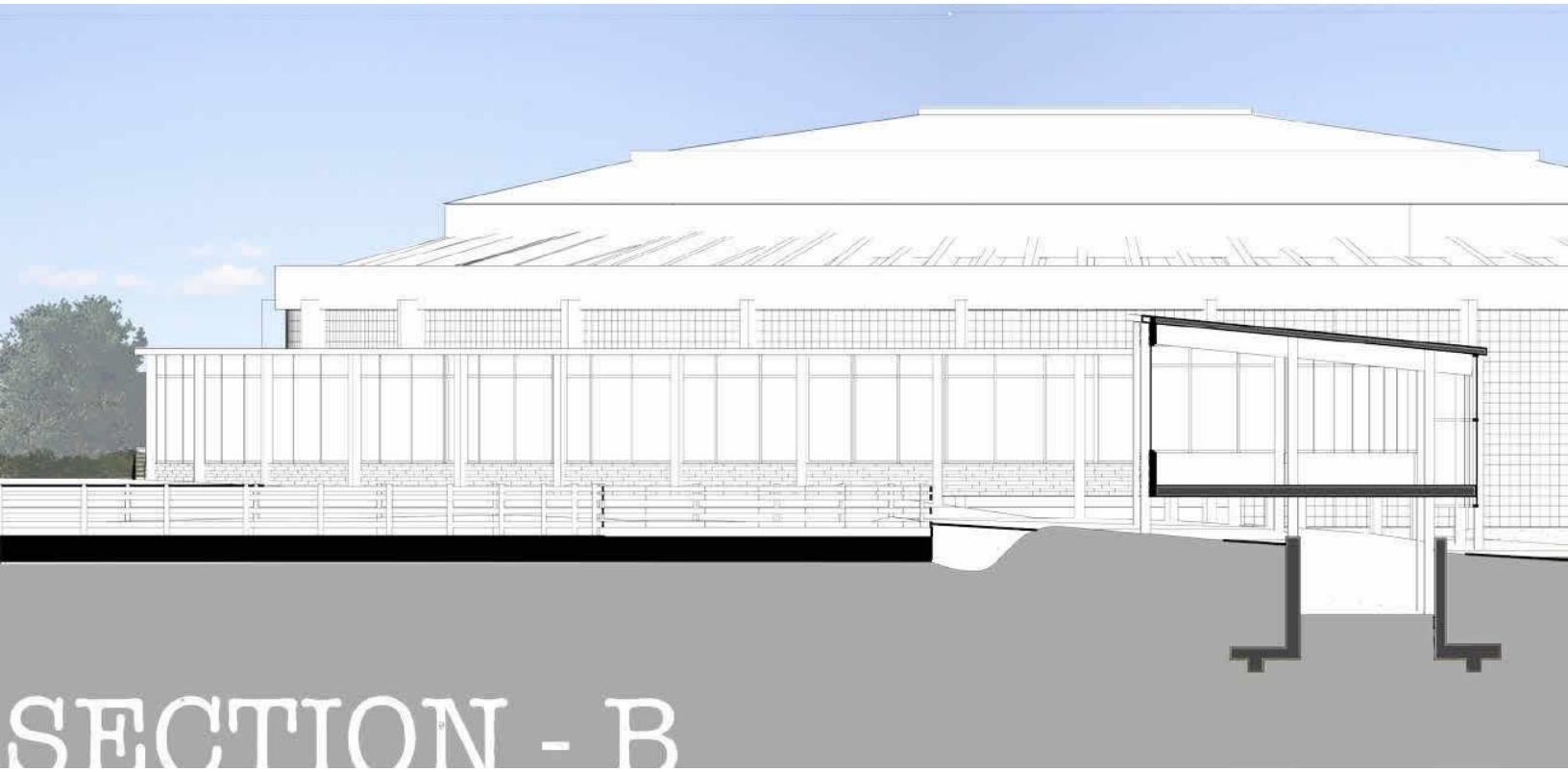

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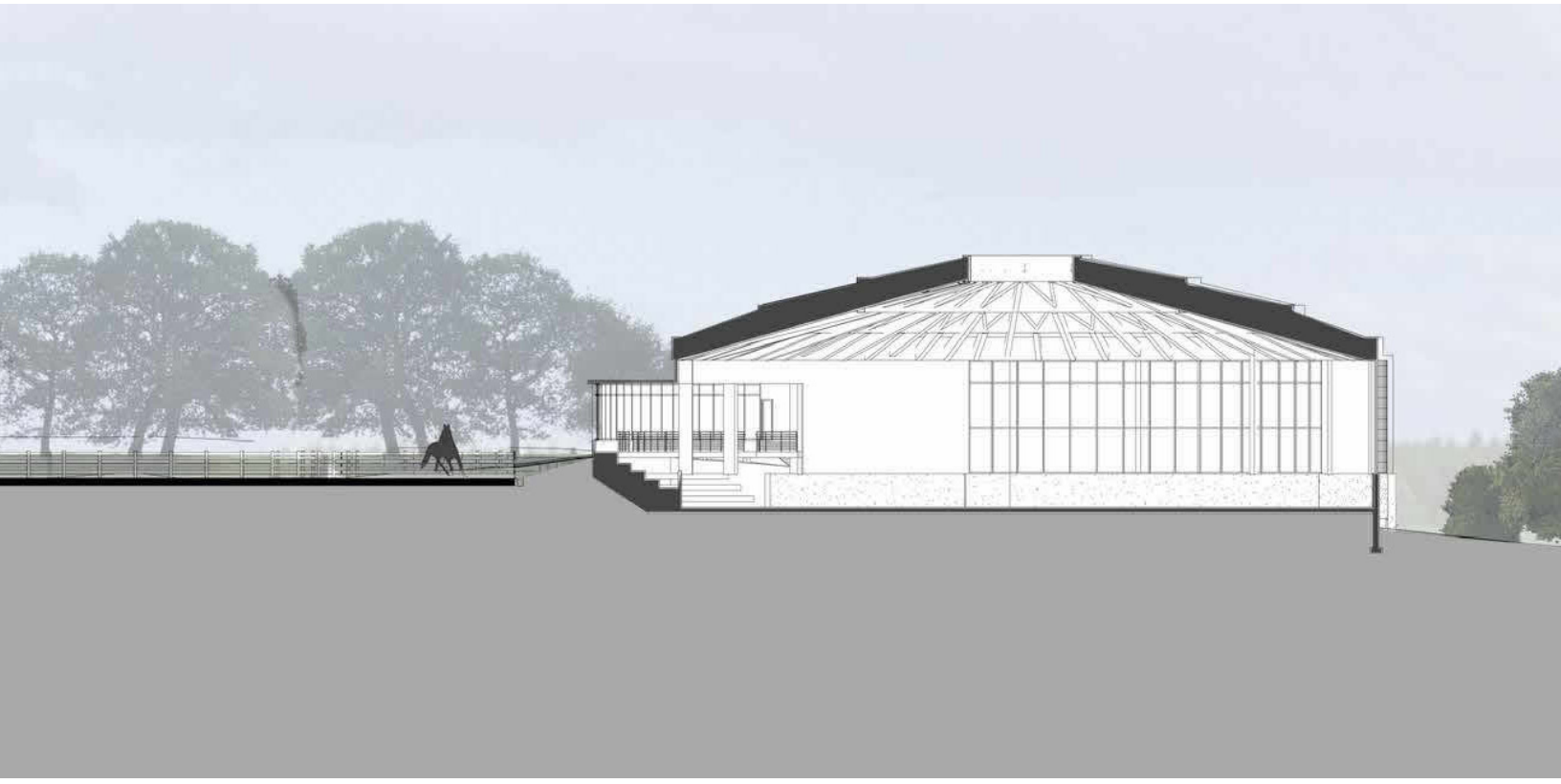

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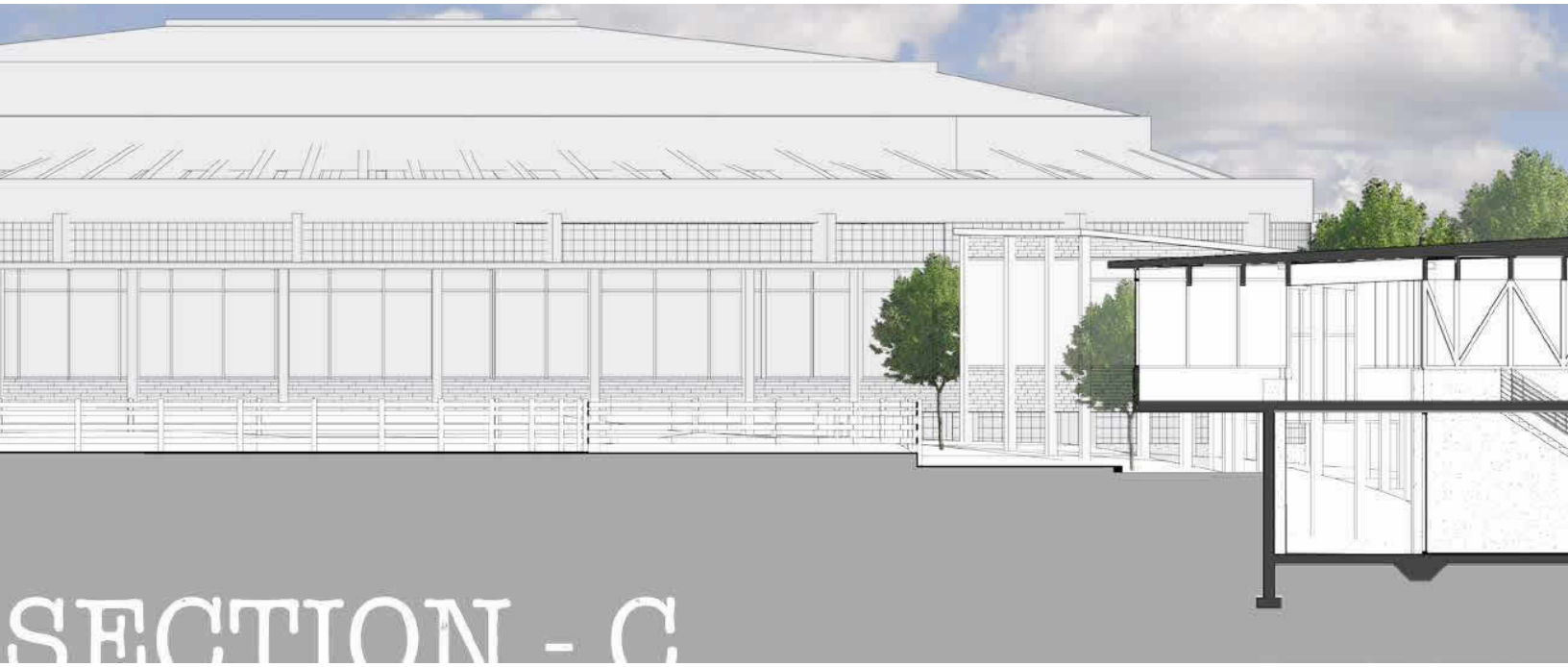

