

control through design



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Rory T J Dorow
Masters of Architecture
The University of Detroit Mercy
School of Architecture
AR 5100, 5110, 5200,& AR 5210
Professor John Mueller
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This book is dedicated
to my parents Kimberly and Timothy Dorow
to my sister Ashley Dorow
and to Sarah Jaeger
and to King Mortimer the First.
Thank you for all your support over the past five years.

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abstract

What is a border? Does a border depend on the site or the people that live there? Is a border just a governmental idea of where their domain exists to? This thesis is an investigation into what the qualities of a border and how need to be made more adaptable and human-friendly for the twenty first century. That the border must consists of elements that not only act as a way of protecting the inhabitants of a country, but further must act as a way of welcoming others into a country. Borders crossing points are an important part to any community to which they exist. They create the moment that welcomes and ushers a person into a country. However, not all borders put the same emphasis on the introduction of people to the environment. This is the case between the United States-Mexico Border where there is a facility which sole purpose is to check the identification and paperwork of those that come through it. Compare this to the United States and Canada where the opposite to be true. Here is the world's longest unbroken border between two neighboring countries. Throughout many sections along the border there is nothing to introduce a person from one country to the next other than a sign telling of the significance of the point they are crossing. During the exploration suggestion about how a site and its characteristics; including people, geography, and connections from one area to the next; must be taken into consideration in

order to properly identify the point to which one enters a country. That it is only through the culmination of many different ideas is a country able to truly embrace others; welcoming them in to be an integral part of the culture that exists. A country cannot truly exist without the want and need for other countries to explore their land. In today's globalized society the need for the interaction of other cultures is of extreme importance. That it is through the relations of countries; whether that is through trade or entertainment of others; that they will continue to develop and grow. This therefore means that a border cannot rely on its main purpose of protection, but grow to embrace others.

thesis

In today's globalized economy international trade and commerce are a way of life. Small businesses can ship and receive merchandise to markets that have never before been considered. Specifically, with regards to the internet, global trade is becoming a more viable option for businesses. Companies are outsourcing work to other markets where the work can be done for cheaper instead of hiring people in the community where they are located. What does this mean for the American nation as a whole? How does this relate to the idea of border security and permeability in the nation's border? As trade and commerce continue to increase around the nation's borders, security must therefore increase accordingly to combat any illegal trafficking that may occur. Whether this trafficking is in the areas of drugs or illegal aliens, the nation's borders will have to have more pressure on them to identify what comes through. The problem associated with this increase in security is how one is able to keep the borders welcoming and inviting to all, so as not to make the border a fence to be negotiated through at the opening. Instead the border is to be an engagement into the site and community. As one approaches the border, they will be welcomed into the country and not have the feeling of intimidation and loss. The border must captivate the ideas of control and entrance to establish a sense of relation to the site. This thesis is an investigation into bor-

der check points and how to make them more adaptable and human friendly for the twenty-first century.

Traditionally a 'region' has been described as a track of land with relatively homogenous characteristics and marked boundaries. Such a definition has commonly led to the drawing of boundaries along features of natural environment, such as mountain ranges and rivers. This has had the effect of imbuing the boundaries with false permanence, and of emphasizing the interactions between people living inside the region and their natural environments. Their region becomes a rather introspective entity, while the importance of social structures and inter-regional linkages are minimized. And yet almost every boundary defined in this way can be disputed, and different geographers may use different bases for drawing boundaries.¹

So what is a region in response to a boundary? How is this idea to be defined from one area to the next? To respond to these questions proposed, the term *borderland* needs to be defined. Jeremy Adelman and Stephen Aron say that there are two distinctly different definitions for the word. There is the idea of *borderland* which is a "contested boundaries between colonial domains" and the concept of *border land* which means "a region differentiated by a formal border making the territorial domain of both nations but characterized

¹ Bukowczyk, John. Chapter 1.

as well by international coexistence.”² These two sets of words, though viewed as the same, are distinctly different. When one is referring to borderlands they are referring to the metaphorical line that is in existence between two communities, such as that between the United States and Canada. This idea is in contrast to the thought of border lands which refers more to the cultural and political aspects that separate one community from its neighbor.

Now that a border has been defined, one must from there extrapolate what type of border exists in today’s world. Throughout much of the world’s countries, one could describe it as a “borderland” that forces a “border land.” By this, it means that most borders have been established in the world through governmental and political power and now a country’s inhabitants try to grow a sense of cultural pride and conformity. The United States is a prime example of a nation that has this identification problem. Its creation is that of a melting pot and that there is no one element that binds it together in unity. Instead, it is through defining a border that the United States is trying to instill upon its citizens the sense of belonging to one single being. That everyone who is a member of the United States has the same unalienable rights as any other person. This is not to say that every country should be classified as a “borderland.” There are still many nations at

war within themselves that are trying to identify who they are and where their territory extends to. That their land is not an assumed line created by a government in defining a nation, but it is the cultural history of a community that people have always considered home.

Since borders do exist, there is a need to secure these borders. The question is how one goes about defining a border. Is the best way to generate a line like that that exists between the United States and Mexico? Here the border presents and manifests itself in the form of a physical fence that runs the entire border. Or should the border continue to be more metaphorical and perform as a check to control the flow of people? That people are free to come and go from one area to the next, but governments just want to identify and be aware of who is within their borders. This border can be seen when looking at many of the European nations. The thought is not to block or inhibit the flow of goods or people. Instead it is to protect the country while welcoming visitors into the country.

Welcoming is the idea that is lacked the most on issues of border security. The United States, more so than many other countries, puts its focus on the idea of check points. Talking to architecture student Jason Pfaff about his touring experiences in Europe, he recalled that the hardest country to get into was his

² Bukowczyk, John. Chapter 6.

own. "Many countries while in Europe would only check your passport and occasionally ask questions as to 'Why do you come here?' or 'What do you intend on doing while here?'" Pfaff went on to explain that he was able to tell the people that he was traveling with because many times they would rush ahead to try and get through the check point first. He found this especially to be true when arriving back to the United States. "The United States border was, from my experience, the most stringent, they had the longest line for the check point of any of the countries I went to and I am a citizen."³ Based on these experiences how are we as a society supposed to confront the idea of border? The border needs to be addresses as a whole. It is not just the border that defines the edge of one government's domain from the next. Instead, it is through the culmination of many different elements that leads to the true acceptance of others.

The Berlin Wall was a physical symbol that did not encourage the intermixing of East Germany and West Germany. Unlike the historical reasons for erecting a wall, the Berlin Wall was designed for the other extreme. For instance, when one looks at walls such as the Great Wall of China or Hadrian's Wall, they were developed to keep people outside of an area; the Berlin Wall was developed to keep people in. Hagen Koch, a former East Ger-

man secret service agent describes the wall such "that traps along the Wall were not designed to stop traffic from the West, but to prohibit flight from the East."⁴ Here the physical barrier was not keeping out another country; instead it was an internal struggle that set out to limit the amount of influence that was to be received from other cultures within the same country. The wall created a line that instead of bring the communities together so that they may continue to grow and prosper off one another, the two governments were forcing a wedge between the two communities. This concept of separation leading to a better overall life only created a rift between the societies in feelings of supremacy over their neighbor and creating a social and economical barrier. The border is not meant to completely segregate opposing thoughts. Instead it makes the opportunity for a passage through which people may flow to better their lives. That a community may acquire new technological advances that may not been achieved otherwise.

With the onset of modern commerce and finance, medieval walls gradually loss their function. While many survived in economically less developed areas, they were frequently demolished in commercial centers, not because they obstructed the mobility of the citizens, but mainly for the reason that their sites had turned into prized real estate.⁵

This statement explains that one cannot expect

³ Pfaff, Jason. Personal interview.

⁴ Preuss, Evelyn.

⁵ Preuss, Evelyn.

a society to excel when it limits its influences. Instead, a country must open their borders welcoming outside influences in. It is only through external influences, especially in today's global world, that true development can be made. Nowhere is this idea of global trade more established than in the North American Free Trade Agreement (NAFTA). NAFTA was established January 1, 1994, as an agreement between Canada, Mexico, and the United States to eliminate the taxes and tariffs on goods. After establishing this contract, imports and exports through our nation's borders have been on the rise. Since its issue in 1993, the United States has increased trade from \$297 billion dollars to \$930 billion. Further, there has been an increase in American investments from 45 percent between the years of 1979 and 1993 to 117 percent since 1993.⁶

In order to address the notion of a welcoming border, one must first decide what the border consists of. As mentioned earlier in the investigation, a border can be a metaphorical line that has been determined by a government or it is an area that is culturally significant. What must be additionally kept in mind is that as the world exists in its present state, more commonly a border is established by a government. So now that these borders exist, how are we to improve upon them? Many of the conclusions in ways to create a more hu-

man friendly border crossing for the twenty-first century come from the site. Site relations offer ideas about the border that are not always a priority in the initial stages of a security check point. When looking into the United States and Mexico border there is a strange feeling when approaching the check point. At first, in the distance one sees a long fence extending for miles in each direction. As one approaches a small hole and a little building appears in the fence, where a guard stands ready. At the fence the guard checks to see whether or not the papers are legal and if this person is allowed to enter the country. If everything works out, the person is on their way watching the building and fence grow distinct in the rear-view mirror. If something is wrong, then the person is detained until the mistake is fixed or the person is charged for a crime. Compare this with areas of the United States and Canada border in the Great Plains and Rocky Mountain region where the approach to the border is the other extreme. Here one leaves a city and drives down a road watching the town grow distant behind. After a while a new town appears on the horizon, but where is this new town? Is the town still in the United States or in Canada now? There is no differentiating between countries just a little sign on the side of the road that says one is leaving one country for another. So here is where the proposal of site and experience meet the concepts of entering and welcoming. That

⁶ NAFTA Facts

one has a firm understanding of where they are and are embraced into the site and community to which it represents.

Debates have been waging on at the United States-Mexico border about the civic duties the United States should do. The issue of a border and border security is not the problem. Instead, the difficulty lies in how are people greeted at the border. Fernando Romero, a Mexican architect, and his firm, LAR, have been researching into this issue for the last seven years. In 2001 he designed a pedestrian bridge and cultural museum that would connect El Paso, Texas, and Ciudad Juarez, Chihuahua. The bridge was designed to create a Hyperborder between the two nations that would provide interest in the border. Additionally, the bridge would provide as a link between the two countries to grow stronger ties and connections with each other. In creating the Hyperborder, LAR looked into different aspects for improving relations between the countries. These characteristics included health, migration, demographics, and security as a way to establish the missing link and connection between crossing and welcoming. Welcoming means more than to just entering since it is also the experience along the way. "There are a lot of emphasis on migration and security in the dialogue between the two countries, but really the picture is more complex," says Alex

Quinto, a graphic designer at LAR.⁷ This same type of connection was designed for the border between San Diego and Tijuana. Similar to the Hyperborder, this new connection between the countries would be a pedestrian bridge that would include retail space, cultural centers, restaurants, and eventually a hotel and conference area. The location was chosen due to the importance it has as an existing crossing point. According to Pat Hightman, a redevelopment program manager with the San Diego Redevelopment Agency, "... the main border crossing between San Diego and Tijuana is the busiest in the world. There's an unbelievable amount of traffic that goes on between these two cities."

⁸ This would provide a cultural link between the two adjoining countries creating an idea of unity and approach that was missing.

Site is the key element to any border facility. It establishes the reason for the facility to exist as well as what types of vehicles will be traveling through the location. The site chosen for this investigation is in Sault Ste. Marie, Michigan. The issues that need to be considered here are different from those that exist in other international border crossings in the United States. Here, the majority of the crossing between Canada and the United States occur because of noncommercial vehicles. Personal vehicles make up 2.4 million of the annual crossings on the bridge, with the major-

⁷ Romero, Fernando.

⁸ Bergsman, Steve.

ity of the people using the bridge to go home. The number of commercial vehicles using the bridge has been steadily increasing each year. In 2001, there were 129,789 truck and bus crossing and this number has been on the rise since 1980 where commercial usage has grown by 227 percent.⁹ Since this crossing is so significant to both commercial and noncommercial use, a place of reception needs to be created. For those coming home, to welcome them back; for those who are transporting goods, to establish a space that will embrace them and invite them into the United States. But what is it about the site that will generate this type of feeling? To answer this, one must first look at what is culturally significant about the site. These aspects include the approach through the bridge, the community that it enters into, and the history of the area itself. It is through these established ideas one may be able to accurately incorporate the feeling of the crossing. By taking into account what the community has to offer, one has the ability to usher in and make others feel accepted into the country.

The establishment of location through border is an aspect that must be dealt with. To continue on with borders as they currently exist is not only poor for one community, but does the entire world injustice. The world is becoming more globalized everyday in the way in which business is conducted. As business con-

tinues to use and interact with these borders, so to must the borders interact with man. Trade is not an action in which a country does not have to worry about what is coming into a country. Instead, one must understand that it is through the interaction of people that a community will thrive. This means that the borders must be embraced. It is only through proper connection to site and culture will others come. To focus solely on security is not the best strategy for a checkpoint. Man needs to understand that to bring others in, they must embrace one another and not form a wall. As in the example of the Berlin Wall, where East Germany did not accept the views found in West Germany, splitting the country into two distinct sections only further separated the nation. Establishing an idea that through seclusion they would be able to better themselves and how this was not the case. Further, as in the case with Mexico and the United States, the simple means of forcing an opening is contrived or with Canada how the crossing point is nonexistent. Entering into a country should not be an act mankind merely does. Instead, it must be celebrated to establish arrival and openly receive people. This argument is not to say that security should not be included in the border experience. Governments need to patrol and guard the country to understand and protect a nation. Moreover, it is to establish the concept that arrival, in addition to security, needs to be determined. As

⁹ MDOT. See Traffic Trends at the International Bridge.

stated by Fernando Romero, “Architecture is a translational process. We translate social, political, and economical matters into a specific architectural or infrastructural solution.”¹⁰

¹⁰ Romero, Fernando.

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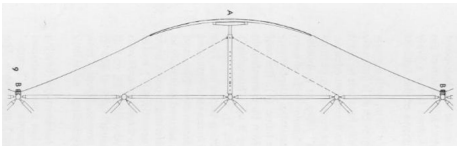
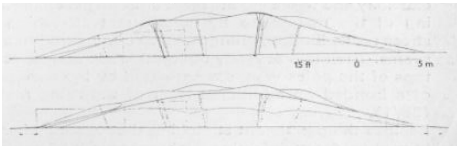
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precedence



All photos above courtesy of *Frei Otto: Tension Structures*

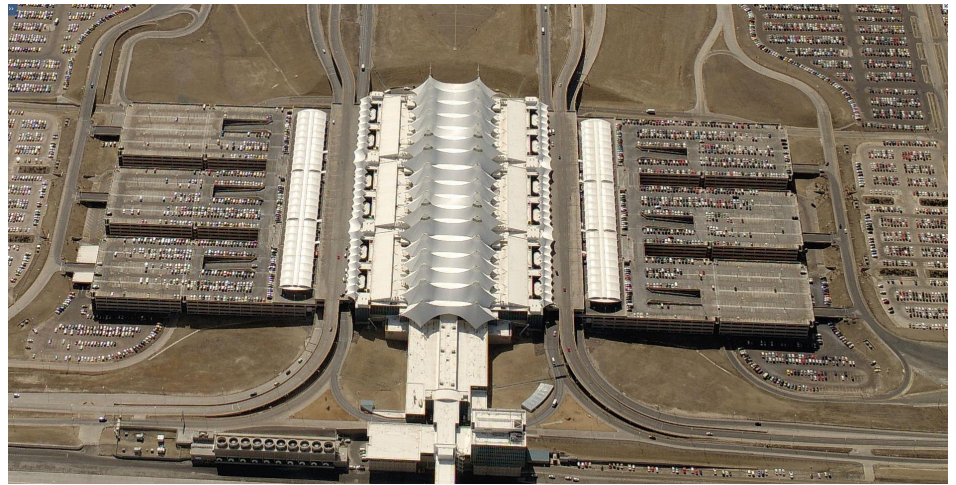


Photo courtesy of *Microsoft Livees*

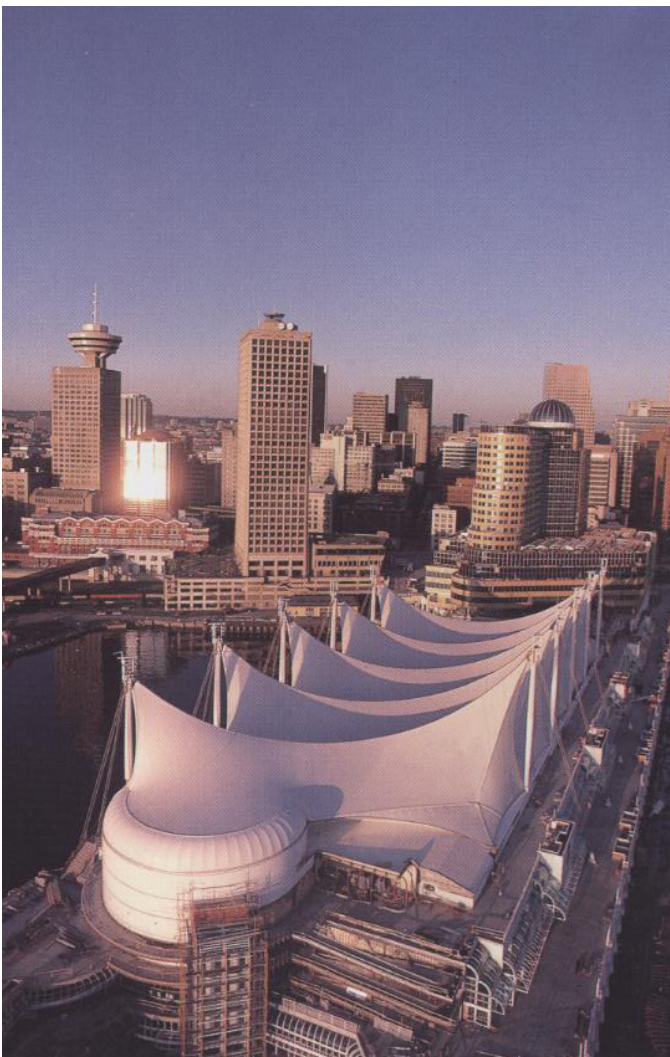


Photo courtesy of *Light Structures: Structures of Light*

Tensile was an early design element to work with in creating a building that would be drawn from the site. The issues that could be drawn from the site included ideas of slope, wind loads, snow loads, and natural lighting. Though there are multiple other issues that need to be dealt with when referring to site, this gave a preliminary base in which to look at building design. Researching tensile structures one noticed the various and complex issues that may develop into a form. Based on site relations, it was determinate that the building had to become organic. That the building itself must grow from and incorporate the land to which gave it its rise. In looking at the manipulation of the membrane one realizing that a building developed using it, one could make the building feel as a peeling back of the site. How buildings skin is being developed from the land and is literally a direct connection between the shape of the building and the earth. Additionally, the ideas of a tensile structure allowed for natural lighting in area that during a good portion of the year is felt as drab due to the amount of snow. That through the building one would be able to look beyond how gloomy the outside might be and see the beauty of the light reflecting off the snow.

tensile structures

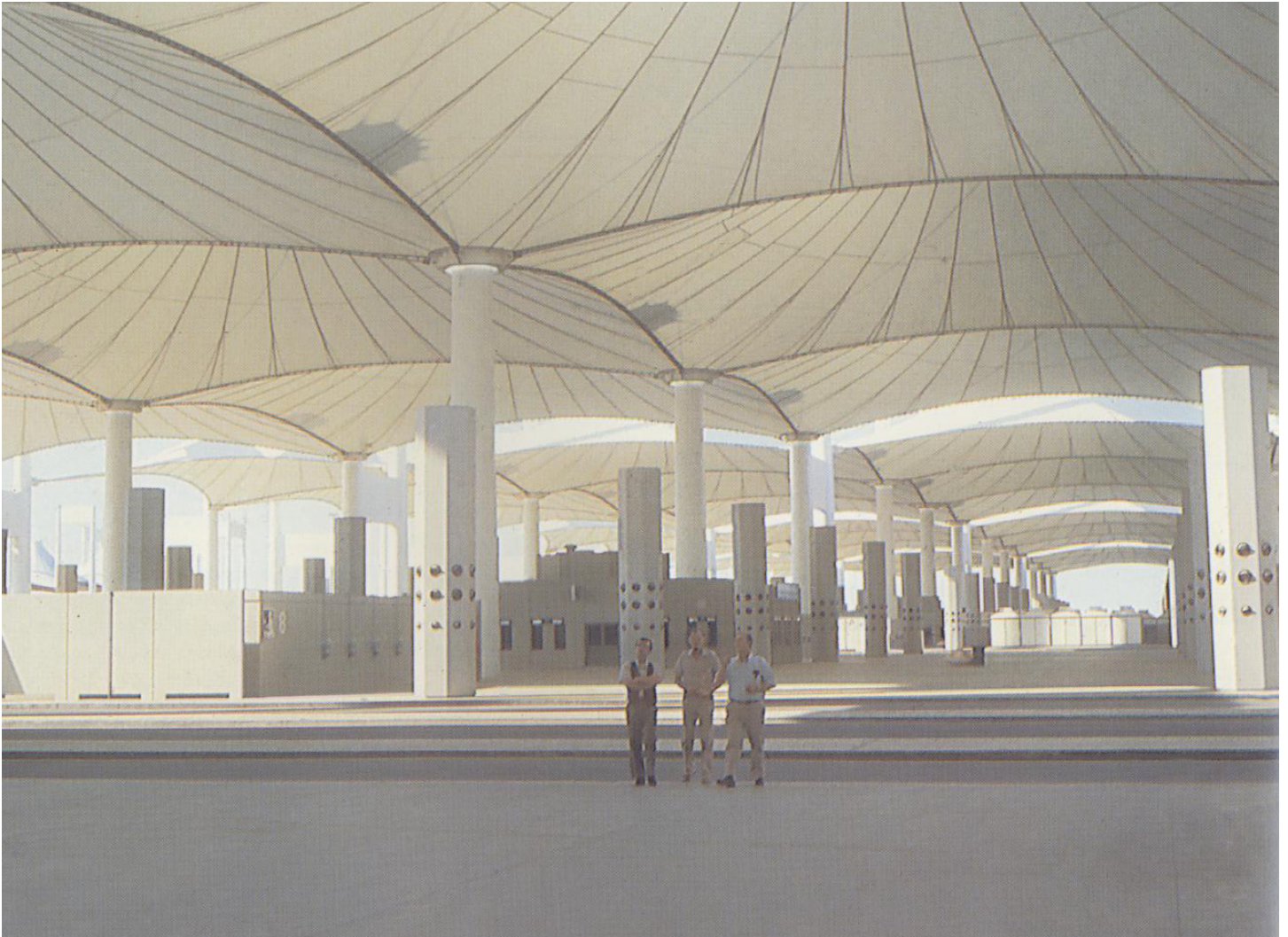


Photo courtesy of *Light Structure: Structures of Light*



Photo courtesy of *Frei Otto: Tension Structures*

denver international airport



Location: Denver, Colorado

Designer: Fentress Bradburn Architects

Year: 1989

“The Passenger Terminal Complex design called for a far-reaching vision coupled with imaginative building techniques. The complex is an excellent example of how materials, patterns and textures from the local environment can be strategically incorporated to address the physical, cognitive and functional needs of the user.”¹ This concept of functional needs for its users leads the design team to make the passenger terminal accessible to all. That all bathrooms have handicap accessible bathrooms and additionally many unisex bathrooms were to be installed to allow the handicap and their assistant in the bathroom. Further, this idea of facilitation continues to the parking system which makes a definitive area for assistance.

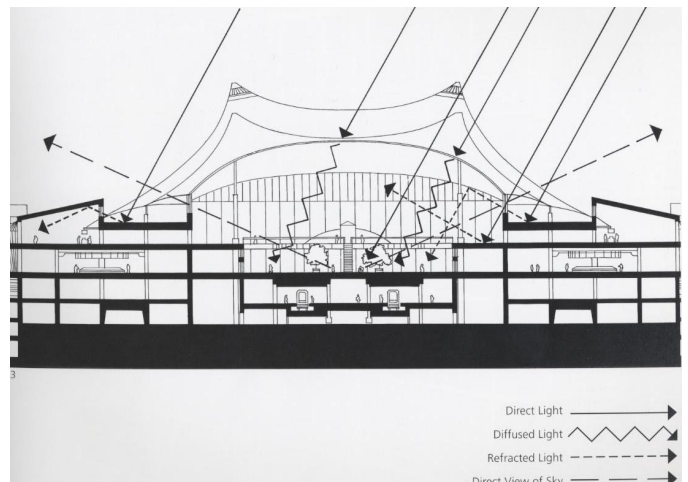
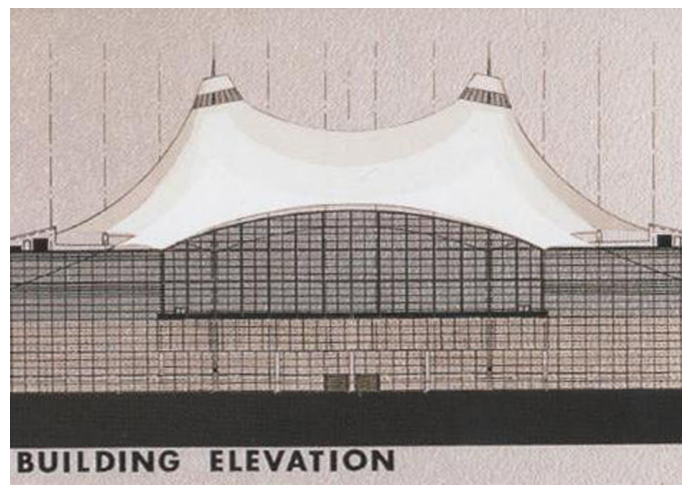
Also, the use of natural light is an example of people’s desire for day lighting of interior spaces. That people respond with a more positive mood and altruistic behavior patterns according to Dr. Diane Martichuski of the University of Colorado in Boulder. In the eight tallest peaks, skylights have been incorporated with diffusers to add to the natural daylight that would

¹ Sommers, Jessica. Chapter 6.



otherwise seep through the Teflon-coated fiberglass tensile-membrane roofing material. Further, due to the tall open structure and use of indirect lighting all the way down to the baggage claim area there is a feeling of open space and lightness.

This structure captivates its patrons and ushers them into the airport. Through the sheer size of the complex people are able to be fully incorporated into the building. Additionally, use of security pavilions, art exhibits, museum displays, information booths, seating areas, telephones, and ATMs are key concepts that needed to be considered during the airports design, like when designing a border station. These ideas not only offer assistance to those that enter the country, but further indicate ways in which to make the facility seem more human friendly.



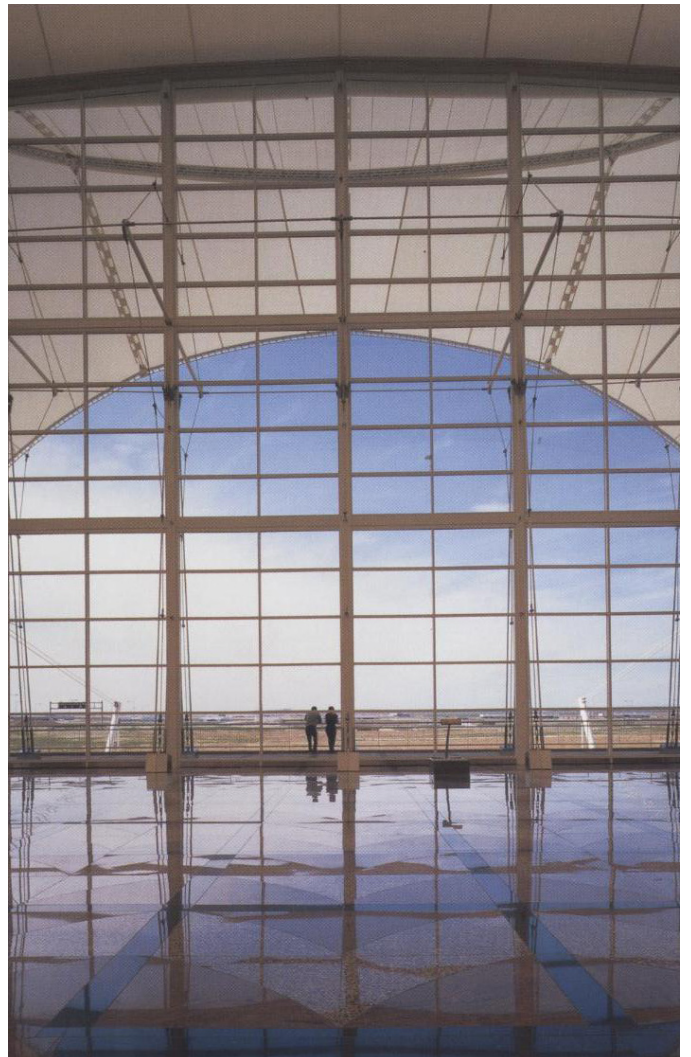
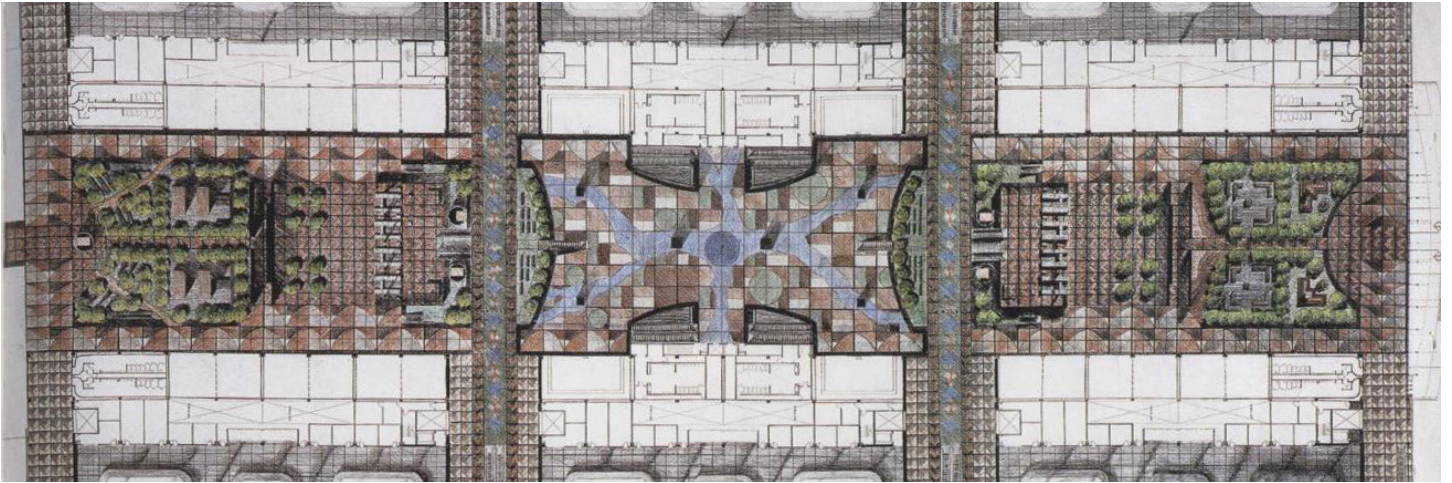
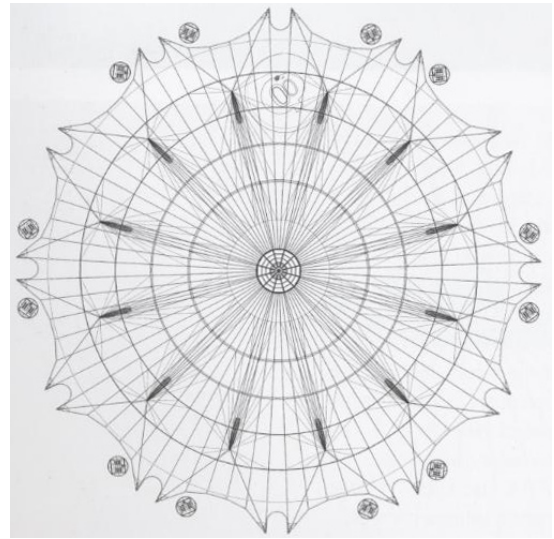
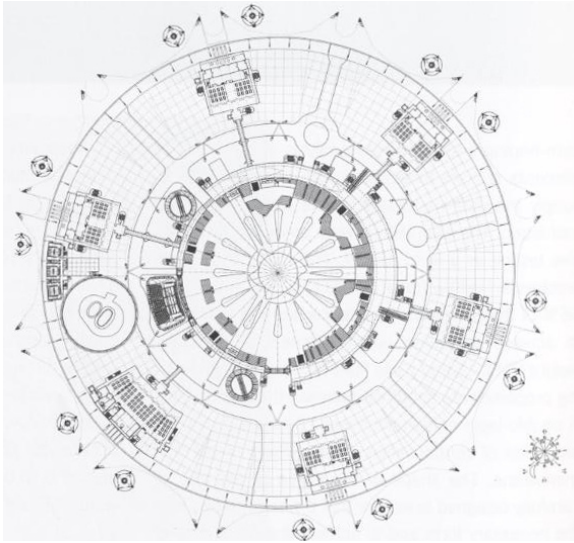




Photo courtesy of Microsoft: Live Search

millennium dome



Location: London, England

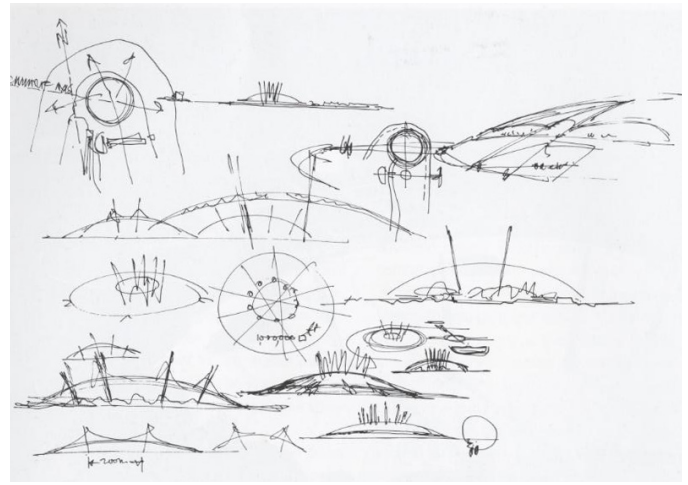
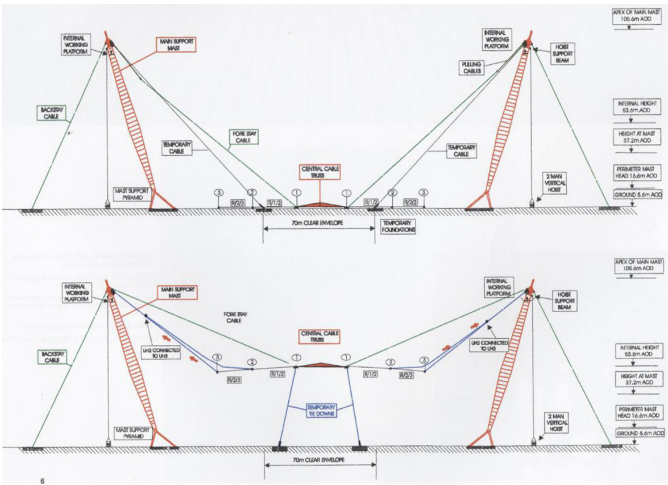
Designer: Richard Rogers Partnership

Year: 1996

The Millennium Dome was designed to be the centerpiece of the new urban district on the Greenwich peninsula in London, England. The urban district was erected on the former gasworks in an urban renovation for the millennium exhibition. At the base of the hall there is a span of 356 meters around with a distance of 200 meters between the 12 steel trusses. Each of the trusses is then anchored into the ground at two steel reinforced concrete junctions. Roofing materials for the dome is made of medium-weight PTFE-coated glass panels in order to provide the adequate weight needed for tension on the roof cables. In order to attach the roof to the cables 20,000 aluminum claps are anchored to various 32 millimeter diameter cable pairs. Cables for the roof are then attached on one side by a 30 meter compression ring supported off the ground by the 12 steel trusses and the other ends to a series of tie downs. According to Ian Liddell, an engineer at Buro Happold, "Man has long dreamt of creating large enclosure to ameliorate the inhospitable climate in various parts of the world. Perhaps the most famous



All photos courtesy of Membrane Structures



example by Buckminster Fuller to cover a large area of New York... The millennium dome could be extended to cover a large area of 150,000 m² with PTFE cladding – in other words, an entire town covered for extreme climates.”¹

This building was originally looked at because of its use in tensile structures. After reviewing the building it was also noted for the span it is able to cover. The Greenwich peninsula renovation was not considered the most influential urban renovation project but the structure itself remains as statement of the significance and ideas that were incorporated within it. Furthermore, the structure of the dome and its unique incorporation of 12 steel trusses protruding from the inside of the dome into the exterior, 100 meters above the ground, offer ideas how the structure can develop the form and not the form develop the structure.



