

**Preserving the Intangible Qualities of a Building Culture: A Case  
Study in Windsor, N.S.**

by

Anthony Dean Dumaresq

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## **ABSTRACT**

The land-based infrastructure of the Nova Scotian boat building culture is studied in this thesis to explore how the intangible qualities of a building culture can be understood through architectural ideas. The study finds the infrastructure associated with this industry to be closely tied to adaptive and resourceful attitudes toward this built environment. From this, combined with intimate knowledge of materials, structural principles, and an environment where incredibly malleable buildings are created, emerges a unique approach to problem solving and design.

In order to propagate these qualities into the future this thesis proposes a design-build school that would embody these principles. The adaptive re-use design of the school will facilitate students learning through direct interaction and manipulation of the building that houses the school. This, along with the knowledge of the faculty, will foster a culture of problem solving and design in the same spirit as Nova Scotian boat builders.

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## **CHAPTER 1: INTRODUCTION**

### **1.1 Research Question**

What architectural lessons can be derived from the study of the land-based infrastructure associated with the boat building culture in Nova Scotia and in turn how can architecture contribute to the preservation of these intangible qualities?

As a focus, this thesis will address this question by examining the buildings that boat builders constructed in the province and in particular those found in shipyards. The first half of the document is a study that identifies and explores prominent qualities within this aspect of the boat building tradition. The second half proposes a design/build school that draws on these inherent qualities. In doing so the goal is to establish metaphoric translations of the boat building culture rather than trying to make literal representations of boat building techniques and technologies. In this light the qualities identified are imprinted on the next generation of builders/designers and the tradition can continue. The intent is not to perpetuate the traditions in necessarily explicit or conscious forms, but rather influence the way new designers and builders approach the construction environment.

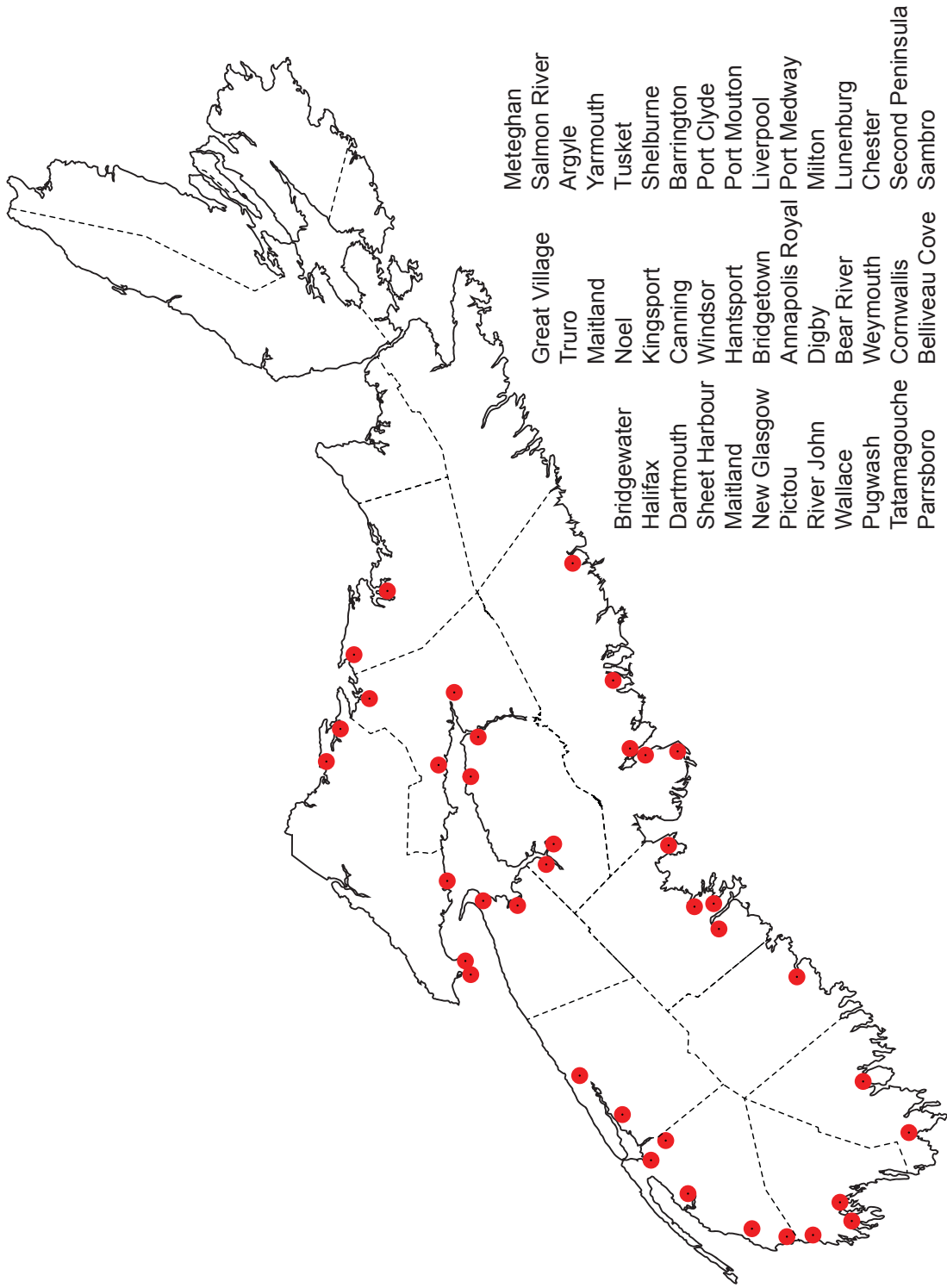
### **1.2 Boat Building in Nova Scotia**

The history of boat building in Nova Scotia is as long and varied as the province itself. It has always been rooted in independency and self-reliance. The first records of boat building, outside Native American boats, date to the early 17th century at the settlement of Port Royal, Nova Scotia's first European mainland settlement. The physical geography of the province provided an ideal location to foster

ship building culture. The peninsula shape of the province provides a large coast line perforated by rivers and inlets that create hundreds of places of refuge from the perils of shifting ocean conditions. From these moments of refuge ports developed around the coast line. In the early history of the province these communities were isolated and only accessed by water. As a result the ship building that took place was often vertically integrated in one family or business. (Spicer 1968, 18) These people would cut the trees, square and mill the timber, build the boat and ship goods to sell in other ports. This self sufficiency and understanding of multiple trades is something that persisted through much of the industry's history.

This rich history has not only defined the founding of the province/colony, but has had a lasting impression throughout our history. With such a prolific presence has this building culture extended its influence beyond just the marine culture? If so it becomes particularly important to understand and preserve the aspects of it that have shaped large parts of our cultural identity in both architecture and beyond.

In addition to its prolific presence intertwined with Nova Scotian history, an understanding of boat builder's impact on the building culture is important due to a local decline of the industry seen spurred by the onset of industrialization since the late 19th century. The shift toward steel and the steam engine left Nova Scotia with a resource base that limited our ability to compete with more developed areas with more abundant and consistent mineral deposits. On top of this ship yards were not equipped to handle the scale of ship building produced by these methods. Much of the work was conducted in larger cities along the great lakes that were



Historic ship building towns of mainland nova scotia (Spicer 1968)

better able to compete with large steel based shipyards in the U.K. and other parts of Europe (Wilson 1994, 36). The latter half of the 20th century saw a decline in the ground fisheries in the Atlantic provinces causing a major reduction in construction of new vessels. (McDermott 1985, 8) This hit the hardest in the mid 1990s with the cod moratorium. The fisheries is still an unstable industry in eastern Canada relying mostly on shell fish.

The cargo shipping industry that was dominant in the Atlantic provinces in the 19th century has all but disappeared. This was partly due to factors mentioned above but also due to developments in other modes of land-based transportation most notably the railroad and later roads and highway systems that supplanted much of the marine shipping industry in the province. This combined with changes in international shipping markets and political structures, namely Canadian confederation, had a significant impact on the decline of the ship building industry in Nova Scotia and the replacement of marine industries by road and railway lines. In essence for Nova Scotia shipping, marine is the old and land is the new. This has changed the economic dynamics of the province which has seen declining towns, fading industries and their associated infrastructure. (Sager and Panting 1990, 127)

Today Boat building is mostly at a smaller scale with many shops focusing on repairs rather than new builds. The industry has moved almost entirely away from wood with the exception of private yachts. In its place most smaller boat such as fishing boats are built of fiber glass and larger ships of steel. There is very little ship building associated to cargo shipping as it did in the past and is mostly focused on fishing vessels, yachts and transportation such as ferries. Many



towns that had thriving boat building industries are now void of this activity without much of a mark remaining from the once extensive infrastructure systems associated with boat building. With ship building declining and the infrastructure disappearing all over the province what heritage should be preserved and what Architectural lessons can be learned from this industry that once gave Nova Scotia such a strong global presence?

### **1.3 Intangible Heritage - Nara Conference**

In order to frame the heritage values embodied by the ship building industry this thesis relies on key UNESCO documents to provide a frame work to identify components of value in the examination of land-based boat building infrastructure. In particular the 2006 international conference in Nara, Japan has provided insight into understanding and identifying the intangible heritage in the industry. UNESCO published a report on the conference which has become a global benchmark for understanding intangible heritage.