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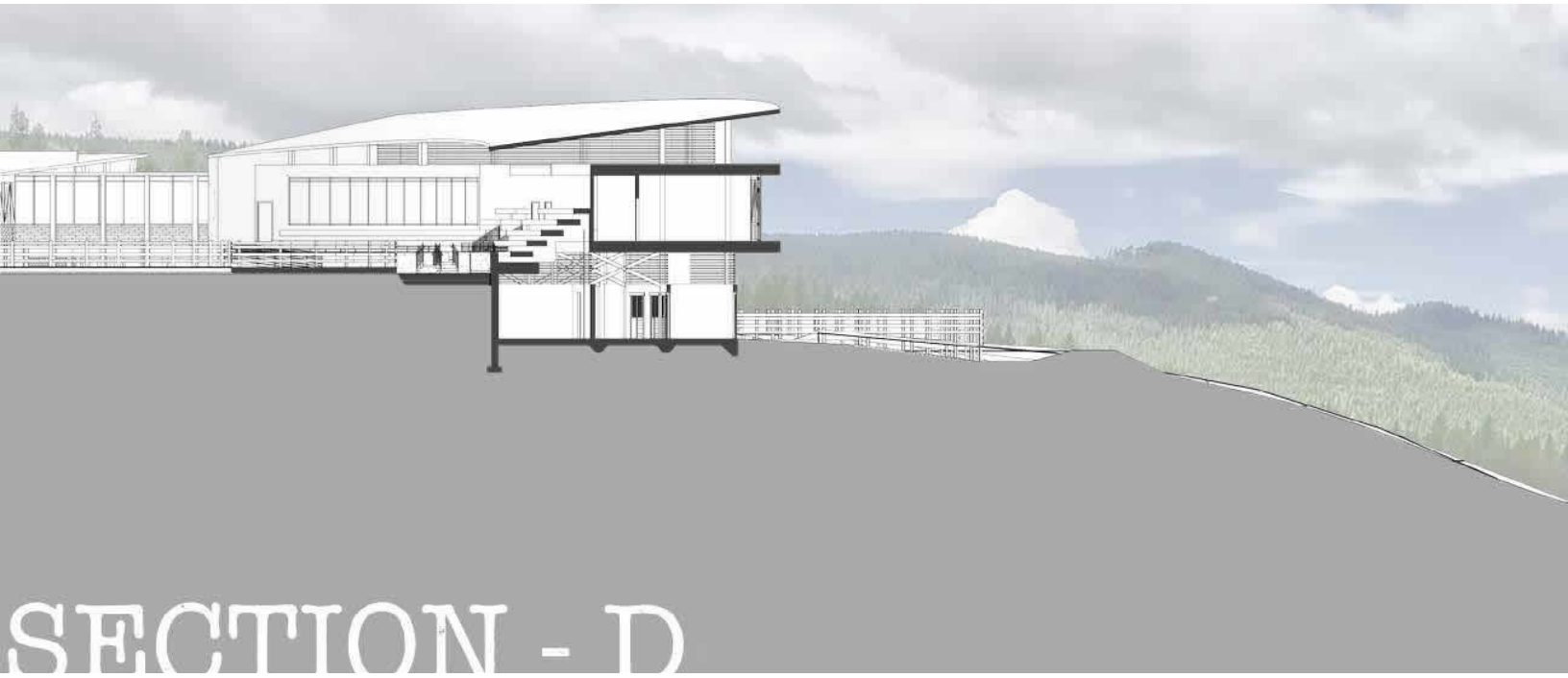
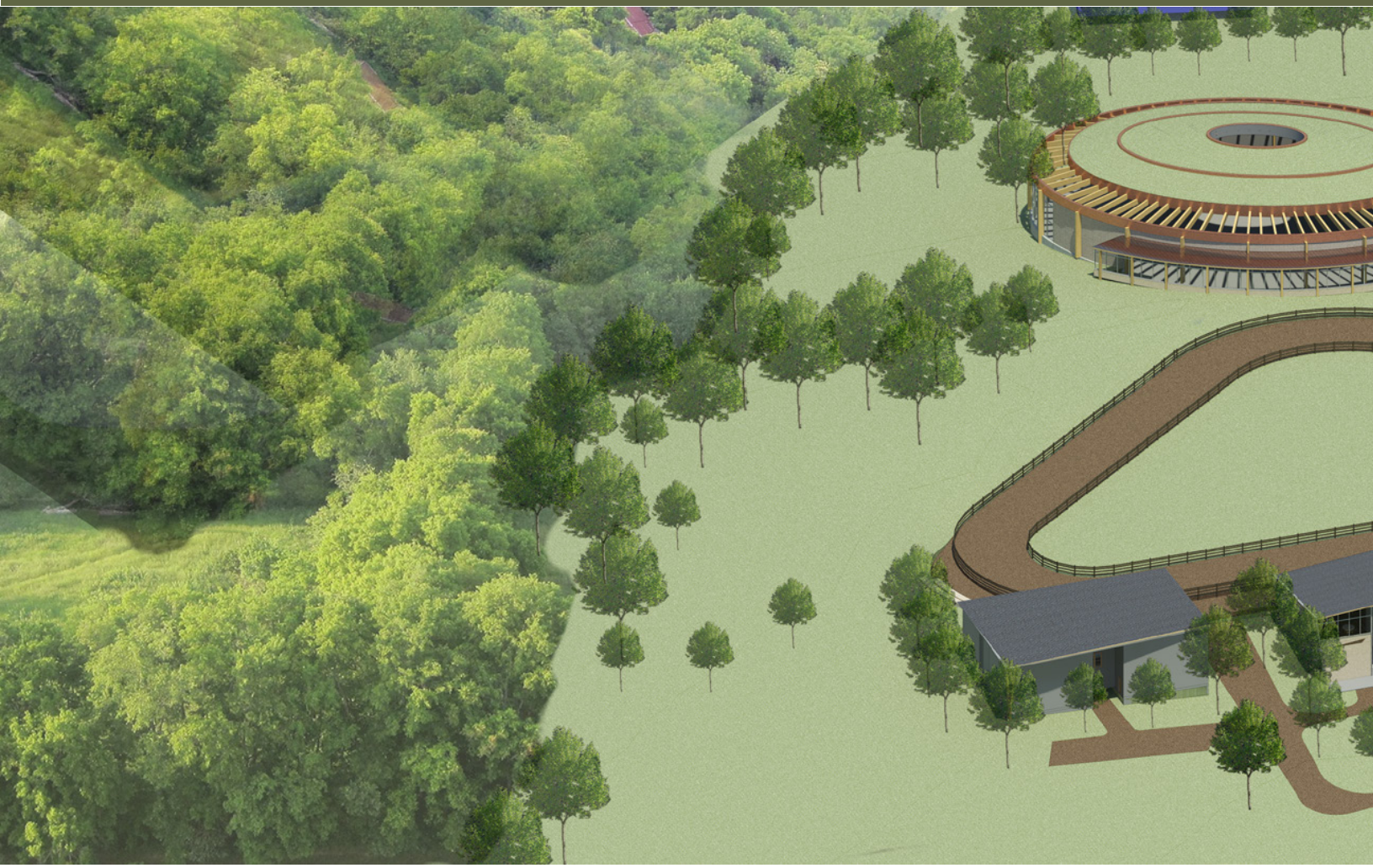
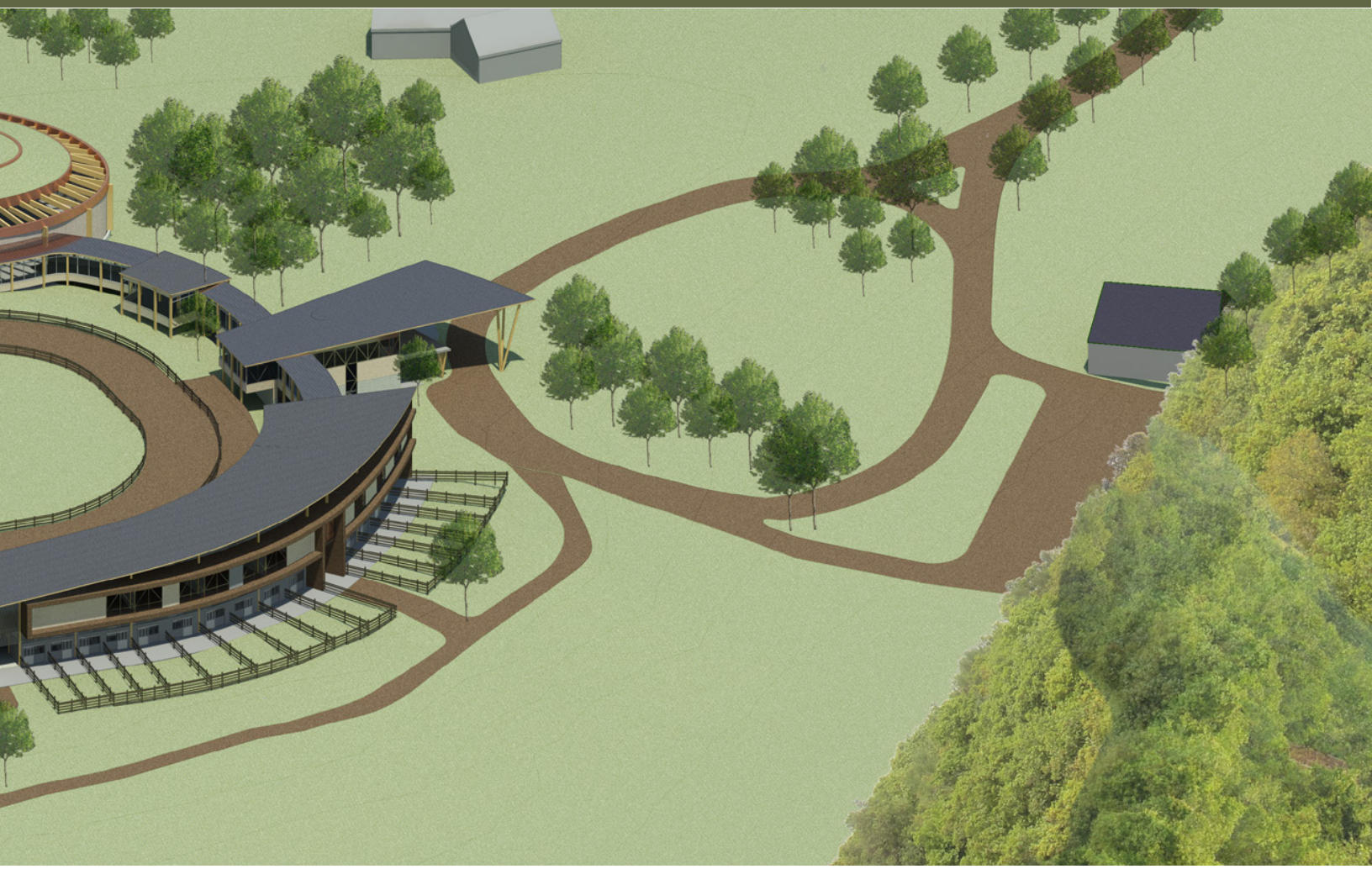