Photos courtesy of Microsoft: Live Search



Unless otherwise denoted all photos courtesy of Membrane Structures

¹ Koch, Klaus-Michael. See section on the Millennium Dome.



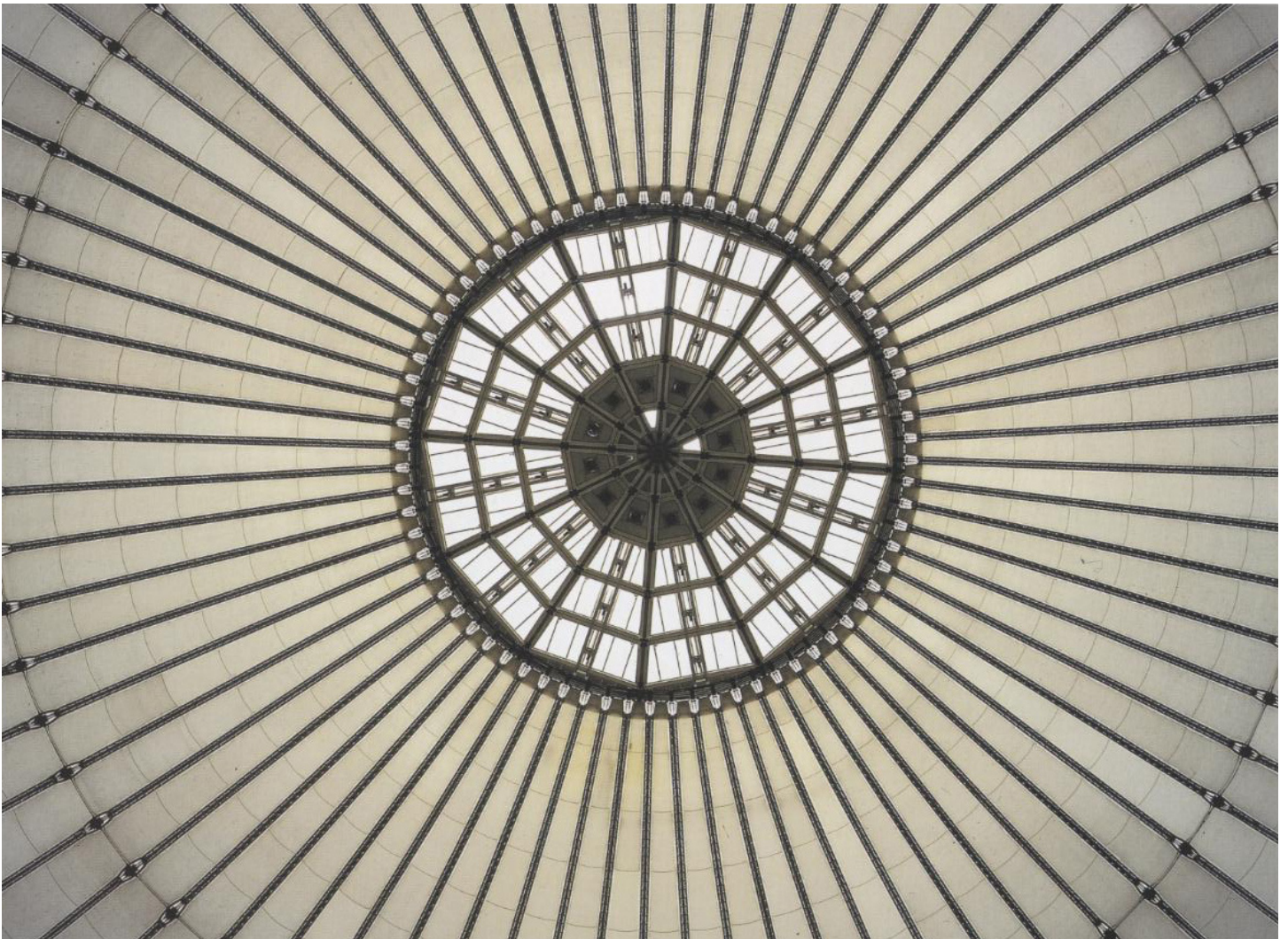


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city in the antarctic

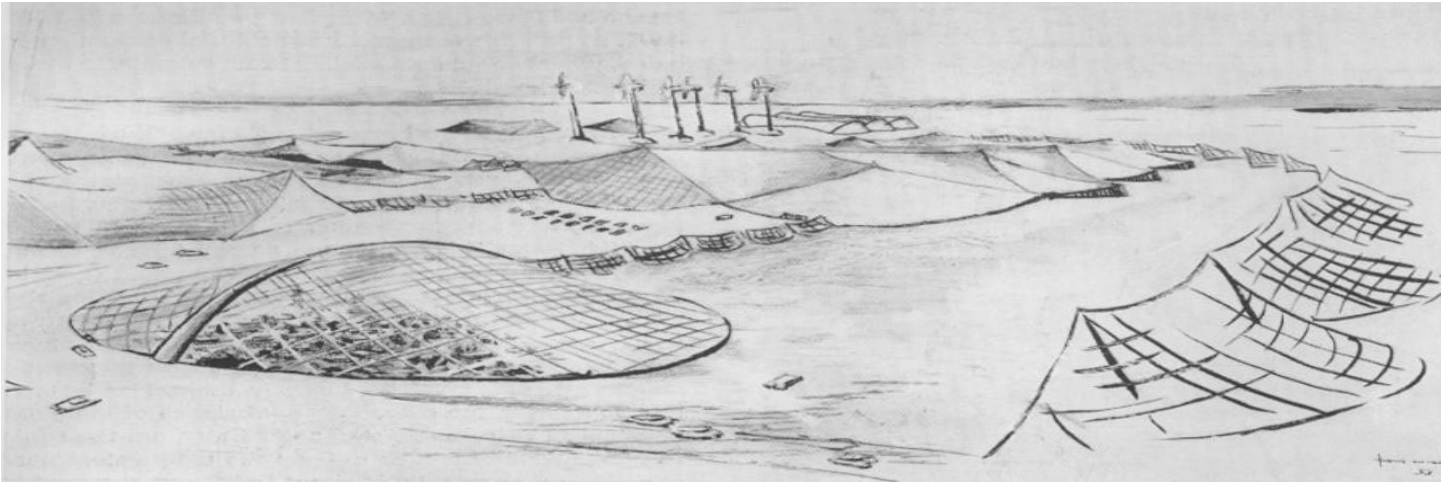


Photo courtesy of *Frei Otto: Tension Structures*



Location: Theoretical project for Antarctica

Designer: Frei Otto

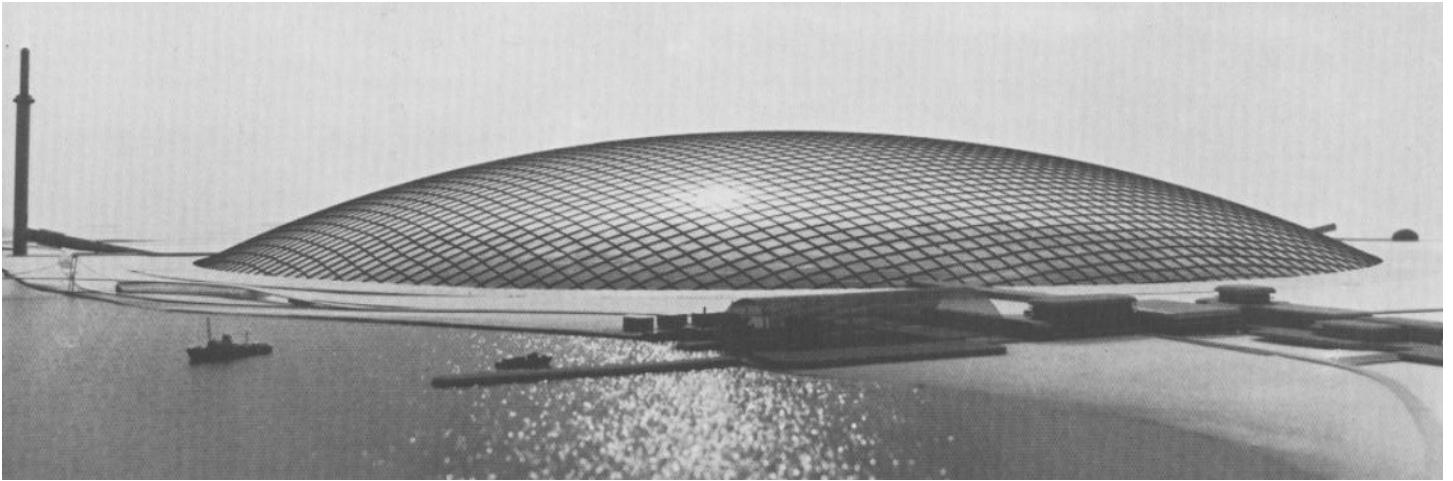
Year: 1953

The “City in the Antarctic” was designed by Frei Otto in an attempt to find a way in which to collect Antarctica’s vast supply of natural resources. It was originally calculated to be able to have anywhere from 15,000 to 45,000 people live in the community year round. During its creation Frei Otto needed to consider the extreme environment in which he was designing the community for. “The purpose of the transparent giant envelope is, by the simplest means, so to improve the deadly local climate that an ‘oasis’ where life can exist is formed.”¹ That aside from just the extreme cold that exists in the Antarctic Frei Otto, also needed to consider the aspect of sunlight that. He designed moveable shading devices on the south of the building to combat the climates twenty four hours of light in the summer. Additionally, a system of tracks and rails were mounted to the ceiling of the structure to fasten an artificial sun during the winter months. Other climatic issue to design for in Antarctica is the presence of condensation that will occur on the interior of the membrane. To counteract this problem warm air is circulated around the membrane structure at zero degrees



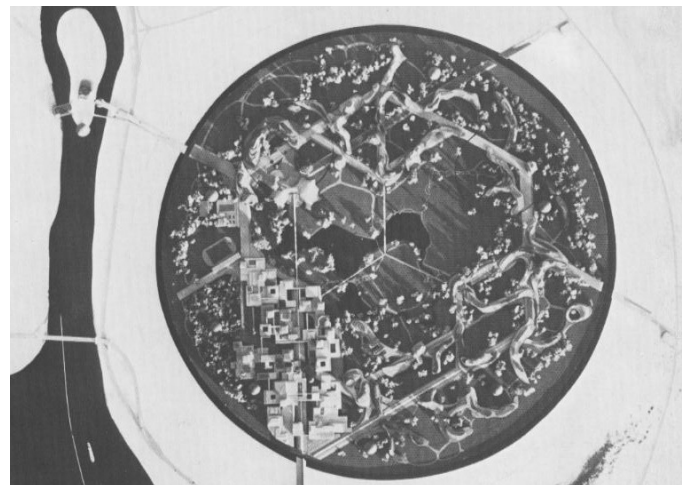
Unless otherwise specified all photos courtesy of *Frei Otto: Form and Structure*

¹ Roland, Conrad. See City in the Antarctic

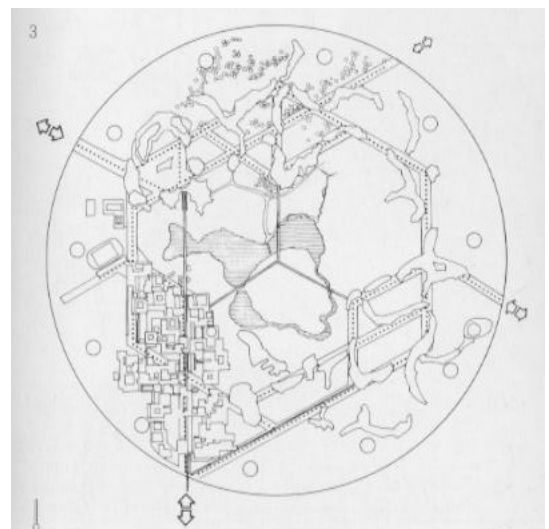


Celsius. If this is performed properly the formation of condensation around the tensile structure would be negligible if any.

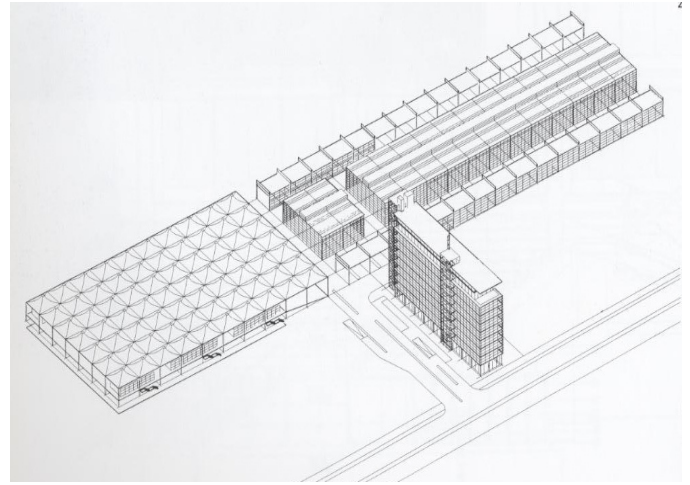
This structural design was first seriously considered for Siberia, Russia. Siberia has a rich diamond deposit and in the process of unearthing the diamonds, Professor Ljudkowski designed a tensile structure based off Frei Otto's work. This complex was designed to maintain an internal temperature of around ten degrees Celsius (fifty degrees Fahrenheit) while the external temperature is minus fifty degrees Celsius (minus fifty-eight degrees Fahrenheit).



The importance to this structure in the development of a tensile structure in the Upper Peninsula is the temperature range that it can be used in. The Upper Peninsula experiences some of the United States windiest conditions with winds coming straight off Lake Superior. Additionally, the snow load in the Upper Peninsula and specifically the Sault area can be extremely large. Therefore, if a membrane structure is able to withstand the wind and snow loads of Antarctica, it will also be able to withstand the elements in the Upper Peninsula.



truck depot



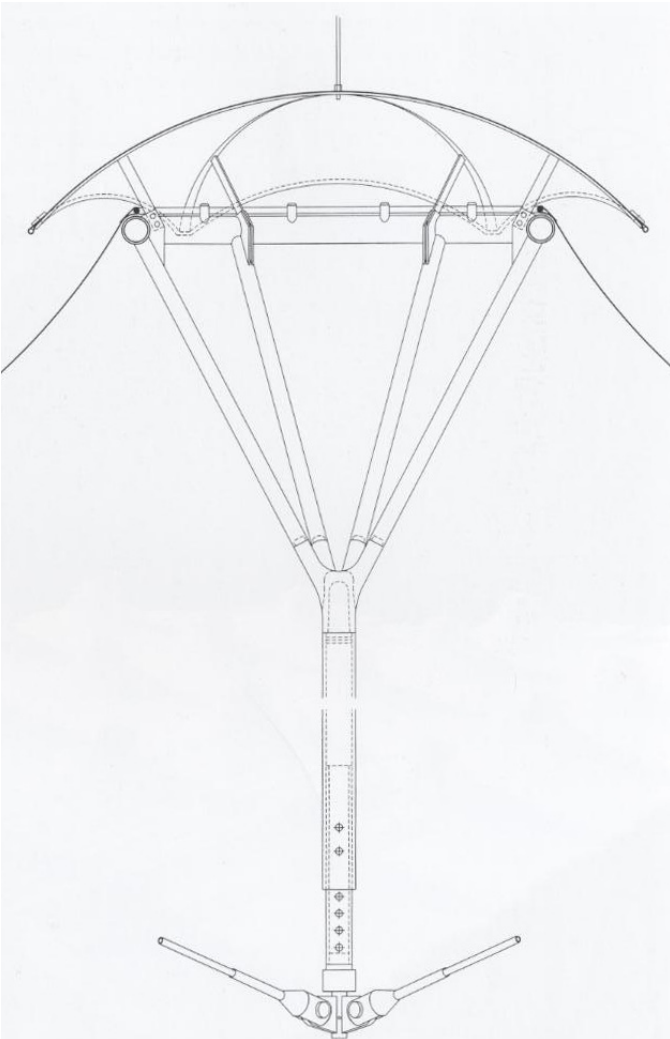
Location: Munich, Germany

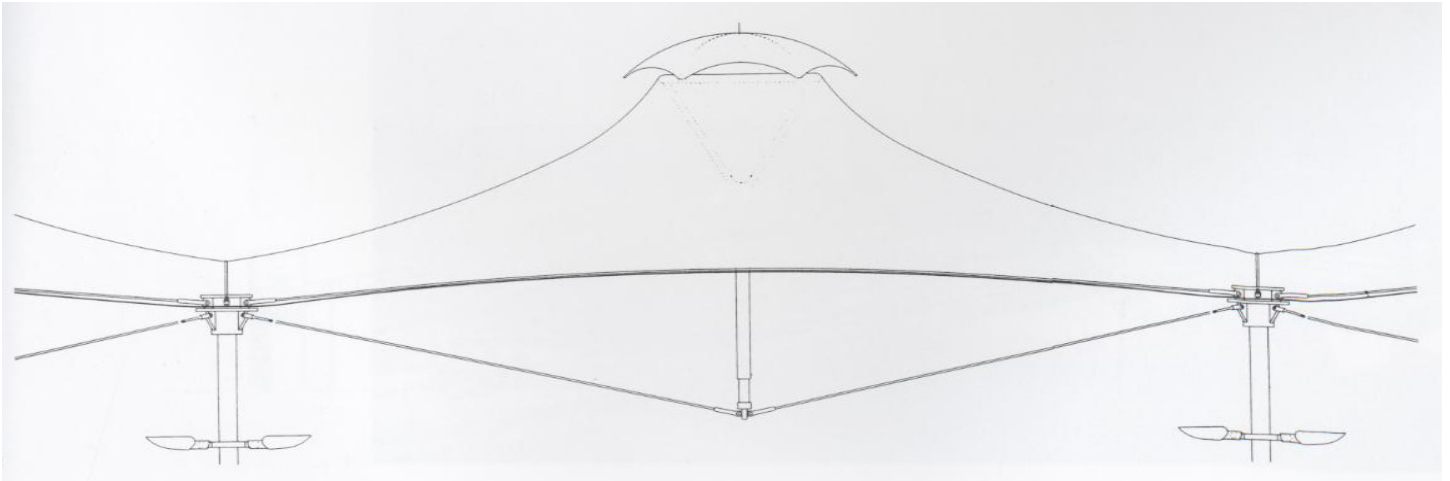
Designer: Ackermann and Partner

Year:

The Waste Management Office in Munich, Germany, needed a way to provide both style and function. Here the facility can be broken down into three main parts. There is the main office building which is mainly constructed out of steel and glass, the workshop which is intelligently designed to be fully incorporated in with the surrounding community, and finally the membrane truck depot. Since the tensile structure main use was for a storage area for refuse collection vehicles the concept of a membrane structure came to be the perfect solution of form and purpose. The membrane structure was financially practical for the purpose of the structure and additionally the aesthesis of the form provided the cover to fit the assembly in with the neighborhood.

The use of a membrane structure was considered because Ackermann and Partner recently finished the design of an ice-skating rink in which a tensile roof was used. During considerations of whether or not to use the material, the company realized that the PTFE roofing membrane would allow ample amounts of daylight into the building that the facility would not



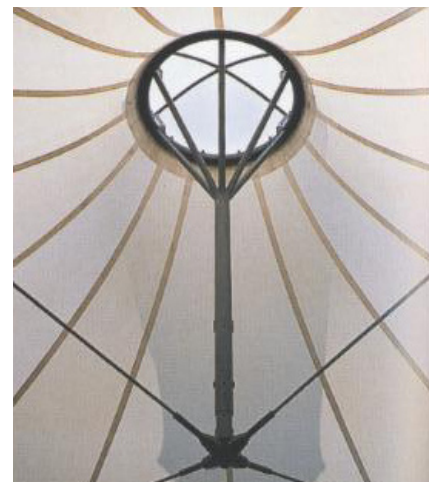


need artificial lighting during most days. Additionally, the membrane coating was dirt resistant and would let through large amount of day lighting before it would need to be replaced.

The disadvantages found with using this system was that the pre-cut membrane system would have to be welded together on the job site and the system would have to be extremely precise. However, “The degree of exactness in the construction allowed the membrane to be made with precision measured in millimeters.”¹ This precision was useful when it came down to the reinforced concrete deck which had to be exact.



By looking at this facility it offered ideas of how to incorporate the roadway with new station that is to be designed. That through a membrane structure, both the facility and roadway will not be looked at as two separate entities with one unifying idea, instead that they will become one being. That the building and the roadway may wrap and through the use of a membrane structure become one solid unit that both cars and people would be able to pass through.



¹ Kock, Klaus-Michael. See Truck Depot, Office for Waste Management.



Photo courtesy of *Building in Wood: Construction and Details*

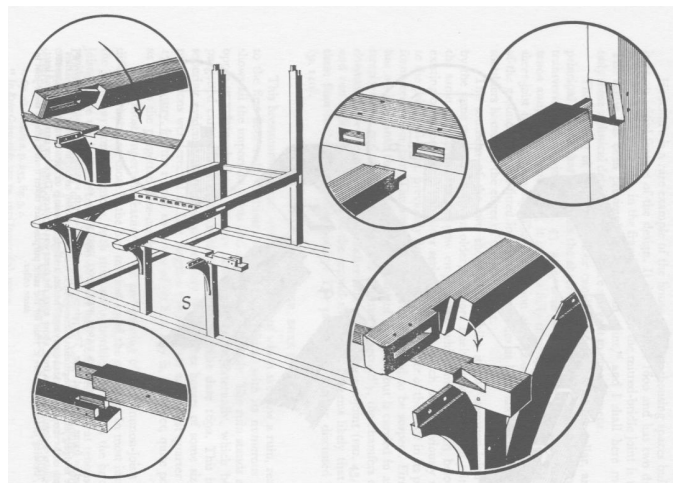


Photo courtesy of *The Development of Timber as a Structural Material*

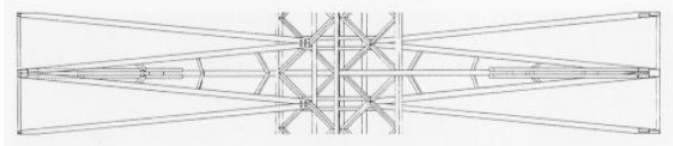


Photo courtesy of *Building in Wood: Construction and Details*

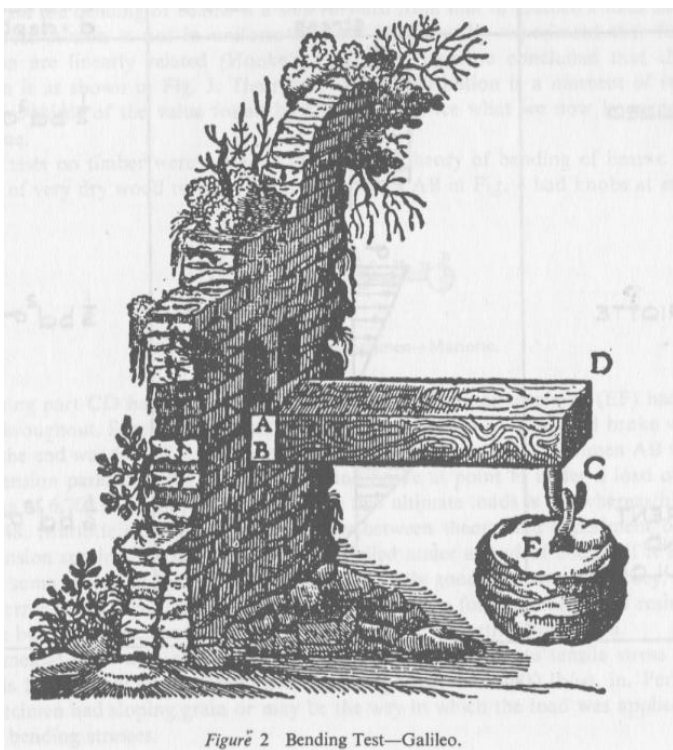


Figure 2 Bending Test—Galileo.

“... decisions made by a carpenter or engineer in framing a structure relate to the economy of their time and the level of technology available.”¹ So what does this mean for a building designed in Michigan’s Upper Peninsula? The Upper Peninsula’s has a history of various resources that are exported from the region. These resources include metals such as iron ore and copper, further the Upper Peninsula has been known for its history in logging. Trees in the UP can be up to five hundred years or older. This being noted when one is developing a building located in this area; the use of wood should play an integral role in the fashion of the building. The obvious response of the use wood is in the structure of the building. When wood is used as a structural element the inherent beauty of wood can be left exposed. If designed with care and proper attention to detail is considered leaving an exposed structure can become both a form of elegance and craft. Traditional Japanese houses pay close attention to how wood can be molded and transformed into a piece of art. Time and care was spent in the creation of each connection to ensure durability and beauty. That the connections were an important part to any project, that through them the entire facility may stay together. One should not merely bolt a connection together and hide them as in today’s quick build fashion. Instead, these connections are to be embraced for the purpose and importance that they hold. So to must the idea of a wood

¹ Yeomans, David A. See the Introduction.

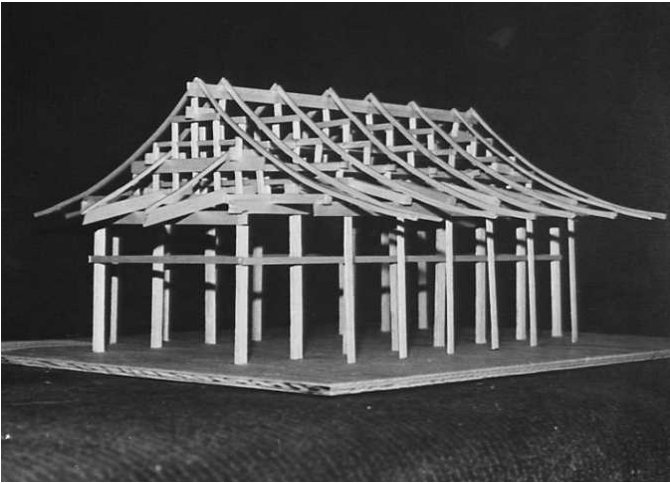
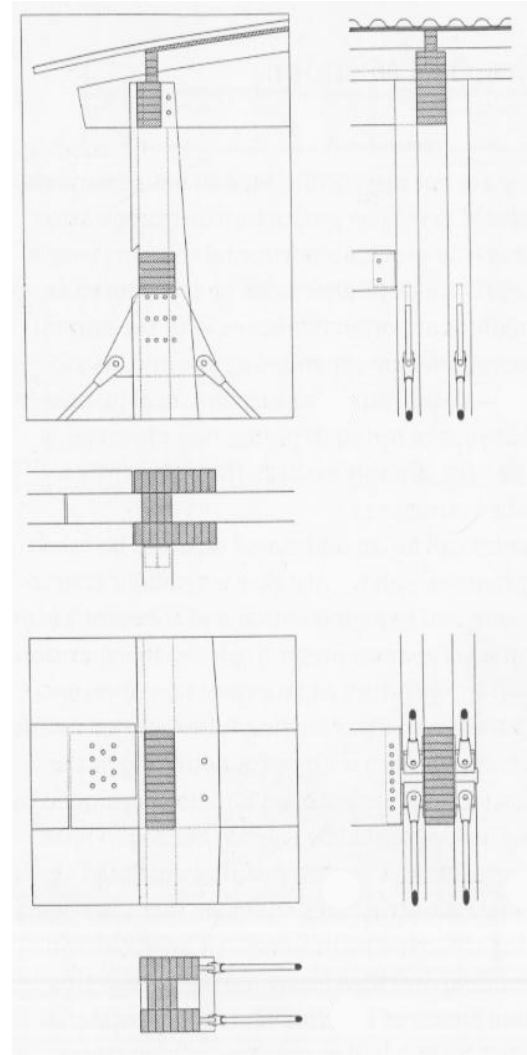


Photo courtesy of [Google.com/Images](https://www.google.com/images)

structure in the UP should be considered. That details and connections in the facility need to be examined. That through the use of wood as structural material the building may not only draw from the history of the overall area, furthermore, the idea of craft can lead to a more substantial and impressive building. That though the detail the facility will receive the respect and importance that a border facility will need to enforce laws.



All photos above courtesy of *Building in Wood: Construction and Details*

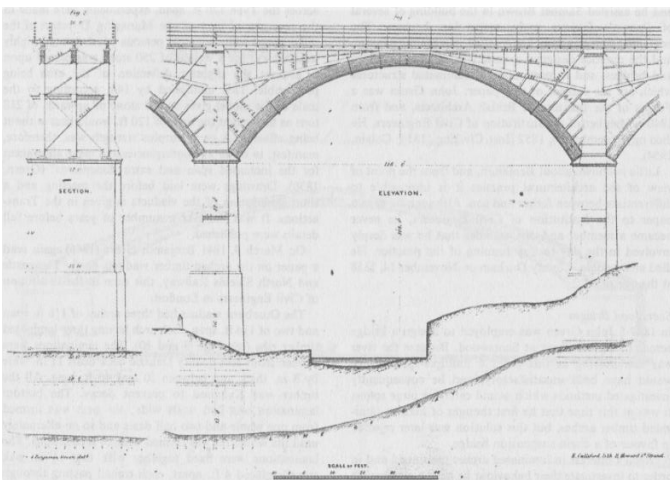


Photo courtesy of *The Development of Timber as a Structural Material*

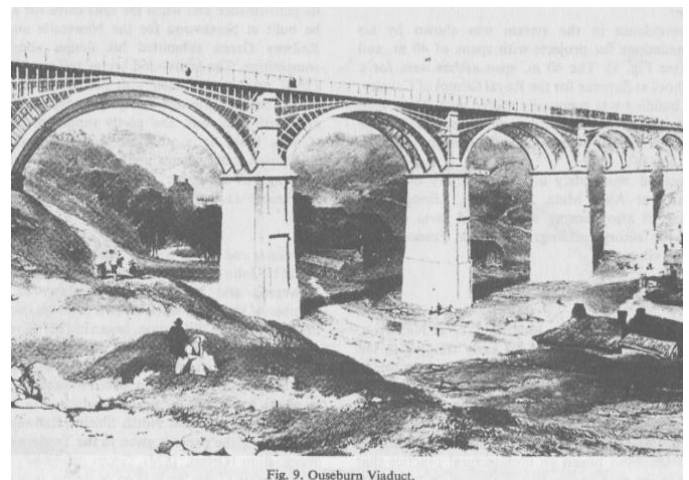
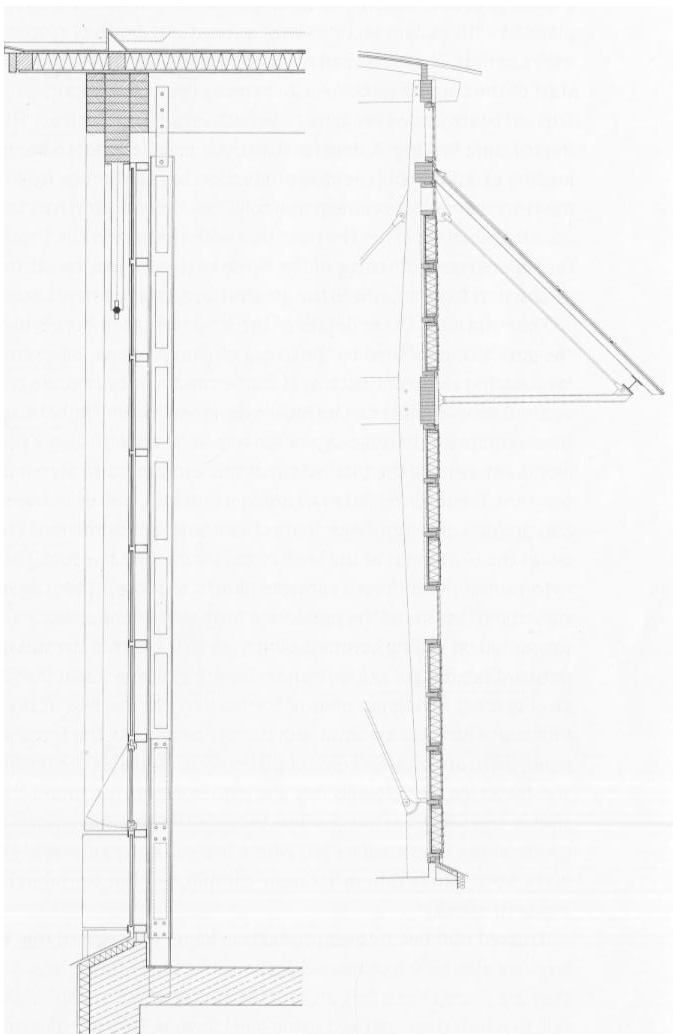
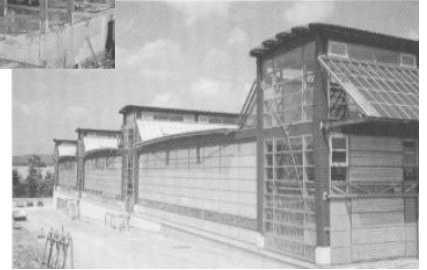
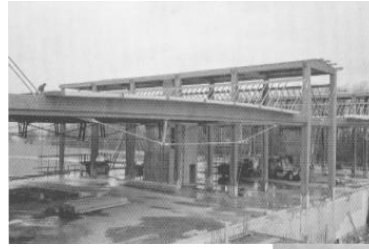


Fig. 9. Ouseburn Viaduct.