This conference used the ICOMOS (International council on Monuments and Sites) Venice Charter from 1964 as a starting point for both inspiration and as counter point to understanding the limitations of viewing only the tangible aspects of heritage when considering how to preserve it. (UNESCO 2006, 130). The Venice Charter was established for the conservation and restorations of monuments and sites. This is described not just through singular pieces of art and architecture, but through the context that they exist within. (ICOMOS 1964, 1) The Nara Conference aimed to look beyond the static view of heritage and address intangible qualities of heritage that are not covered in the Venice Charter.

There are several key points that the charter embodies:

1. Intangible heritage finds expression through the actions of humans (UNESCO 2006, 114).
2. Without living people enacting the culture it would not exist. (UNESCO 2006, 116).
3. There is no necessary connection between intangible heritage and a tangible one. (UNESCO 2006, 102).
4. “Just as tangible heritage is representative of a past period or series of periods, intangible heritage reflects today’s reality: it is here, it is living, it is constantly changing. Its foremost characteristic is this vitality, this possibility of adapting to the changes in individuals of whom it is the expression.” (UNESCO 2006, 102)

These key principles of describing intangible heritage were used as a basis for identifying heritage qualities from the land-based infrastructure of the boat building industry, and in turn how they could influence architecture in the province.

#### **1.4 Intangible Qualities of Land Based Boat Building Infrastructure**

There are many facets included in the boat building culture that should be preserved. We can see this type of heritage preserved in many institutions around Nova Scotia such as:

- The Maritime Museum of the Atlantic (Halifax, NS),
- The Avon River Heritage Museum (Newport Landing, NS),
- The Age of Sail Heritage Centre (Port Greville, NS),

- The Dory Shop Museum (Shelburne, NS),
- The Dory Shop (Lunenburg, NS),
- Muir-Cox Shipbuilding Interpretive Centre (Shelburne, NS).
- The fisheries Museum of the Atlantic (Lunenburg, NS),

These museums have established a baseline for preserving the tangible qualities of this building culture by archiving and exhibiting tools, records, examples of parts of ships and whole ships. Didactic panels in these institutions depict methods and techniques of boat building which are culturally important to Nova Scotian history and identity. On the other hand contrary to colloquial understanding there are very few examples where these tools and techniques are directly translated to the architecture within the province. This can be shown through an examination of buildings in coastal communities, and in short can be summarized in an understanding that a boat is not a building; that the two operate differently on structural and programmatic levels. Basic elements such as envelope and fenestration are designed fundamentally differently. This is not to say that there is no influence but rather to state that the influence is less literal and is embodied in an attitude toward building and design.

The preserved tangible boat building heritage may illustrate little connection to the architectural vernacular of the province, but there are still important lessons to be learned from the intangible qualities of the boat building culture. These qualities are most evident in the land based infrastructure produced in the boat building process. When examined closely these buildings reveal a dynamic architecture that

is freed from aesthetic and static restrictions found in many architecturally designed buildings. Here there is a divide clearly seen between the informal and constantly changing building types found in ship yards on the one hand. On the other are buildings that we have culturally accepted as architecturally significant which tend to remain more static. The following case studies illustrate some of these dynamic and innovating qualities present in many shipyards around the province. They also illustrate a perspective on design that differs from that which an architect often brings to the table.

#### **1.4.1 Boat Sheds Case Studies**

There are examples of ingenuity and ‘outside the box’ design and construction in shipyards all over the province that characterize these dynamic buildings. Below are a few examples found around the southern end of Nova Scotia.

##### ***CME Marine Works Inc., Sambro***

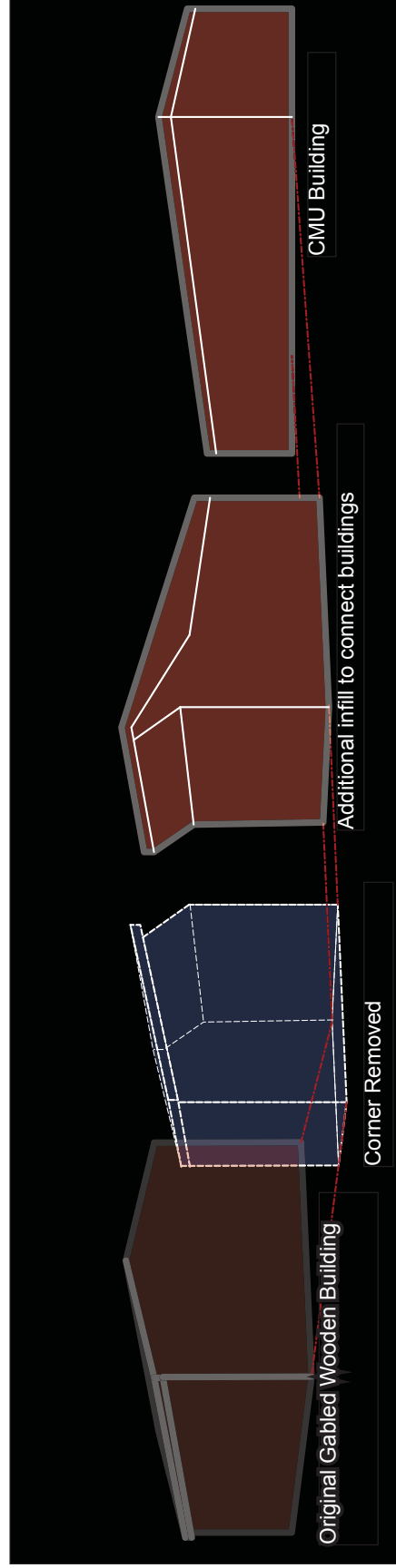
This shipyard, founded in the early 20th century, has changed its form as the market has changed over the past century. The main building depicted below used to house boats when it was first constructed in the early 1950s. At this time wooden ships were still built in many parts of the province, mostly employed in the fishery. This building in particular has been constantly adapting in response to functional demands from the work being conducted in the yard. The original building was an elongated gable structure. Later a second rectangular concrete masonry building was built. In a third move these buildings were connected by an oddly shaped building that bridges the two. When it was built the truss system of the third building appears to have been

bearing on the original gabled building giving it two bearing points. In the past year the corner of the original gabled building was torn off to make room for a boat that had to be maneuvered around the yard. This changed the nature of the trusses in the third building from a traditional two point bearing load to a cantilevered structure. To accomplish this level of adaptability requires both an intimate knowledge of building systems and an intellect that is not restricted by conventional thoughts and attitudes toward design and the building culture.

This exemplifies the situation of the boat builder because the actual value of the adaptation is hidden in the lack of attention that the boat builder has given to the aesthetic component of design. They are uninhibited by the conventional sensibilities that an architect might be limited by. In this case in particular the corner was never re-clad to match the rest of the building. They essentially just nailed some plywood up and covered it with 'Tyvek' weather barrier. Had an architect been involved perhaps the ingenuity and dynamism of the building adaptations could have been represented and had attention drawn to it rather than have it hidden under lack of attention to finishes and aesthetics.



Shed at CME Marine Works Inc.



Shed at CME Marine Works Inc. exploded into component parts.

***A.F. Theriault and Son, Meteghan***

Theriault's Yard is an excellent example of the boat building culture translating to land based architecture. Established in 1932 it grew to be one of the largest shipyards in the province. With several marine railways and large scale wooden buildings that could house several ships under construction at one time.

In the late 1980s there was a push for this particular yard to modernize. The utilitarian nature of the business dictated a need to continue ship construction during the renovation process, but there was also a desire to replace the main boat building shed with a new larger spanning, and more durable steel shed. In response to this challenge the managers developed a plan to construct a new steel building around the old wooden one so that the boats inside the wooden shed wouldn't be delayed by the construction process. Once the steel shed was complete the wooden shed was demolished from inside the new steel shed with only a minimal disturbance to the production in the yard.

This example again illustrates unconventional design driven by a problem solving approach not restricted by more traditional design conventions. The interesting aspect of this project is that the steel structure depicted below has a much more dynamic appearance before it was clad. This is something that an architect may have taken advantage of and perhaps try to emphasize, but the shipyard made the decisions to cover the structure with a generic metal cladding with little concern for the aesthetics or the dynamic narrative embedded in the building.



Original wood shed at A.F. Theriault yard (Theriault yard archive, n.d.)



Steel frame constructed around wood shed (Theriault yard archive n.d.)



Steel columns sistering wood columns during construction. (Theriault Yard Archive, n.d.)



Gable end of wood building during demolition. (Theriault Yard Archive, n.d.)



Steel shed complete (Theriault Yard Archive, n.d.)



***Smith and Rhuland Shed, Lunenburg***

The Smith and Rhuland Yard is best known for building the Schooner Bluenose and Bluenose II. The shed that the Bluenose II was built in still stands today along the waterfront in Lunenburg. The building holds significance in several ways. It has embodied and has embodied both the dynamic nature of how the boat builder approaches land-based infrastructure and also the static form that is often attributed to culturally significant buildings.

The building, when first constructed, was very utilitarian. It was a long building made with light timber framing. Its cross section remained fairly consistent both spatially and temporally. The longitudinal section extended and retracted by adding and removing structural bays. This would have been changed based on the need of the particular project under construction.