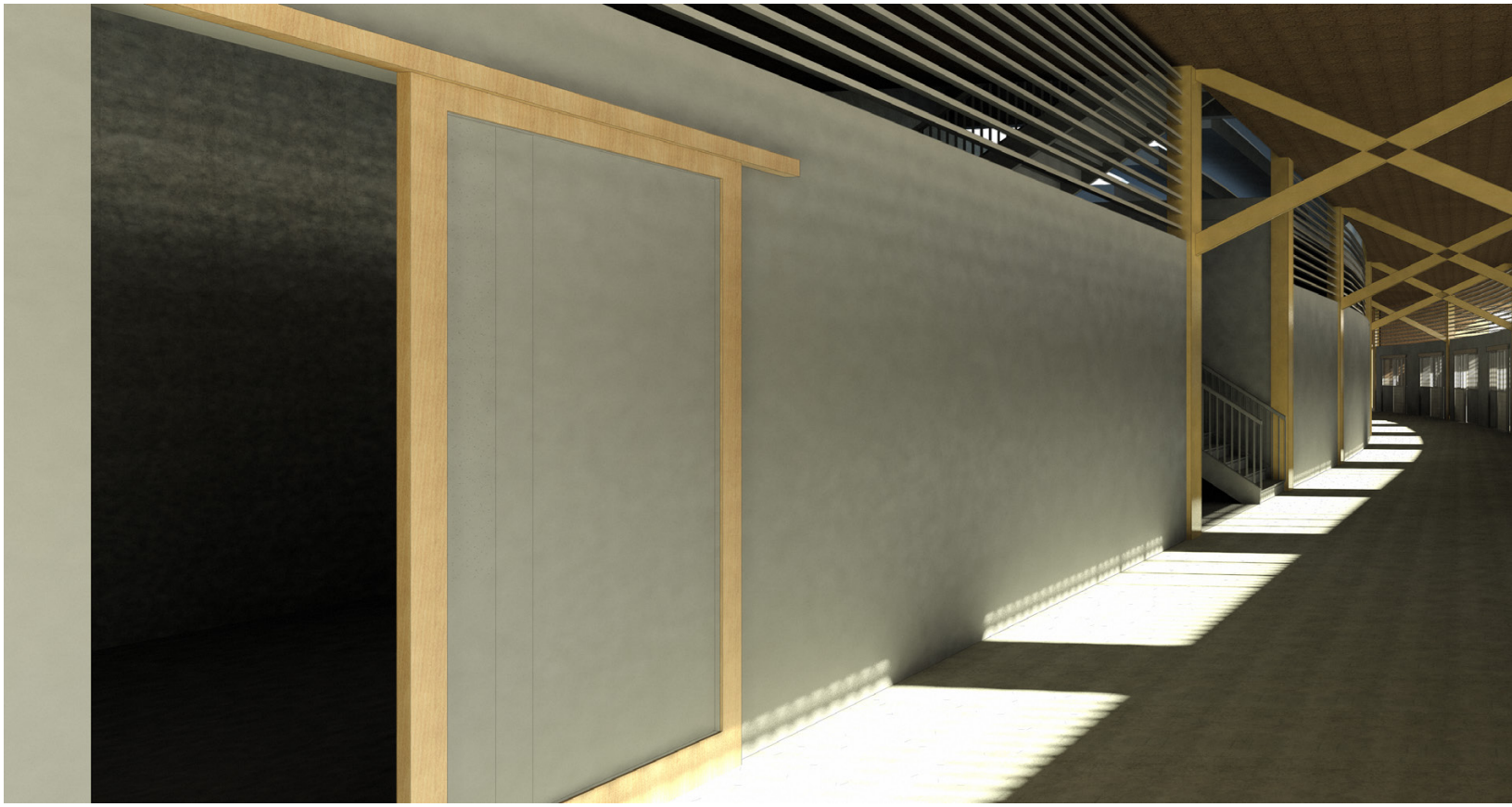
SECTION - D

SECTIONS



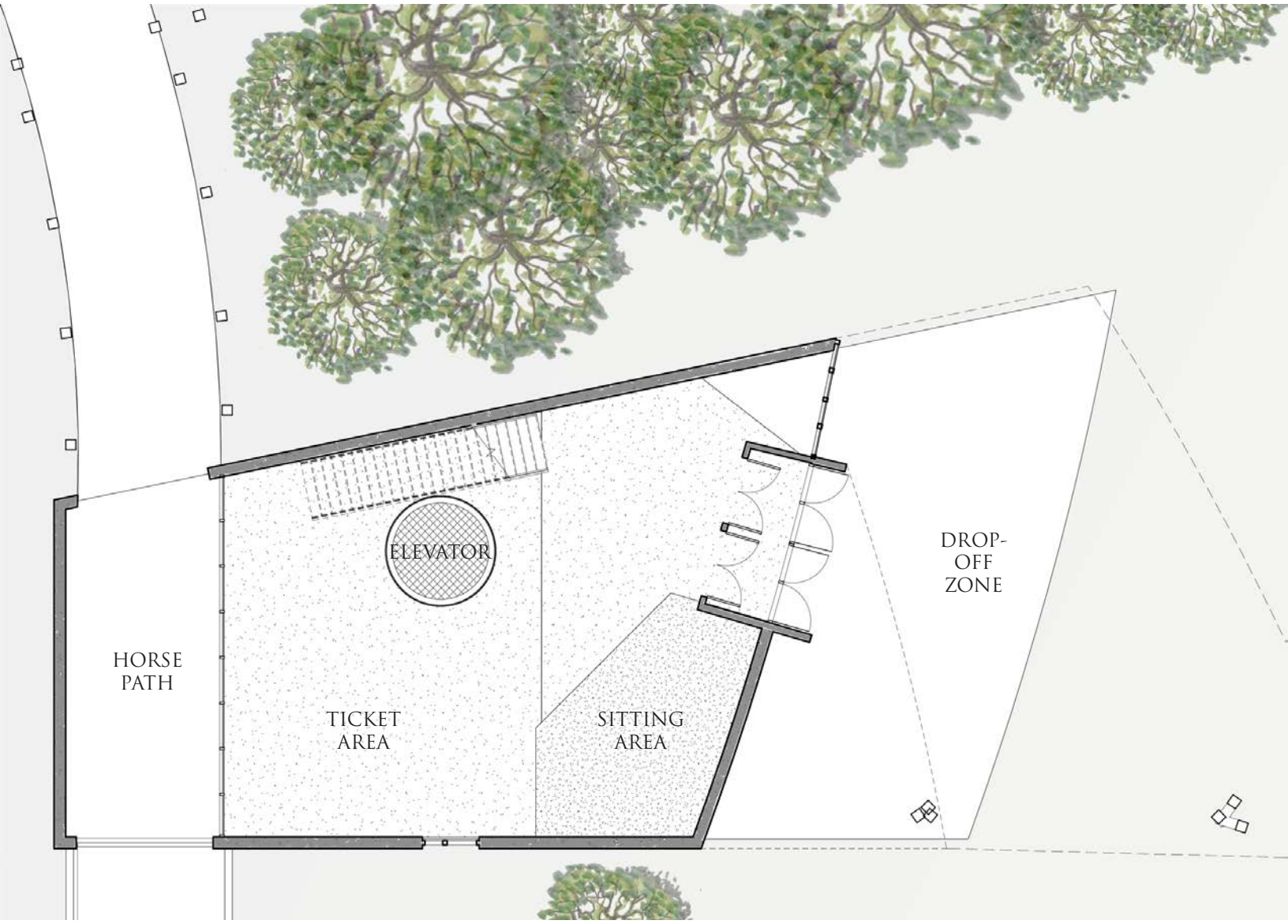


AERIAL AXON

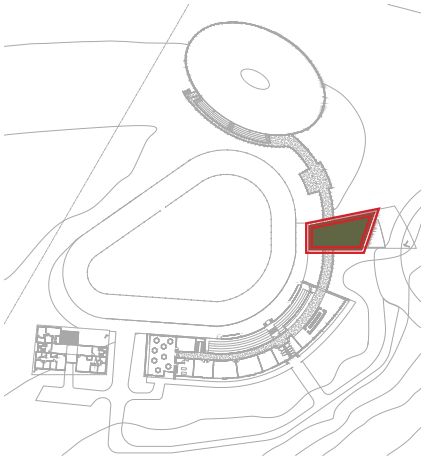


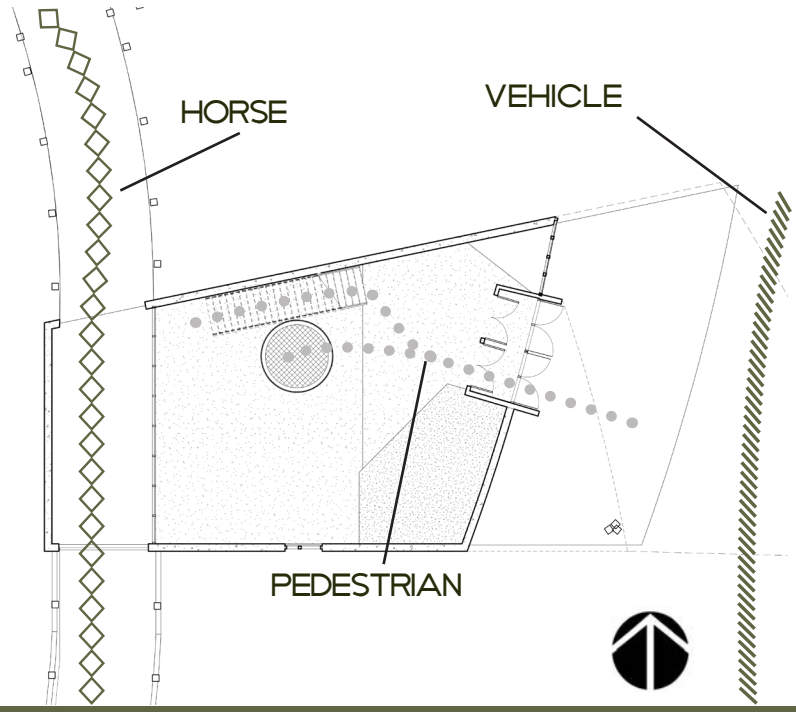
BAR
LOUNGE

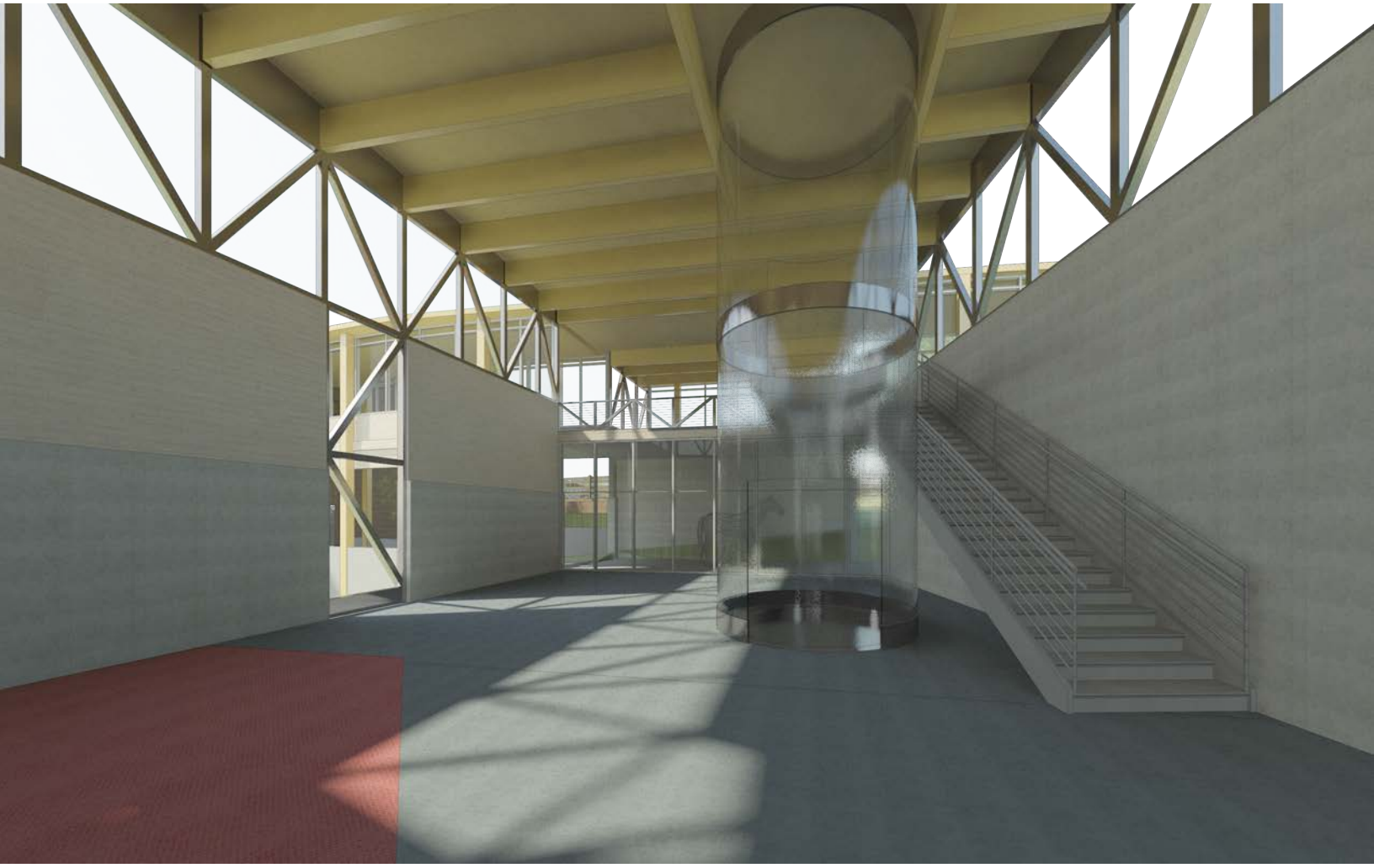
STABLES



ENTRANCE HALL



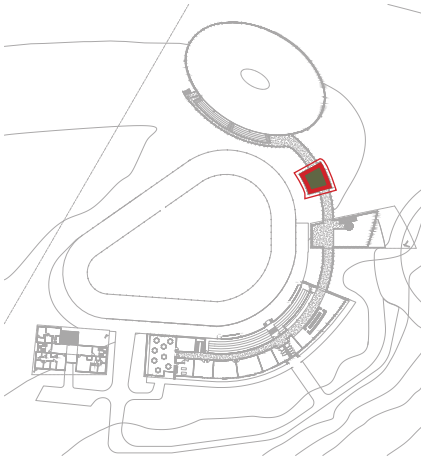


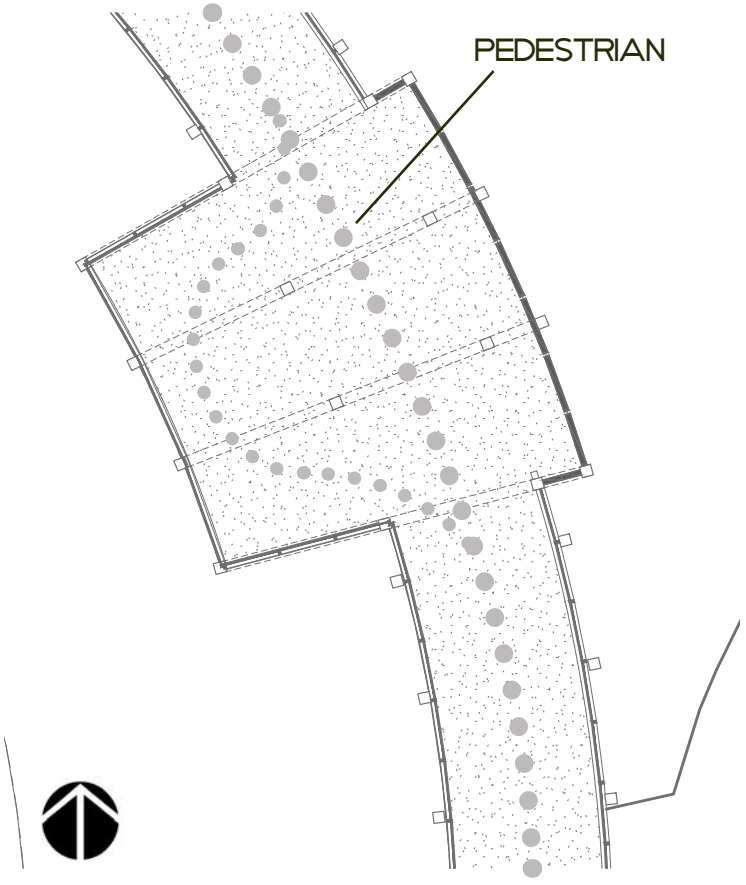


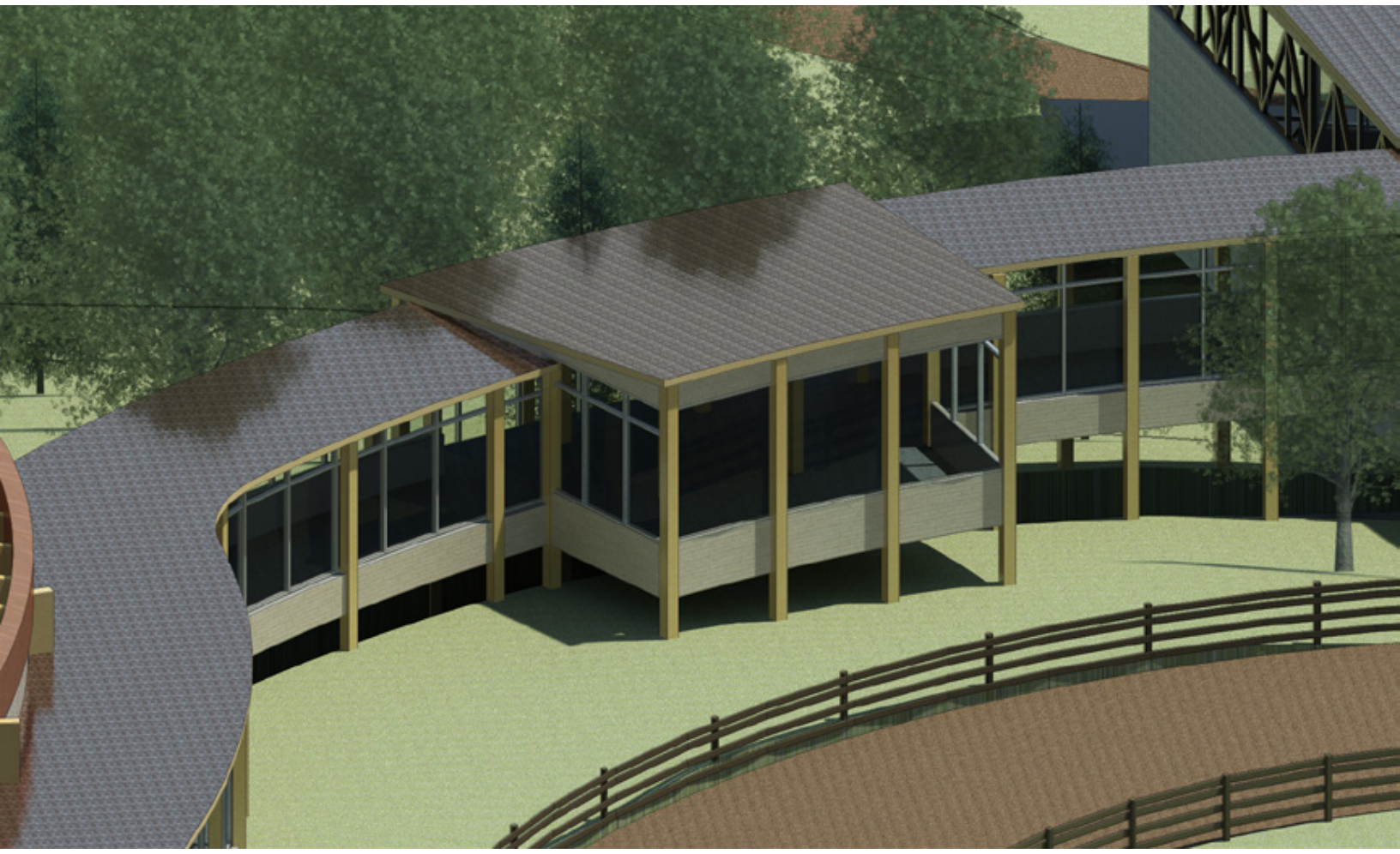
The Entrance Pavilion serves as the primary building seen on arrival. It greets guests with a large overhanging roof, creating a carport for drop off. Once inside the Entrance Pavilion, guests may wait for friends, purchase tickets and possibly even see a horse on its way to the Indoor Arena. Once proceeding upstairs, guests may enjoy encompassing views of the track no matter where they go.