Photo courtesy of *The Development of Timber as a Structural Material*

production plant wilkhahn



Location: Eimbeckhausen, Germany

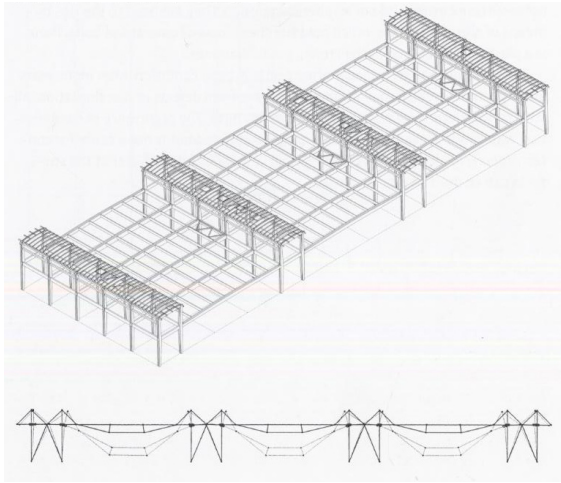
Designer: Thomas Herzog

Year: 1992

Thomas Herzog's idea was to create an assembly plant that was ecologically friendly. In doing so the building would have to be both low-energy during its construction, as well as to use material friendly resources. Before the design work of the facility can begin, first one must understand what an assembly plant is. An assembly plant is not about services offered like a professional building, it is about the number of goods that can be produced. "The underlying idea is to provide a horizontal covering over a working area made up of repetitive units which can be reproduced or subdivided."¹ This is to say that the focus of any plant is not the appearance or the aesthetics, but the products that are built. Clients' decisions are based on quality not whether the work environment has is distinctive. Only after the facility is able to be broken down to the basic operation can the building be built up to give the building the characteristics that emulate its function. Here at this basic level is where Wilkhahn Plant received its form.

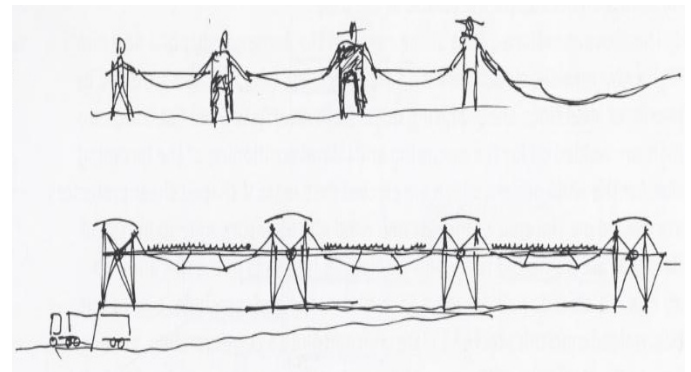
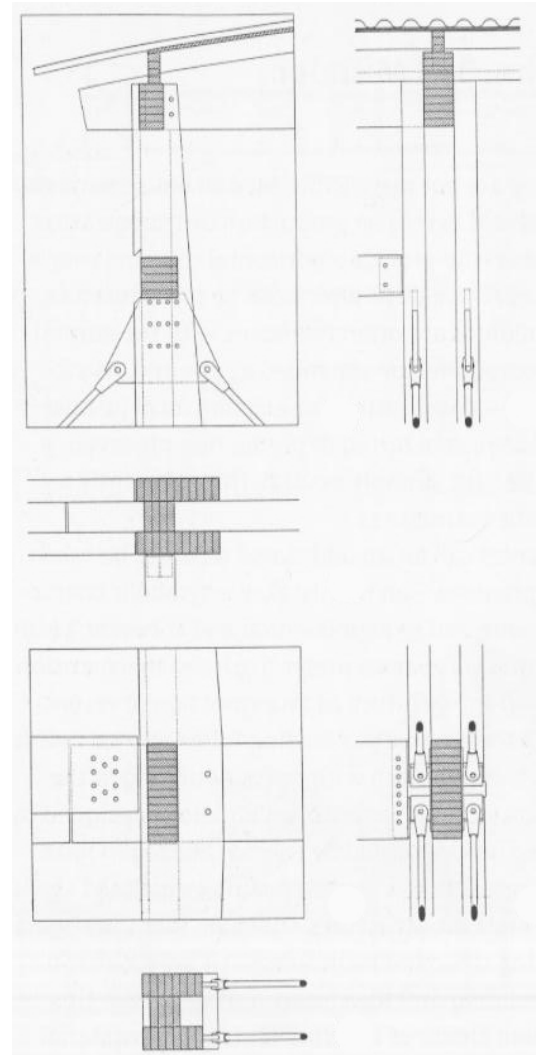
The building's shape was developed after Herzog looked at the assembly line work. His ideas derived from the idea of the man working side by side in a

¹ Gutdeutsch, Gotz. See Wilkhahn Production Plant section on subject.



row. His work was to “... characterize the solidarity of the work force, ... ‘guarding’ the intervening production area.”² The work creates the products and therefore sets up the building. Therefore the building must follow this pattern creating a standard form that will work across the building as products would move from worker to worker. This flow of work and people lead to the design of the two-legged trestles, also known as H-frame, which were spaced every 30 meters apart holding the load of the building.

The production facility offers insight not only about the uses of wood construction, but additionally about design development. A border patrol facility does not have to be designed to be aesthetically pleasing because it has to exist. Instead, it is only through care of design and building use that ideas will be generated, that the building represents the importance of the design.



² Gutdeutsch, Gotz. See Wilkhahn Production Plant on section on design.

superior dome



Photo courtesy of *Google.com/Images*



Photo courtesy of *Google.com/Images*



Photo courtesy of *Western Wood Structures, Inc.*



Photo courtesy of *Western Wood Structures, Inc.*

Location: Marquette, Michigan

Designer: TMP Associates

Year: 1991

Located in Marquette, Northern Michigan University is home to the second largest wooden dome in the world. The Superior Dome uses native wood from the area to construct the home for the Northern Wildcats. The dome itself reaches a height of 525 feet and with a span that is 536 feet in diameter. Construction of the facility uses a three-dimensional interweaving grid system with ribbing to give the dome rigidity. Additionally, the dome has a steel hub at the peak connecting the glulam beams. The hub also provides compression to the dome's beams to support the overall mesh grid. Testing for the dome has shown that it can withstand eighty mile per hour wind gusts that may occur off shore from Lake Superior, additionally it support up to sixty pound per square inch of snow load. Despite the fact the dome's design is based off the ways for it to withstand the elements, through its craft and detail in using the interweaving mesh design the internal structure of the building is inherently beautiful.

Through the use of simple wood construction the facility did not need to specialized contractors brought in, instead local contractors could be used.



Photo courtesy of *Yahoo.com/Images*

Marquette is a large community for the region, however, it still has a small market and does not receive much work outside the area. In the using wood construction the entire community could then be stimulated, that the money spent on construction and materials would be able to stay within the community. These elements made the Superior Dome part of the community, that it would not just be seen for its location, but to its connection with the local materials and workers which could only be used through knowledge of the site.

By understanding the site, the design was received the ability to give back to the region. It created a connection between the structure and the workforce of the Upper Peninsula. Therefore, examining the Superior Dome is essential when designing for Sault Ste. Marie because the Sault has a similar economy to that of the Marquette area. Both of these communities rely on local business and tourism to support their economy. To plan a facility that will draw outsiders in while giving back to the people that live there it is not only proper, furthermore it is good design.



Photo courtesy of *Western Wood Structures, Inc.*

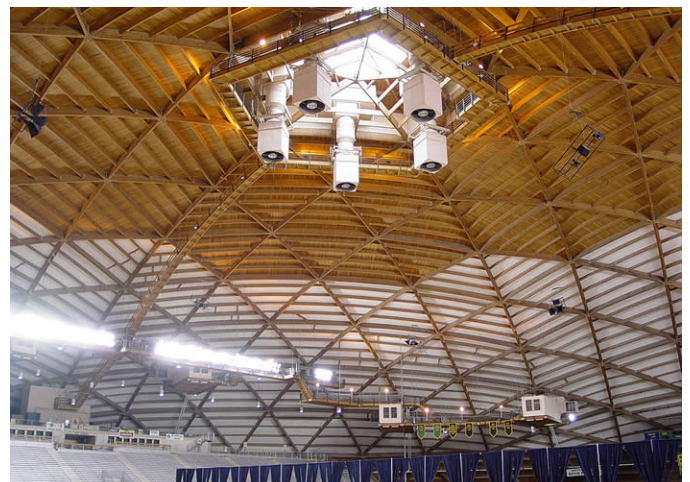


Photo courtesy of *Google.com/Images*

westminster lodge



Photo courtesy of *Google.com/Images*



Photo courtesy of *Google.com/Images*

Location: Dorset, United Kingdom

Designer: Edward Cullinan Architects

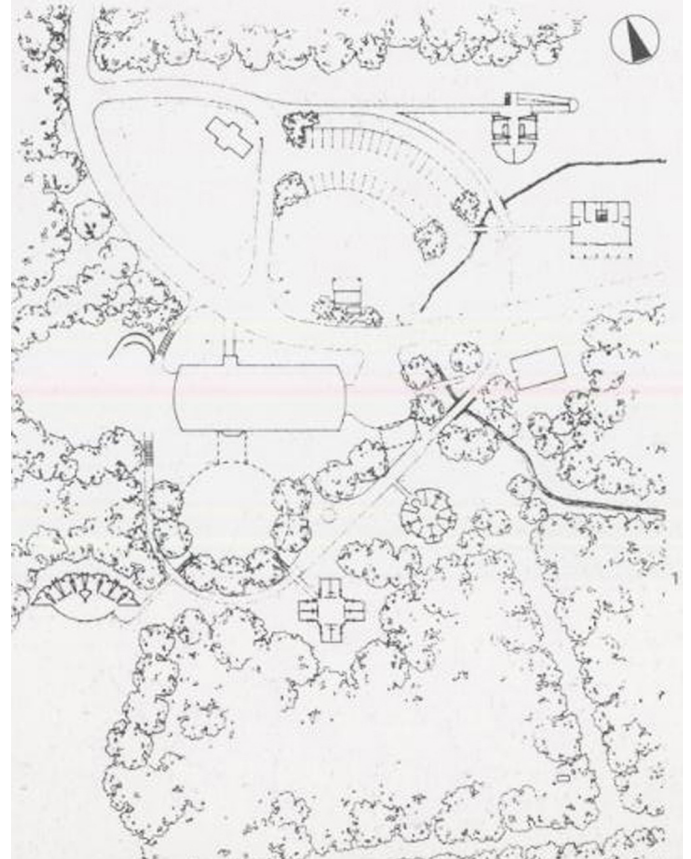
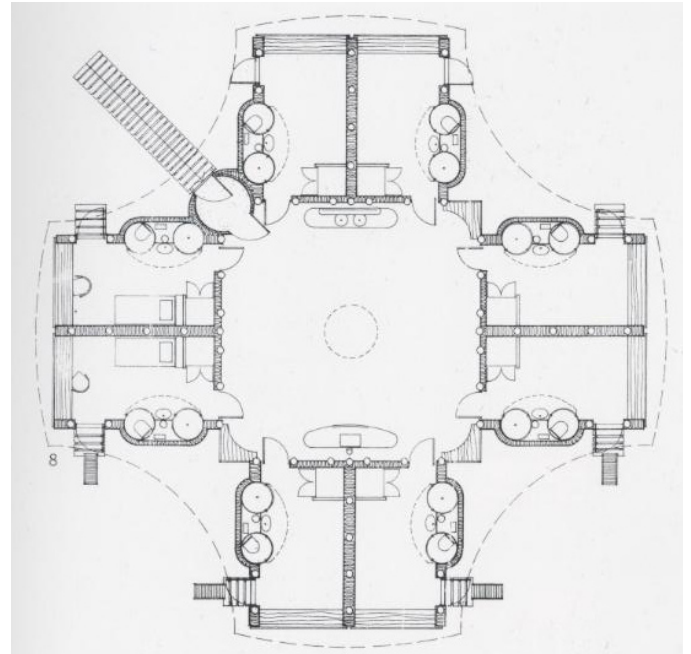
Year: 1991

The Parnham Foundation, in the United Kingdom, is an organization that supports the education of skills and trades. Its school, Parnham House, is built to recognize ecological crafts in an urban setting. At one of their locations in Hooke Park, the school decided to setup a community that focused its concepts of wood-related designs and techniques. The Westminster Lodge was constructed to be a housing unit for eight of the school's student, that the students would be continuously surrounded by the design through craft.

The lodge itself was designed to be a private dwelling for eight of the school's students. The building consisted of four bedrooms, each one having its own private shower, and a communal kitchen and wood burning stove. It was proposed to be built in coordination with four other building that an "ecological village" would be designed based on the natural resources found the UK. The lodge was built using roundwood, which is not a permitted building material in the UK yet, however, the school is working to have it accepted. Roundwood is different than typical rectangular slats in that it is round in section. To create



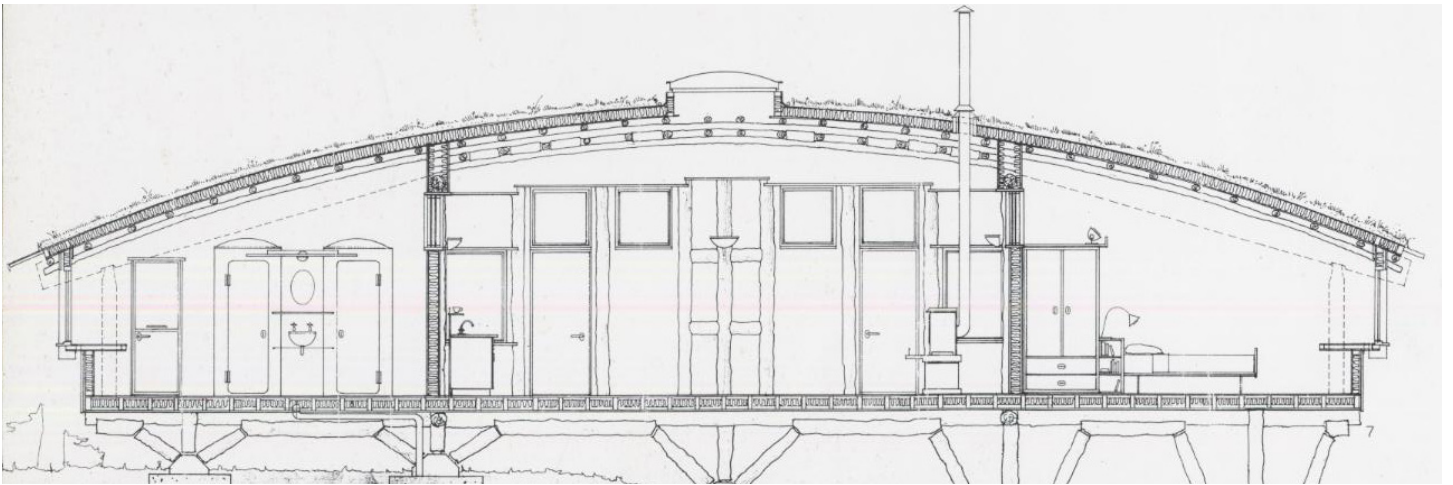
Photo courtesy of *Wood: New Directions in Design and Architecture*



slats trees need to have a larger diameter than round-wood that it can be milled down. “Britain imports 90 percent of its timbers,”¹ due to the limited amount of land and forests provided. Therefore the school is trying to promote the initiative for thinning, which uses wood that is not large enough to be used as timber post or beams, due to the availability of the smaller trees to the region.

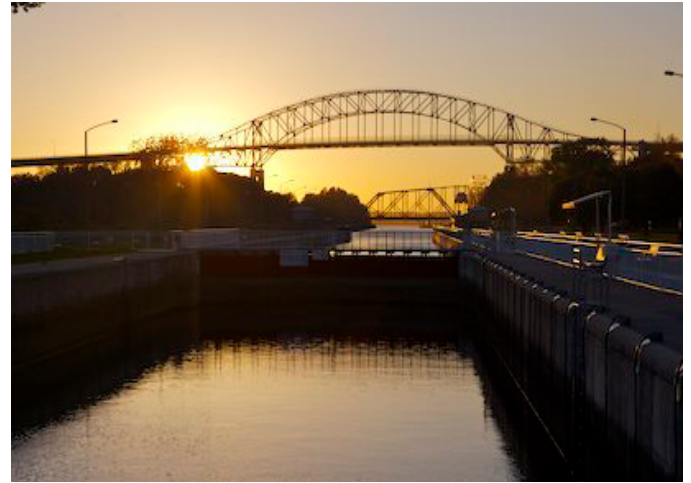
The Westminster Lodge is important to the investigation in its use of materials and structure. Though wood has always been considered a structural element, the school pushed for a new use of it that buildings throughout the UK would be able to use it. In that redesigning the structural theory behind it, wood may be used as a structural material without always needing to import it. By refiguring the woods use the design of the building was able to use locally logged trees that would not normally been considered due to its smaller stature. Parnham House’s school was able to look at a traditional way of building and reinvented it into a beautiful structure that without exploration of a material could not have been built.

¹ Stungo, Naomi. See section on Westminster Lodge.





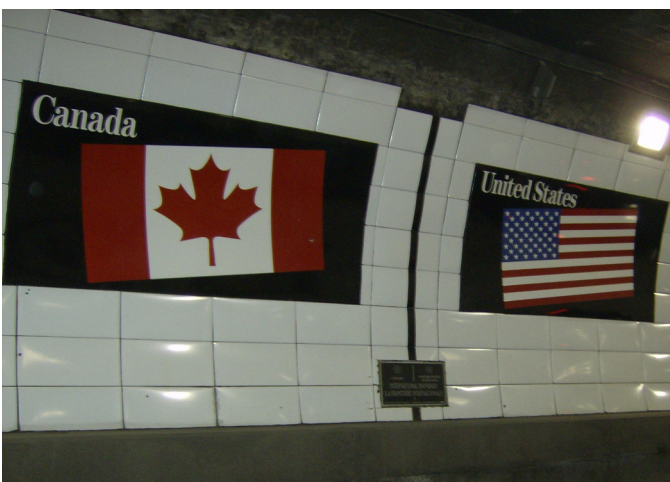
All photos courtesy of *Wood: New Directions in Design and Architecture*



A border by definition is “the line that separates one country, state, province, etc., from another.”¹ This means that a border can exist as long as there is an ideological difference between communities, politics, or practices. So how then how does one go about to establish a border facility for this difference? What are the problems that must be identified to determine how a border crossing is to be designed?

In order to determine the strength and weakness of a border, different checkpoints must be examined in order to conclude ways to which they succeed or fail. It is not through the single vantage point that a border may be created, instead it is through the culmination of many ideas that a crossing will be properly developed. In doing so various borders must be acknowledged and looked at to conclude what about a border makes it important. The two borders that are mentioned in this book are the United States-Mexico Border and the Berlin Wall. This is not to say they are the defining representation of a border at it best or worst. Instead, these two borders offer ideas that illustrate a problem and a solution to the problem; that the solution affects the overall well being of a community that it may be improved upon.

Sault Ste. Marie has unique characteristics specific to the international border between the United States and Canada. Similar to the way at which other



¹ Dictionary.com. See definition for Border.



Photo courtesy of Ross Barney Architects



Photo courtesy of Ross Barney Architects

borders were viewed, the border here must be viewed to determine a way at which the crossing can become scaled down to become a more human friendly environment. In the process of creating this border facility one must examine how past borders have shaped and built the community, that by this examination one will be able to create a facility that improves on the errors of the past, while generating a form that will improve the world for the future.

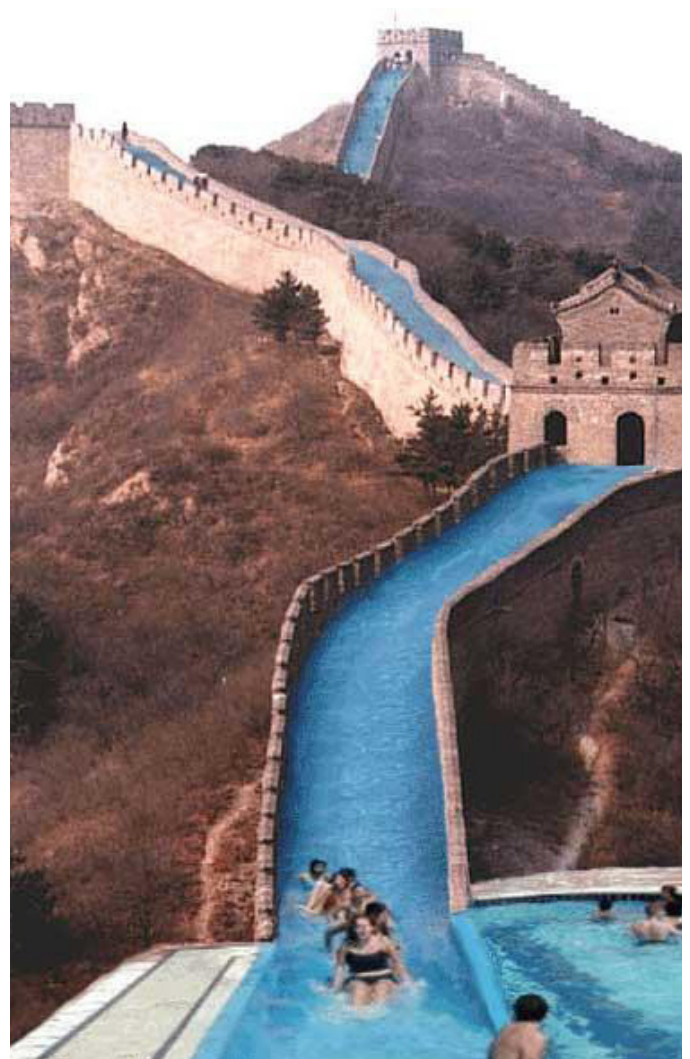


Photo courtesy of Google.com/Images

Photo courtesy of Google.com/Images

fernando romero



Location: United States-Mexico Border

As the United States economy continues to grow so too does the pressure put on at the United States-Mexico border. With every year more immigrants cross the border into the United States from Mexico looking for work. “The money Mexican migrants send home to their families has become one of the most important incomes of the nation.”¹ For many Americans, however, this concept of immigrants entering the country is not only a problem, but a fear. Americans feel as if the immigrants are taking the jobs away from hard-working American citizens that deserve the jobs. In response a greater emphasis is being put on the borders with each passing day. Currently a fence runs the length of the border trying to keep immigrants out. The problem associated with this is in today’s global economy how does a country expect to continue to grow unless borders become more open?

Fernando Romero, a Mexican Architect, has been working on border patrol issues between the United States and Mexico since he started LAR-Fernando Romero in 2000. The firm has two offices one in Mexico and the other in San Diego that work to identify and resolve issues that exist at the border. Currently two buildings have been produced to emphasize and offer solutions to the border issue. The first structured

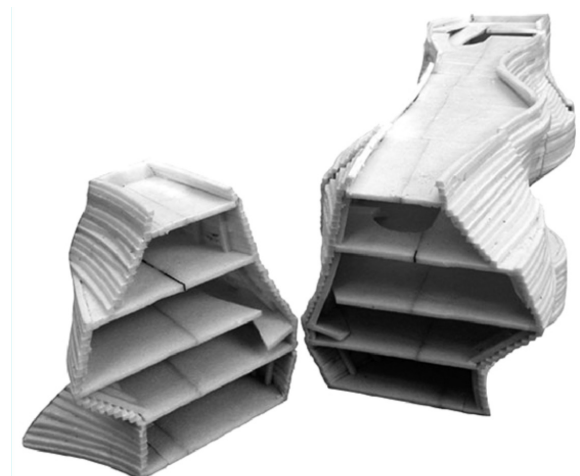
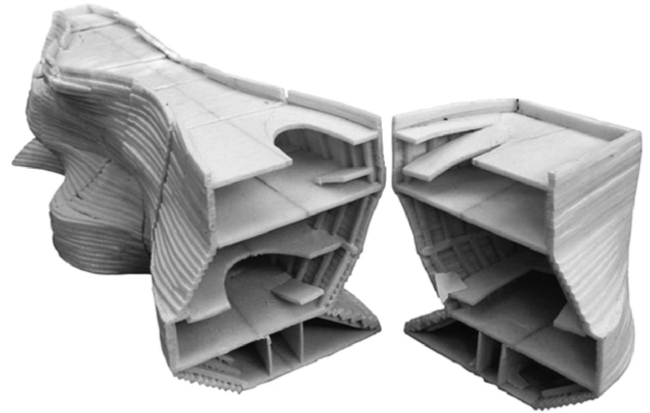
¹ LAR-FernandoRomero.com. See section on Border-Museum.



Photo courtesy of [Google.com/Images](https://www.google.com/images)

crafted was the Border Museum located at next to the Rio Bravo in 2005. The museums form was creation of the ever-changing issues of the regions border combined with the natural organic form of the river. The second facility designed was the Bridge Museum Mexico/USA in 2006. Similar to the first museum the bridge identified the problems that exist at the border, this bridge additionally offered a way in which to address the issue of crossing. During the bi-national affairs in 2000 the United States and Mexico wanted a way in which to represent their mutual relationship. “The building would function as a memorial piece to celebrate this unique moment in history: a museum devoted to the migration flows between the two countries.”² This theory led to the design of the bridge becoming not just about the process of crossing the border. Instead, it led to the creation of what a border should be or become. The bridge not only offered the vital parts of a border such as security and checkpoints. As an alternative it offered solutions about how the border could become a more pleasant for the people that use it by offering things such as a library and auditorium. These additions take the hardness and solidity of a border away and lead to a place that is more enjoyable for all.

A border is not just a place to cross, but should be the overall experience of the area. People need to have the knowledge of place. To design without lo-



Unless otherwise denoted all photos courtesy of [LAR-FernandoRomero.com](https://www.lar-fernandoromero.com)

² LAR-FernandoRomero.com. See section on Bridge Museum Mexico/USA.

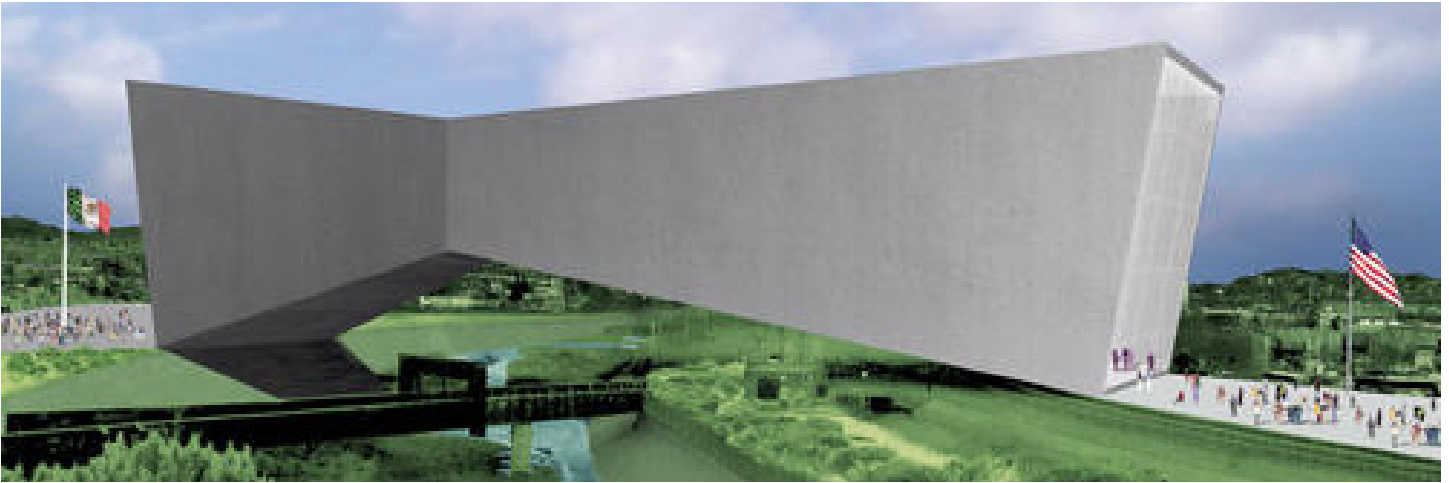
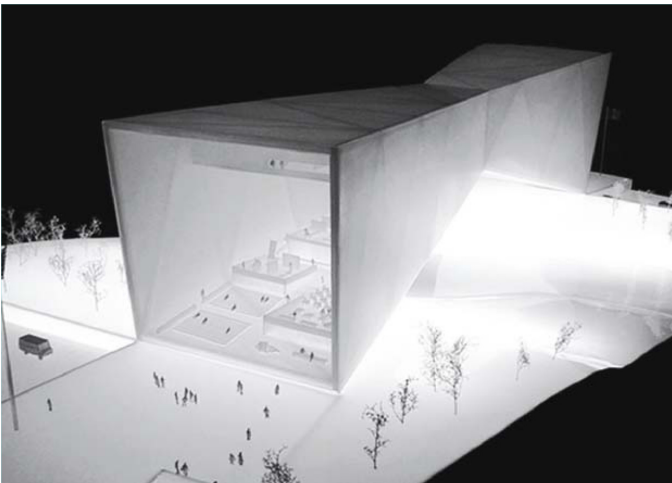


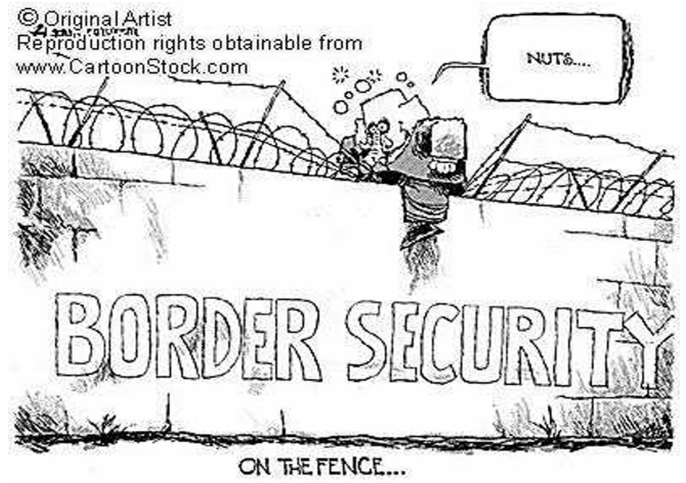
Photo courtesy of *designactivism.com*



cation leads to a design that is forced, in designing a border facility at the Sault one needs to do so much the same way that Fernando Romero designed for the US-Mexico border. The border must become a reflection of the community and people that it represents.



Photo courtesy of *LAR-FernandoRomero.com*



the wall



Photo courtesy of *Google.com/Images*



Photo courtesy of *Google.com/Images*

Location: Berlin, Germany

Year: 1961-1989

After World War II ended Berlin was broken up into four sections. On the west stood democratic America, Britain, and France, the east communist Soviet Union. Prime Minister Churchill was the first to see the rift that this separation was creating believing the Soviets were creating a distinction between the two regions separating the thoughts and political practices. Sixteen years after the end of the war the Soviets built the wall that Winston Churchill foresaw. The Berlin wall became the concrete embodiment of the “Iron Curtain” that was told about years before.

Unlike many walls that had been built in previous centuries, however, the Berlin Wall was different. Previous walls were built to keep the outside world away; by contrary the Berlin Wall was designed to keep the East Germany citizens in. The Soviet's believed that the best way at which to advance their society was by creating a distinction between the communities. In breaking the society into Democratic versus Communist, the Soviets felt as a better overall society could be established. Unfortunately, the further the two societies became apart, the worse the Eastern Berlin became. By eliminating the trade of technology between



Photo courtesy of *Jason Pfaff*



Photo courtesy of *Jason Pfaff*

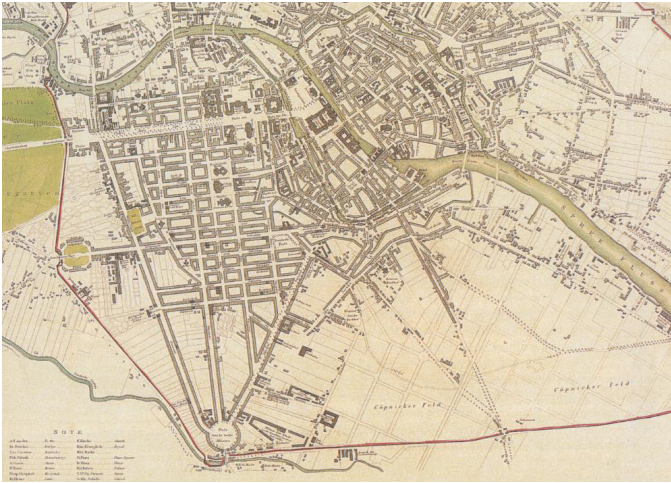
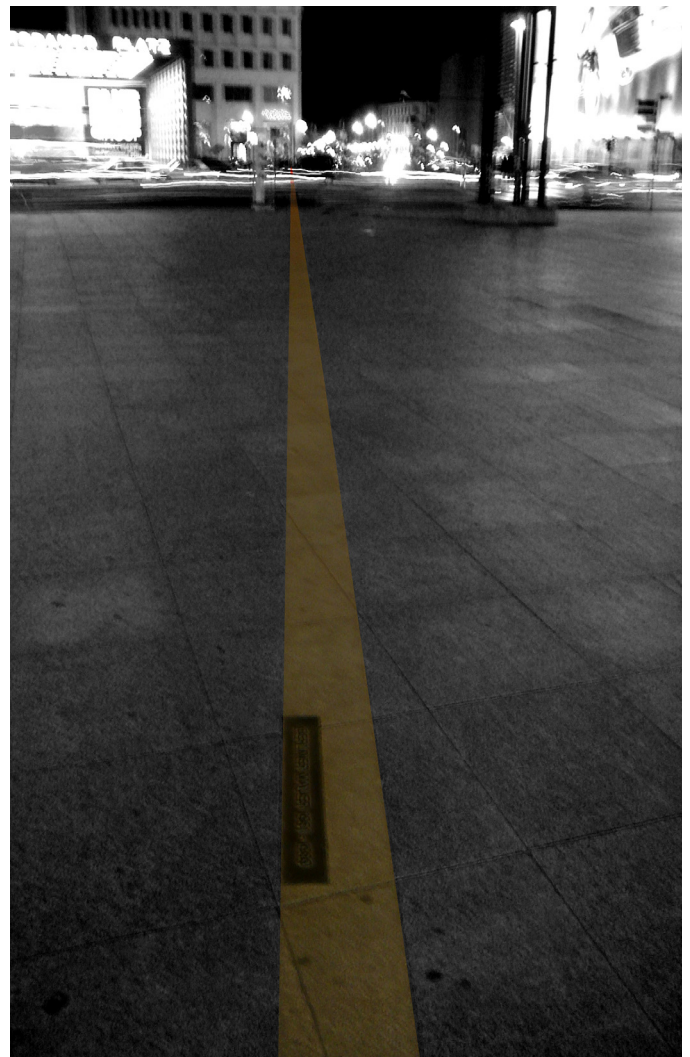


Photo courtesy of *Architectural Review*



the communities, East Berlin was forced to become a worse civilization. John F. Kennedy said, “connoted an attempt, by political fiat, to reverse the growing economical and social mobility of the modern world.”¹ President Kennedy’s quote meant that by sanctioning the community, the general well being of the land will be threatened.