Sometime after the Bluenose II was built there were several bays removed from the building and the diagonal corner braces were removed and replaced by buttress like arched braces added to the interior of the building to provide lateral stability. These more elaborate details I would argue were added because of the cultural value attributed to the shed that housed the construction of the Bluenose II.



Bluenose shed - note exterior wall clad with plywood



Bluenose II keel laid in shed - note diagonal lateral bracing (Government of Nova Scotia, n.d.)



Bluenose shed as it stands today



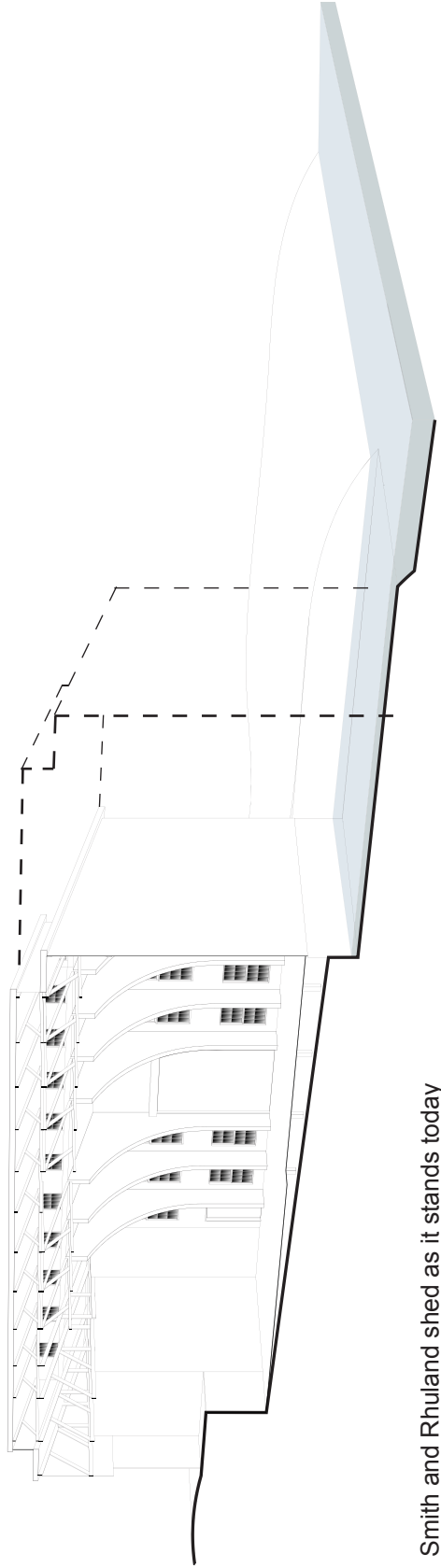
Arched bracing Bluenose shed

As Stewart Brand described in his book *How Buildings Learn* “detail is the enemy of change” (175). By this he was describing how more elaborate detailing gives an object a certain amount of preciousness and value. When value is attributed to an object then motivation to change it is diminished. By adding the more elaborate detailing to the Smith and Rhuland shed, reminiscent of church structures, the building becomes less dynamic and more static thus in line with more conventional architecture.

There are portions of the building that remain dynamic, such as the wall on the water side of the building. This end of the building is clad only with plywood. When a boat is launched, which is not a frequent event, the plywood is removed, the boat is launched at high tide, and then the wall is re-clad. This transition and meeting of static and dynamic architecture illustrates a fascinating convergence of the utilitarian attitude of boat builders, and buildings that hold cultural significance.



Original form of Smith and Rhuland shed in the 1960s



Smith and Rhuland shed as it stands today

### ***Snyder's Shipyard, Dayspring***

A fourth example of ingenuity in land based architecture derived from the ship building industry can be found at Snyder's Shipyard Inc. in Dayspring N.S. The main Boat building shed in the yard was built in 1967. The Belfast truss system used in the building, according to the yard manager Wade Croft, hadn't been used in the province prior to the ones here employed by Reginald (Teddy) Snyder who had taken over the yard in 1944. The truss had to be tested by the provincial building inspector and was found to withstand far more weight than required. The truss uses small dimensional lumber with a cross section of 2 inches in a lattice formation as webbing and an arched top cord laminated with mechanical fasteners. (MacKay-Lyons 1994, 22) This truss was duplicated in several buildings around the Bridgewater area such as Bucks Home Building Centre and the GCR Tire and Service factory.

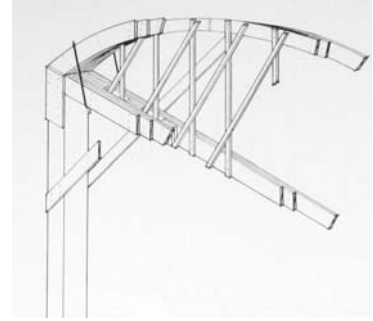
The Snyder's shed, as seen in other examples above, illustrates a high level of malleability. The centre bay was built in 1967, but the two wings were added in 1985. Since then there have been holes cut out of walls, wall treatments added and removed. In 2004 a truss bay was added to lengthen the central portion of the building to accommodate a longer boat in the shed.



Belfast trusses in Snyder's Shipyard



Snyder's Shipyard, Dayspring, N.S.



Belfast truss (MacKay-Lyons 1994)



Snyder's main building - note holes cut into walls

### ***Lessons from Land-based Boat Building Infrastructure***

It is the fact that the examples above of shipyard infrastructure are not eye catching or glorified in an architectural sense that makes them valuable to this study. The examples are partly valuable as physical manifestations produced in the act of boat building, but their architectural value truly rests in the attitudes and capabilities that they represent within the boat builder. These are the intangible qualities that need to be preserved. The argument made here is not that architects should be designing by mimicking the boat builder. It is not to eliminate the use of aesthetics in design or to remove static and permanent components in buildings. What is being argued is that by adding a critical mind and eye that architects are trained to apply to the attitudes and knowledge of the boat builder, these intangible qualities could live on and adapt by influencing the design attitudes of architects. This shift in attitude could result in an understanding of some of the limitations presented by the conventional framework embedded in modern architectural practices that views buildings as static objects.

The more traditional model for an architecturally designed building could be considered static because of the idea that buildings are designed for an opening day. At that point the building is considered complete or whole. After the completion date interaction with humans creates wear and the architectural purity in the design is degraded. Bernard Tschumi discusses in his book *Architecture and Disjunction* "Entering a building may be a delicate act, but it violates the balance of a precisely ordered geometry (do architectural photographs ever include runners, fighters, lovers?)...No wonder the human body has always been suspect in archi-

ecture: it has always set limits to the most extreme architectural ambitions. The body disturbs the purity of architectural order.” (Tschumi 1994, 123)

In opposition to the architecturally designed static building, the boat building sheds are never in a finished state. They are often in a state of flux and are adapted by the boat builders to suit any particular project. These types of buildings are never considered whole in the same way as a static building has its opening day and its peak before it is worn down by the user. Steward Brand described a similar classification of buildings as ‘low road buildings’. As he describes them “nobody cares what you do in there”, that there is a freedom inherent in utilitarian buildings that allow a certain amount of creativity because of their informal nature. (Brand 1994, 24)

These dynamic characteristics are found in the meeting of the boat builder’s utilitarian attitude combined with a knowledge of structural principals and familiarity with building materials. I propose this dynamic relationship that the boat builder has to the land-based infrastructure was bred from the self-reliant and utilitarian attitudes fostered by the development of vertically integrated businesses in smaller isolated communities along the coastline of the province. These qualities are difficult to identify solely by examining in techniques or technologies specific to boat building, but are identified in the above case studies of the infrastructure that supports the ship building industry in the province, not in the way that the boat builders interacted with the boats, but rather in the way they interacted with the buildings that housed the boats under construction. These qualities allow the buildings to be malleable in the hands of the boat builder



and opens up possibilities in design that professional designers may not have access too. It also stretches the limits of conventional design because of the boat builder's unique understanding of the structural limitations, the possibilities and restrictions of the available building materials, and the programmatic requirements demanded from any particular project.

The idea of dynamic buildings is obviously not limited to boat building cultures. Many examples of these buildings and spaces that are open to change and encourage adaptation by the user do not hold these qualities based on the intentions of the architect. The examples seen in the following section, are a result of an attitude of possibilities presented in the way that users interact with a given built environment.

## 1.5 Case Studies: Dynamic Architecture

### *MIT Building 20 - The Magical Incubator*



Building 20 shortly after construction. (Magical Incubator, MIT Video 1998)



Building 20 shortly before demolition. (Molloy 2013)

In 1940 the British invention of RADAR was brought to the United States who were tasked to develop the technology to aid in the war efforts. As a result a new department was founded at MIT. The RAD LAB (Radiation Laboratory) was to be housed in a new building on the Cambridge campus in Massachusetts. The war's demand on steel restricted the three story, 200,000 square foot building's construction to wood. The local fire Marshal approved the temporary structure with the condition that it be demolished six months after the end of the war.