VIEWING PAVILION

Situated between the Entrance Pavilion and the Indoor Arena, the viewing Pavilion provides a resting space with prime views of the outdoor track. Beneath the human circulation, there is a similar path for horses

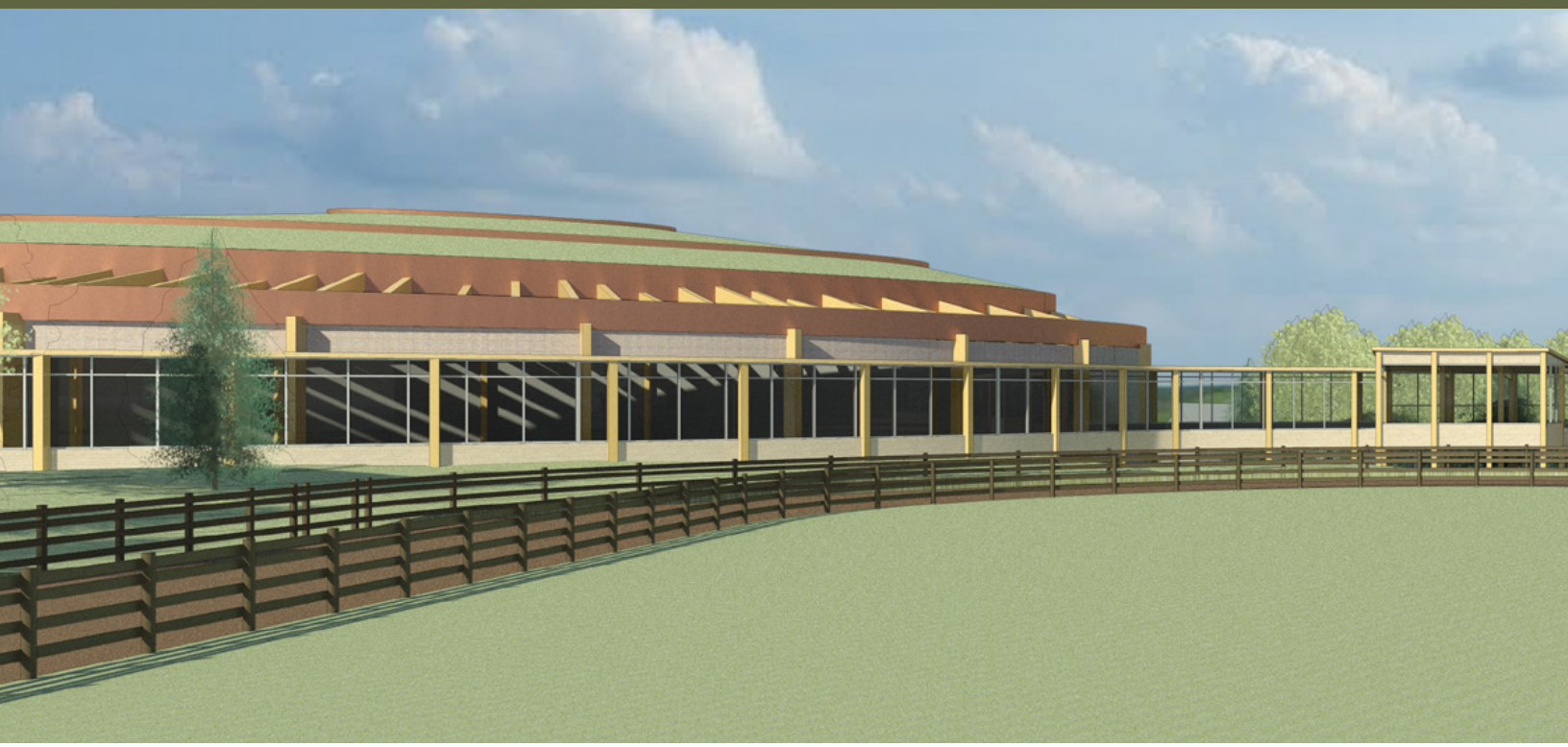


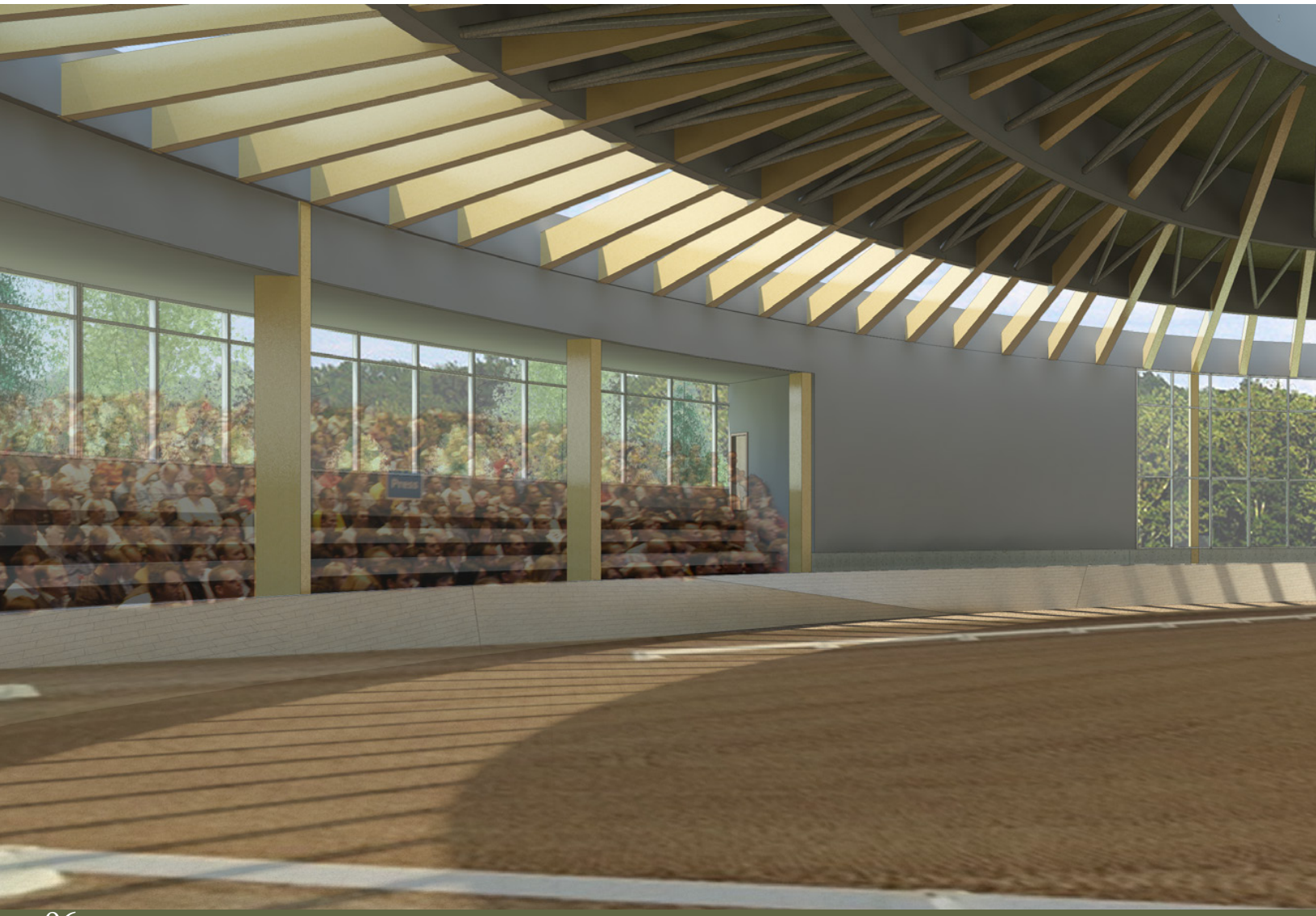




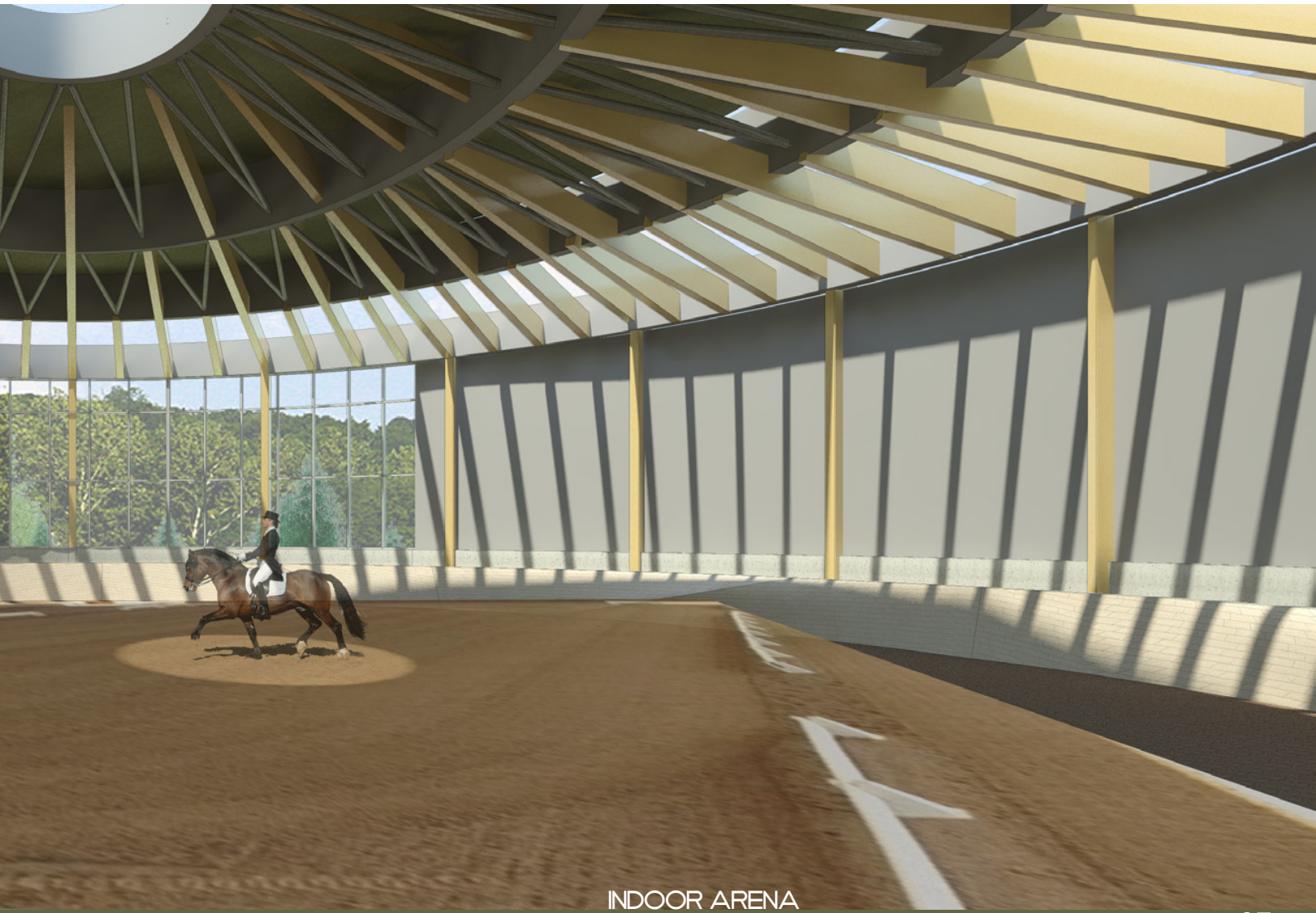
EXTERIOR OF VIEWING PAVILION

INTERIOR OF VIEWING PAVILION

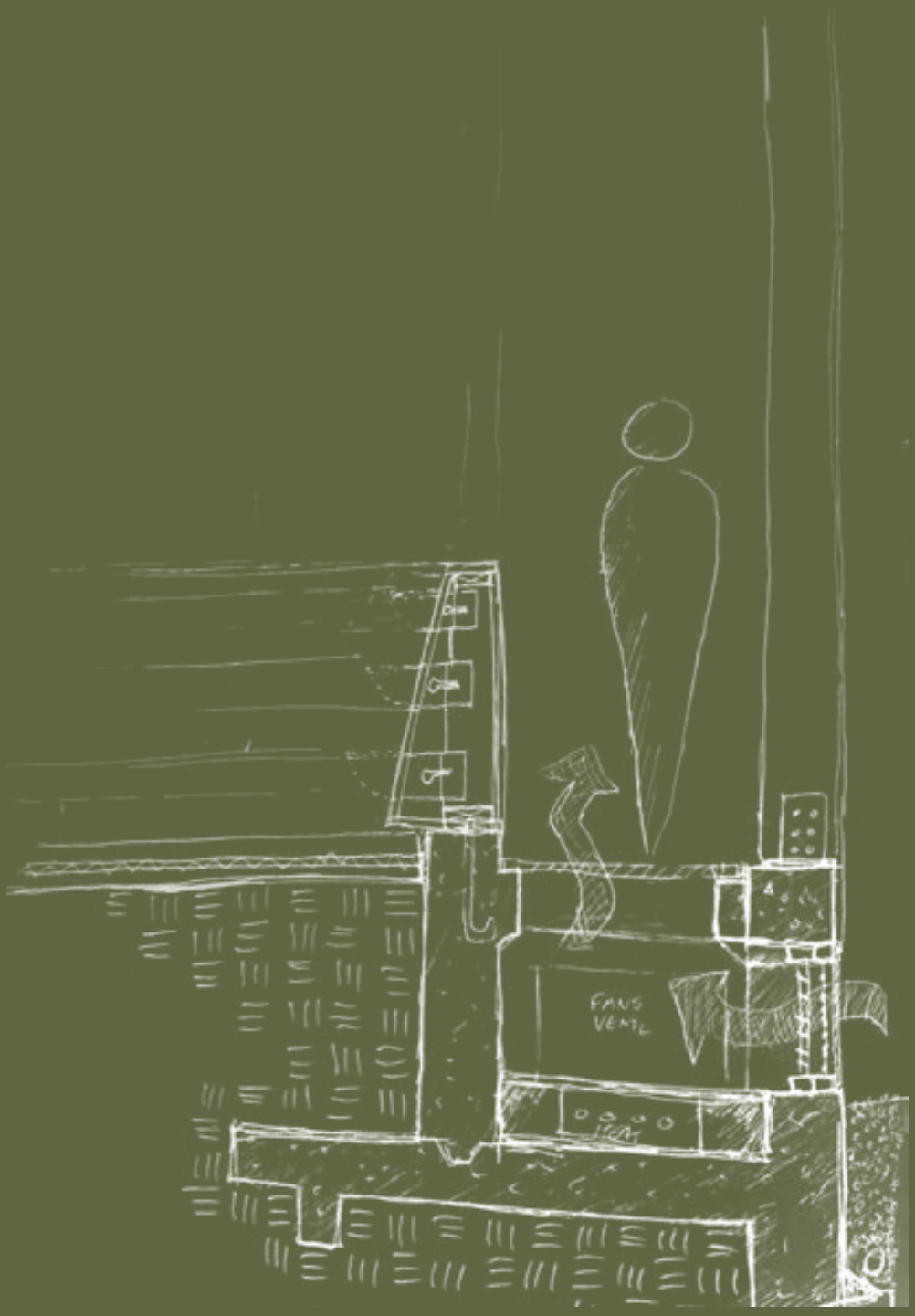




OUTDOOR TRACK



INDOOR ARENA



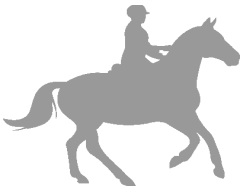
ARCHITECTURAL

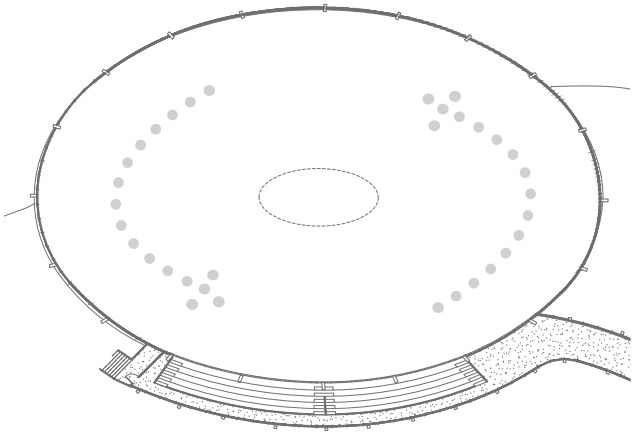
THEMES & INNOVATIONS

MIXED USE
INDOOR ARENA

Veritably one of the most important spaces in this project is the indoor arena for riding events or simply for practice. While most equestrian centers dedicate a structure for one particular style of riding, or relinquish responsibility to an outside area which is victim to weather conditions, this arena is a flex-use space. Riders of both western and dressage riding styles may use the same space, provided appropriate set up. The larger elliptical shape was taken from an averaged ratio of standard western arenas while accounting for the inserted geometry of the standard dressage dimensions. Together, the generated geometry helped form both the structure as well as the orientation of the seating for those guests who would be viewing the events.