The Berlin Wall showed that civilizations need the contribution of others cultures in trade and ideas to create a thriving community. It represents a way in which a border can destroy a community, that without the acknowledgment and support of other countries that a nation will not prosper. For East Berlin, it was not until the destruction of the Wall that they were able to turn themselves around, strengthening the belief that people need to welcome others into their country.



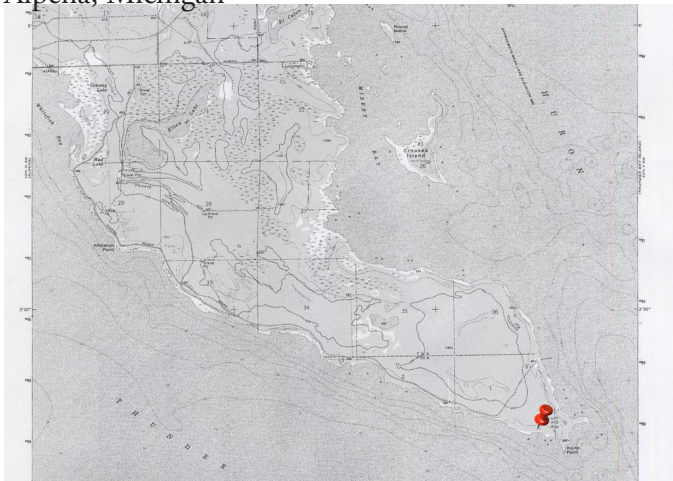
¹ Preuss, Evelyn.

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sites

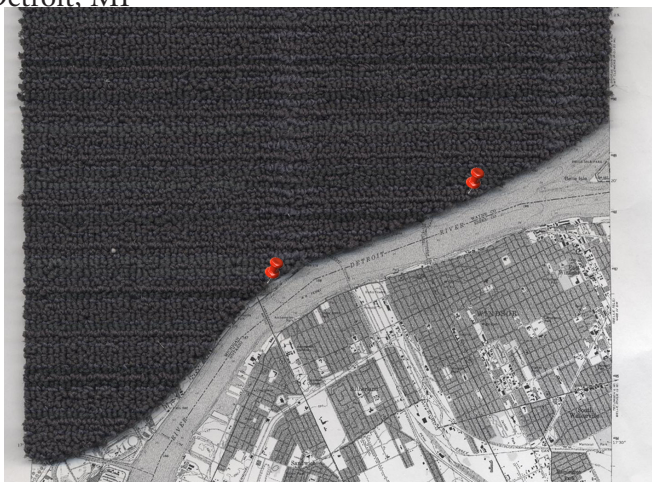
Alpena, Michigan



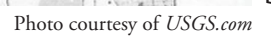
Port Huron, MI



Detroit, MI



SAULT STE. MARIE SOUTH QUADRANGLE
MICHIGAN-ONTARIO
7.5 MINUTE SERIES (TOPOGRAPHIC)
NEAR SAULT STE. MARIE 17 QUADRANGLE



alpena, mi



Photo courtesy of *Google Earth*



Photo courtesy of *Google Earth*



Photo courtesy of *Google.com/Images*

When looking at Alpena, the community had the opportunity for something new, which made the site intriguing. Unlike many border sites, Alpena does not receive many illegal immigrants through its lands. This is mainly due to its location on Lake Huron. The only way of entering the country here is by boat through the middle of the lake. This approach compared to many other ports would be especially tedious. It is because of this reason that Alpena could have a new patrol concept implemented into the community. Alpena has the rare chance that if a new patrol station does not work out then another attempt can be tried until a way that works is found without placing the entire community at risk. Further, because of its location being off the shore of Lake Huron it gave the facility the capabilities to be able to patrol the entire lake. That by water the officers may be able to reach most places around the lake in relatively short amount of time. The problem associated with this site, however, is the remoteness of the community. That to be able to see if the new system would work, one would need to have a larger crossing. Additionally, as the thesis developed and became more about welcoming one into the country, a community that ushers in more people needs to be looked at.

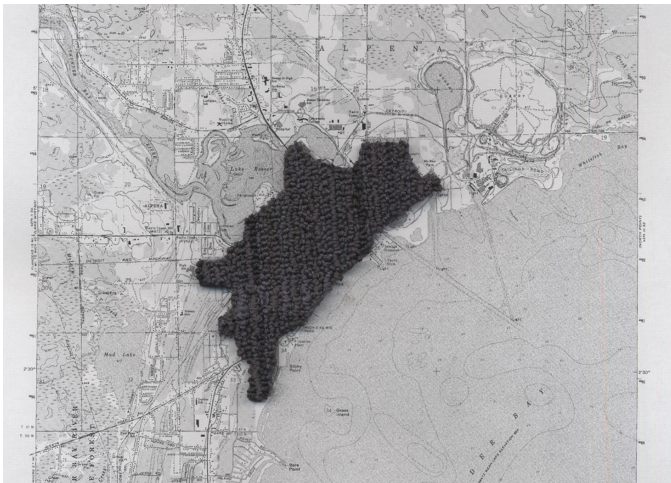


Photo courtesy of USGS.com

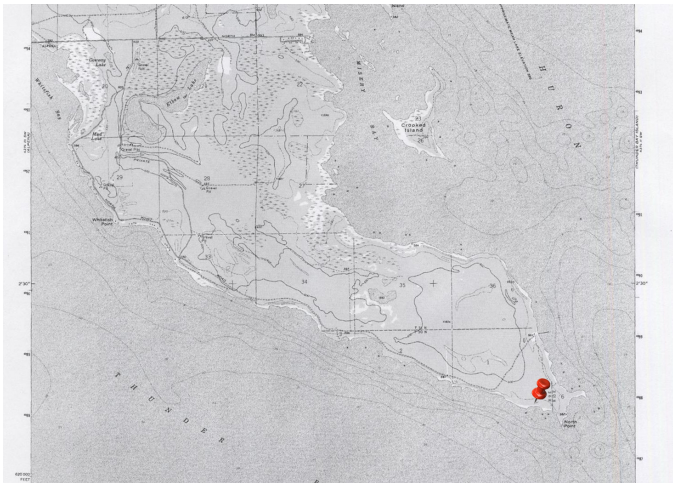
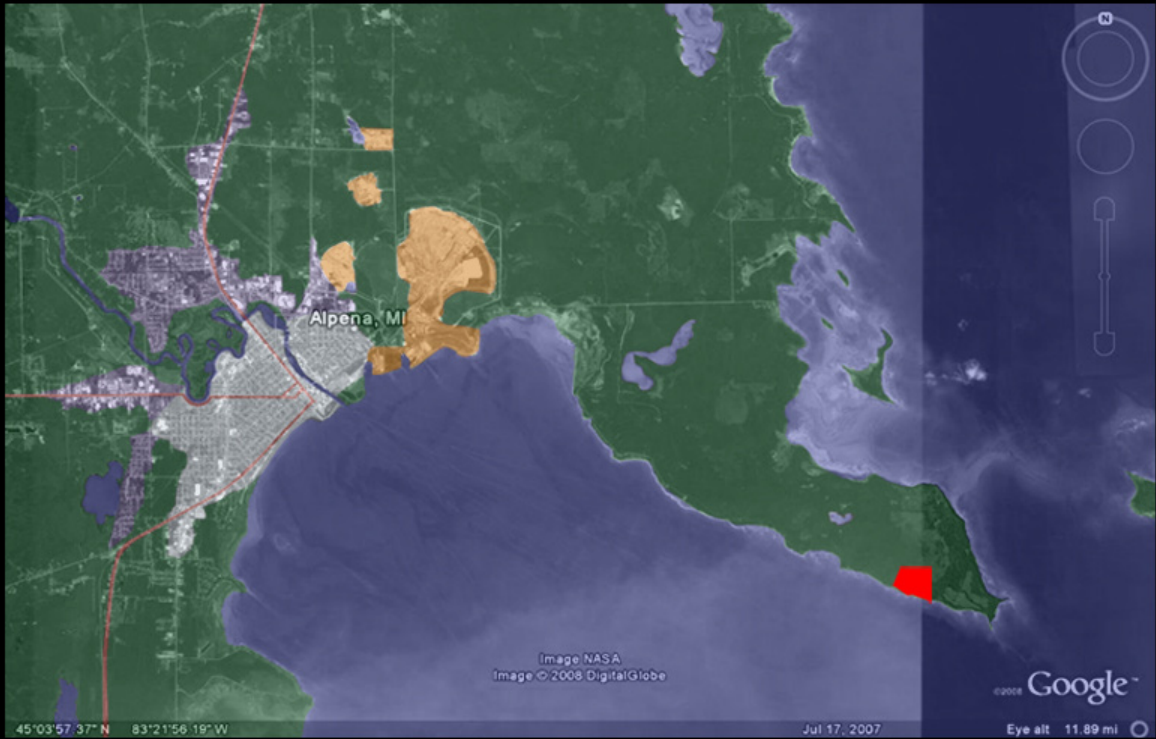


Photo courtesy of USGS.com

alpena - site map



- | | | | | |
|--|---|---|--|--|
| City | Expressway | Industry | Water | Site |
| Suburb | Highway | Green Space | Vacant | |

Photo courtesy of the author

port huron, mi



Port Huron has a unique location within the state of Michigan. Looking at Port Huron's location one will see that it is at the base of Lake Huron. This offers the ability for a border patrol facility to gain access to the entire lake. In receiving this access to the lake security is able to not only patrol who travels north and south on the lake doing normal commerce, additionally, they will have the ability to watch who is going east and west to and from Canada. Further, Port Huron, other than being located on the base of Lake Huron where the ability to patrol the lake is possible, is located at the start of the St. Claire River. Here the St. Claire River is only half a mile apart and a port of entry at this location would provide the ability to limit all access north and south on the river. The specific site chosen for the building to be constructed is on the north bank of the Black River, where the Black River flows into the St. Claire River. The Black River tributary offers the port facility protection and safe harbor for any boat that would be needed for patrolling. Finally, the original site chosen was only two and half miles away from the Blue Water Bridge. Through selecting this location the facility would have access to the current station located at the bridge and be able to work simultaneously to protect the border. As the thesis developed into an idea of welcoming so did the site selection here. The second site looked at was further upstream the Black River was looked at that it would have a more welcoming feeling. The site is located on



the south bank of the river in a park adjoining Interstate 96. Here the site offers a more of a greeting through the peace and serenity of the location. The disadvantage to both sites located in Port Huron was the distance of the sites from the Blue Water Bridge. The sites did not offer the proper salutations to create a strong feeling of embrace.



All photos courtesy of the author

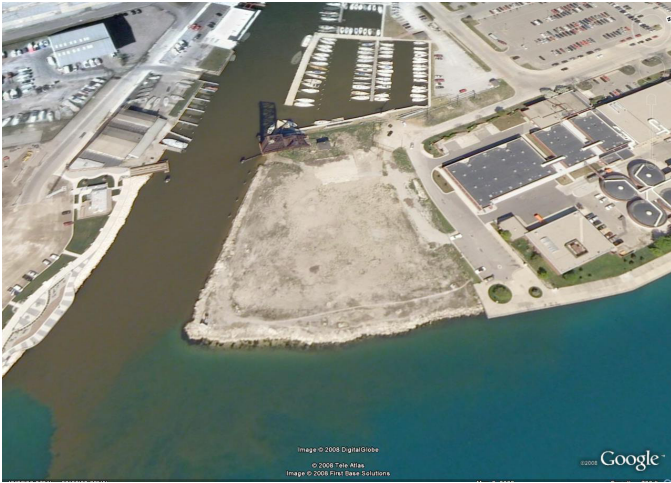
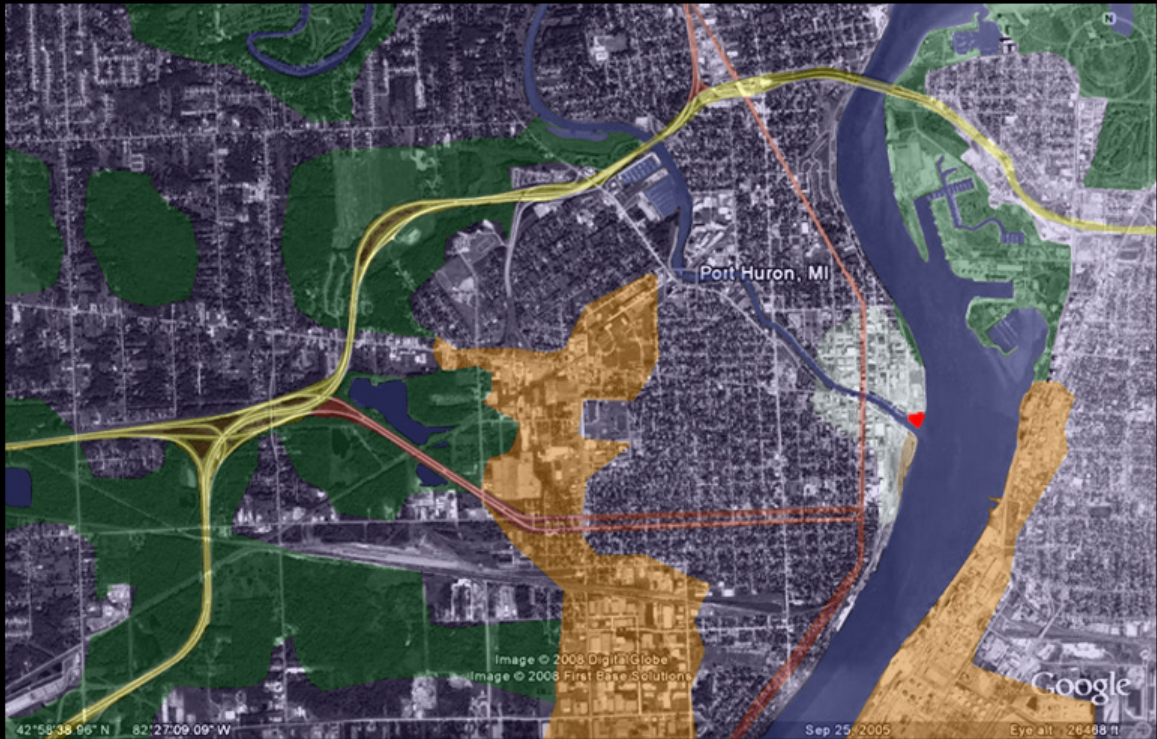


Photo courtesy of Google Earth



Photo courtesy of Google Earth

port huron - site map



- | | | | | |
|--|---|---|--|--|
| City | Expressway | Industry | Water | Site |
| Suburb | Highway | Green Space | Vacant | |

Photo courtesy of the author

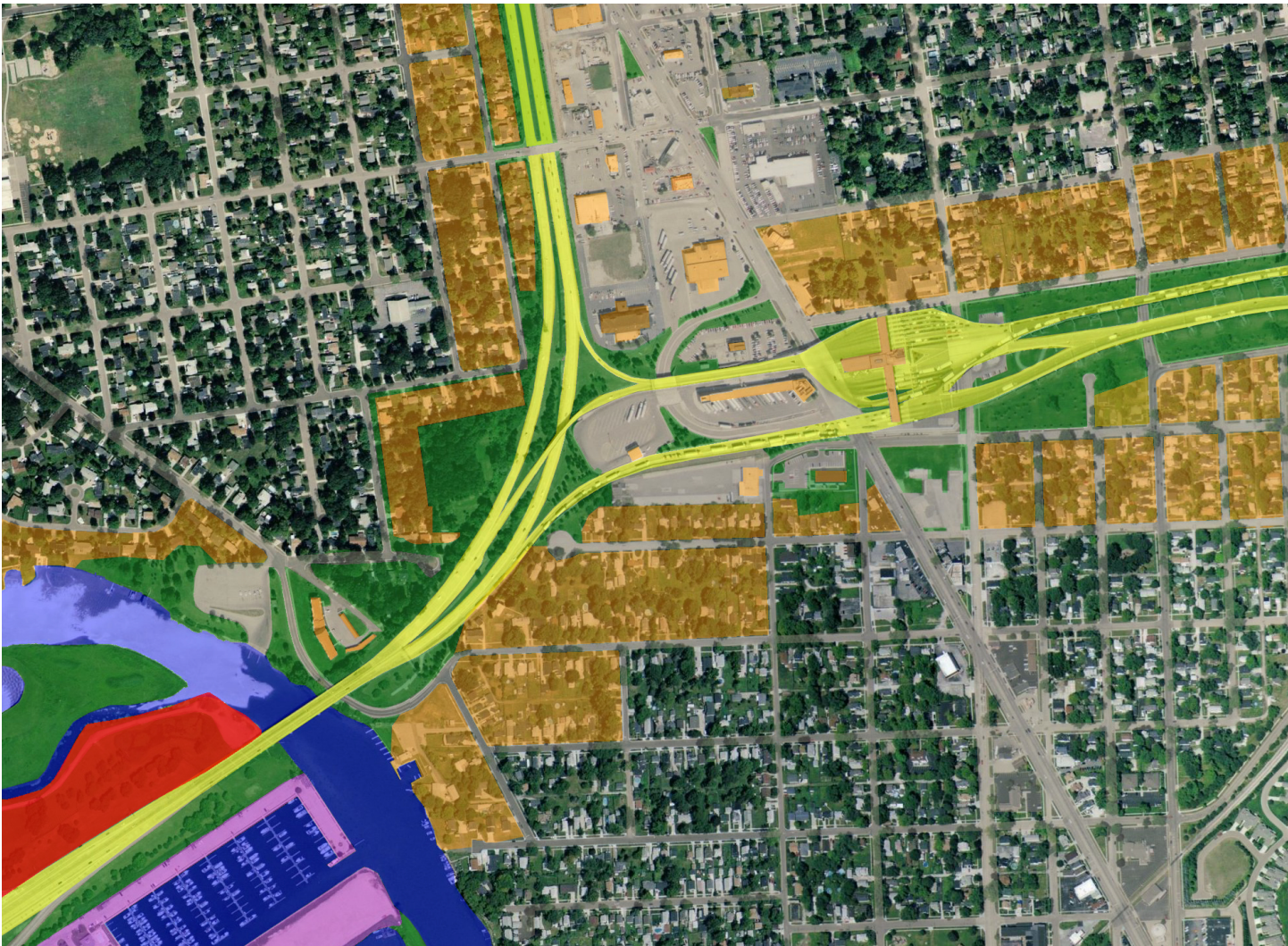


Photo courtesy of the author



Unless otherwise specified all photos courtesy of Google Earth



The location in Detroit was looked into due to its influence as a major city in the United States. Historically Detroit was at the forefront of manufacturing and led the way in car production around the world. When viewing the site near the Ambassador Bridge ideas needed to be kept in mind as to why Detroit would be a community that would need a new border patrol facility. These concepts were that such as Detroit is now a low income community, it is in close proximity to the Canadian border, and further that the community already has two existing border crossing points but no official entry. A low income community offers the ability for oppressed individuals to find housing and jobs that are otherwise not seen in a thriving community. Additionally, with the community's proximity to Canada jumping the border is about timing. That unlike most areas in Michigan the river narrows to only half a mile across in the downtown area. During research of the community, the local coast guard station was looked at precedent in the area of border security. The coast guard has the authority to speak and act for the Immigration and Naturalization Services (INS). During the tour their representative stated that though illegal crossings in the area are not as regular as other parts of the country, it still happens. That the station already has a camera fixed to watch the river on a twenty-four hour basis that is able to track boats to ensure they are able to keep the Detroit area safe. Finally, though there are two existing border stations



there is no greeting. The most impressive feature on either part is the tunnel or the bridge. Once one is to arrive into the country after the paperwork is checked there is nothing to welcome one into the community. Through this crossing one gains the feeling that they are either in or not.

Like in the case with in Port Huron the original site decided upon was too far from any of the main crossing points to be viable to use as the project developed. A site further downriver next to the Ambassador Bridge was then looked at. This site gave more priority to the feeling of entry, but still continued to lack the area for expansion that is needed in order for the program to fully become integrated into the community.



All photos courtesy of the author

detroit - site map



	City		Expressway		Industry		Water		Site
	Suburb		Highway		Green Space		Vacant		



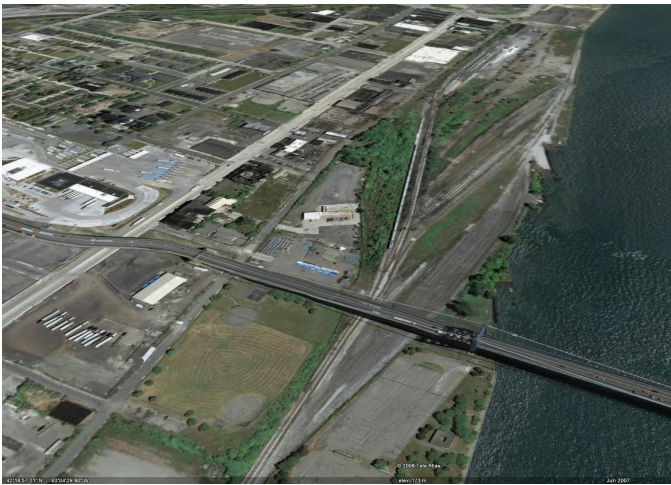


Photo courtesy of Google Earth

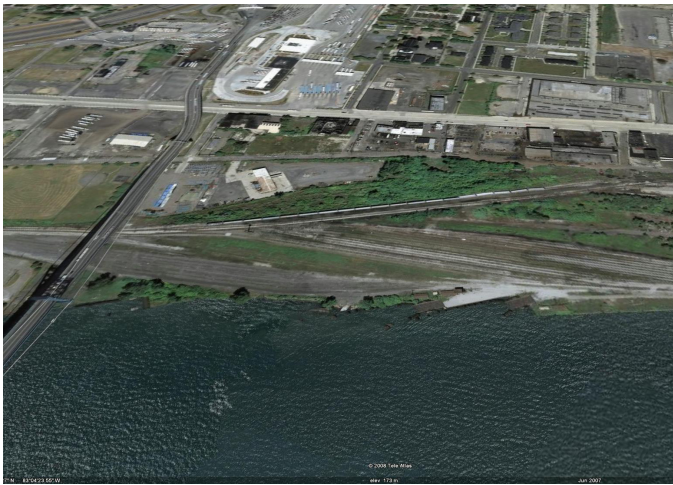


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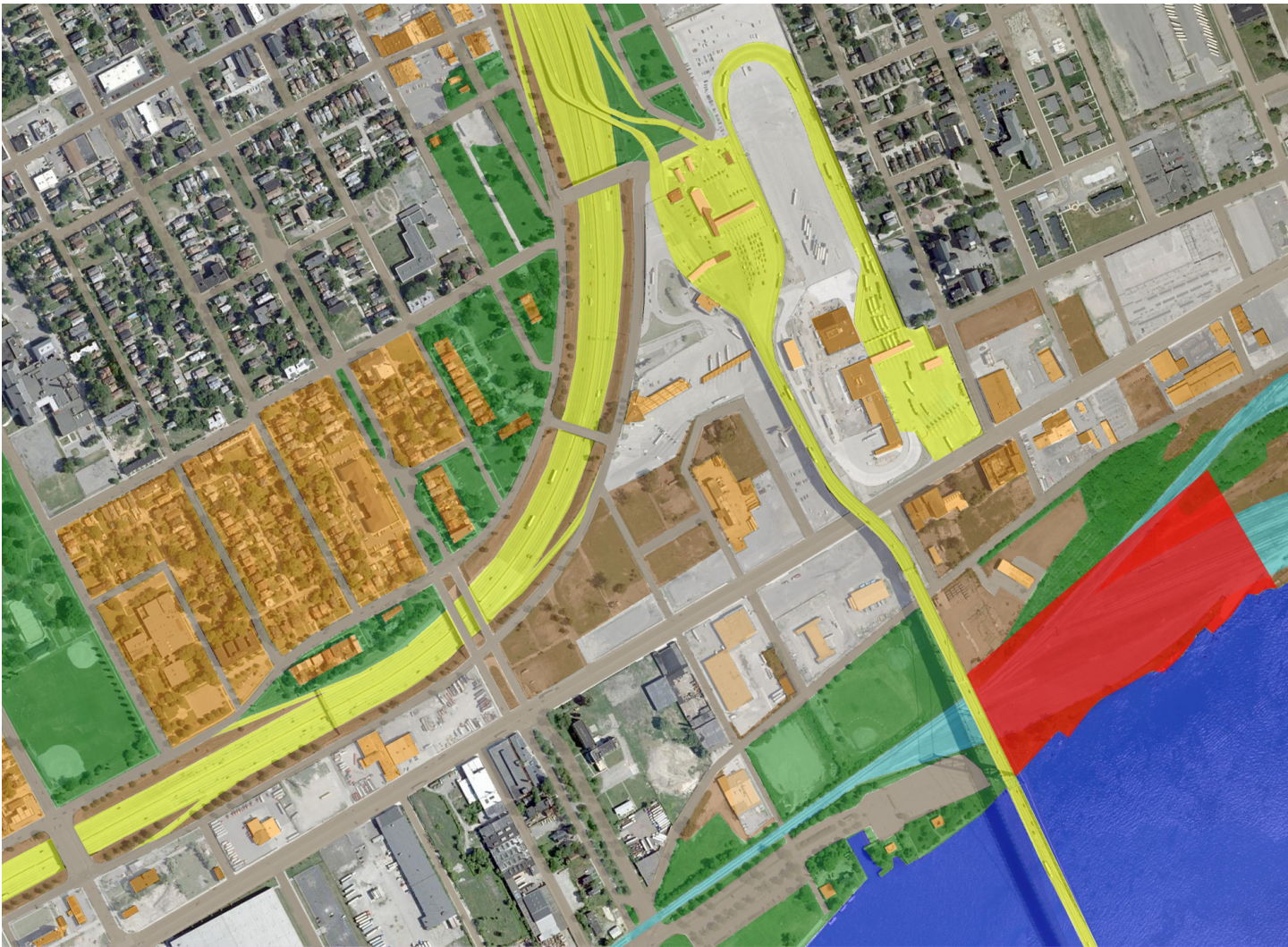
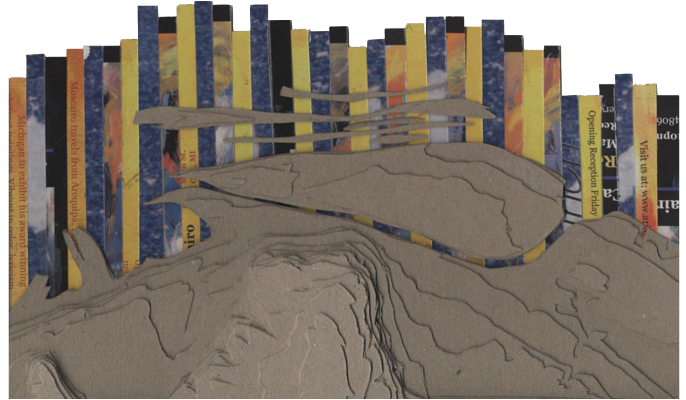


Photo courtesy of the author

sault sainte marie, mi



Sault Ste. Marie, Michigan sits at the northern end of Interstate-75 city of. Known for the Soo Locks and the freighters that travel through them, the locks are the sole source of navigation between Lake Superior and the rest of the Great Lakes. Here also lies the border between northern Michigan and Ontario. The International Bridge carries around 2.5 million cars, trucks, and buses across itself annually into Canada for various reasons; such as home, vacation, or trade. People traveling to Canada pass through the Sault, the last exit in the United States before crossing the bridge. It is for this reason that a border patrol facility needs to be established with dominance and care here. One cannot travel further north at this site without entering Canada which sets it apart from the other three sites considered in Michigan. The other sites did not offer the authority that was needed to create a new facility. Where they each had their own specific characteristics in ways they could be viewed as a border community, they did not have the ability to be a defining doorway between two countries.



The site itself is located at the base of the International Bridge on the American side. Directly to the East of the site sits Lake Superior State University, on the West is an open green space. It is the home of the current U.S. Port of Entry which does not show the importance of a building at this location. The building as it exists is there out of necessity; it is not one that



Photo courtesy of Jenna Wilcox



Photo courtesy of Jenna Wilcox

fits with the importance of a building to this caliber deserves. The current facility offers the basic components of a Port of Entry like checkpoint lanes, offices, and detention centers, but nothing that makes it stand out from any other border. The overall feeling of the facility is demanding and cold that the only function of the facility is to offer security and nothing else. While designing a facility one must remember the importance of security, but this cannot be the only quality of the facility. In planning the structure one must be consciously aware of the setting and context of it.

Location is not the only reason that is needed to be considered when choosing a site for such an installation, instead one needs to keep the surrounding community in context. Sault Ste. Marie, Michigan, is the Midwest's oldest community because of its importance in shipping. This historic location has always been a major access route and needs to establish its influence in the modern society showing that it is still a major source of transportation. During World War II the Sault area was considered of great importance to iron shipping. It was considered so important to the war that it was always under armed guard by the United States Army. It was realized that if someone were to attack and destroy the Sault area and its locks the United States would lose much of their iron supplies for weapons manufacturing. Though the locks are not patrolled by the army anymore the area still has his-



Photo courtesy of Allan Frappier



Photo courtesy of Allan Frappier



Photo courtesy of the author



torical significance in the products that are transported throughout the Great Lakes region.

The International Bridge additionally offers the ability to control the flow of people into the United States. The bridge is the only connection to Canada from Port Huron, Michigan, to US-53 in Minnesota and further connects the Interstate-75 corridor with the Trans-Canadian Highway. These two aspects illustrate significance of the crossing to all looking to enter or exit Michigan. This connection serves local transport and international alike in the shipping and delivery of goods. It is the only way for many products to go between the two countries with access at any time.

These reasons indicate why the Sault was chosen to be the location of a new facility to be installed. The site showed the how the area could improve upon their current practices so that people will want to make use of the border and enter the United States. In that making a facility here others will experience the perception of place.





Photo courtesy of Google Earth



Photo courtesy of Google Earth



Photo courtesy of the author

intial design

site relations

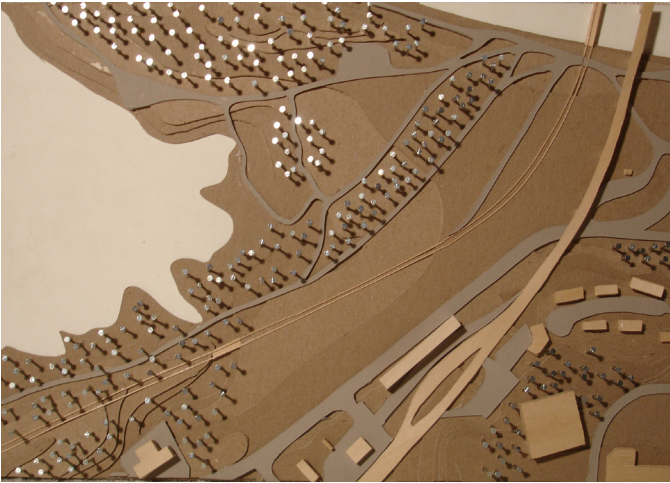


Photo courtesy of the author

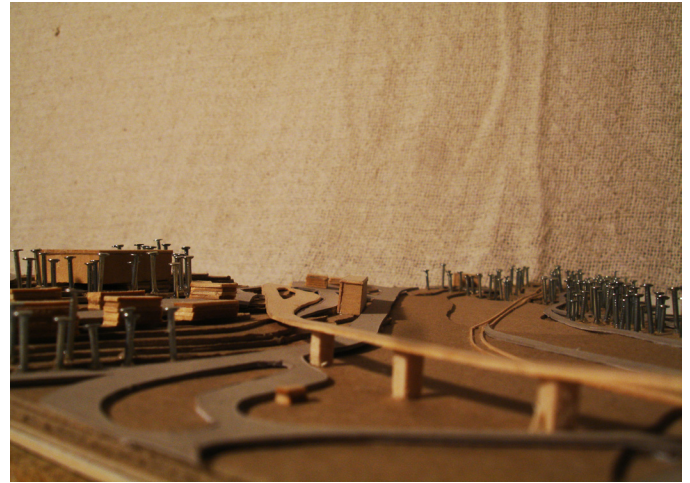


Photo courtesy of the author



Photo courtesy of Jenna Wilcox



Photo courtesy of Jenna Wilcox

The site in Sault Ste. Marie needed to be looked at for more than just its relationship to the border, but further issues that deal specifically with the site needed to be considered. These concepts include the lay of the land, wind conditions, and the solar conditions attributed to the site. That the building must developed from the landscape and that the building is not an arbitrary piece stuck into the land. The shape of the land gives precedence and accents certain features that need to be picked up on when a facility is designed. That due to slope of the terrain one should infer that the building form should slope accordingly, that it may accentuate the land. This is not that the building is to be an exact replica of the land only extruded. Instead, they should be more characteristics of the land. Where the building can be more a peeling back of the land to create a new form derived from the land.