By the end of the war there was a major influx of new students returning from military service. With the jump in student population building space became extremely valuable

and the propositions of tearing down 200,000 square foot of building was not greeted warmly. After the war other departments moved in including, the Acoustics Lab, Linguistics department and clubs, the physics department, computer science and engineering and the Tech Model Railroad Club. (Douglas 2015, 32:03)

The building held offices for 9 Nobel Prize winners and countless inventions and technological breakthroughs came out of building 20. The 'magic' of the building is believed by many to be two fold; One was the fact that so many faculties and clubs were forced to intermix in the winding halls and cluttered spaces; The other was the fact that the building was never considered precious so its occupants were free to adapt their spaces to suit their needs at any given time. In other words it was the meeting of the knowledge of the people who occupied the space and a space that encourages innovative and adaptive atmosphere.

The first commercial atomic clock was developed in the early days of building 20. To accomplish this Jerrold Zacharias required a three story space, so he just knocked holes in the floor plates and proceeded with his experiments.

Other examples of this malleability were recounted in 1998 during a celebration of the building shortly before it was torn down. Paul Penfield, head of electrical engineering and computer science, reported "You know that if you want to run a wire from one room to another, you don't call physical plant, you don't plunk down \$1000 to call an electrician and a carpenter. Instead you get out a power drill or a screw driver and you jam it through the wall and you string the wire. You take care of things right away and you do it in

one afternoon rather than waiting six months for a purchase order to run through.” (MIT 2011, 3:25) As Noam Chomsky recalled in 2011 “Building 20 was a fantastic environment. It looked like it was going to fall apart. There were no amenities, the plumbing was visible, and the windows looked like they were going to fall out. But it was extremely interactive.” (Bergstein 2014, 1)

The building was named the magical incubator. Part of this was surely the great minds that congregated in the building, but it was the temporary nature of the building that has largely been attributed to the ideas and creativity that came out of it. This is a particularly good example of the dichotomy between the utilitarian, adaptable view of the industrial cultures and the more static view taken by many architects.

This dichotomy is illustrated quite well in the differences between Building 20 and the Statta centre designed by Frank Gehry that now stands on the site. The Gehry building took a lead from building 20 and wanted to emulate the dynamic spaces that it provided. In Statta centre we can see debatable results. The building is quite static in the sense that its structural framework is mostly concrete and steel, but the layout was supposed to embody some of the principles that made Building 20 a centre for innovation. These include oddly shaped spaces, many informal ‘breakout’ spaces and corridors that encourage people to meet with individuals from other departments. Some of these design moves do accomplish the intension, but I would argue that the building as a whole is still quite static and that it lacks that same relationship between individuals and their built environment that was so well facilitated by building 20.



Aerial view of Building 20 (Business to Community 2012)



MIT Stata Centre (Bing Maps 2014)



Quartier Modern Fuges 1926  
(Le Corbusier Totalarch 2014)



Quartier Modern Fuges restored to original condition  
(Brand 1994)



Units with pitched roofs added  
(Brand 1994)



Garage insert (Brand 1994)



Workshop added to rear of unit  
(Brand 1994)

### ***Quartier Modern Fuges - Le Corbusier - Passac, France.***

In the 1920s a 51 unit housing development was built in Passac, France for Henry Fuges, a wealthy industrialist. (Huxtable 1981, 1). The development was commissioned with the design brief to produce a laboratory to put Le Corbusier's theories into practice and carry them to their most extreme conclusions. The results, although fascinating, were not what Le Corbusier or Fuges had intended. In fact Le Corbusier has been quoted referring to the Passac development "you know, it is always life that is right and the architect wrong". (Boudon 1969, 1). What is of particular interest in this as a case study is how the complex was considered an architectural laboratory, but in a very static sense that saw its conclusion once construction was finished (Boudon 1969, 21). At this point the 'laboratory' becomes more of an observatory.

The complex was built in a modern and minimalist style. It contained many modern amenities such as central heating and running water that were cutting edge for the time. The stark minimalist style was quite restrictive so residents started to adapt these spaces to accommodate their needs. Court yards were filled in, pitched roofs were added, Garages converted to living rooms, terraces were covered over and shed like additions added to the sides of houses to make workshops and garages. The idea put forward by Le Corbusier that the user should adapt themselves to the architecture was not followed here as the users took over the architecture to make it their own (Brand 1994).

The reaction to the static nature of Le Corbusier's design is a lesson in extremes. Which needs to be taken in both directions, just as many of the design qualities of the boat build-

ers is lost in a lack of attention to the architectural merits of their ingenuity, the same can be said for the loss of the design intent of the Passac development as people react to the rigid structure imposed by the static design presented by Le Corbusier.

### ***Lesson From Dynamic Buildings***

The purpose of examining these case studies is to present a dichotomy between static and dynamic architecture. The main issue that can be gleaned from these examples is that dynamic architecture is rarely planned. It could be argued that the boat sheds were designed to be malleable, but it seems more likely that the malleability was a by-product of the type of construction and utilitarian nature of the industry. The other examples were not intended to be dynamic, but came out of the circumstances surrounding the building. Is it possible to design a building that embodies both the rationality and design oriented ambitions of the architect while allowing for the dynamism and malleability found in the land-based infrastructure associated with the boat building industry? In other words this thesis is attempting to find a connection between dynamic architecture and static architecture.

The proposition below is to bring these two dichotomies together is a design-build school established based on the principles learned from the land-based boat building infrastructure. Here the point is to design a building that will facilitate design techniques in the same attitudes as the boat builder.

## CHAPTER 2 - DESIGN

The first half of this study has identified the architectural lessons of the land-based infrastructure associated with the boat building culture as a design perspective that is adaptive, resourceful and dynamic. The design section seeks on one hand to take these lessons and find a way to incorporate them into a physical building. On the other hand it attempts to find a way to keep these intangible qualities alive in future generation. In this light the program of the building is a crucial part of the building because, as seen in the case studies when dealing with dynamic architecture, how the user interacts with the building is as important as the building itself.

### 2.1 Program

The program for the building is a design-build school that reflects the inherent properties that existed in the building culture of boat builders in Nova Scotia. Ideally this would include actual boat builders as instructors, but this is not necessary to accomplish the task of teaching from lessons learned from them.

The intention here is not to have every student explicitly conscious of the fact that they are learning how to build and think like a boat builder, or even to have them learn specific boat building techniques. The intent of this design and program is to take the inherent properties of the boat building culture and make them a necessary part of the program through the architecture and the building. This is to be accomplished through the way that the students interact with and manipulate the building itself that the school is housed in.

The attitude of possibility and ingenuity was embedded into the physical infrastructure built by the boat builders. It was evident in the everyday interactions that they had with their environment. In this vein the building to house the design-build school is to be adaptive and responsive to the students in the same way. The building itself becomes a teaching tool. This is to provide the students with an environment that eliminates the necessity of a conscious knowledge that they are working within the boat builder's tradition, but through their interaction with the building the students are necessarily immersed into an environment similar to that which the boat builders have designed and built in over the centuries.

## **2.2 Site**

Site selection, although important, was secondary to the program. The concepts embedded in the school ideally could take place anywhere, but there are certain characteristics that were taken into consideration to facilitate the connection to the maritime heritage.

The chosen site is an abandoned textile mill on the outskirts of Windsor N.S. It was chosen for the following reasons:

1. Large scale building - The size of the allows for larger scale projects to take place within the building. Fairly large floor to floor span and a uniform structural grid provides the students with a coherent starting point in their designs.
2. Proximity to water - The mill's situation between the highway and the river will allow the users to be aware of both of these features. The interventions made to the mill in this project will also act as a type of theatre set for the onlooking passerby on the highway. The idea is to connect the old



with the new.

3. Heritage Value - The history of the building is enough to provide the restrictions necessary to spur creativity.

4. Distance from physical boat building infrastructure - The vision is that the design building is not restricted to a shipyard shed. The mill itself has no historic ties to boat building, but it can act as a mediator between this unique Nova Scotian building culture and the modern building culture in our increasingly globalized community.

5. Connection to industrial culture of Nova Scotia - The mill provides a traditional framework for industrial buildings in NS.

These characteristics allow for a connection to the heritage from which the intangible qualities were derived. It also allow for a distance that does not restrict the students to replicate the physical manifestation of the boat building culture while still finding ways of understanding and propagating its principles and lessons into the future.

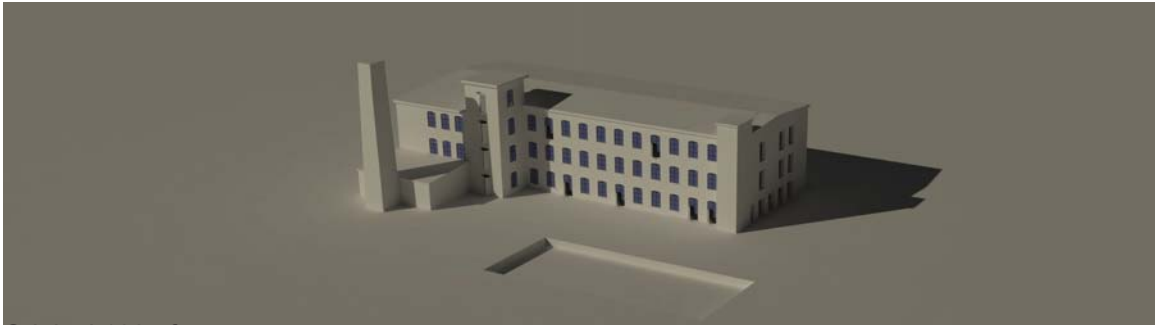


Site map - photographed from a site model built in a public building studio at Dalhousie university.