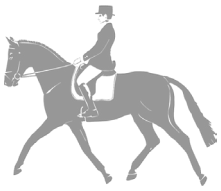
WESTERN RIDING

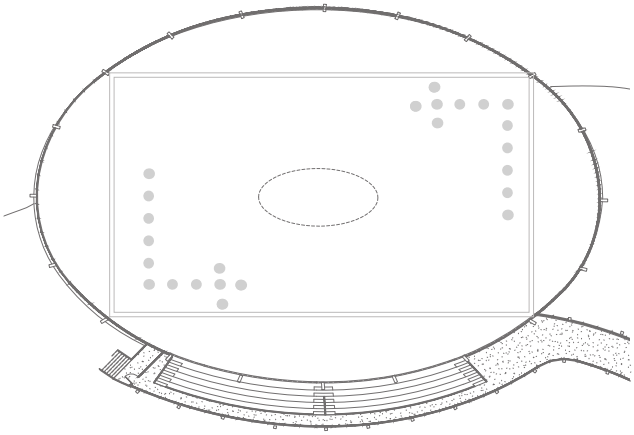




The ellipitcal shape is geared toward the cyclical movements of western style riding and can help focus more of the movements into a fluid motion.

DRESSAGE RIDING





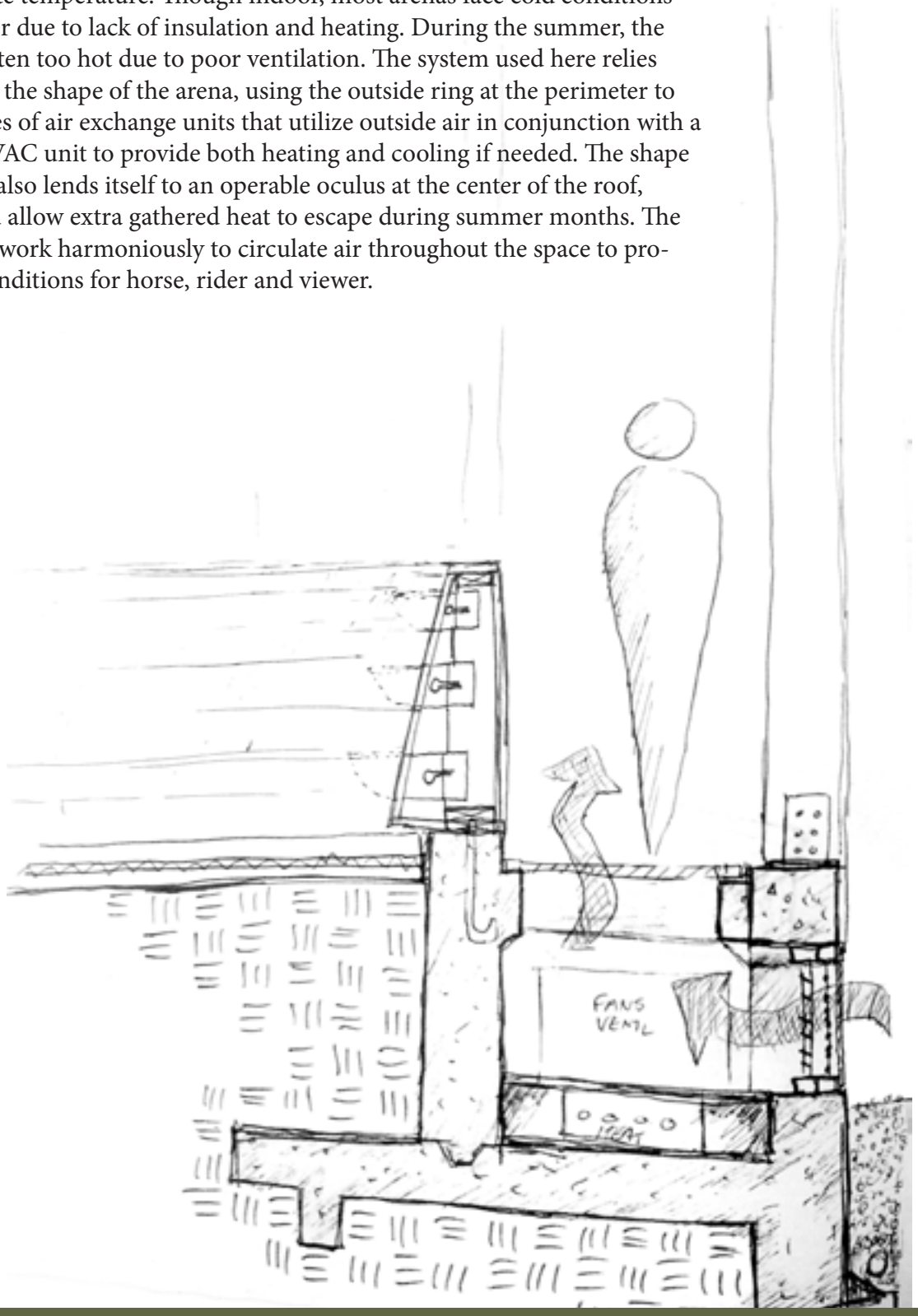
With enough space to set up a rectangular pen, dressage events are a simple conversion when hard corners are needed to showcase skills of control.


A
B

VENTILATION

INDOOR ARENA

One of the largest problems faced by indoor arenas is often the inability to correctly regulate temperature. Though indoor, most arenas face cold conditions during winter due to lack of insulation and heating. During the summer, the spaces are often too hot due to poor ventilation. The system used here relies primarily on the shape of the arena, using the outside ring at the perimeter to install a series of air exchange units that utilize outside air in conjunction with a four pipe HVAC unit to provide both heating and cooling if needed. The shape of the arena also lends itself to an operable oculus at the center of the roof, which would allow extra gathered heat to escape during summer months. The two systems work harmoniously to circulate air throughout the space to provide ideal conditions for horse, rider and viewer.