Average wind directions also play a role in the design of the building. Unlike many areas the prevailing winds for this area are in opposite directions. During the summer the winds come from the West to Northwest. During the winter the wind comes from the East to Southeast. This being kept in mind it has been inferred that most of the fenestration should be on the west side of the building to protect the building. Through knowledge of the winds one can that identify the weak areas of the site that may not have



Photo courtesy of Ross Barney Architects

been considered before. When one is studying aerial photos and topographical maps the site, the site may appear to have characteristics that would not have been identified without proper knowledge of the winds.

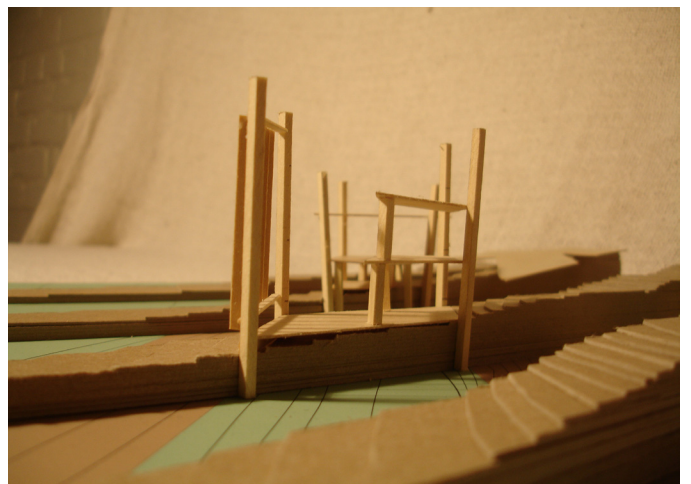
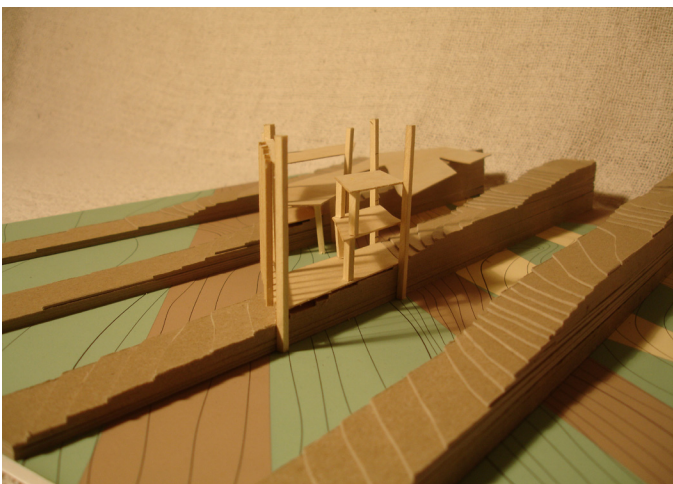
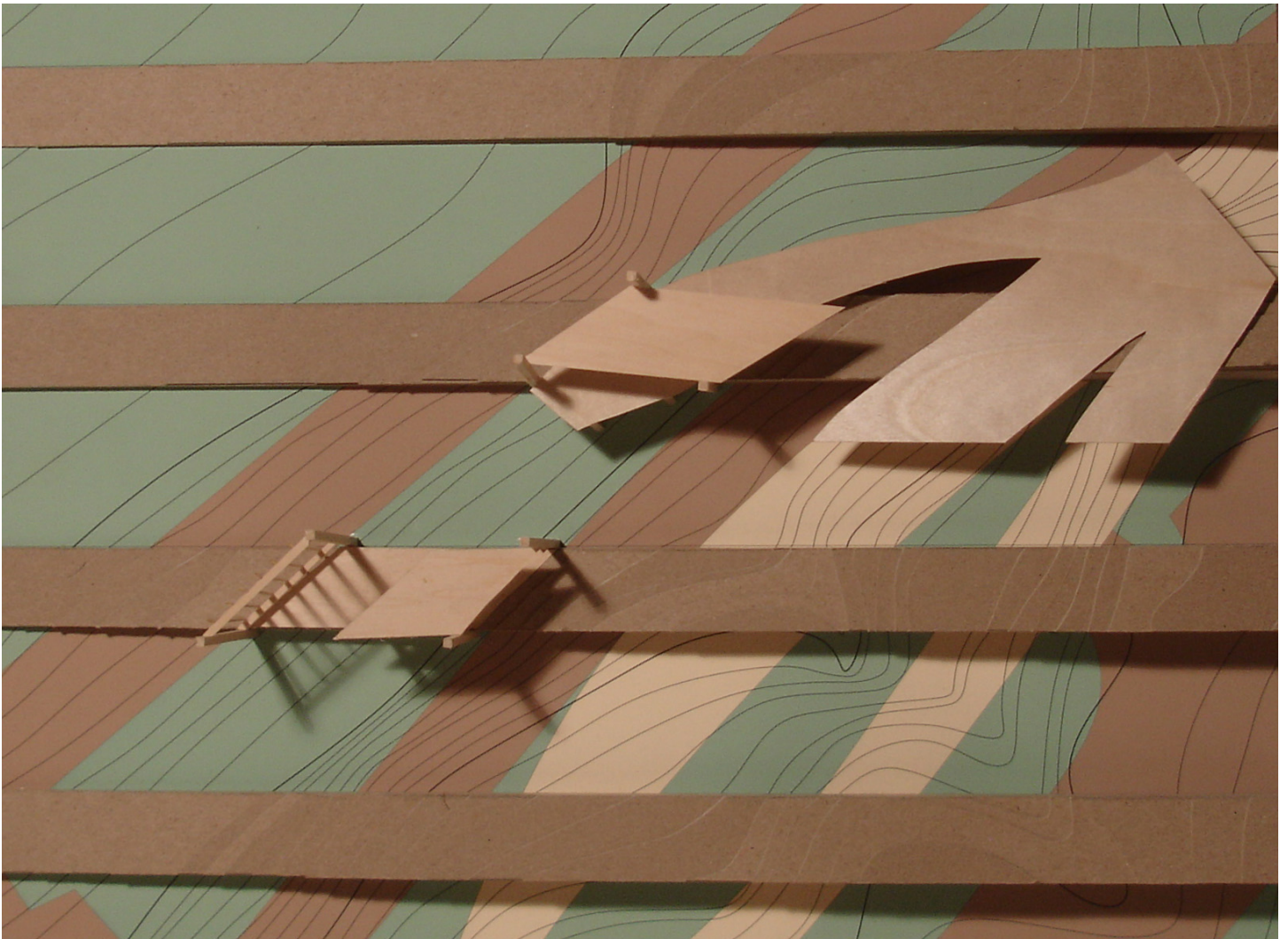
Heat gain also was an aspect that needed to be considered during the preliminary site work. One needs to understand the sun angles so that a building can be designed accordingly. Solar heat gain usually occurs when the sun is between 240 degrees and 270 degrees. A building located in the Sault will therefore only needed to be considered with solar gain during the summer. In the spring and fall the sun is barely able to reach the angles on which a building will receive solar gain and during the winter there is almost no, if any, solar gain. This therefore means that using large amounts of fenestration is not a large concern. Understanding the sun angles can then contribute to a grander overall design. By learning where the sun will hit at certain times of the year one will be able to design accordingly and have a play of light and shadows within a building.

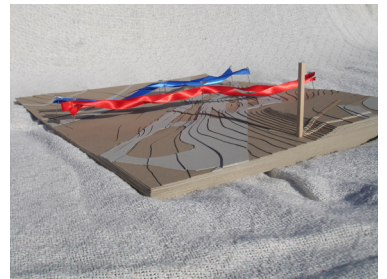
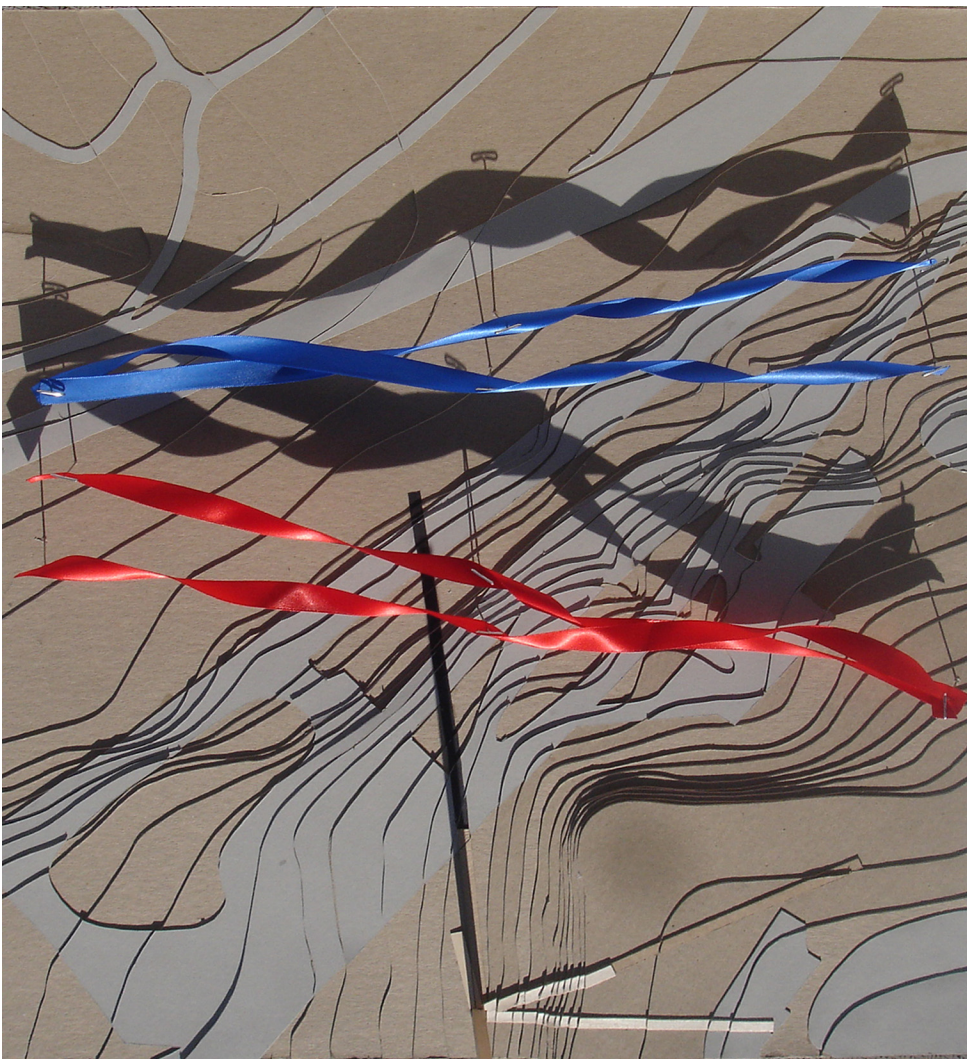
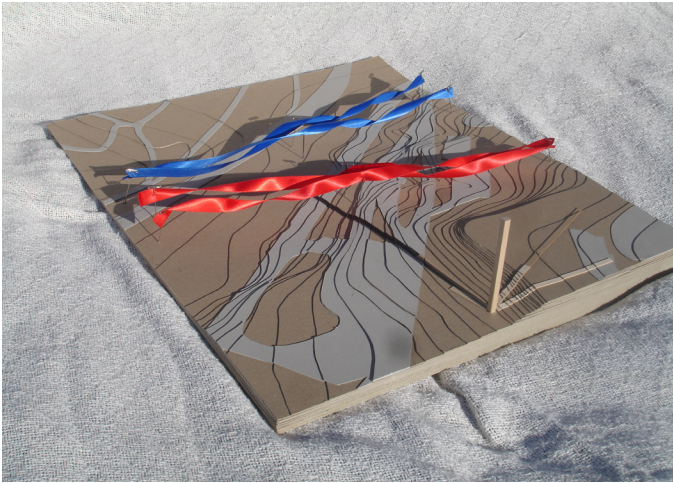


Photo courtesy of Jenna Wilcox

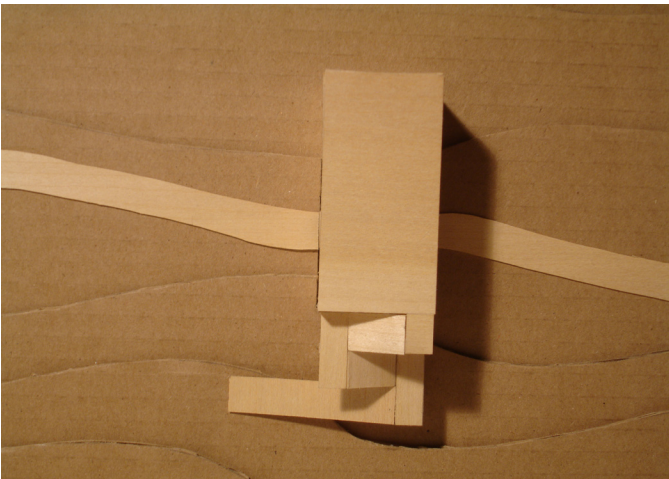
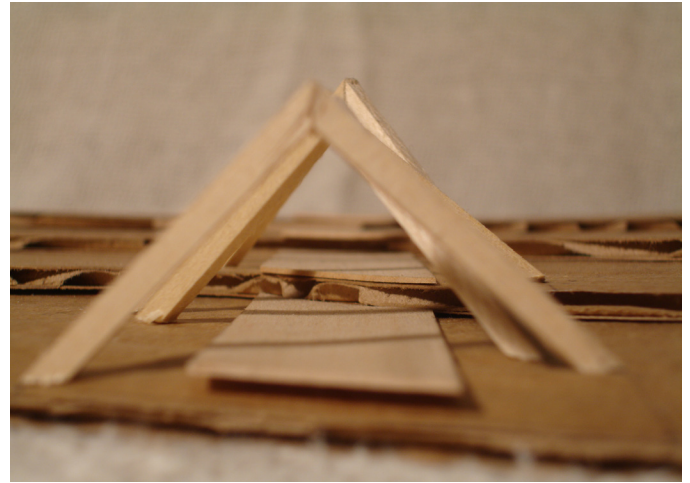
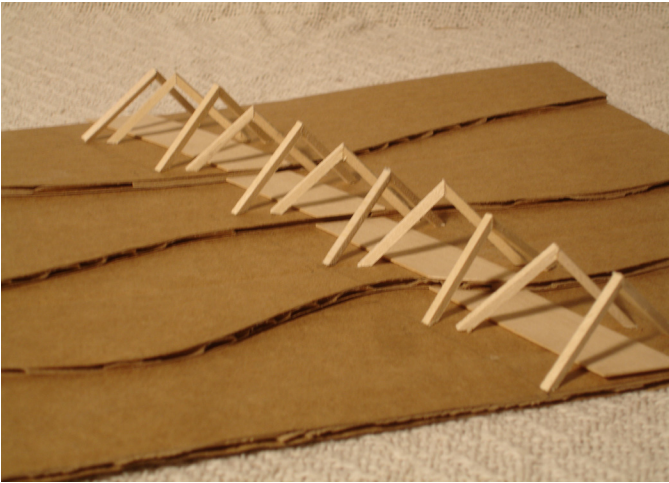


Photo courtesy of Jenna Wilcox



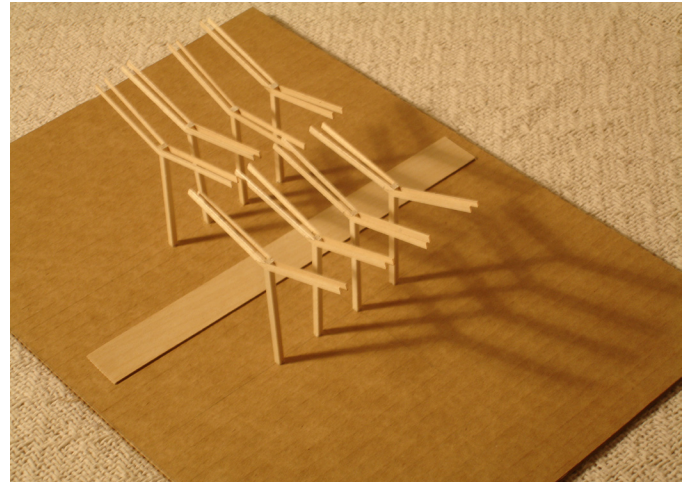


green space usage



Landscape is just as important of an issue when making an area more human friendly as the building design itself. A pristine setting can evoke a feeling of ease and should be considered when developing an entry way. Through the use of calm settings one receives the ability to feel at home and welcomed into any environment that they are placed within. Further, by using a landscape one is able to instill features that offered to visitors. In using features such as Ashmun Bay, which is just to the west of the site, one will be encompassed by the site; establishing a feeling of place.

In the winter snowmobiling is a way of life in the Upper Peninsula. Snow here is able to reach three or more feet deep making the snowmobile is a way of life for locals. They visit, play, and work on them throughout the winter. More than that, however, the snowmobile is the savior to many communities in the Upper Peninsula during the winter. Communities rely on vacationers in the winter to come up and snowmobile, banking on the seasons resource to supply them with work throughout the winter. Snowmobilers can be the sole source of revenues during the winter months for many hotels and restaurants that rely on the snow to carry them through. Sault Ste. Marie is home to the I-500. The I-500 is a five hundred mile long snowmobile race on the United States only one mile oval snowmobile race track. It occurs in the Sault every February since 1969 and is a major drawing point the many

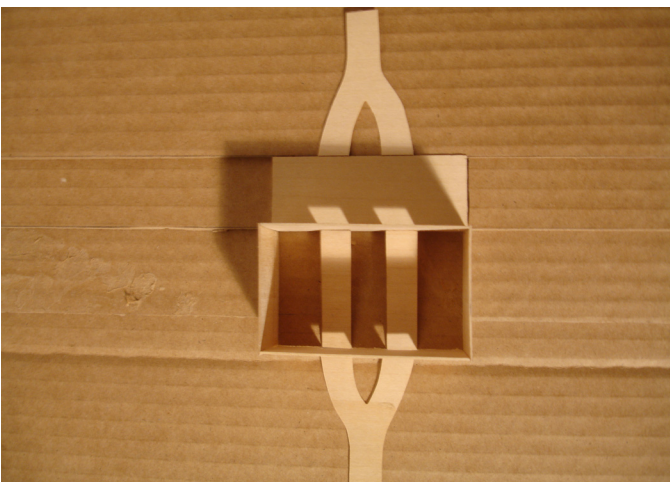
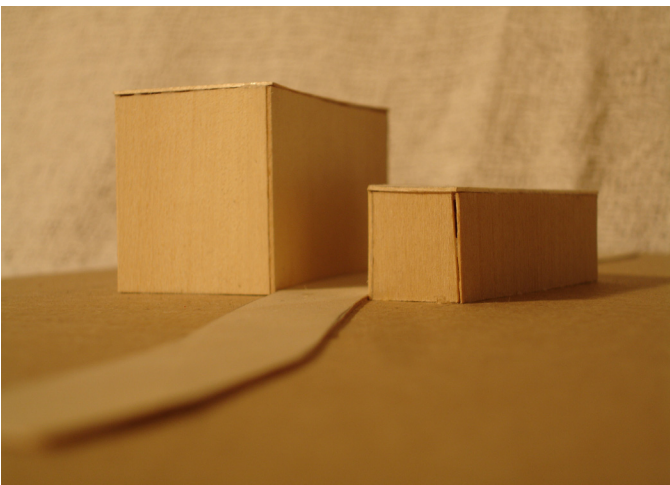
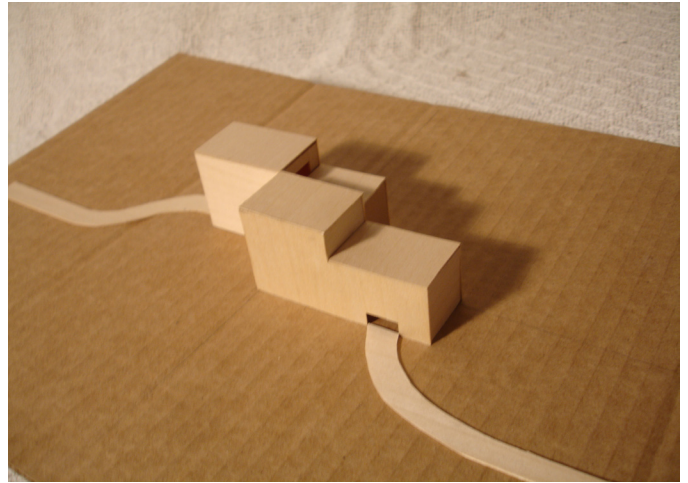


snowmobiling enthusiasts. Due to the importance of snowmobiling, it should therefore be adopted into the environment and the trails that exist on the site should be glorified. That through the glorification of the tourists will be introduced to the importance of the snowmobile to the community.

Similarly to the way the snowmobile shaped the UP, so too did trade. Sault Ste. Marie was settled due to its importance at the base of Lake Superior where locks were built for trade ships to travel between the lakes. Additionally, railroads played an integral part to the trade of goods through the Sault area. The tracks provide supplies for the freighters as well as materials to be shipped; that through the exploitation of the Upper Peninsula's natural resources most of the communities gave way. Therefore these trade routes that have been created supported the cities and towns through the UP. The routes must consequently be glorified for their development of the UP.

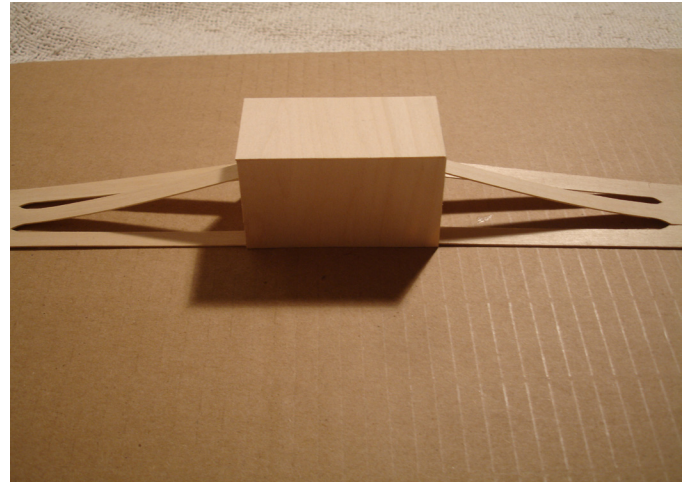
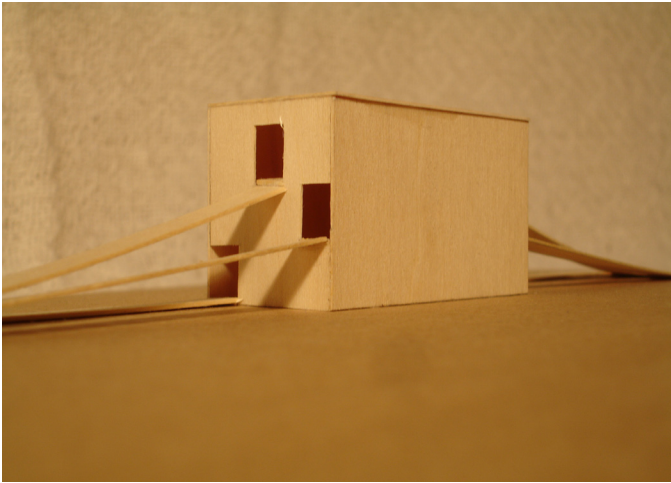


road transitions

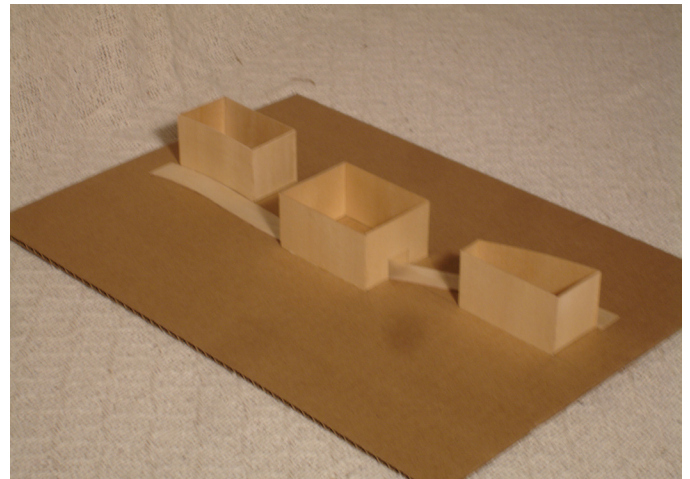
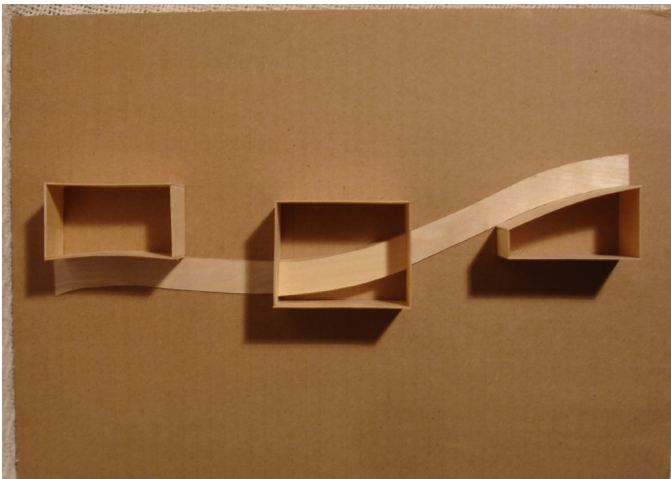
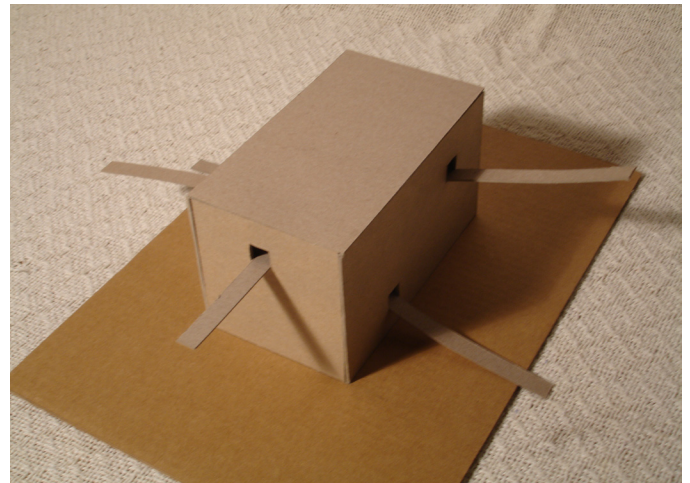


The concept of entering the country cannot stop once through the security checkpoint, instead it must go further and actually invite travelers to the community. That road ways are just as important of a transitional element as crossing the International Bridge. Street signs direct to specific locations, maps tell how to get to a place, but what can be done in order to go beyond merely pointing out a spot? During the investigation it was discovered that roads offer the outline of place and time leading to preliminary designs that were generated to focus on how the concept of transition can be expanded. The road cannot only be a means of traveling, but in addition may become the process of traveling. That through key elements established in cooperation with the road will a person be able to identify the route needed. Through certain features one will not need to consult maps or road signs, instead they will be drawn into the community through a more influential experience. Care must be paid attention to the design elements created, however. During one preliminary analysis a series of interweaving wires crossed the “road.” The wire was supposed to show the significance of the path, but when asking architecture student Christopher Bayer his feelings he responded, “It feels like barb wire to me.”¹ Before more a definite conclusion about how one is to approach a community can be made, a conscious awareness of the design must be known.

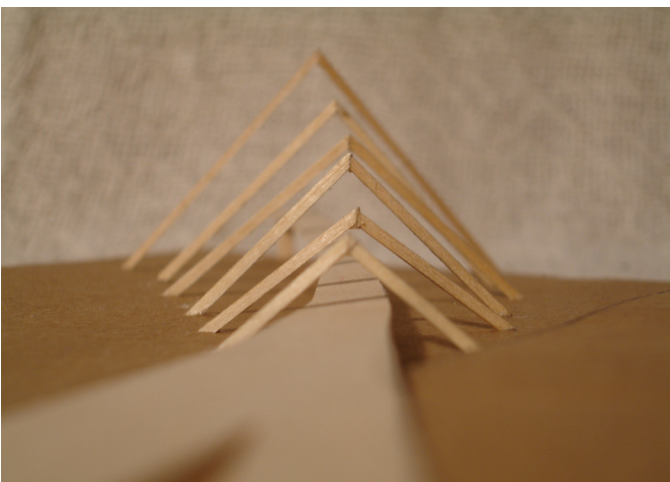
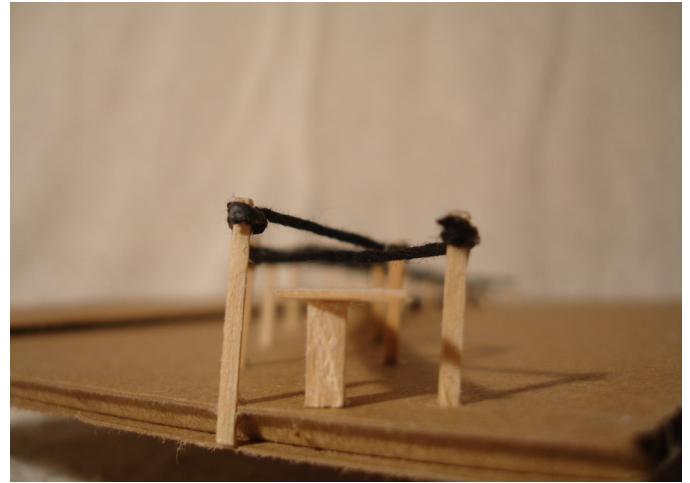
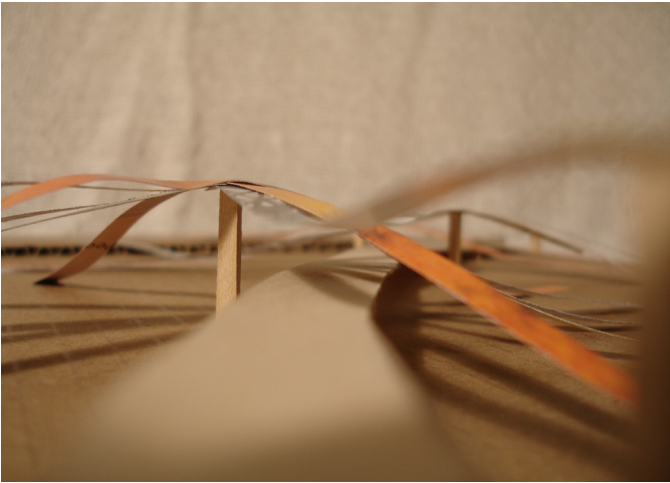
¹ Bayer, Christopher. Personal interview.



The idea of a road transition does not only occur off the site though. Instead, the road may be incorporated into the overall building design. The building and the road should become one element that they may work together in issuing people into the country. In having the building and road become one process it will further lead to design considerations that were not otherwise possible. For instance, by having the road bisect and cut the building into two different segments the building may be broken up into different features. Another option is to allow the building to divide the road, that in having different roadways separate sections of the border facility may be used.



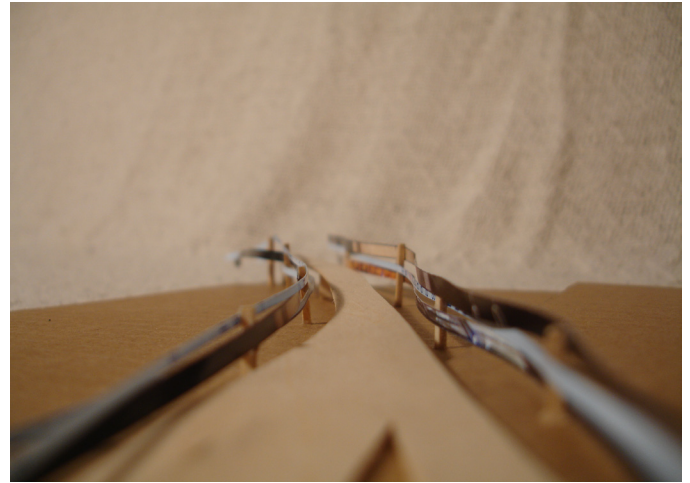
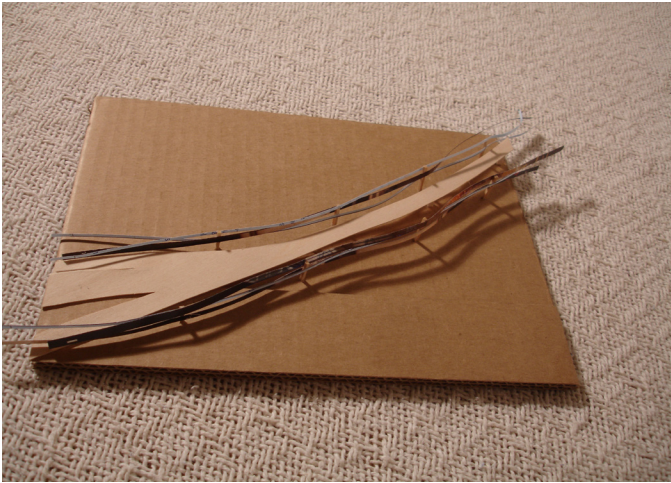
bridge elements



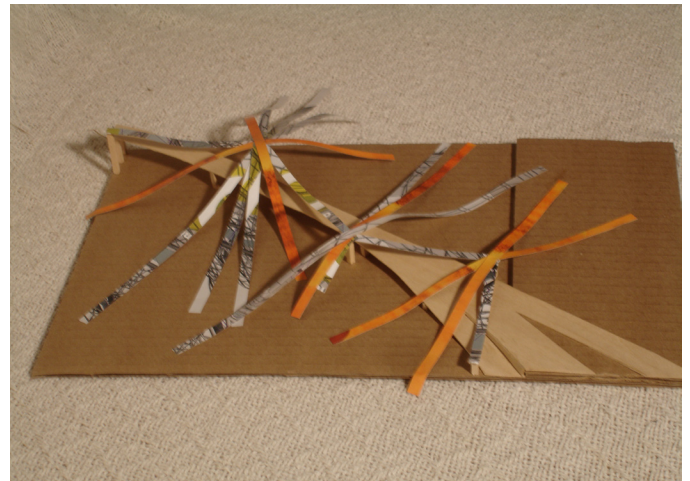
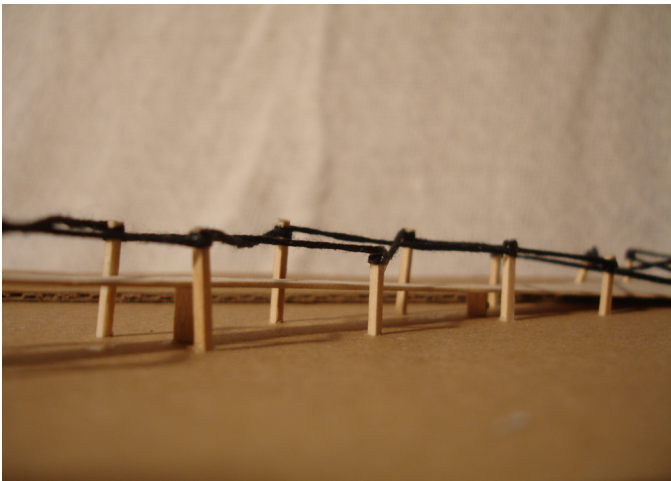
As the thesis progressed, the call for entry became a more pertinent issue to be considered. How does one define entry though? According to dictionary.com entry is “permission or right to enter.”¹ Now that the concept of entry has been defined where does one go about to determine where the point of entry is to be? In Sault Ste. Marie one can infer that the official point of entry in the United States begins with the International Bridge. The International Bridge unto itself is a magnificently designed steel and arch structure. How then does this exquisite shape and detail relate to the site or community? The International Bridge helped to develop and create the communities that it is connected to. Coming from the United States the bridge is at the northern end of Interstate 75 which runs from Michigan through Florida. In Canada the bridge enters into downtown Sault Ste. Marie, Ontario, from there it connects to the Trans-Canadian highway. This connection leads to the two cities being a forerunner in trade. How then can the bridge be improved on to make this crossing point more human friendly?