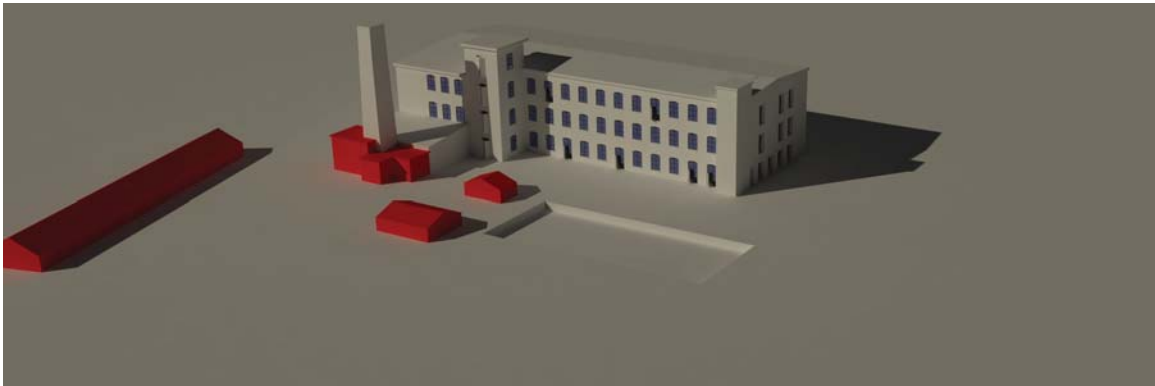
## 2.3 Existing Conditions

This 19th century building was originally purposed as a textile mill and operated as such for well over a century. At its opening in 1883 it consisted of a large brick building built in a similar style to factories in New England constructed in the 18th and 19th century. Over its life span, much like the light industrial ship building sheds, it has changed shape and size dependent on the demands of its program. The facilities were expanding until the late 20th century when business began to slow and parts of the building and most of the outbuildings fell into disrepair. This progression is shown in the figure below.

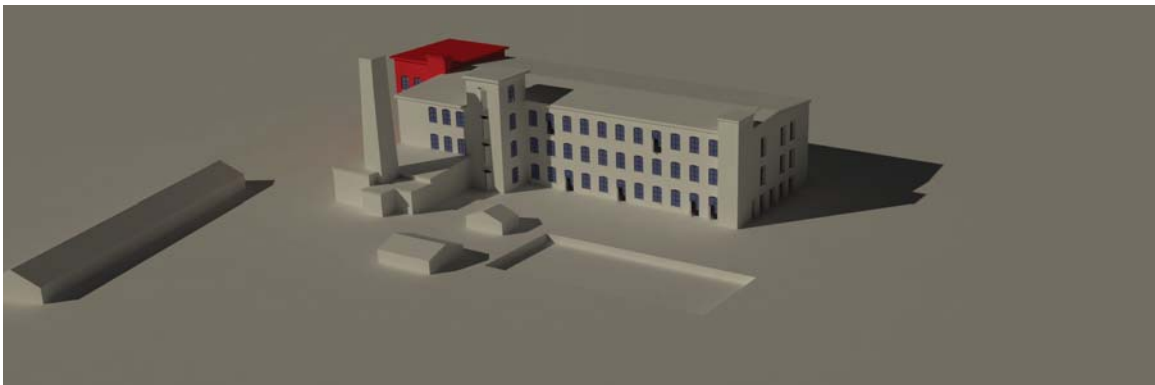
As it stands now the building has the appearance of one monolithic brick building. The exterior wall is virtually all load bearing brick. The interior structure is heavy timber arranged in a grid of approximately 10' by 20' with a floor to floor span of 15'. Adjacent the south side of the building is a human made pond that was used to supply both the industrial textile systems with water and feed the fire suppression system. This pond today stands empty, along with the neighbouring pump house.