STEEL GIRDER TENSION RING WITH WELDED PLATE CONNECTIONS

TONGUE & GROOVE PLYWOOD

SUBSTRATE WITH WATERPROOFING

GREEN ROOF SYSTEM WITH DIRECTABLE DRAINAGE

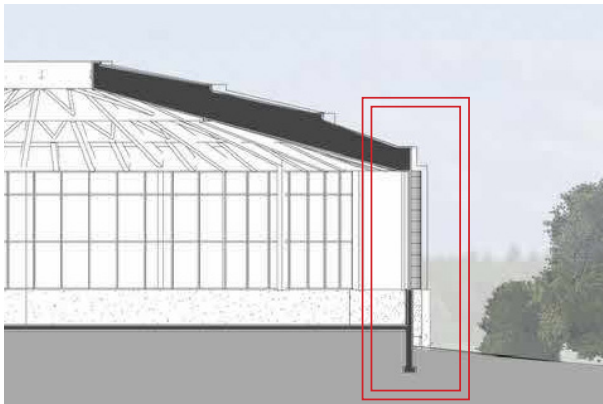
GLULAM ENCASED ANGLED STEEL STRUCTURE

PREMIUM INDOOR ARENA FLOOR COMPOSITION

AIR EXCHANGE HANDLING UNIT
FAN UNIT WITH CUSTOM UNDERSIDE AIR INTAKE

FOUR WAY PIPE SYSTEM FOR HVAC SUPPLY

12 INCH CONCRETE FOUNDATION AND RETAINING WALL

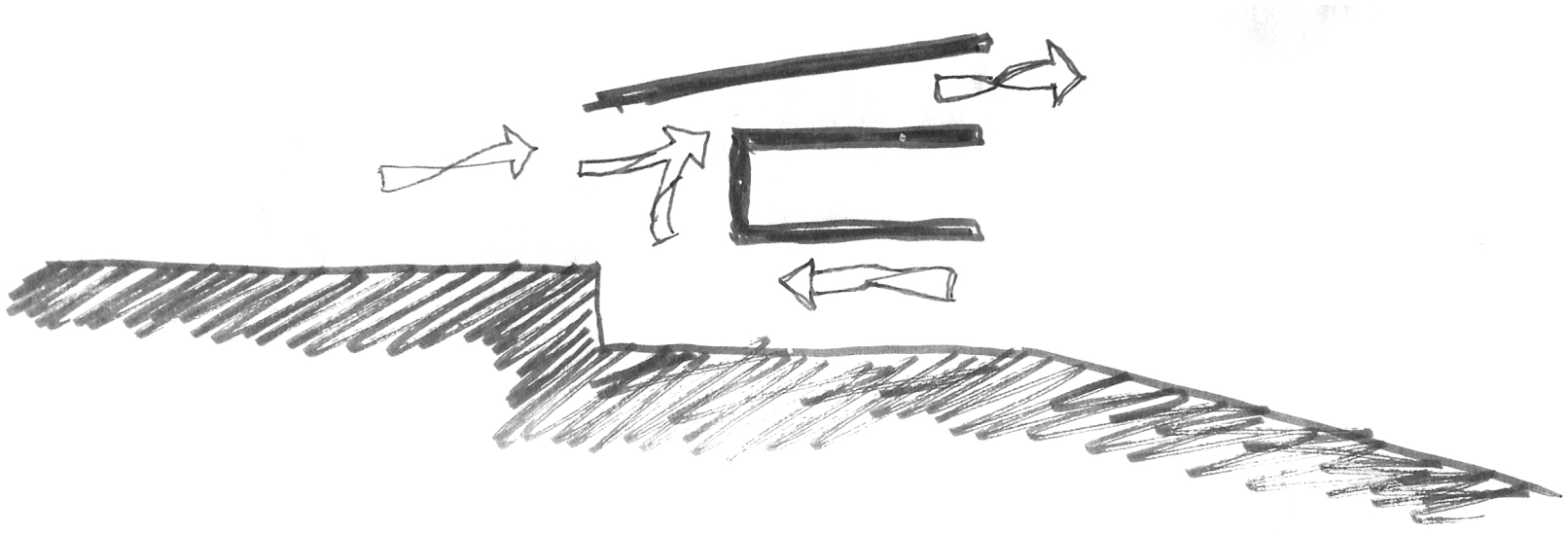


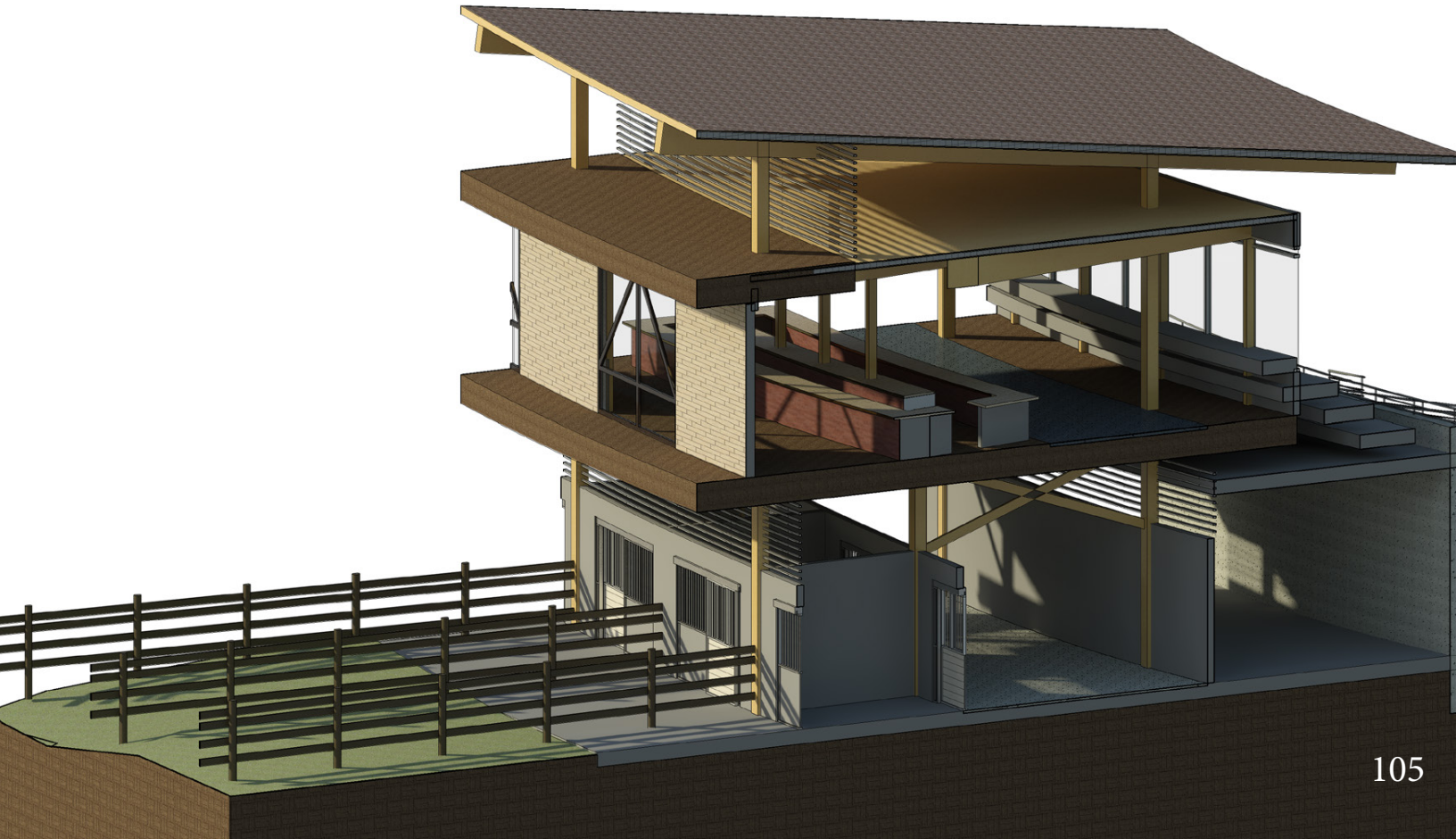
SECTION A

VENTILATION

MAIN BUILDING

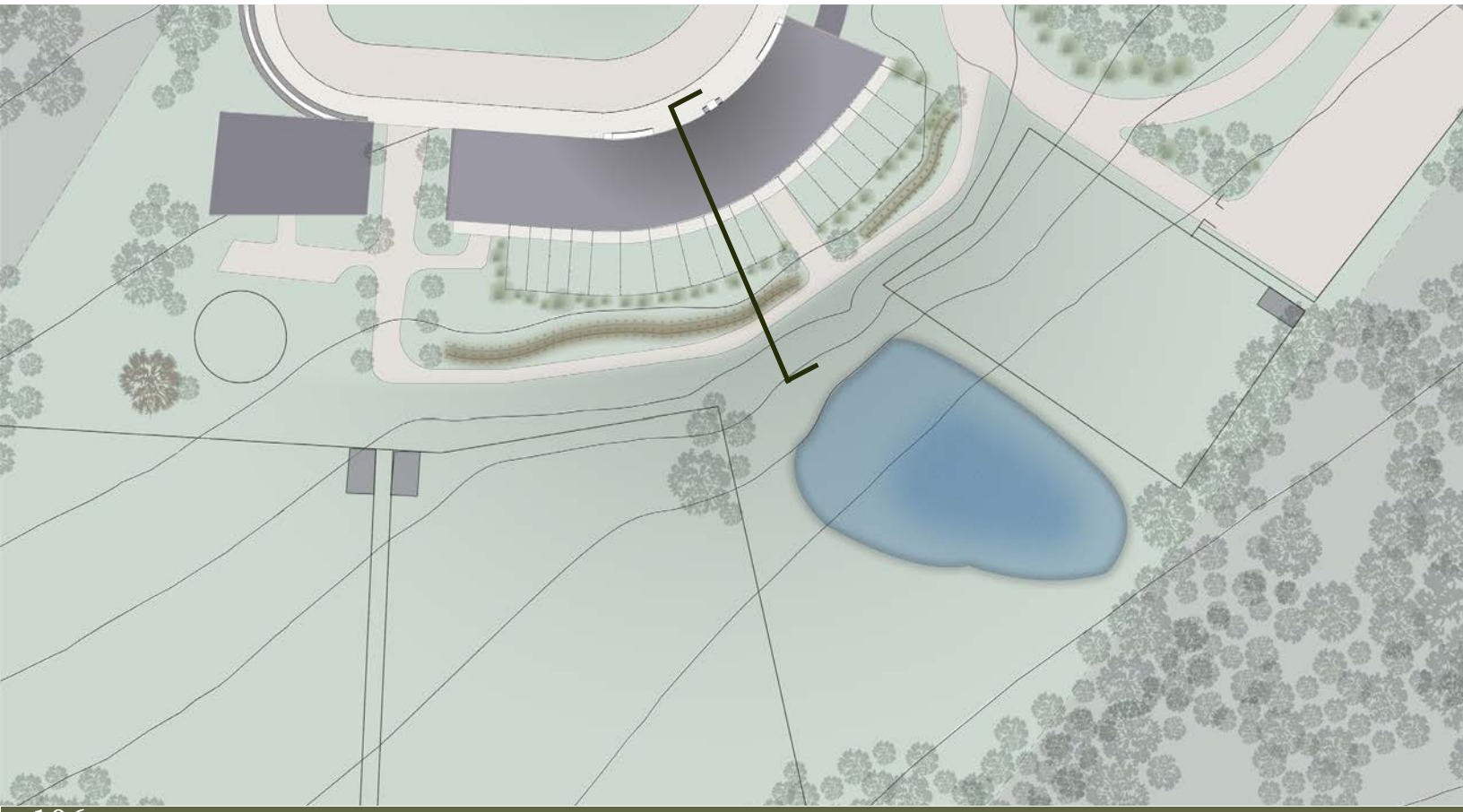
To prevent stagnant air from milling within the stable area, the design of the building was incorporated with an idea of natural ventilation. Mechanical ventilation could become expensive and require added electrical works, which can be prone to starting fires. By utilizing the forms of the stables and stadium like seating, a natural ventilation pattern can be used given the wind patterns on the site. Winds from the north and south can create a vaccuum like effect to pull air through the space, ensuring the proper flow of air. Meanwhile, the indoor area including the bar and lounge are not affected by, but rather aid in the process of ventilation.