During the investigation attempts were made to create a clear and determined path that would relate the ideas of entrance and control. Some of the design elements attempts distinctly identified the feeling of control; showing the way to enter the country making the clear idea that safety is of top priority. These

¹ Dictionary.com See definition for Entry.

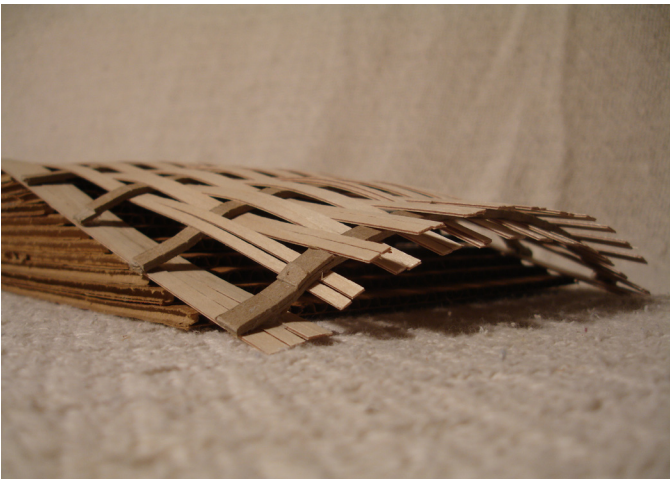
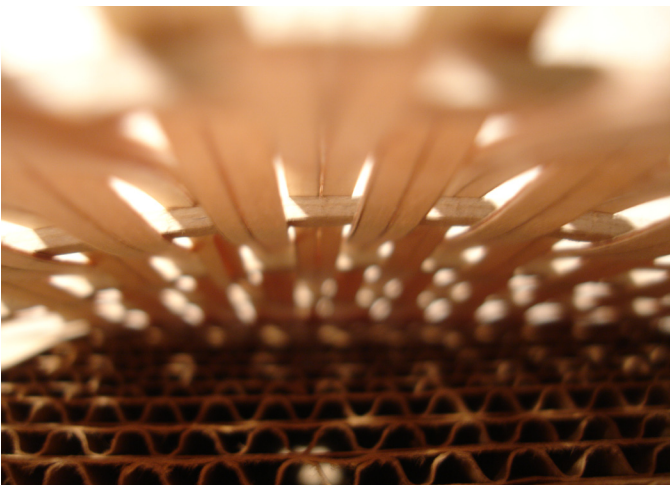
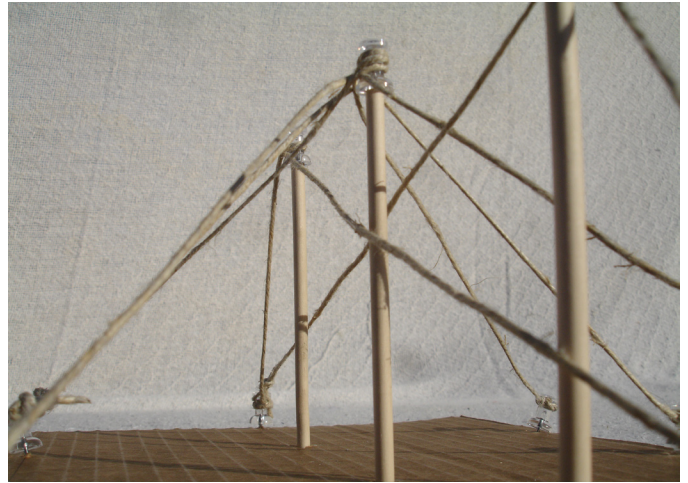
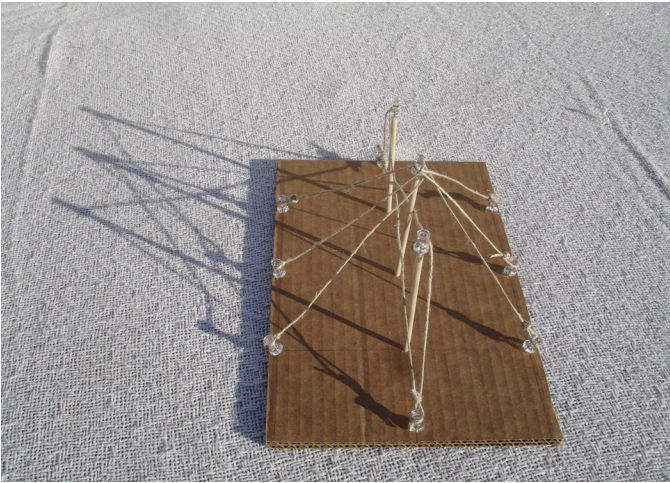


design attempts, however, lead to a less pleasant crossing point. That one would not feel welcomed upon entering the United States. Other designs led to a welcoming approach, but there was not enough emphasis put on control. So how does one create both welcome and security? The way in which was decided to solve these issues was to build off the existing elements of the bridge. That people will be introduced to the United States through the inherent beauty that can be already seen in the bridge and local bridges within the city itself.



All photos courtesy of the author

building studies



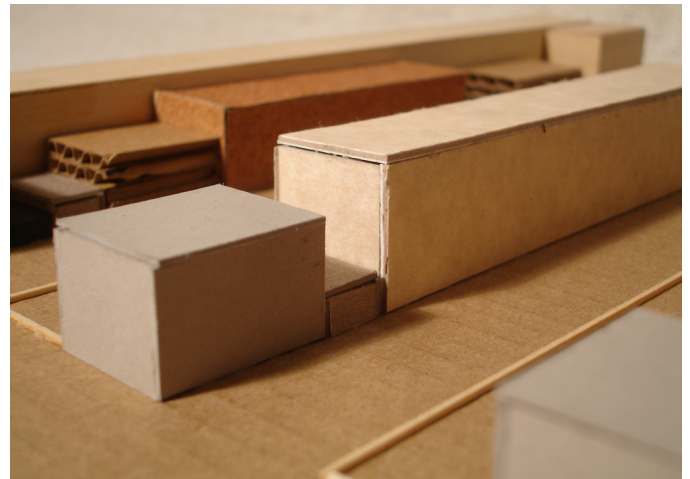
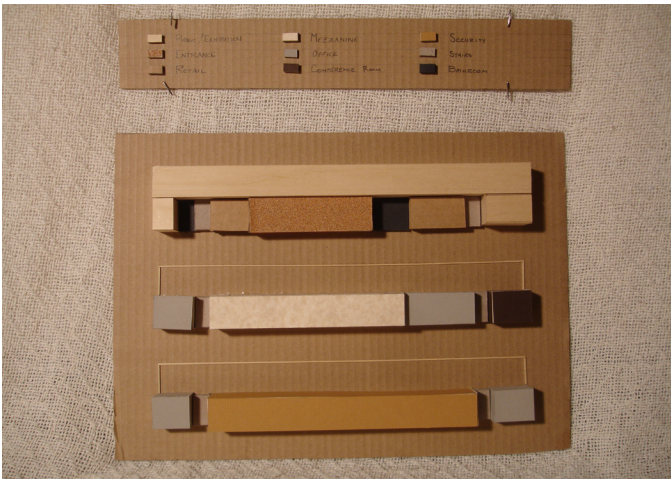
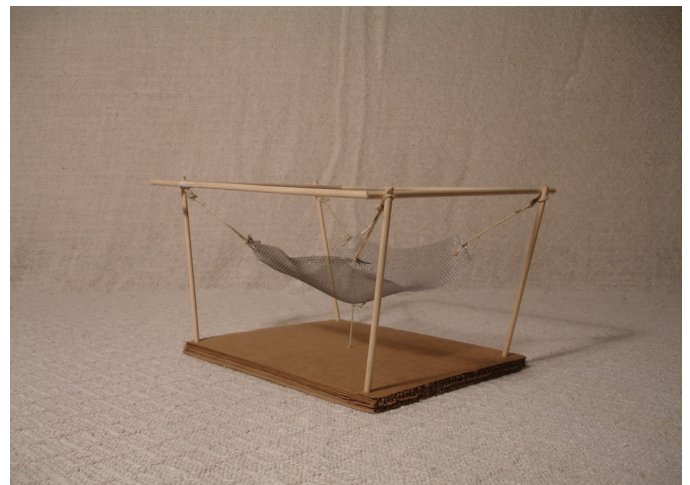
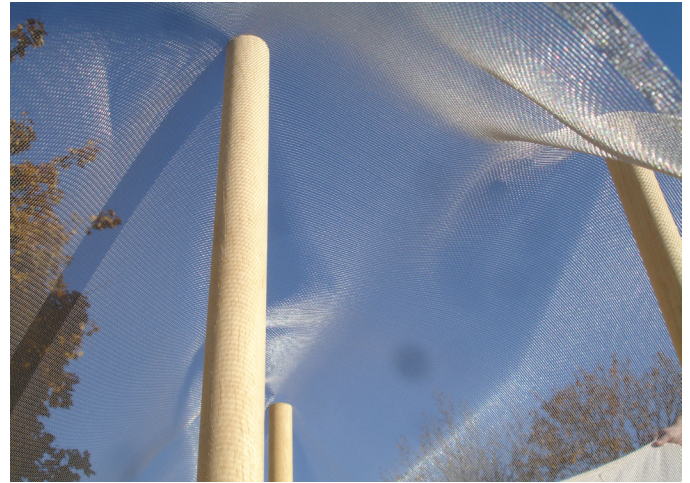
Now that the theories of site and entry have been identified, one must combine all the previous discoveries in attempt to create a structure that satisfies the necessities of the program and the desires of the site. That the program is not only about ways in which to protect the United States border, further the building must welcome people into the country. Additionally, the building must do this in a way that responds to the issues that were previously discovered while learning about the site.

As seen earlier in the investigation, tensile structures led too many of the initial design strategies for creating ways in which to incorporate the facility to the site. The building must become a peeling of the site that it may respond with proper form to the terrain. Through the use of a tensile structure the idea of a peeling and lifting could be accomplished. Additionally, the building would be able to carry the roof out over the road, that the road may also be tied into the building. In using a tensile structure the building could also captivate on the natural daylight reducing the energy load of the overall building. The problem with putting so much emphasis on tensile structures is that the building would become too forced to the site and not enough care would be done in how the structure works with the geography. Instead, the ideas learned while studying tensile structures needed to be maintain, but a more holistic approach needed to be



taken in the design of the building.

As the projected continued going back to look at the experiences gained became the most important step in the design. That by focusing on the four major topics: site relations, green space usage, road transitions, and bridge elements; could the most important issues of the project be determined. In studying these major elements there exploration would lead to a better overall design for the program. The next action is to find the best way to incorporate all the knowledge that has been gained to develop the border patrol facility.



All photos courtesy of the author

works cited

Bayer, Christopher. Personal interview. 15 Oct. 2008.

“entry.” Webster’s Revised Unabridged Dictionary. MICRA, Inc. 30 Dec. 2008.<Dictionary.com <http://dictionary.reference.com/browse/entry>>.

program

preliminary program summary

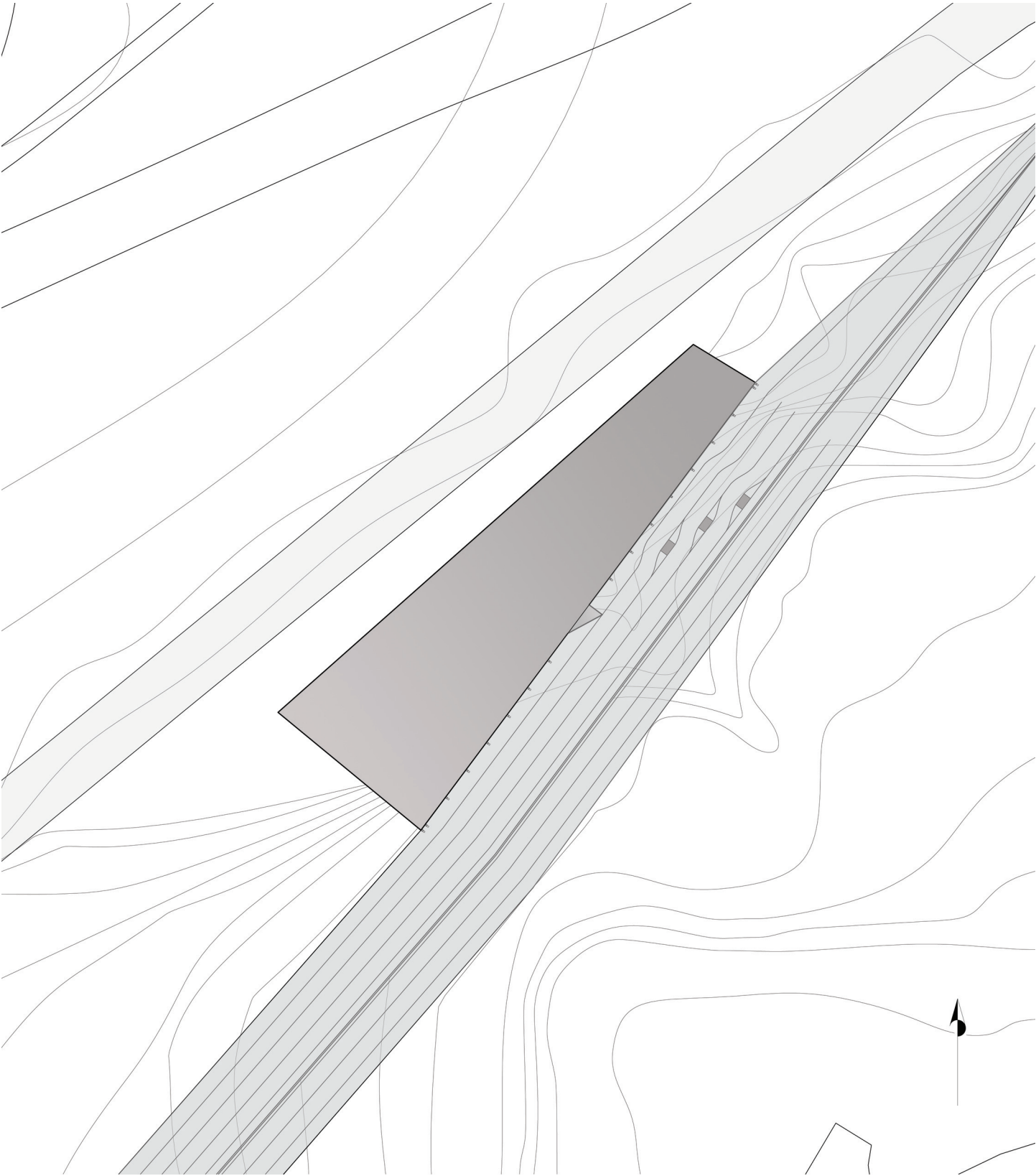
Site plays an important feature in the overall design of the program to be established. The site in which the building is located gives the bases for what needs to be established in order to create a more welcoming feeling for visitors. Sites to which a border is located offers much that is overlooked when creating the crossing point. Through it, a connection to what the community has to offer may be established. By embracing the natural beauty in the Upper Peninsula one may see just a small offering to that which the United States has to offer. In first looking at the site, the International Bridge must be looked addressed as a starting point where the ideas of welcome and control are to be associated with when developing the building. The bridge is the official crossing point between the United States and Canada and must be viewed in terms of how this crossing can push forward towards new idea of border. Designing the bridge in ways in which can both control the route and flow of people is important. At the same time, this control must not offend or inhibit the crossing of people. Instead, it must greet new comers and instill a sense of excitement upon reaching a place that they may not have been to before. Further, the while designing the facility, there must be an exploration into the green space overlooking the building location and how it ties back the immediate community. The Sault Ste. Marie area is well known for its attraction of fishermen, snowmobilers, and vacationers. These are all aspects that must therefore be used in the development of the buildings site. To construct a facility without considering how each of these things is important to the area is unjustifiable. While considering these concepts, ideas such as a kiosk or venue emphasizing the areas snowmobiling history are to be included.

Further, the area has a rich transportation history is to be embraced through the railroad line that exists in the green space to the west of the site. In this area similar to the proposal put forward about the snowmobile trail, the tracks may contain their own specific element that is designed to embrace that which is exported from the Upper Peninsula.

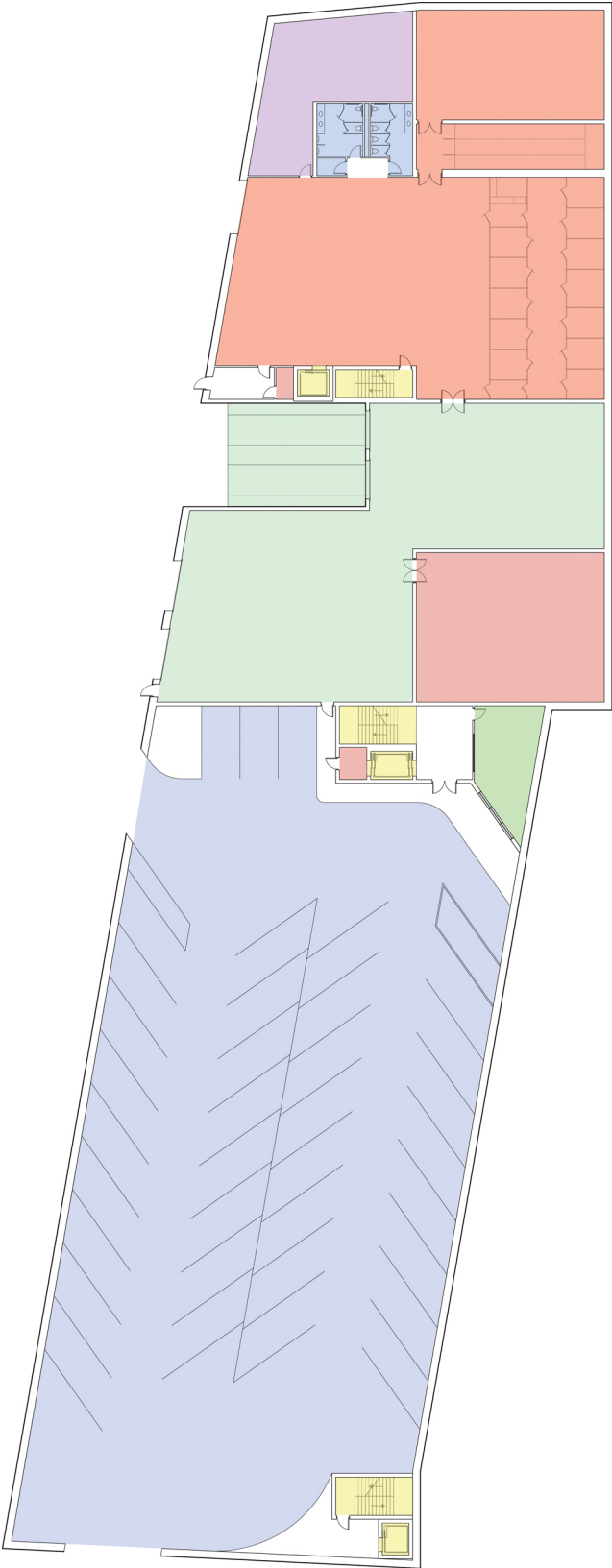
The facility itself must then translate these ideas of site and community relation into a facility that welcomes visitors while protecting U.S. citizens. The building therefore must include areas of security and administration. Places to run background checks on those entering the country and make sure that the border is always secure. The facility itself must have detaining cells for both people and vehicles that are in need of further investigation. Additionally, the building will need areas in which to be able to maintain the vehicles that will be needed for patrol and maintenance of the grounds and green space. After these vital issues of securing the border are established the next vital design piece is how to incorporate the community into the building. This facility is not intended to become a gathering hall; instead it is a way to link visitors to the community. That similar to the kiosks in the green the building may incorporate exhibits of the Upper Peninsula. That through the building visitors will not be turned away from entering the United States, but in fact will enjoy the overall process of entering the country.