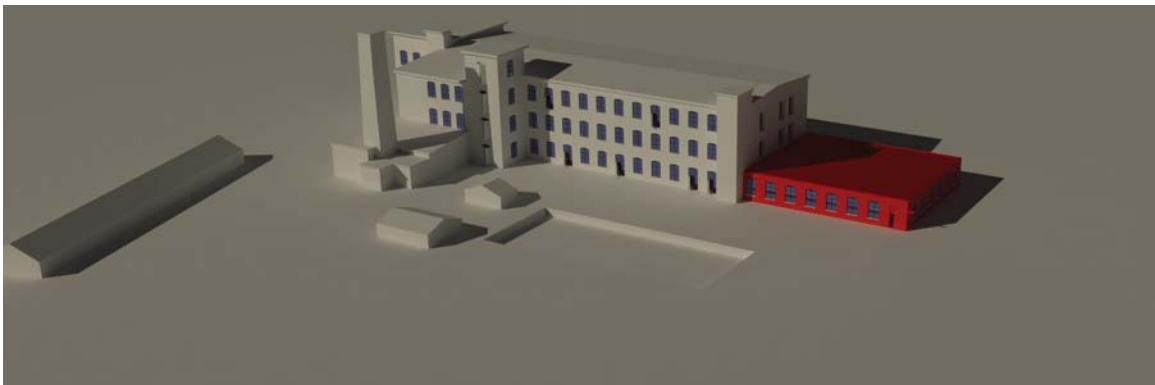
Original 1884 form



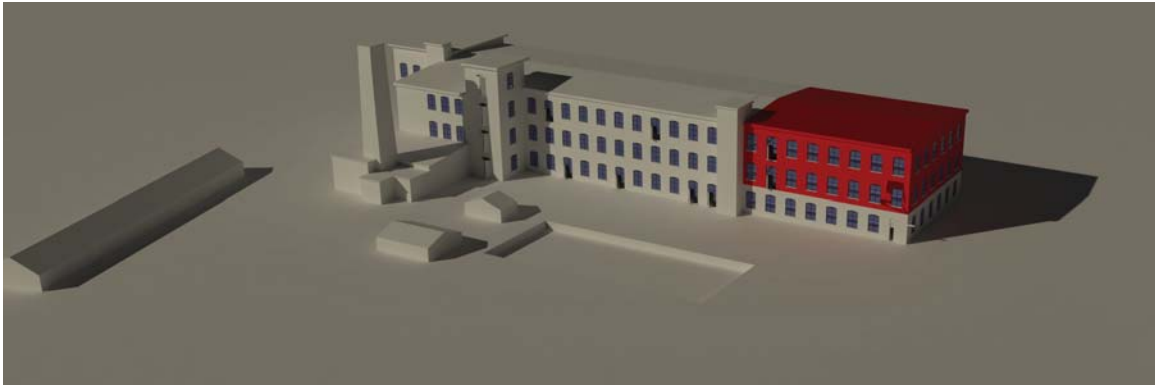
1900 additions



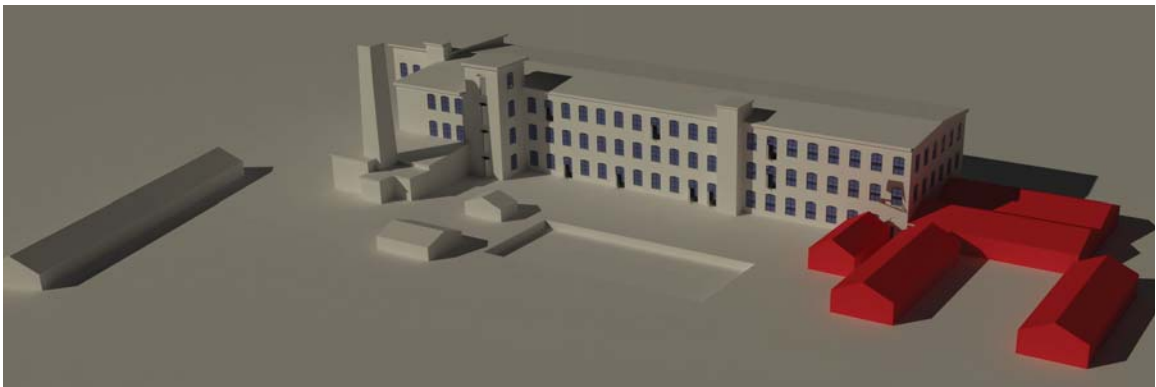
1910 additions



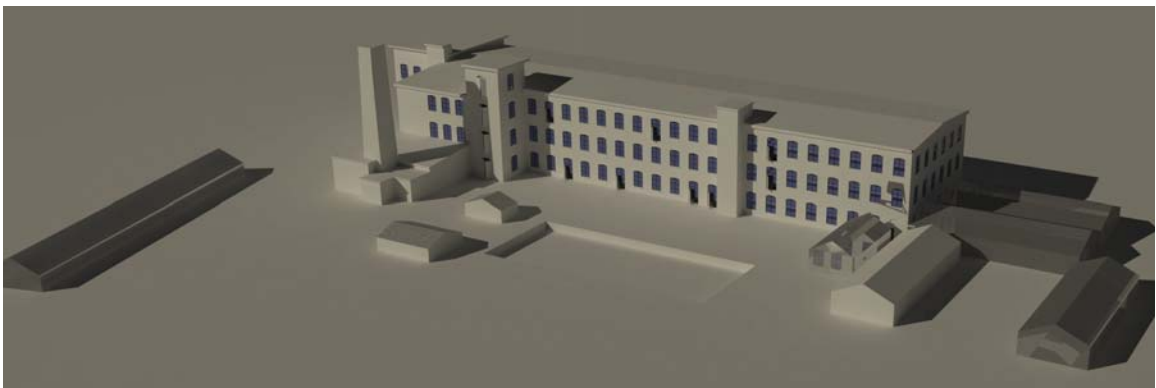
1916 additions



1940 addition



1970 addition



1985 demolition



1998 demolition

## **2.4 Static Vs Dynamic Design**

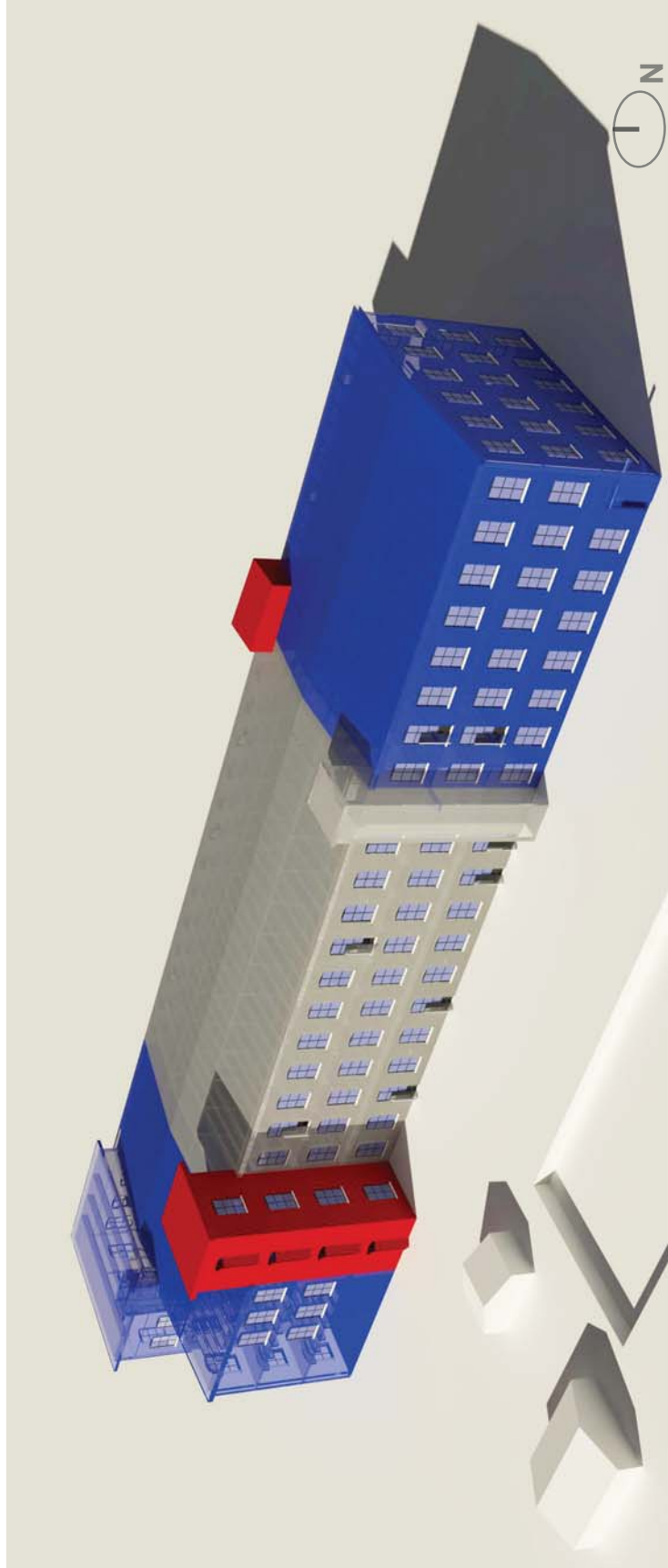
### **2.4.1 Basic Layout**

The primary design move is to create a dynamic space in the centre of the building, a sort of playground that is looked in on from all directions. Flanking either side of this central space are the more static areas of the school. The offices, studios, classrooms and permanent work shops. The centre is the project incubator. It is to be adaptable based on the needs of any particular project underway just as the large buildings in the ship yards were adapted. More specifically the east end of the building will be a student centre containing studios, a lounge and workshops. The westerly end of the building is a faculty centre. This will contain offices, classrooms and an exhibition room/lecture room.

These spaces are organized to keep the open public spaces on the ground floors and have the building become more enclosed on the upper floors. The 'playground' between these two thermally enclosed units is not only the meeting point between the faculty and the students, but it is also a space that embodies the intangible spirit of ship building culture. This space is to be adapted based on the needs of the school to accommodate the projects that are underway at any given time. The only restrictions on this space is the physical environment, the resources/materials available and the creative capacity of the students and faculty. This space is to be in constant flux and designed to be both a space to contain a project, but also a project in itself.

At the beginning of a project the students must first design and adapt the space that they are going to build the project in. This will make them interact with the building in a way

that forces them to understand the building, its materials and the structural principles embedded in it. It will also force the students to interact with their own designs on a daily basis and learn from their successes and missteps.



Program diagram - the blue area on the right is the student centre with a circulation tower in red. The blue area on the far left is the faculty centre, accessed by the main atrium and the adjacent red stair tower. The grey portion in the centre is the adaptable project incubator.



## **2.4.2 The Rules**

The freedom for the students to adapt their working environment to suit any particular program is a step toward learning with a boat builder's perspective, but does not address the design components that are lacking in the boat builder's attitude toward their land-based infrastructure as explored in the previous chapter. In particular the utilitarian perspective of the boat builder omits an attention to aesthetics and does not illustrate the use of a critical thinking in the buildings that house their industry. To address this in the design-build school there will be design rules set out for the students to be used as tools to foster the meeting of the architectural world and the attitudes held by boat builders. Below several categories of rules are listed and explored:

### ***Structural***

In order to ensure that the heritage is preserved structural guidelines are necessary:

1- Each demolition of the school can only remove up to four congruent bays.

2 - Within the confines of the original building envelope the integrity of the 20' x 10' structural grid must be maintained. This does not mean every column and beam are replaced, but that the nature of the grid is to be respected.

3 - When a penetration is created in the brick, the remaining brick above it is to be held up by steel wide flange beams.

### ***Heritage***

These rules are intended maintain the integrity of the heritage value contained within the existing structure. This is

important to insure that future students will always be able to understand the narrative of the building as it changes. This will also encourage the students to learn restoration techniques as these original parts of the building need to be maintained:

1 - Existing structure can be replaced but 20% of original structure must remain intact. This must include:

- Brick work

- Wood beam and grid structure.

- Iron work connections.

- Existing windows.

2 - If existing structure is deteriorating then it must be restored using methods and materials as close as possible to those used to build the original.

3 - Students must study and act with consideration to the Standards and Guidelines for the Conservation of historic Places in Canada when considering the heritage components of alterations. Students must give justification when making design decisions that may not fit with these principals and guidelines.

### ***Aesthetic***

These aesthetic rules are in place to balance the freedom in the interaction of the building while insuring that there is an integrity left in the building in a way that each subsequent student cohort that passes through the school will have a coherent starting point to enter the design processes. It also

provides some limitations on the students in order to spur creativity.

1 - Interventions to be sensitive to all existing structure and environments present on the site. This includes both original building elements and renovations by students.

2 - Students must study and act with consideration to the Standards and Guidelines for the Conservation of historic Places in Canada when considering the aesthetic components of alteration. Students must give justification when making design decisions that may not fit with these principals and guidelines.

### ***Materials***

The purpose of the materials section is to instill an understanding of the balance between functionality and aesthetics. This school is not just a trade school or just a design school. The biggest critique of the boat builders attitude towards their land based infrastructure is the lack of concern for the composition and aesthetic of their buildings.

1 - All alterations are use a similar material pallet. The basis for these materials are to match or compliment the existing.

2 - When considering new materials. Steel, Wood, Glass and concrete are to be the primary palette.

3 - When alternatives are introduced justification must be provided. For example, when considering green alternatives proposals must be given as to how these compliment the existing pallet.

4 - All projects must be complete with finish material. Mem-

branes and flashings must be covered, painted or finished appropriately. All steel added is to be painted black. Brick to match existing red. Interior wood to have a natural finish and exterior wood to be painted.

### ***Analytical***

The purpose of the analytical rules is to ensure that students understand the implications of the design decisions and modifications they've made to the building. It's not enough to just make and carryout design decisions, but to be able to consciously justify them. Each report will require orthographic and interpretive representations.

1 - Pre-design analysis - A report must be made by students to analyse the existing conditions of the building including proposed programmatic changes. This report will include successful elements of the building as well as past alterations that have been less successful.

A section of this report will be dedicated to the heritage value of the project and will address how the proposed intervention will affect the heritage of the building.