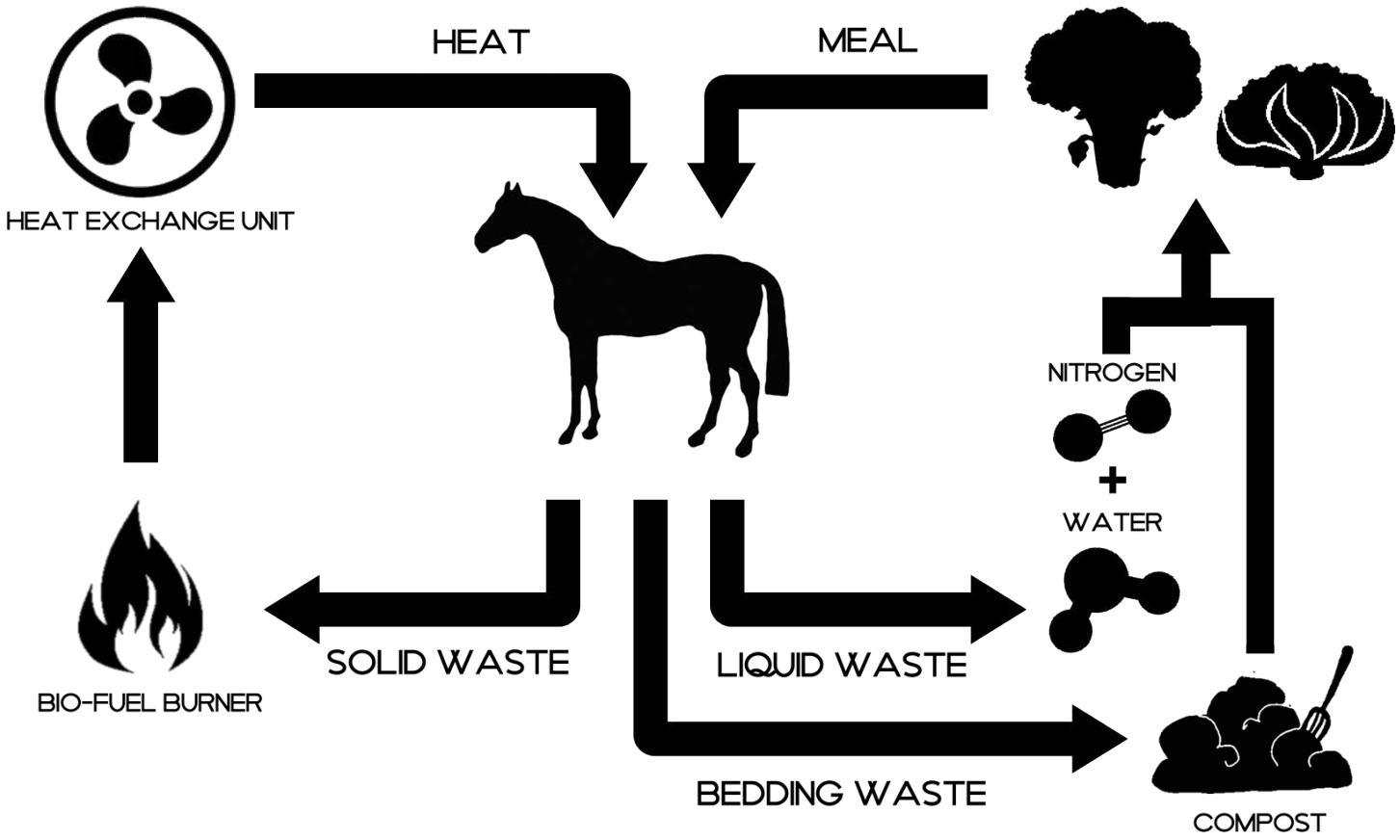


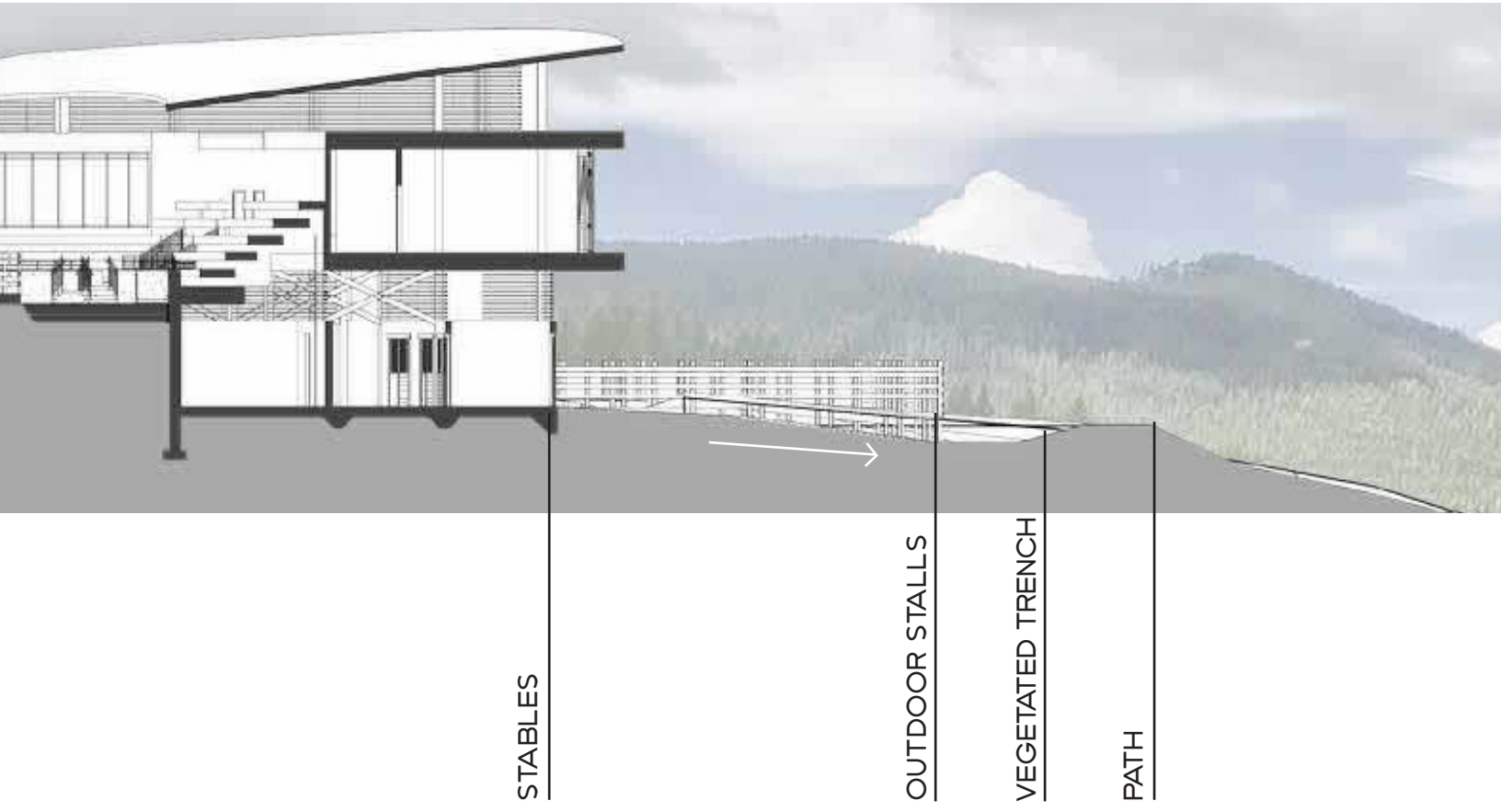


FULL CYCLE
SUSTAINABLE PRACTICE

Animal husbandry of any type is a burden of responsibilites that require proper care and resources so that the animals are well nourished and in a consistent state of comfort. This can produce a lot of waste, from excrement to housing waste. Through an analysis of the site and available resources, essentially all of the waste created is upcycled on site to help take care of the very horses that create the waste. The solid waste is converted to heat via a bio-fuel burner, ever gaining popularity in rural settings, in coordination with a heat exchange unit that can help heat the spaces where the horses will be (as well as generate heat for the residences as a bonus). The liquid waste of the horses was of initial concern due to the slope of the site and the nearby tributary of water. The vegetation landscape drafted for the site would counteract this by planting growths which pull the nitrogen from the soil such as broccoli, cabbage, corn and squash. These items then in turn create meal for the horses once they are harvested. Benefits do not end there, as the vegetation also provides a visual calendar to signify what point of the year it is for guests. By incorporating the waste products into a full cycle system, the impact on the site and surrounding areas is greatly reduced, helping the natural eco-system.




HEAT
MEAL
HEAT EXCHANGE UNIT
NITROGEN
+
WATER
SOLID WASTE
LIQUID WASTE
BIO-FUEL BURNER
BEDDING WASTE
COMPOST


STABLES
OUTDOOR STALLS
VEGETATED TRENCH
PATH

CONCLUSION

CONCLUSION

This thesis has been a journey of constant learning and evolving as both a project itself, and for me as a graduate student. Having known little about equestrian practice and the designs required, I felt the process of learning from the beginning to the final presentation and beyond. Through many interviews with riders, coaches, and architecture firms that have dealt with equestrian design, my thesis became one of importance for the intended client, and as a general message of efficiency within architecture. While sustainability and site hydrology led to the selection of the site, it was the need of the client and the vernacular typologies that enabled me to develop a sound thesis about the importance of intergrated efficiency in architecture.

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