building progression

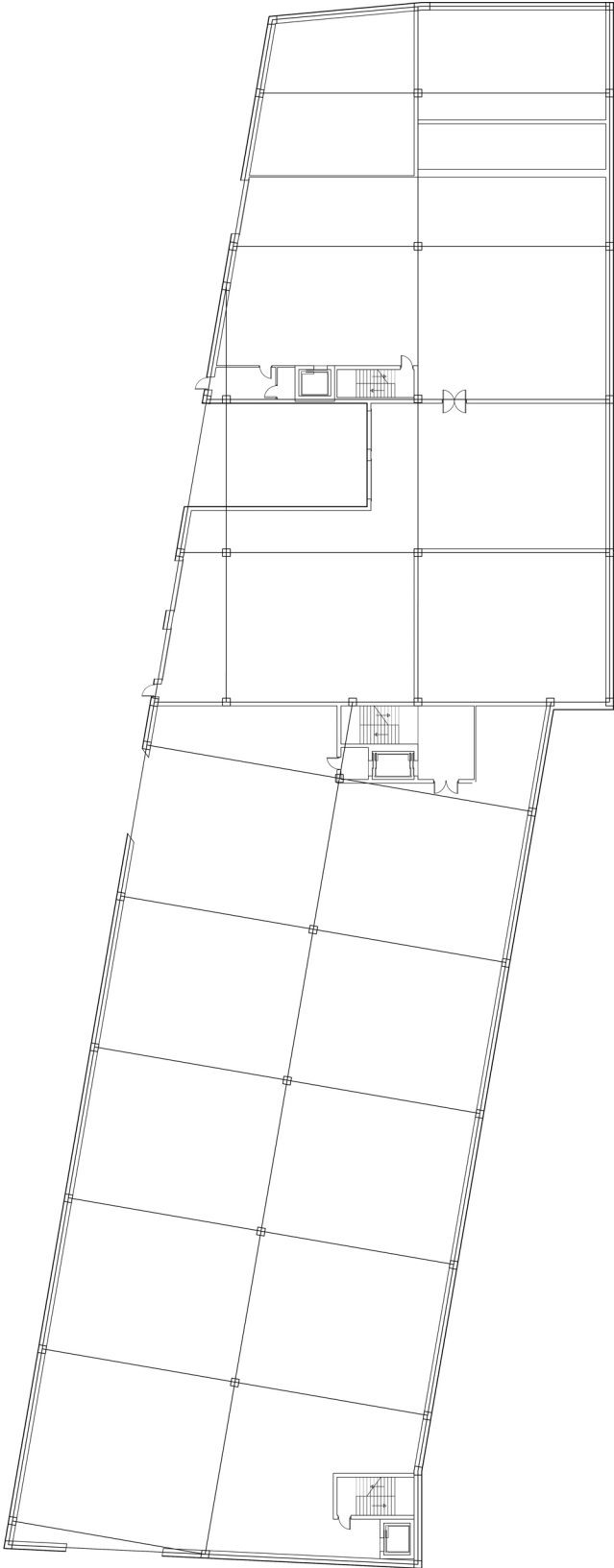
Preliminary Site Plan



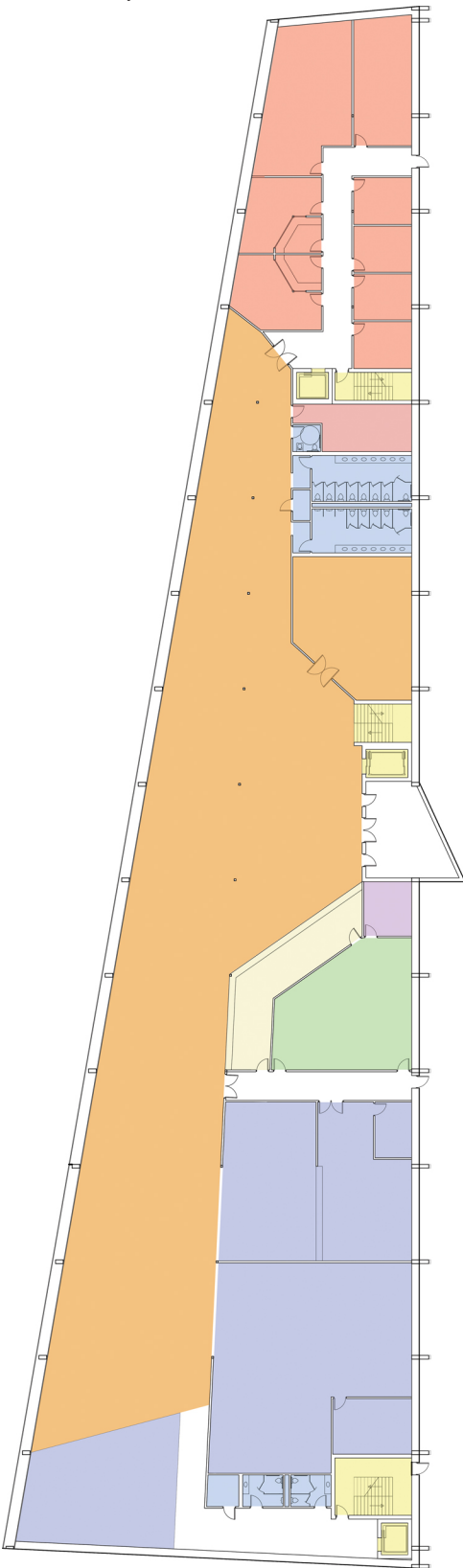
Preliminary Lower Level Plan



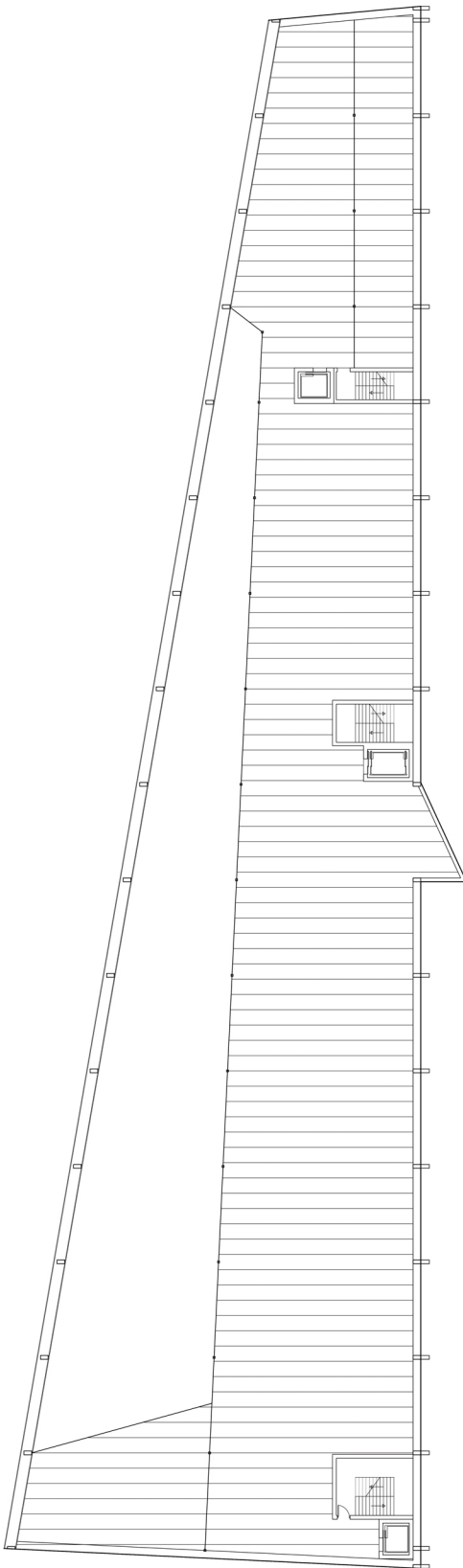
Preliminary Lower Level Structural Plan



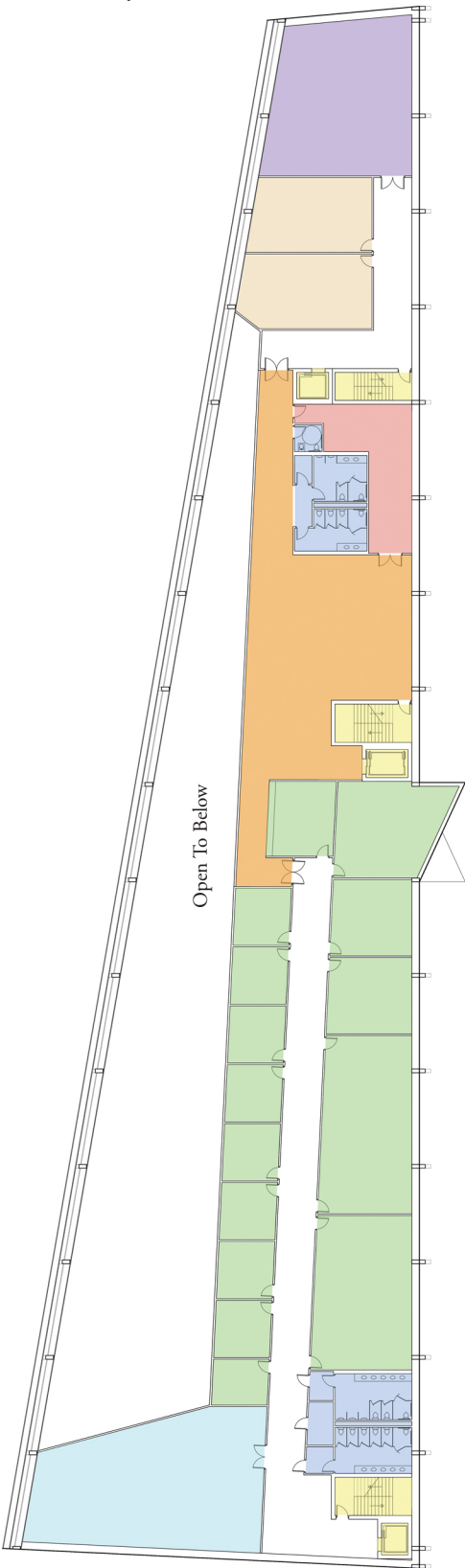
Preliminary First Floor Plan



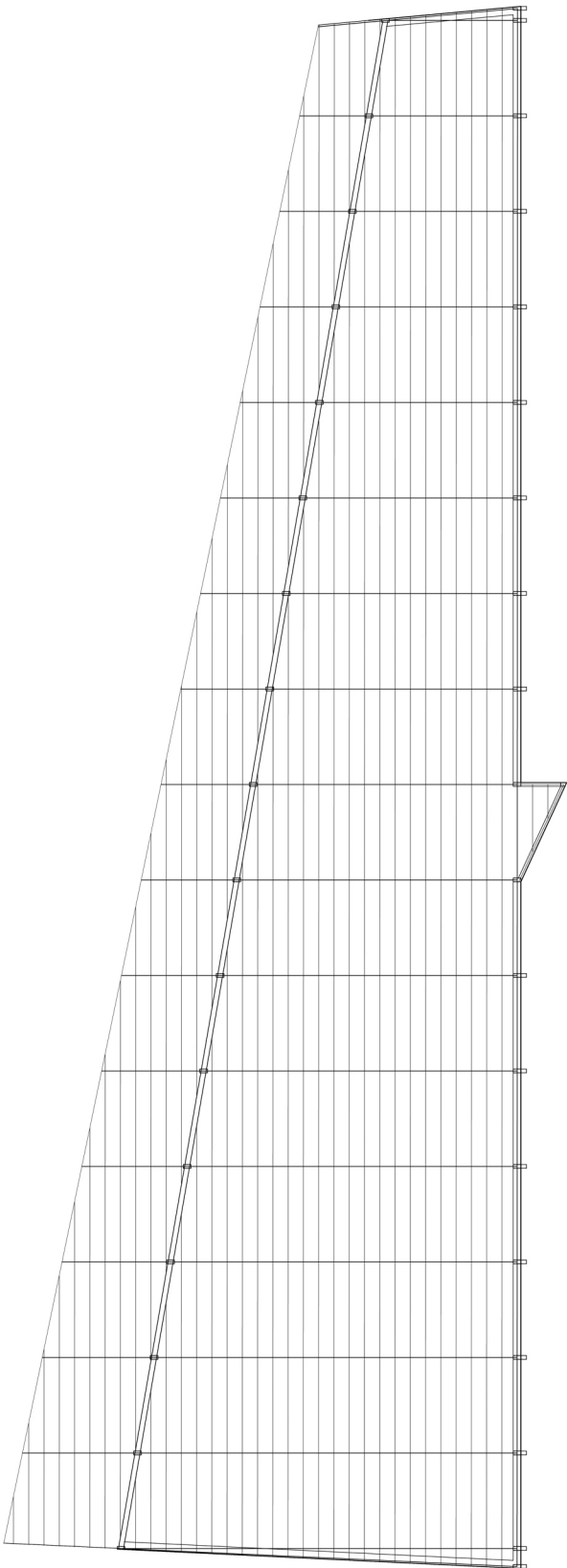
Preliminary First Floor Structural Plan



Preliminary Second Floor Plan

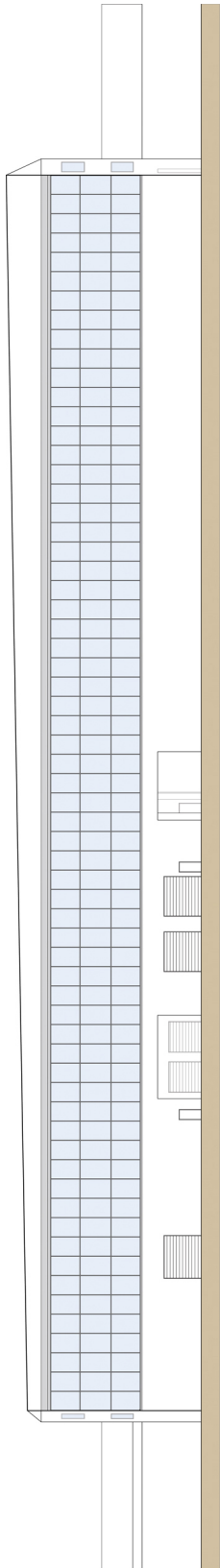


Preliminary Second Floor Structural Plan

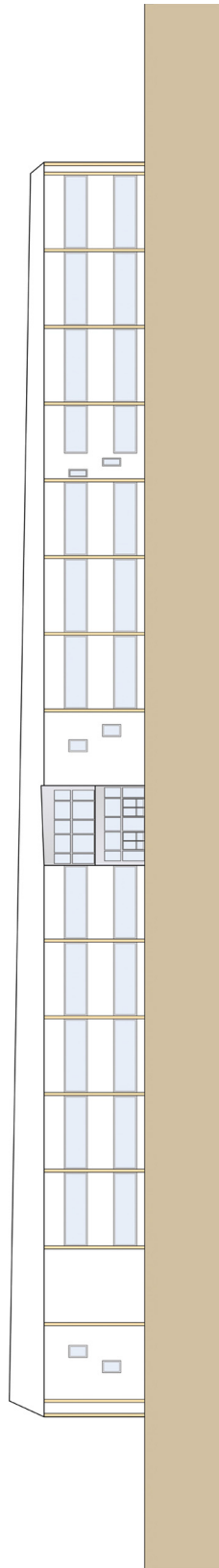


All drawings courtesy of the author

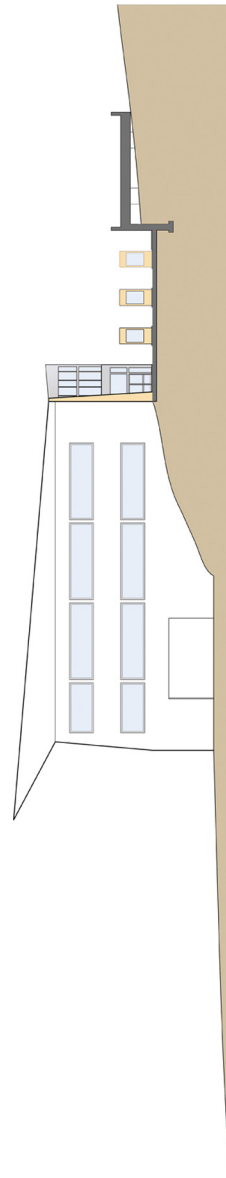
Northwest Elevation



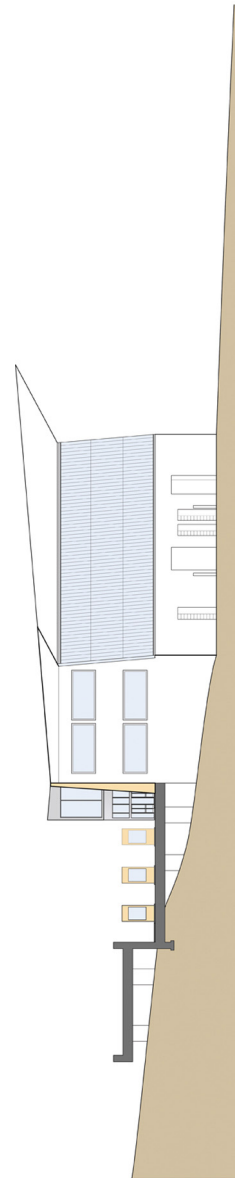
Southeast Elevation

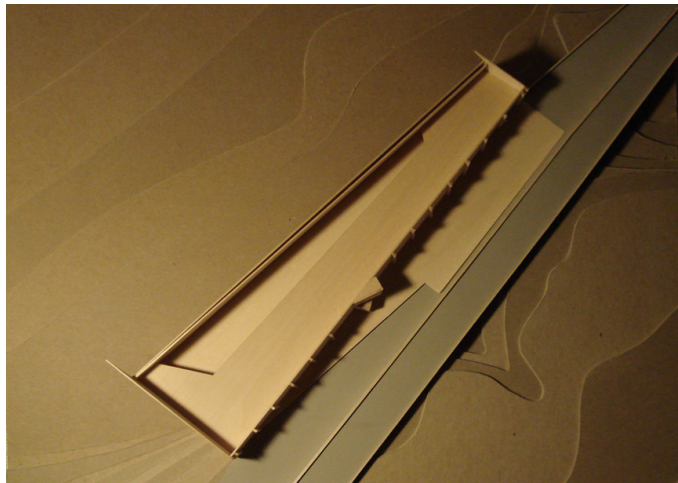
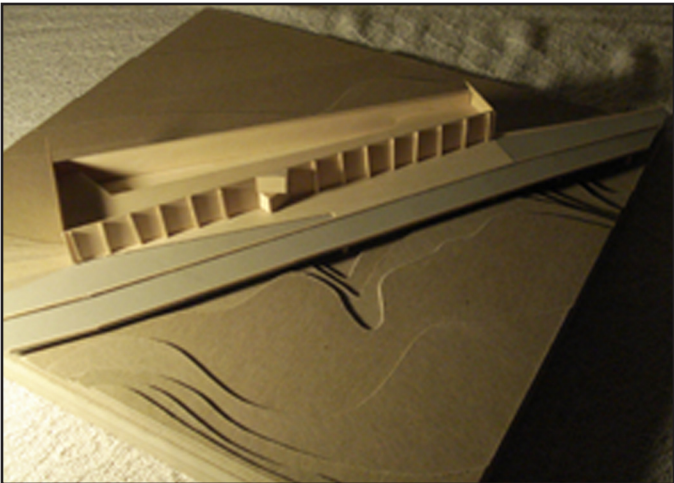
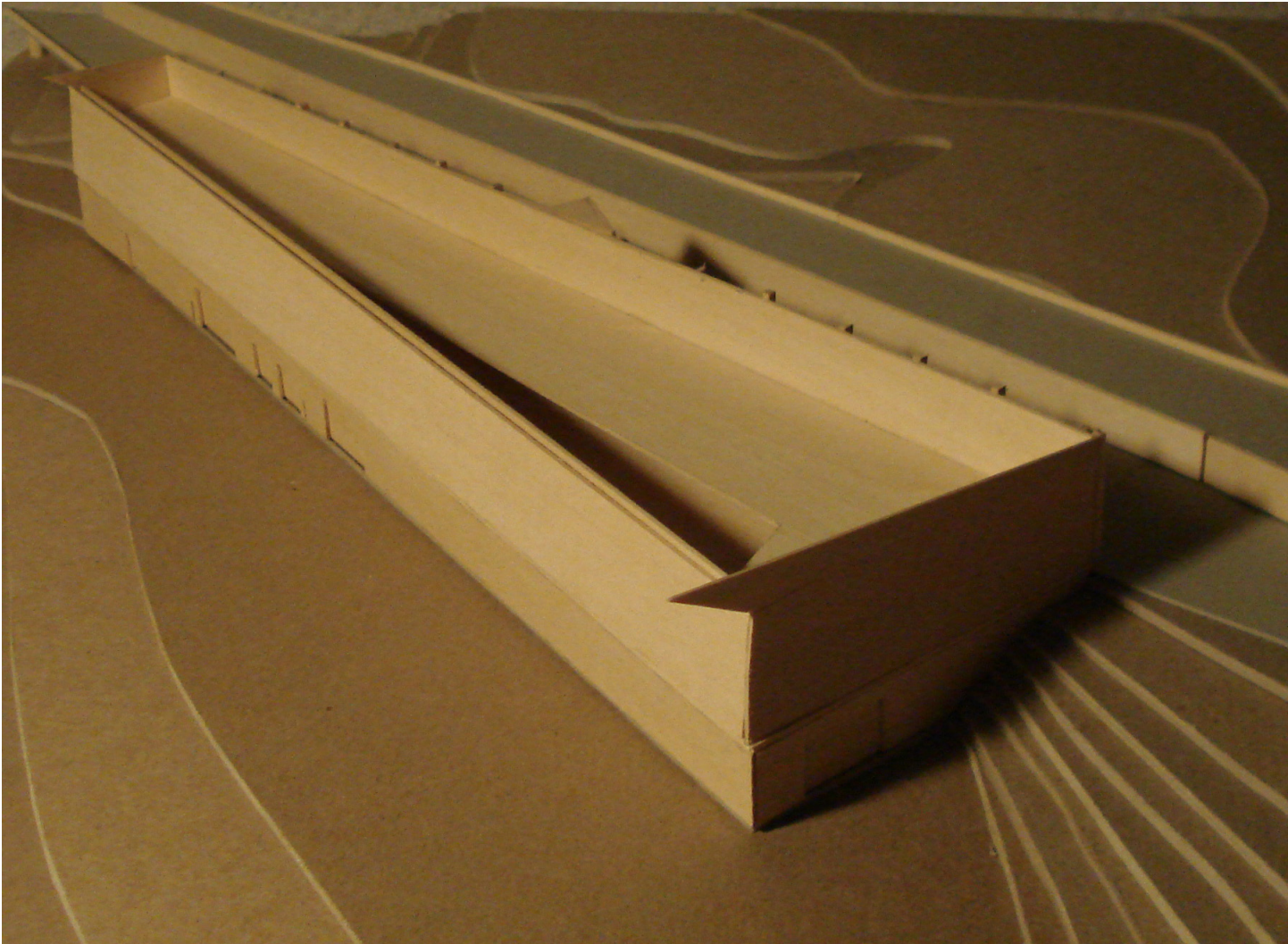


Southwest Elevation



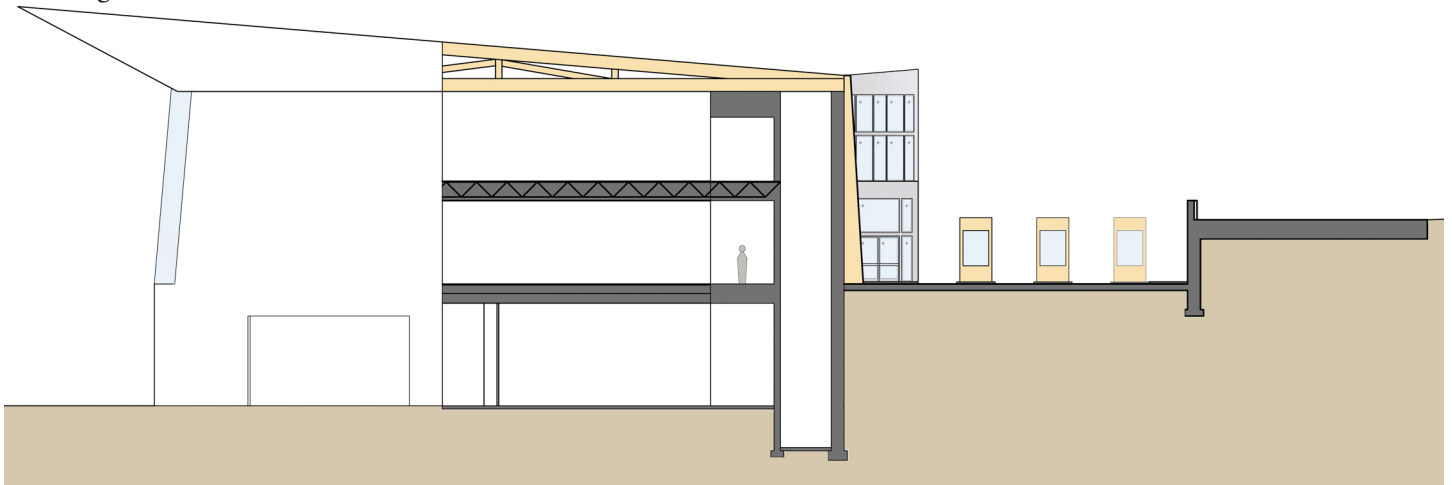
Northeast Elevation



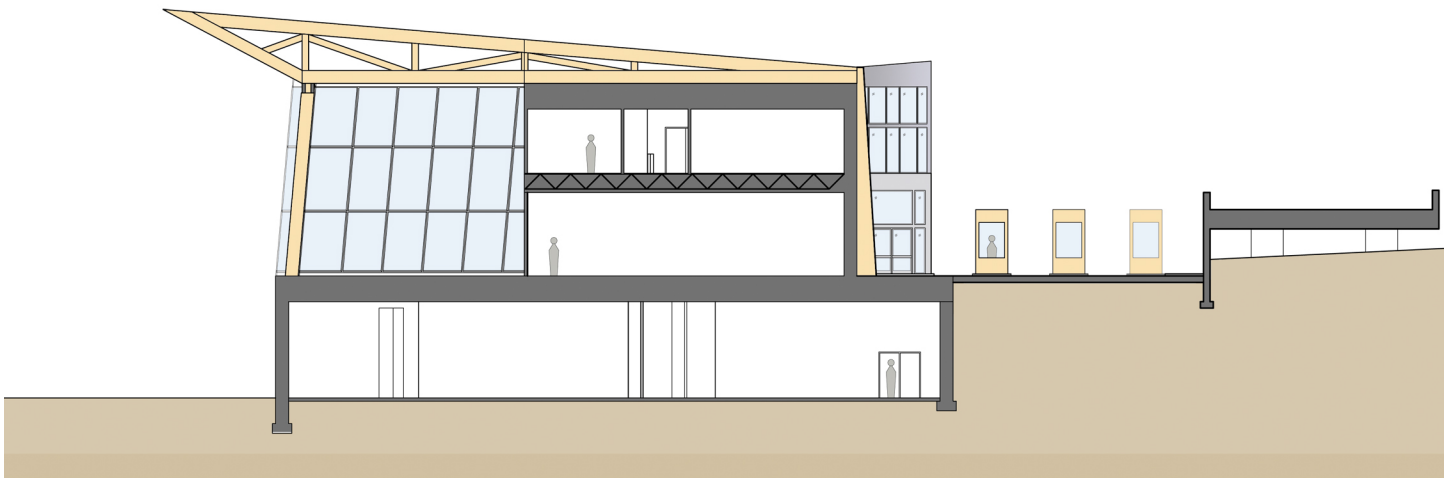


All photos courtesy of the author

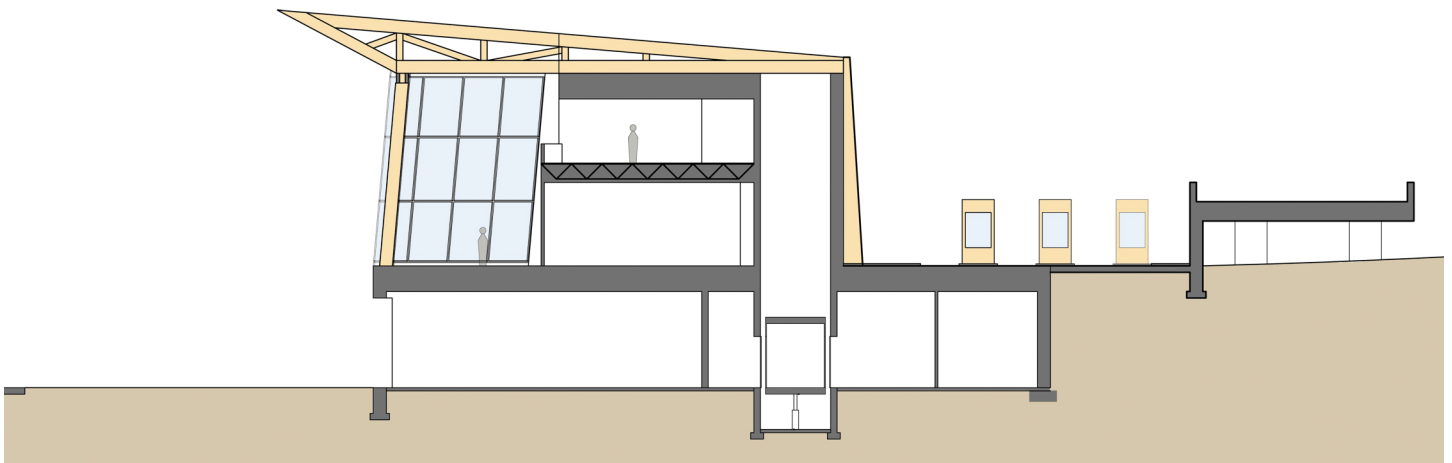
Building Section A



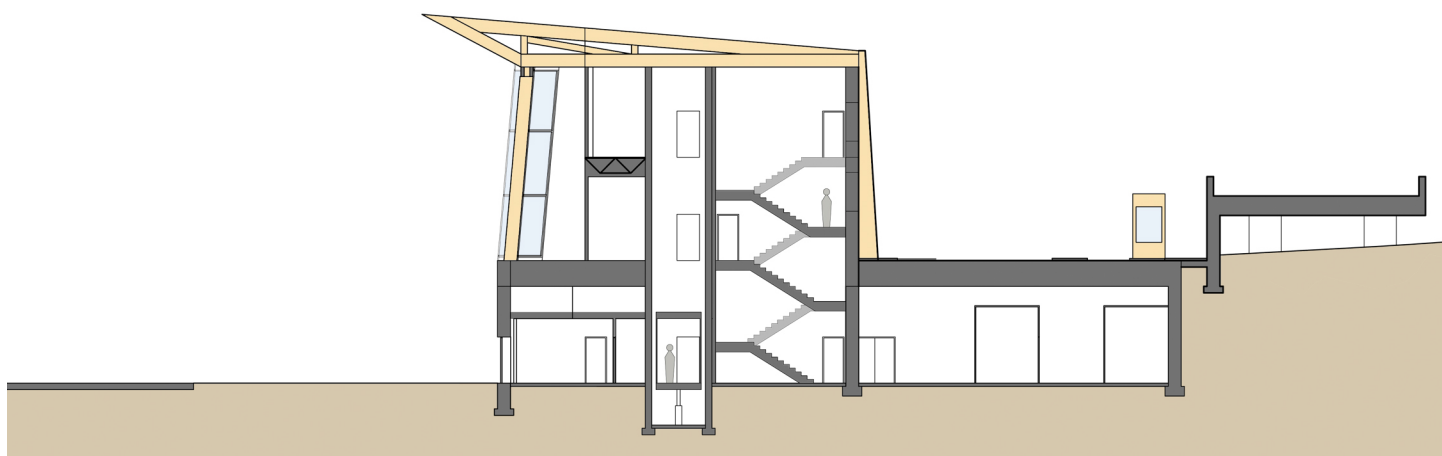
Building Section B



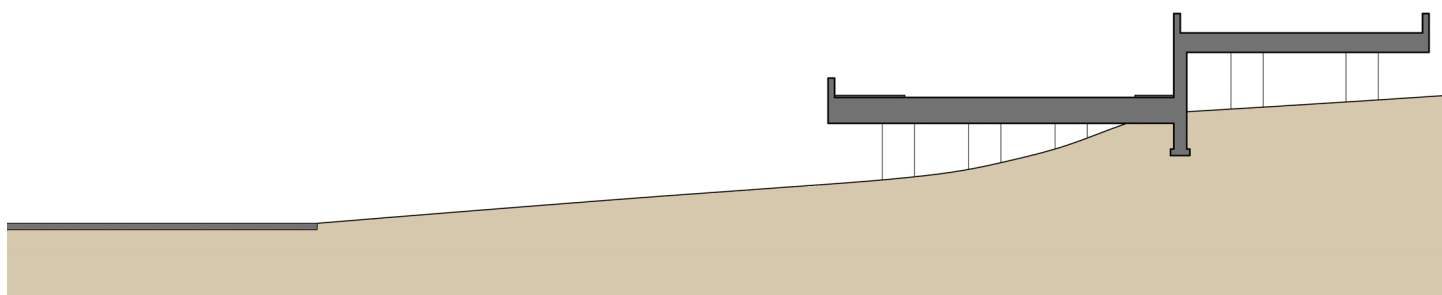
Building Section C



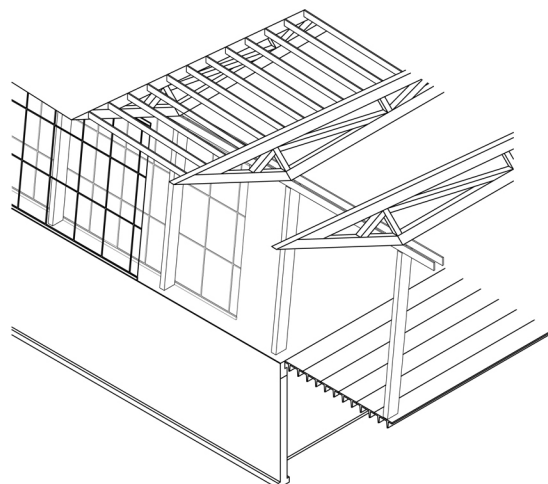
Building Section D



Building Section E



Wall Section



final project

As the project progressed and the facility was developed, the overall layout of the building changed substantially from preliminary attempts of, what an INS facility and a welcome center should be. The idea of having two separate facilities that are interrelated based on their difference became the basis to create a viable installation. Thoughts regarding the relationship to the site remained constant though, as well as working with the International Bridge in order for the station to control the crossing. By playing with the dual personalities of the facilities one may create a more engaging interaction between the welcome center and control station.

In working with the International Bridge it was known from the beginning that this would be the start to control the progression of people. Unlike the U.S. – Mexico border, the St. Mary's River provides a natural border between the U.S. and Canada. Checkpoints at this border crossing therefore, must be approached differently. The bridge acts as the sole crossing point from the U.S. to Canada for 300 miles. During the investigation of the bridge it was decided that the north bound lane of Interstate-75 leaving the U.S. would be elevated ten feet above the south bound lane. The south bound lane coming off the bridge would then remain a bridge until it meet at the corner of the building. This would act as a funnel for those entering into the country to show that this is the point that must be crossed.

The border control station would then be the next structure to come in contact with. Early on it was decided that this facility need to have a more monumental feel. Comparing it to the welcome center it will have to be a much

heavier facility. The exterior façade was looked at from almost the point of view as a prison. Unlike a prison, that is meant to keep people in, the building must still welcome people and usher them into the country. It was determined that the exterior would become a native stone façade to be positioned horizontally, but unlike prisons which tend to have long narrow vertical windows, the building would have horizontal windows that would both be symbolic to the drive into the country as well as mimic those windows found on the welcome center. The interior of the building would be a play of public versus private areas. Since the building's main function is not for the general public their area inside of it will be much smaller. This area will be mainly a waiting area for help concerning documentation problems and similar issues. The private area comparatively will make up most of the facility. This area will include areas for training, interrogation, holding cells, and general office that are needed in the everyday work environment.

The last facility to be development may be the most important structure in making the project something more than for just control, but a way in which to merge control and welcome. In doing so welcome center was considered such as doorway into the country. By looking at the welcome center in this way, it was determined a pedestrian bridge over the expressway would suggest such a door and embrace the idea of entrance. Therefore, as one was ushered through it they would be opened into the U.S. The facility itself was developed to contradict the border control station in its material choice. Unlike the heavy horizontal block wall of the station, this building is to have light vertical copper paneling. Addition-

ally, it is to have more open expanses of glass that open into and overlook the country. The interior of the facility is to incorporate those characteristics normally found around a border crossing such as a duty free, restrooms, and maps, but additionally it is to connect back to the state of Michigan and offer a Detroit style Coney island restaurant.

Border Control Station Lower Level

Employee Entrance	760 s.f.
Security Office	640 s.f.
Training Room	715 s.f.
Locker Room	785 s.f.
Men's	310 s.f.
Women's	330 s.f.
Unisex	145 s.f.
Shooting Range	715 s.f.
Vehicle Inspection	2,700 s.f.
Deliveries	2,000 s.f.
Directory	1,200 s.f.
Storage	525 s.f.
Mechanical Room	1,400 s.f.
Bathroom	635 s.f.
Circulation	1,740 s.f.
Total:	14, 300 s.f.

quantitative analysis

Border Control Station First Floor

Classroom	1,455 s.f.
Classroom 1	705 s.f.
Classroom 2	750 s.f.
Dispatch Center	150 s.f.
Server Room	350 s.f.
Director Office	350 s.f.
Assistant Director Office	145 s.f.
Supervisor Office	300 s.f.
Supervisor 1	125 s.f.
Supervisor 2	120 s.f.
Supervisor 3	105 s.f.
General Office	1,490 s.f.
Conference Room	850 s.f.
Cafeteria	370 s.f.
Interrogation Room	300 s.f.
Holding Cell	900 s.f.
2 Cells @	450 s.f.
Receptionist	265 s.f.
Waiting Room	1,150 s.f.
Storage	320 s.f.
Mechanical Room	450 s.f.
Bathroom	970 s.f.
Circulation	3,650 s.f.
Total:	14,750 s.f.

Welcome Center Lower Level

Storage	300 s.f.
Mechanical	800 s.f.
Circulation	1,905 s.f.
Total:	3,100 s.f.

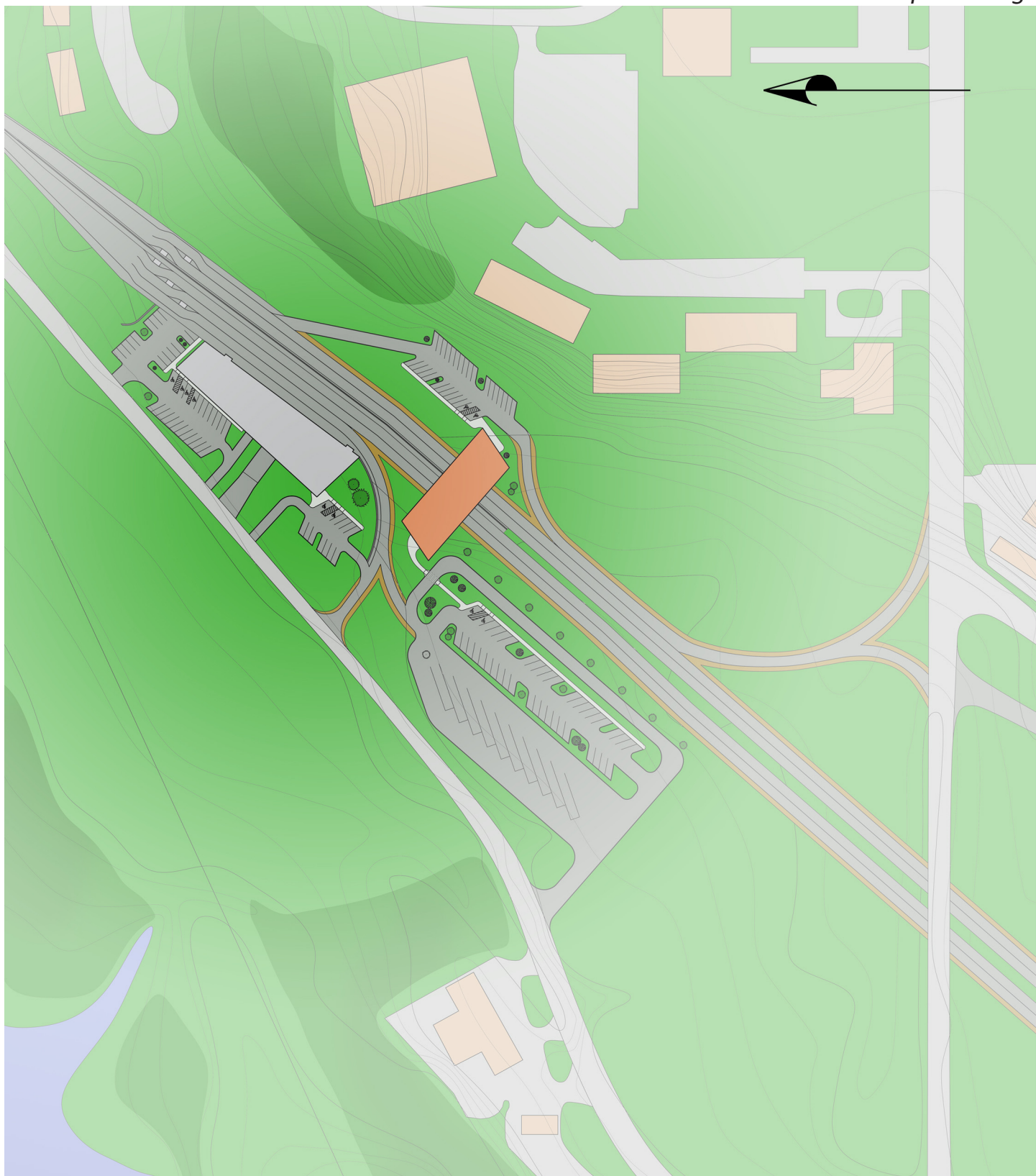
Welcome Center First Floor

Duty Free	1,300 s.f.
Coney Island	550 s.f.
Directory	150 s.f.
General Space	5,400 s.f.
Bathroom	750 s.p.
Circulation	1,100 s.f.
Total:	9,150 s.f.