2 - *Pre-Construction Analysis* - A report will be prepared after the design is completed but before any construction has taken place. This report is intended to promote not just a cohesive design but ensure that the students are thinking of why and how they are making any particular intervention before the intervention is made. This is to include trade coordination, safety analysis and a complete set of working drawings.

3 - Post-Construction Analysis - A report will be prepared when construction is complete. The purpose of this report is

to analyze the construction process in relation to the design. How did the design ideas alter as they were physically manifested? Were concepts improved or degraded as physical limitations were placed on them? What effect did this have on the heritage value of the building? This report will include as-built drawings to be compared to the design drawings.

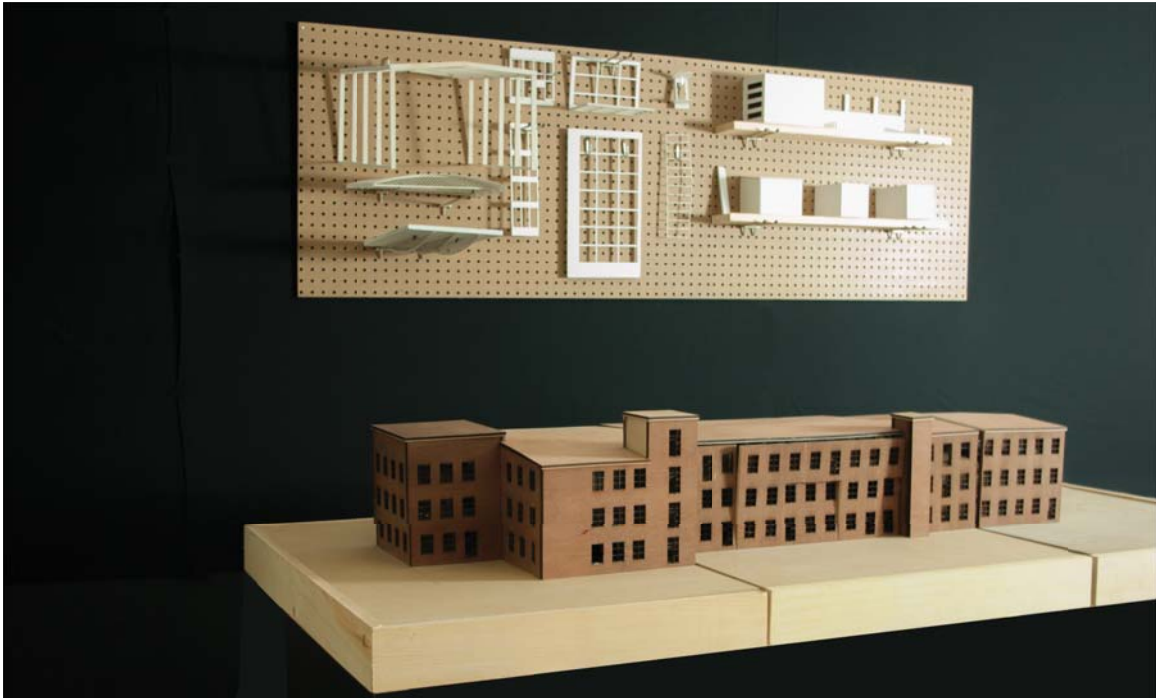
4 - Post-Project Analysis - This report would be produced at the end of the year once the new spaces had been used for a Months. It will summarize the entire process and evaluate its success. The major intent of this report is to make the student conscious of how the design of the spaces actually fulfilled the programmatic requirements. What was successful and what could have been designed differently? Were the construction methods and material durable? After use how do these materials interact, compliment or clash with the existing building?

## CHAPTER 3: PHOTO ESSAY

The photo essay below describes how the building might change over time. The first frames describe the development of the faculty and students centres. The sections after that are categorized by five possible student projects:

1. Module housing construction
2. Boat building: 70' schooner
3. Facade Studies
4. Roofing
5. Steel frame: The cage

These have been chosen to explore the limitation and possibilities established within the rules outlined above. They are mostly arranged in a temporally linear arrangement, but in reality there could be more than one project operating at any given time and the building could adapt in many different forms and the examples below are just a few iterations that could be realized.