Site Plan



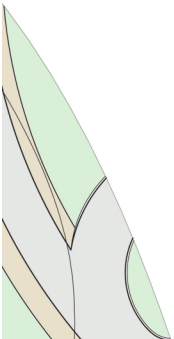
final design



Drawing courtesy of the author

Border Control Station Lower Level Plan





Border Control Station
Lowel Level Plan

- 1. Employee Entrance
- 2. Security Office
- 3. Training Room
- 4. Locker Room
- 5. Shooting Range
- 6. Vehicle Inspection
- 7. Deliveries
- 8. Directory
- 9. Storage
- 10. Mechanical Room



Border Control Station First Floor Plan

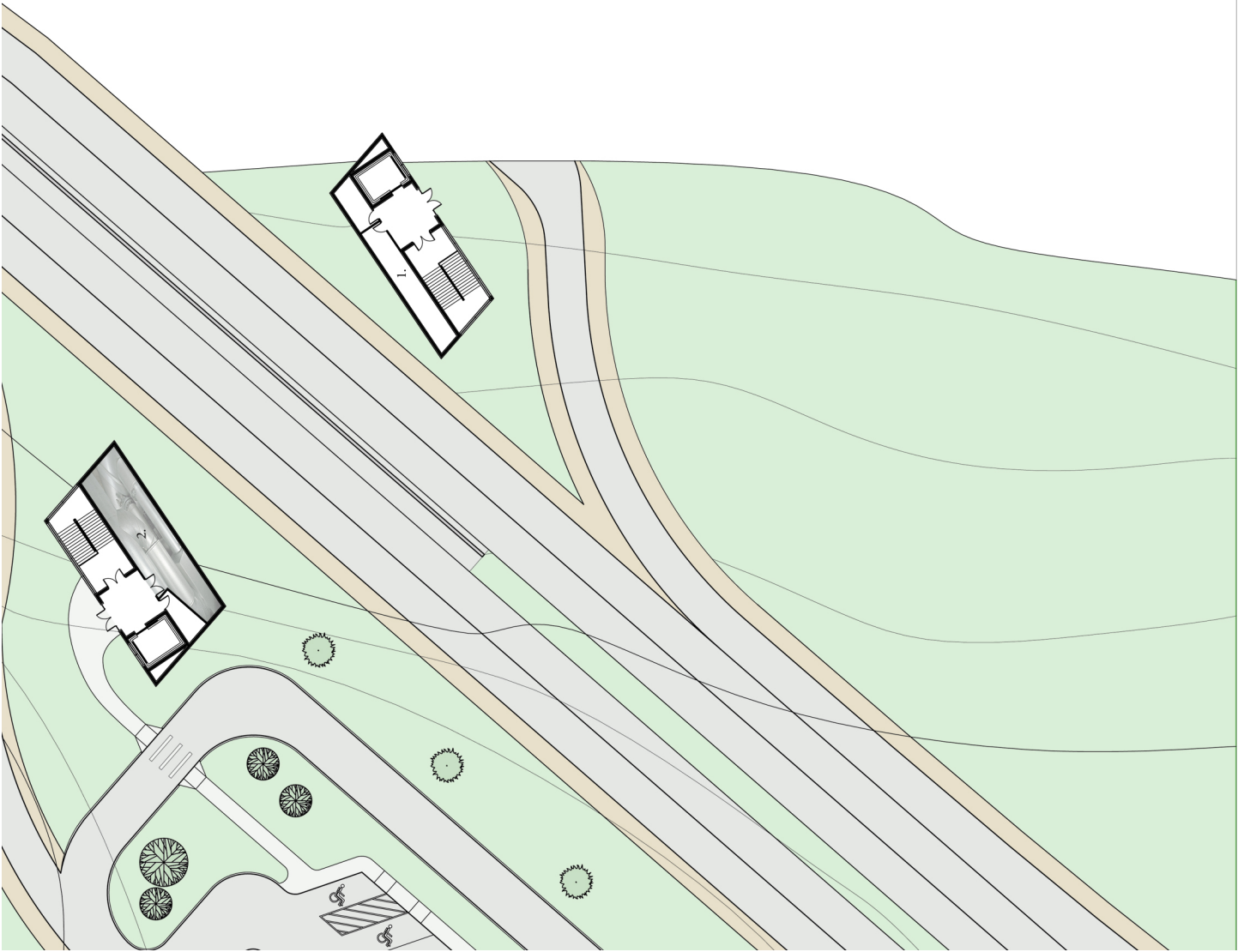


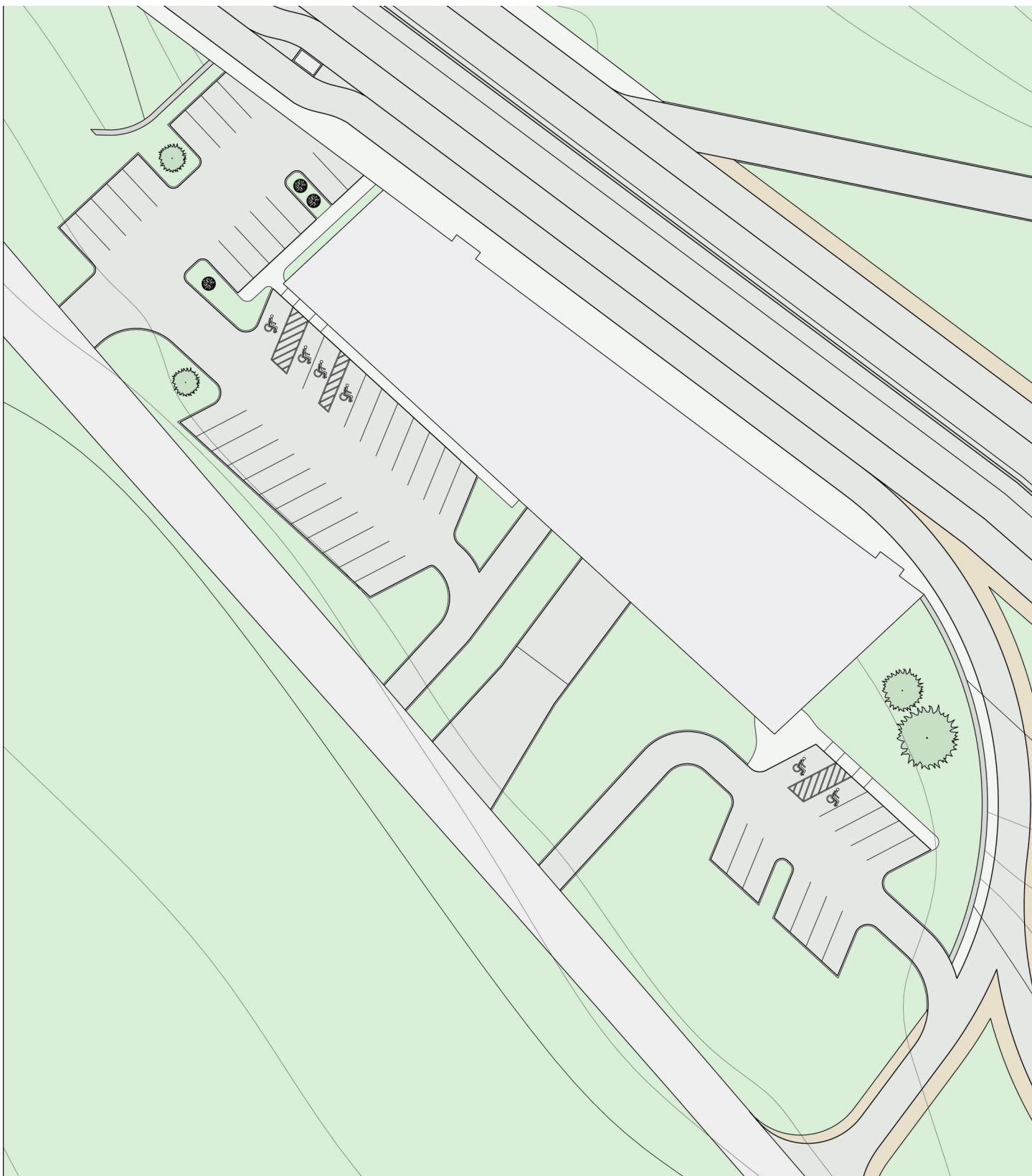
***Border Control Station
First Floor Plan***

- 1. Classroom
- 2. Dispatch Center
- 3. Server Room
- 4. Director Office
- 5. Assistant Director Office
- 6. Supervisor Office
- 7. General Office
- 8. Conference Room
- 9. Cafeteria
- 10. Interrogation Room
- 11. Holding Cell
- 12. Receptionist
- 13. Waiting Room
- 14. Storage
- 15. Mechanical Room

***Welcome Center
Lower Level Plan***

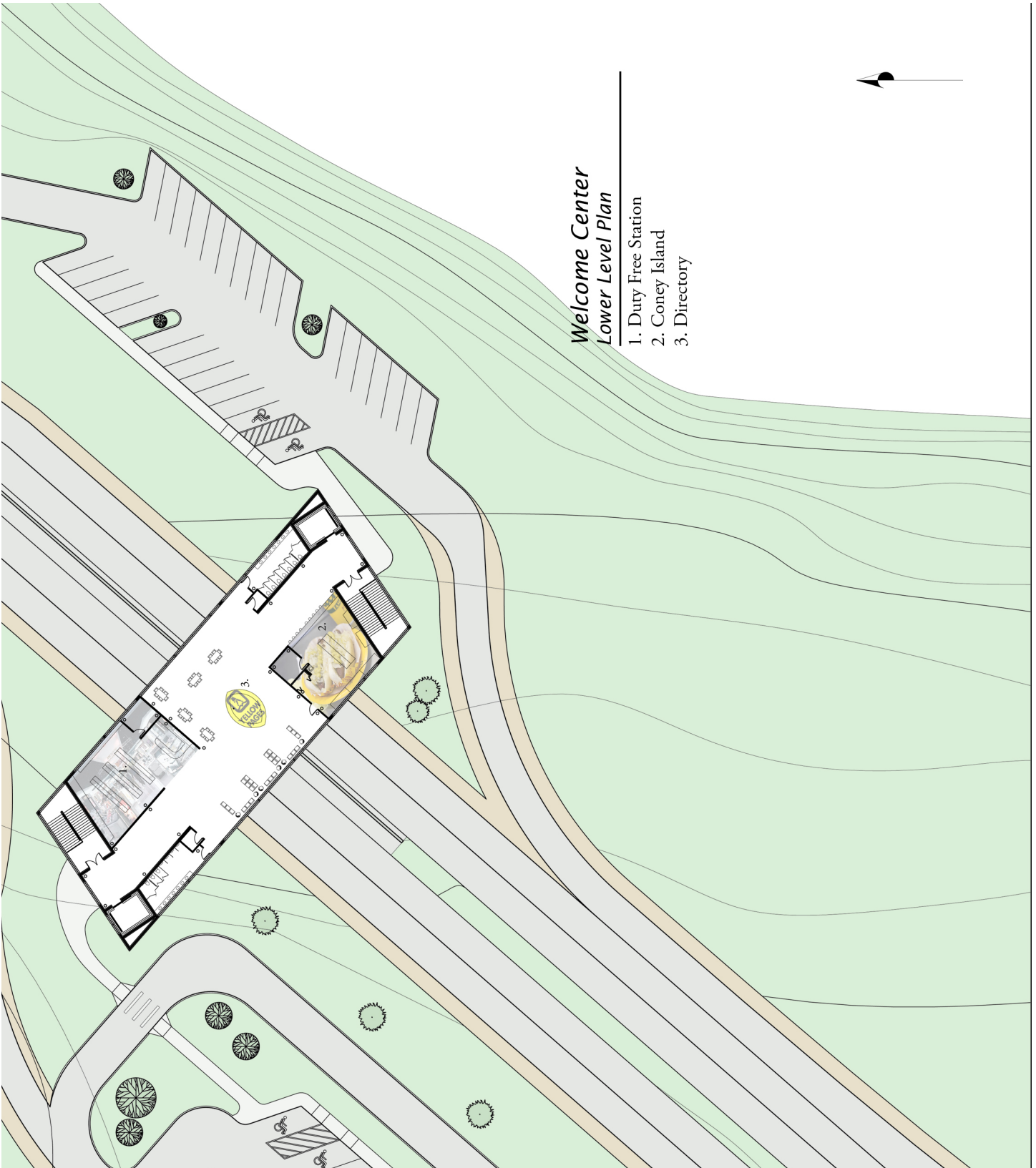
- 1. Storage
- 2. Mechanical Room



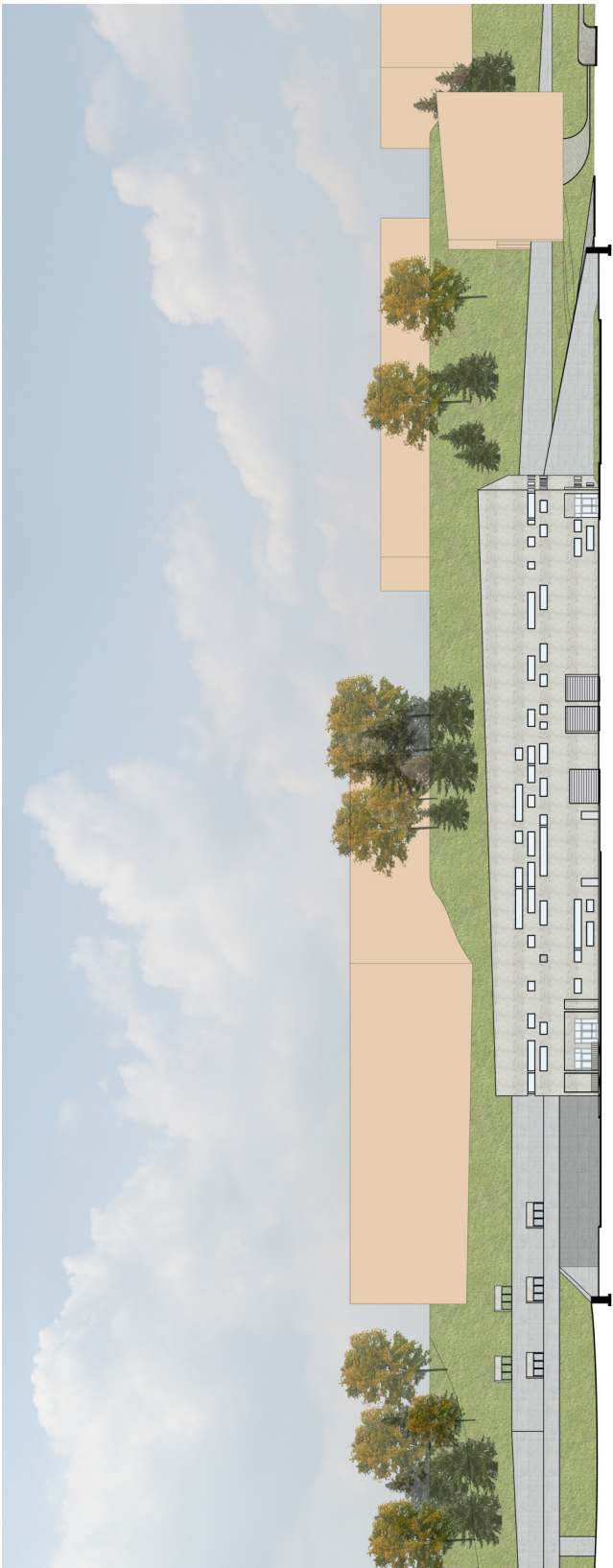


*Welcome Center
Lower Level Plan*

1. Duty Free Station
2. Coney Island
3. Directory



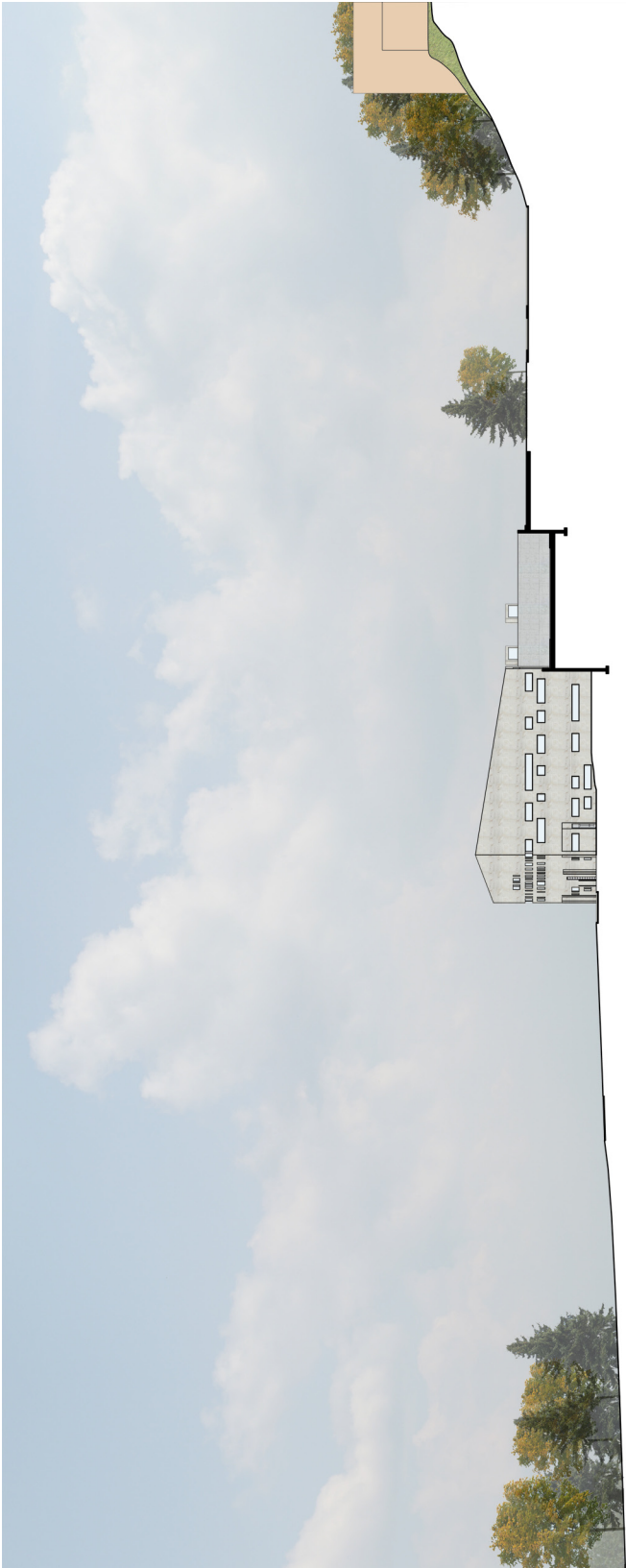
Border Control Station Northwest Elevation



Border Control Station Southeast Elevation



Border Control Station Southwest Elevation

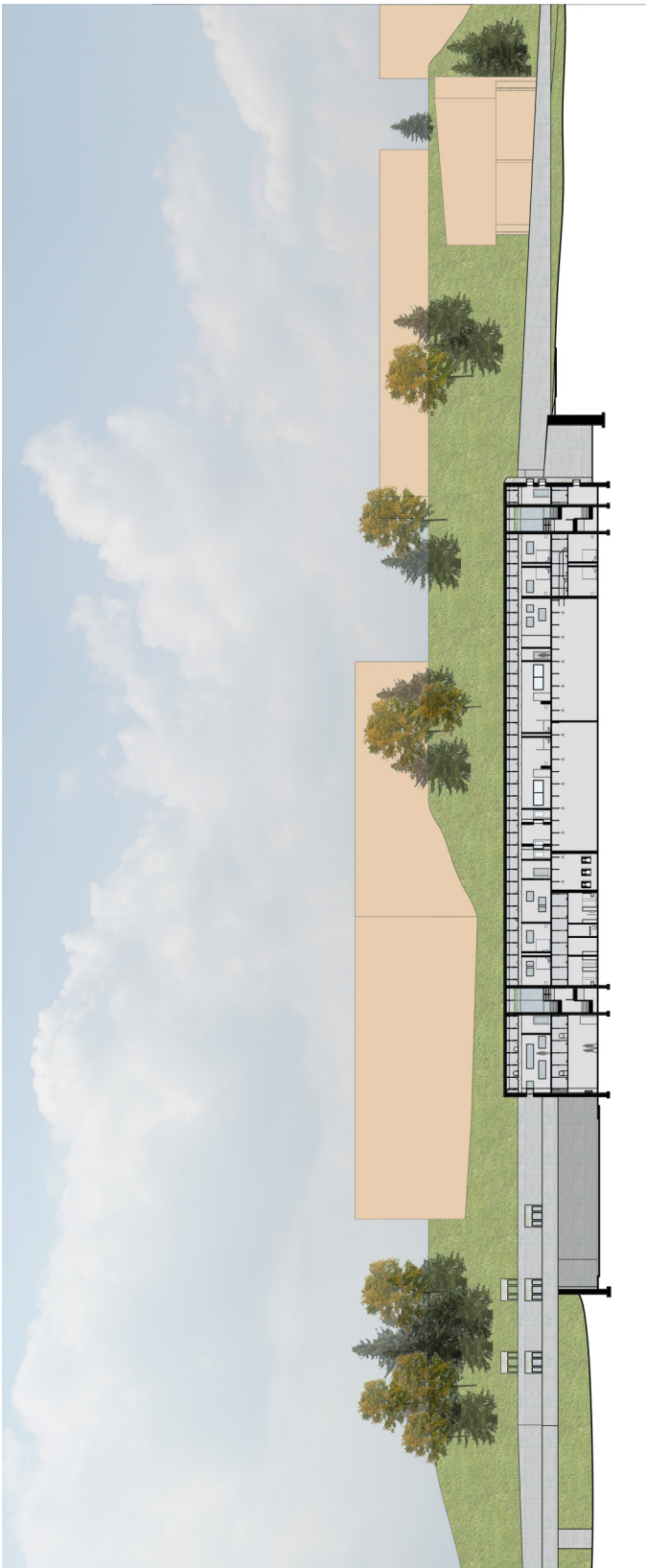


Border Control Station Northeast Elevation



All drawings courtesy of the author

Border Control Station Section

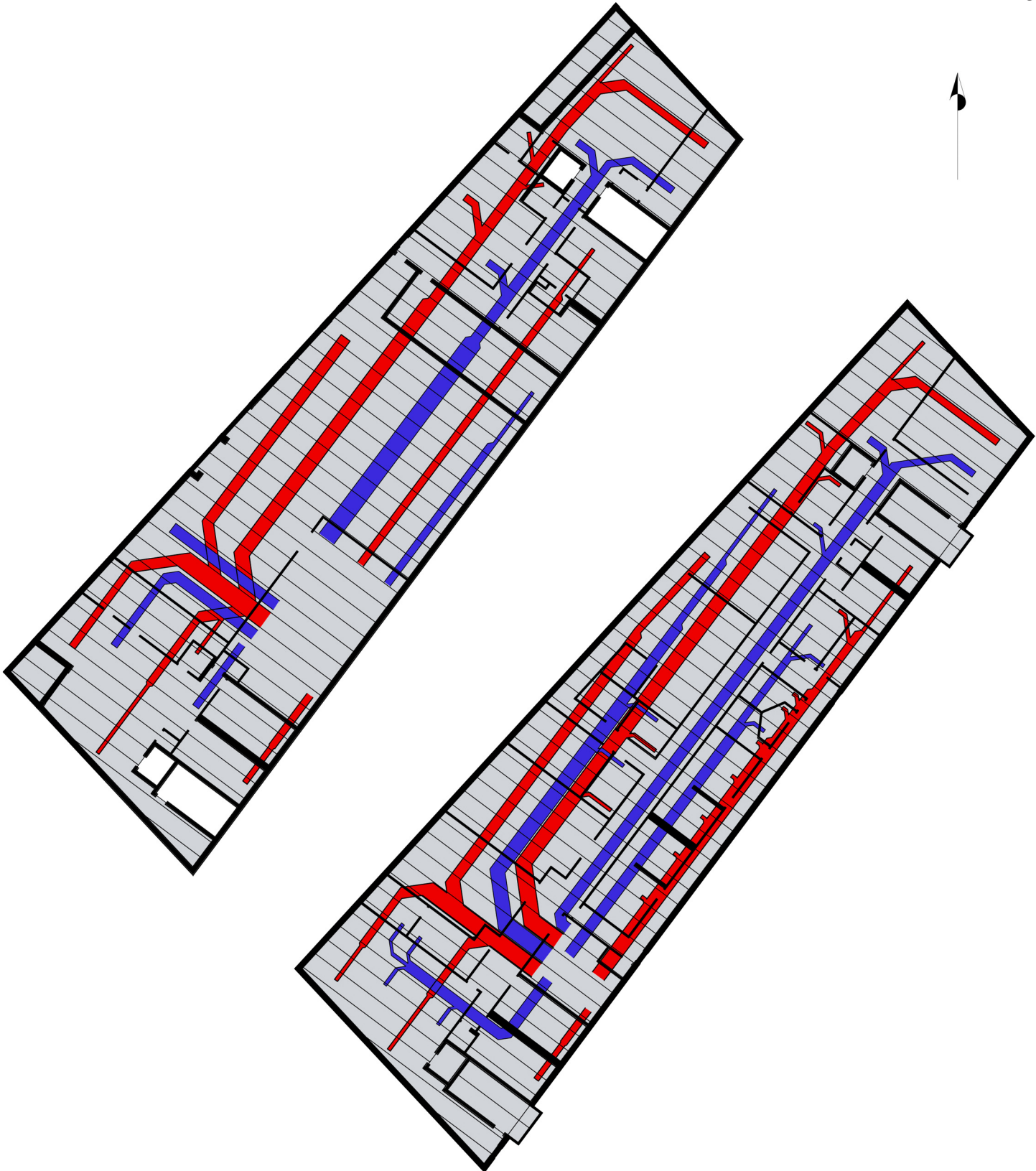


Border Control Station Section



Border Control Station Lower Level Reflected Ceiling

Border Control Station First Floor Reflected Ceiling



Welcome Center North Elevation



Welcome Center South Elevation



Welcome Center East Elevation



Welcome Center West Elevation



All drawings courtesy of the author

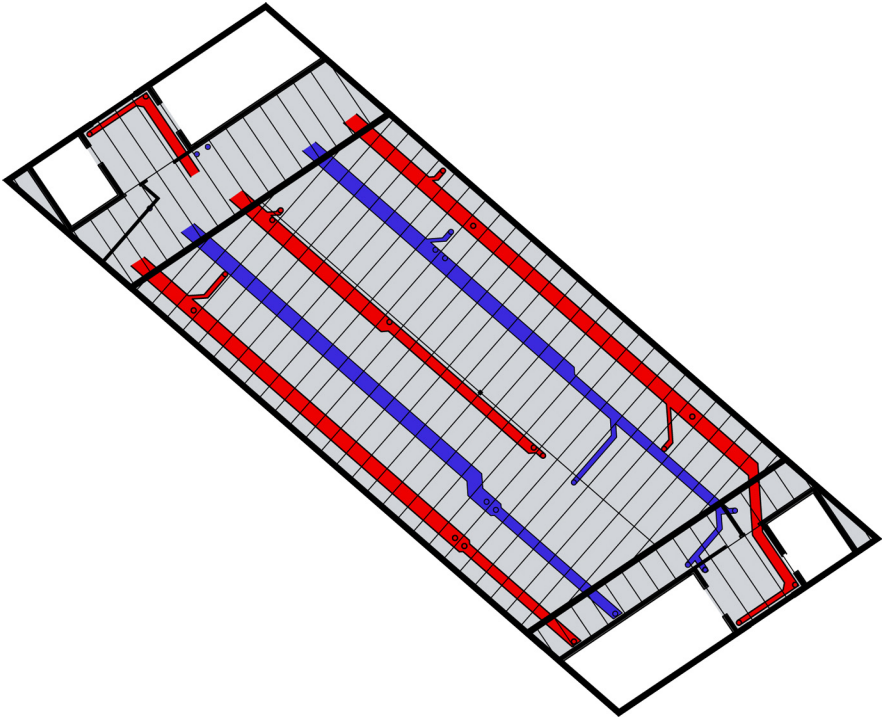
Welcome Center Section



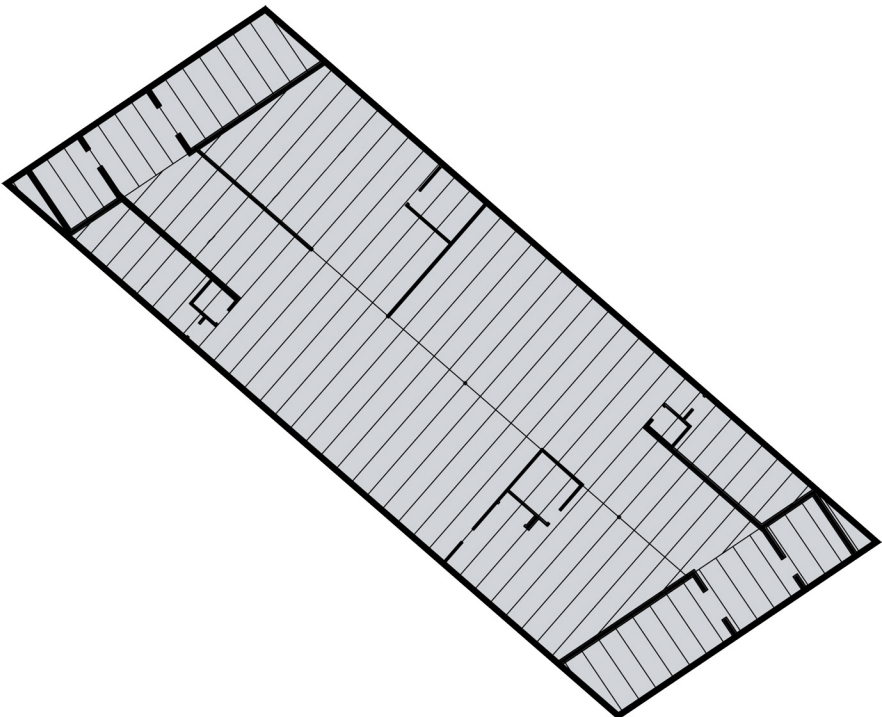
Welcome Center Section

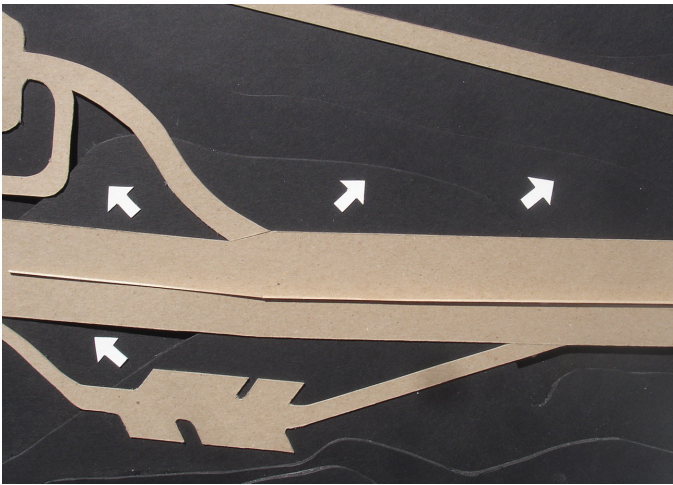


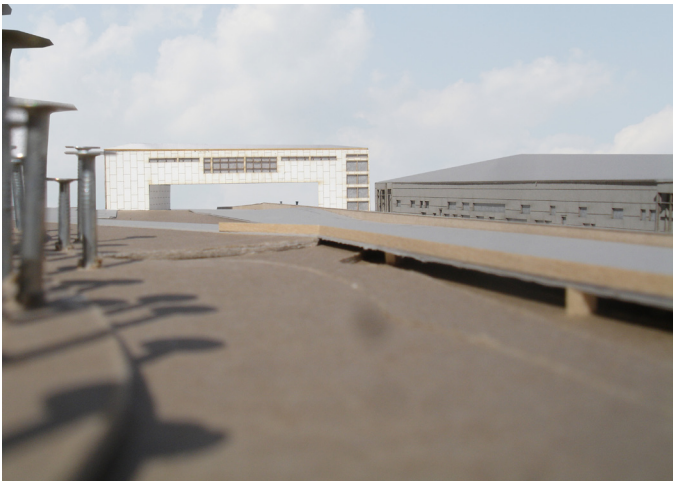
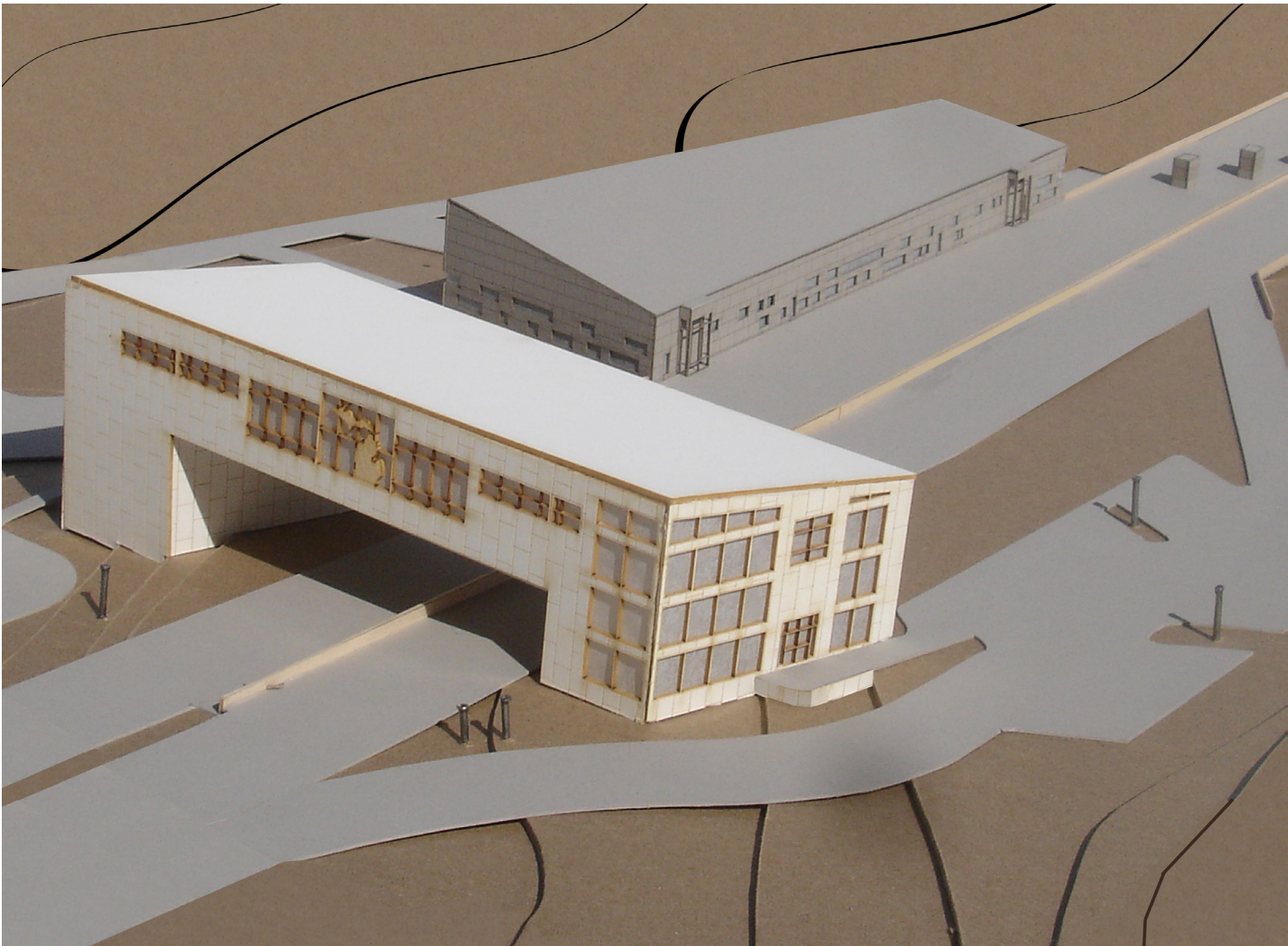
Welcome Center Lower Level Reflected Ceiling



Welcome Center First Floor Reflected Ceiling







conclusions

Now that a border has been defined it is up to people to actively participate in ways that make the crossing a more welcoming experience. This analysis of the Sault Ste. Marie border control station represent a process to which one should start at in order to design for the combination of welcome and control. This is not to say that it is the ultimate answer in ways to have design meet function and form, but a study regarding certain ideas concluded from the problem. During the final critique, ideas were mentioned that the buildings may have wanted to become one entity. Other conclusions from the critique were to think about how both buildings should have been lighter and set off a more welcoming response to those that are crossing into the country. These ideas, though not incorrect, would not have lead to as strong a sense of control over the borders. In the government intelligence programs, there is the theory of the paradox of prevention. This theory is means that if the government stops all attacks the general public will not see what they are doing, then the people will not understand why they should pay the analyst. At the same time there is the idea of the airport mentality which is the idea of total control, that the liability of something missed may be taken away because everyone was screened. By making a complete glass structure at the entrance the general public would not have the feeling of security needed to feel comfortable in their homes.

As the design was finalized the project was to take on the schizophrenic mentality of both welcome and control through a series of installations. Though the buildings are two distinct and individual entities, they are symbolizing one smooth fluid motion from one

point to another. The buildings are to be seen as one element that is passed in and through at the same time. It is through the use of both buildings the community may feel comfortable with who is entering the country and additionally those that are coming in may be embraced and greeted upon their arrival to the country.

The process used in this research of what a border should consist of is not site specific, but may be viewed as an overall base for all borders. Borders must relate back to the site to create the building form. Additionally, one must understand what about the community surrounding the site cannot be touched. In the case of Sault Ste. Marie, the Lake Superior State University sits to the east side of the site. During the siting of both buildings it was important to not disturb the location of this campus. An INS station should give back to the community as much as the community gives to the facility. Additionally, any site lines need to be embraced within the facilities themselves. In the layout of the control station it was important the offices had views that overlooked Ashmun Bay and Lake Superior. It is ideas such as these that orientate the location and building structure to the site, instead of improperly relocating the site to fit in conformity with the building.

The buildings themselves must be developed from those experiences that are culturally significant to the land. In the case of either building the materials chosen for the façade were those that could be locally mined or quarried. Through sensitivity to the environment one will have the ability to achieve a building that represents the community for others that are entering. A border should not be a cut and paste building put on location to

denote where the crossing point is. Instead, the border will become a creation of its own. Though the technical aspects of the interior of the building may be replicated and altered to fit from one facility to the next, each facility must have their own characteristics. This could most visibly be seen in the welcome center with its Coney island stand. Such a characteristic would not be important in a location as that found on the U.S. – Mexico Border, but due its relationship to Michigan's history, it ties the overall idea back.

This notion of a new stance on border security is an implemental solution that will create less tension when one is crossing into the country. At the same time, it will be used to create a feeling of safety and security for those that inhabit the country. The design that was created was a gesture toward the ever globalizing world that, as a nation, we are not to limit ourselves from others. "We must ensure that the global market is embedded in broadly shared values and practices that reflect global social needs, and that all the world's people share the benefits of globalization." ¹

¹ Annan, Kofi.

works cited

Annan, Kofi. Think exist.com. 2006. 23
Apr. 2009. <[http://thinkexist.com/
quotations/globalization/](http://thinkexist.com/quotations/globalization/)>