Existing conditions - View from 1



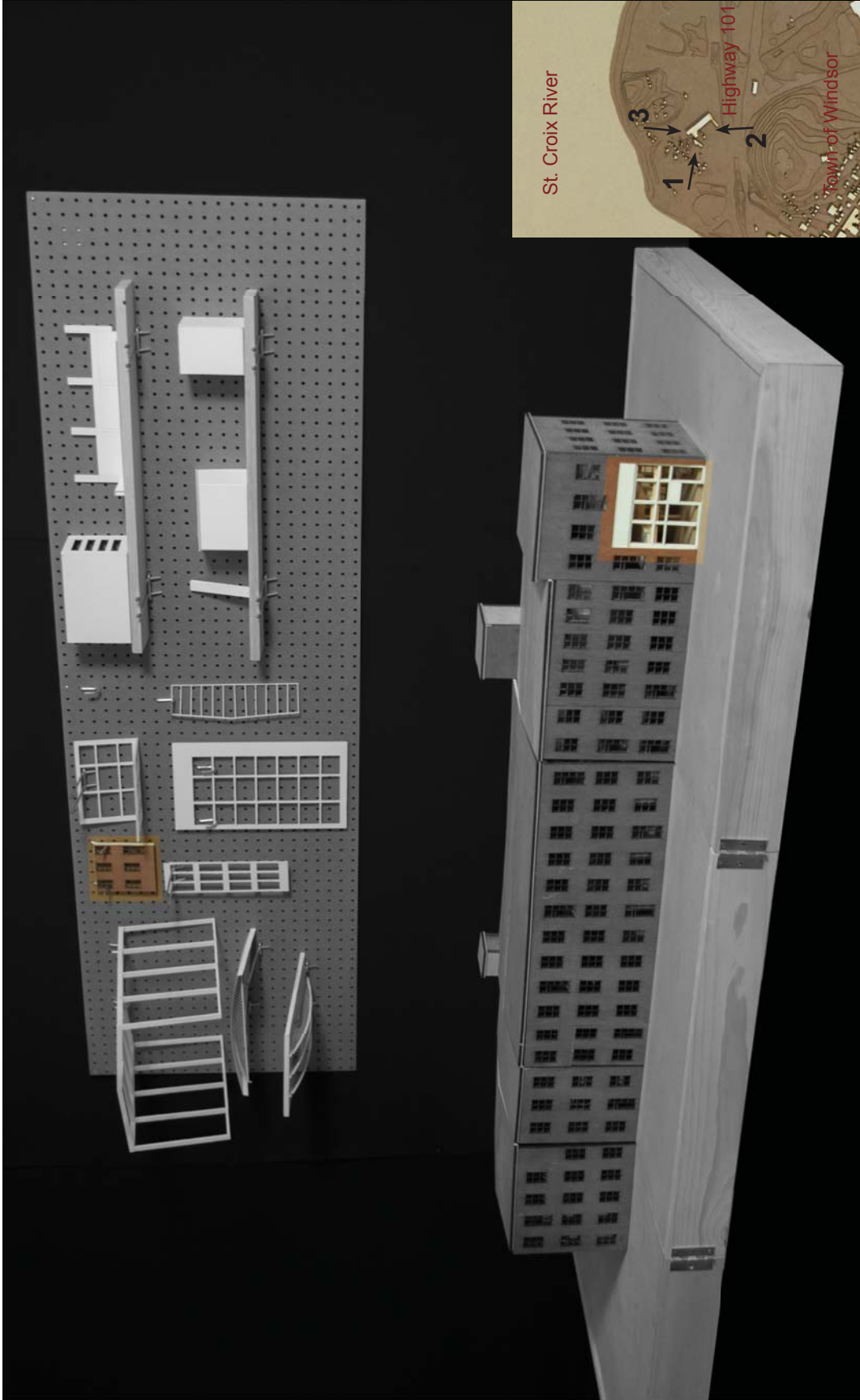
Existing conditions - View from 2



Existing conditions - View from 3



Key Plan



Atrium entrance - View from 3

Key Plan





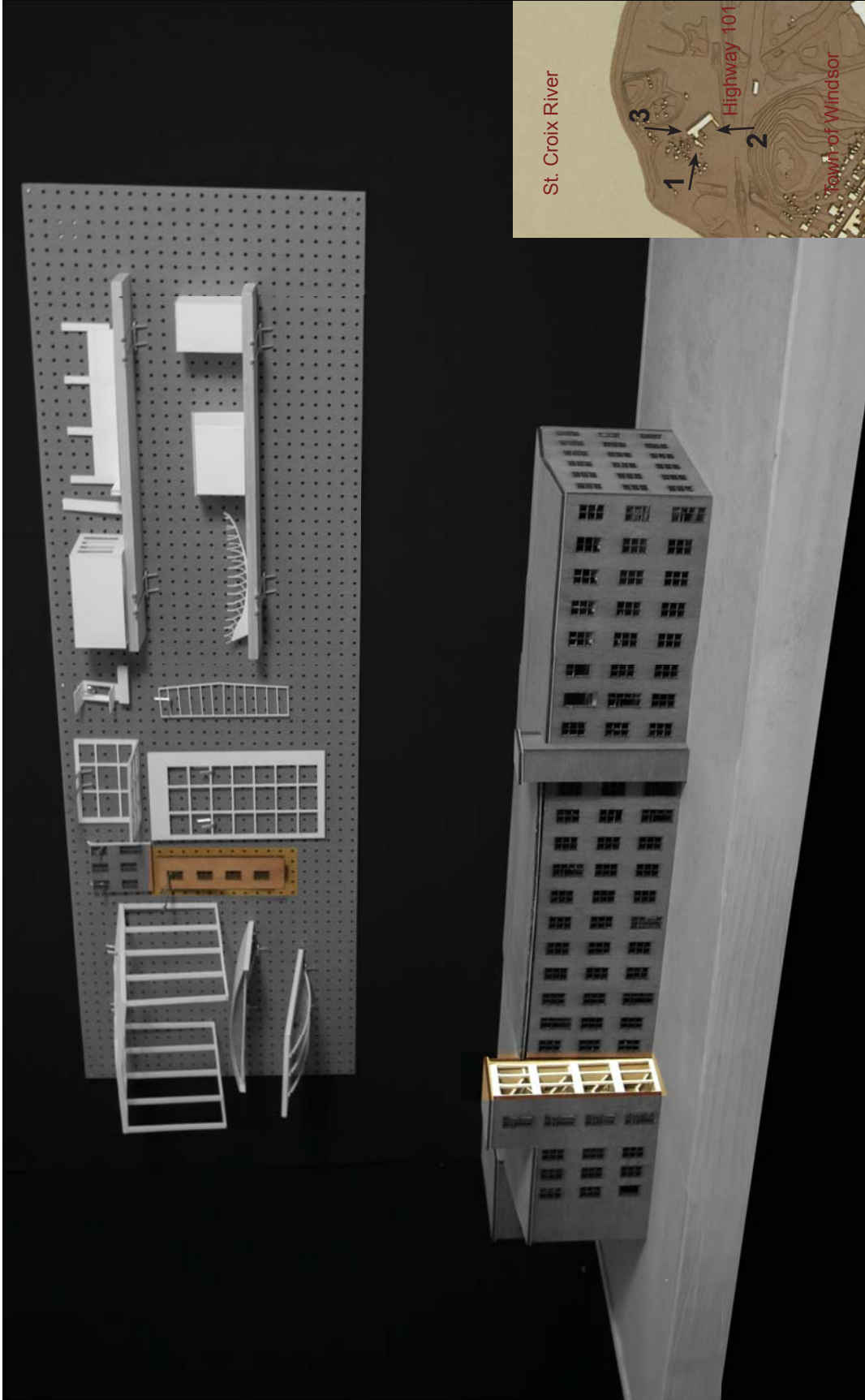
Plan view of top floor of the main entrance atrium.



Corridor from inside the school with light drawing towards the atrium at the main entrance.



The main entrance is human scale, but open with glass covering the wall of the atrium space.



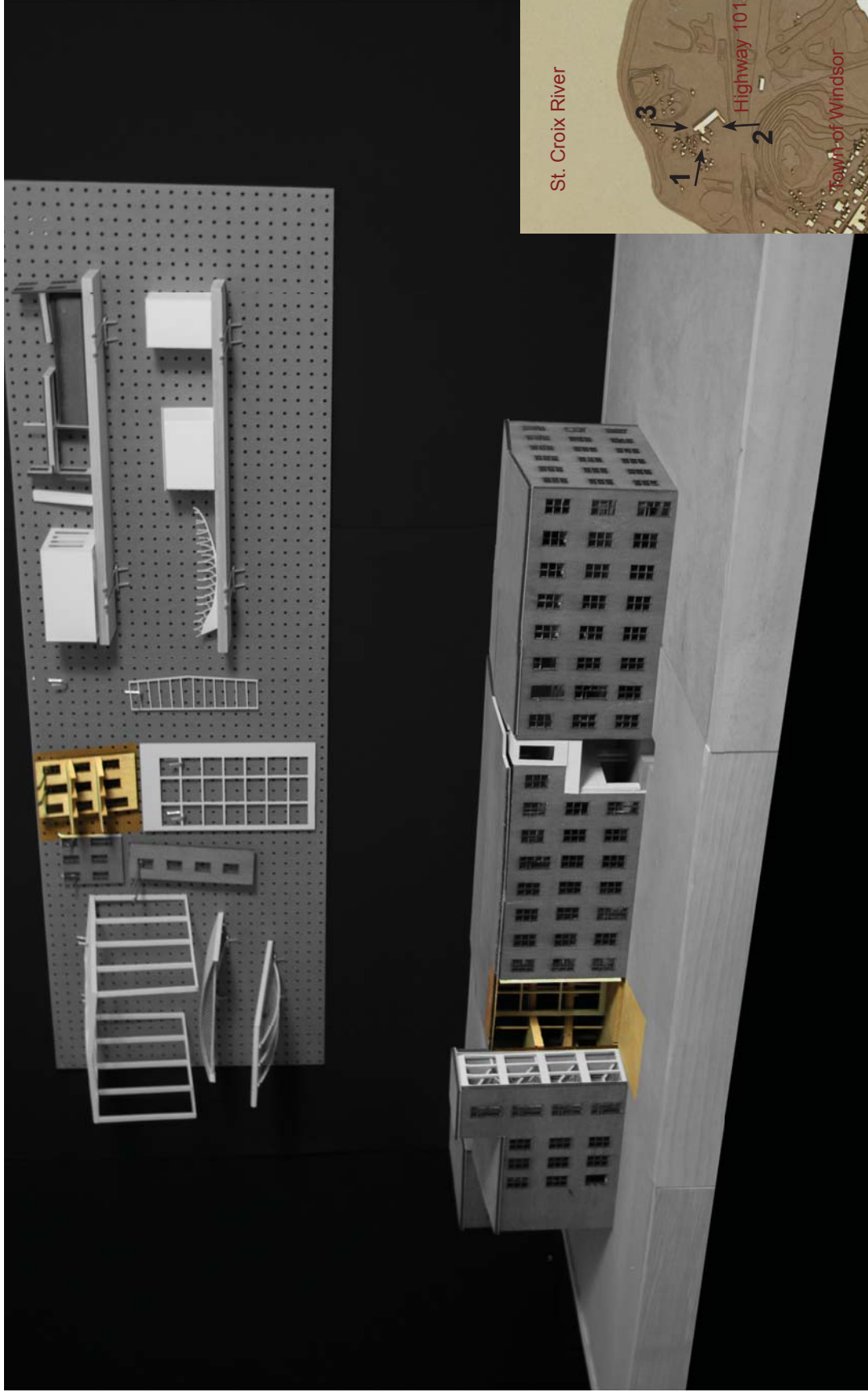
Key Plan

The tower - View from 2



At night the stair tower is light up as a reference to the chimney that once stood as a landmark for people passed by the mill.

**Faculty Centre**

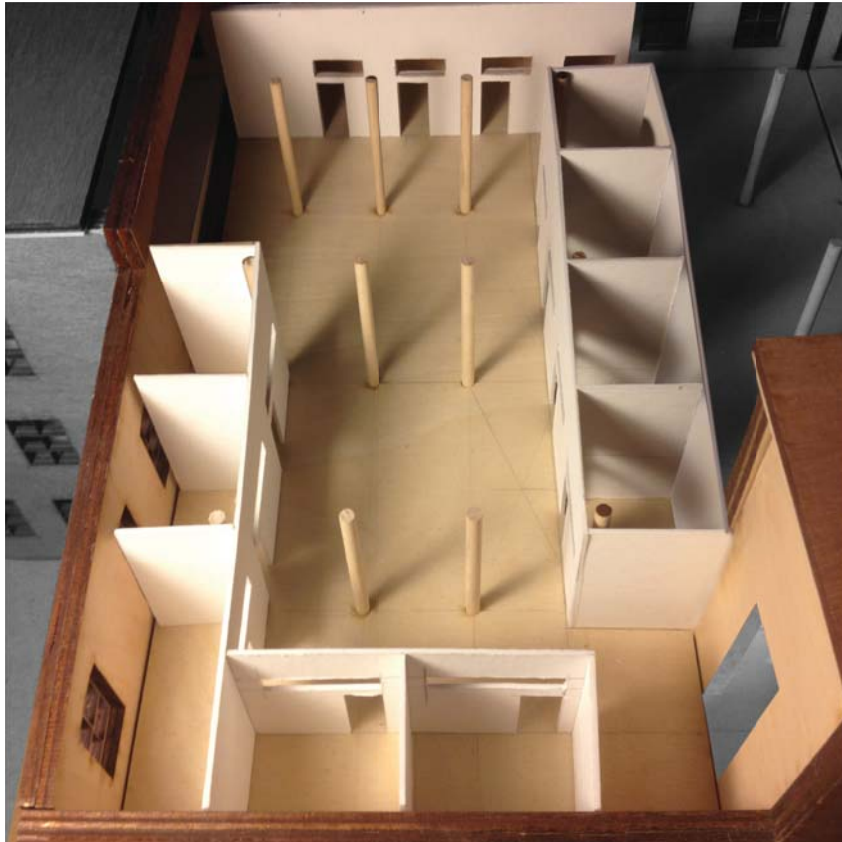


Courtyard entrance - View from 2

Key Plan



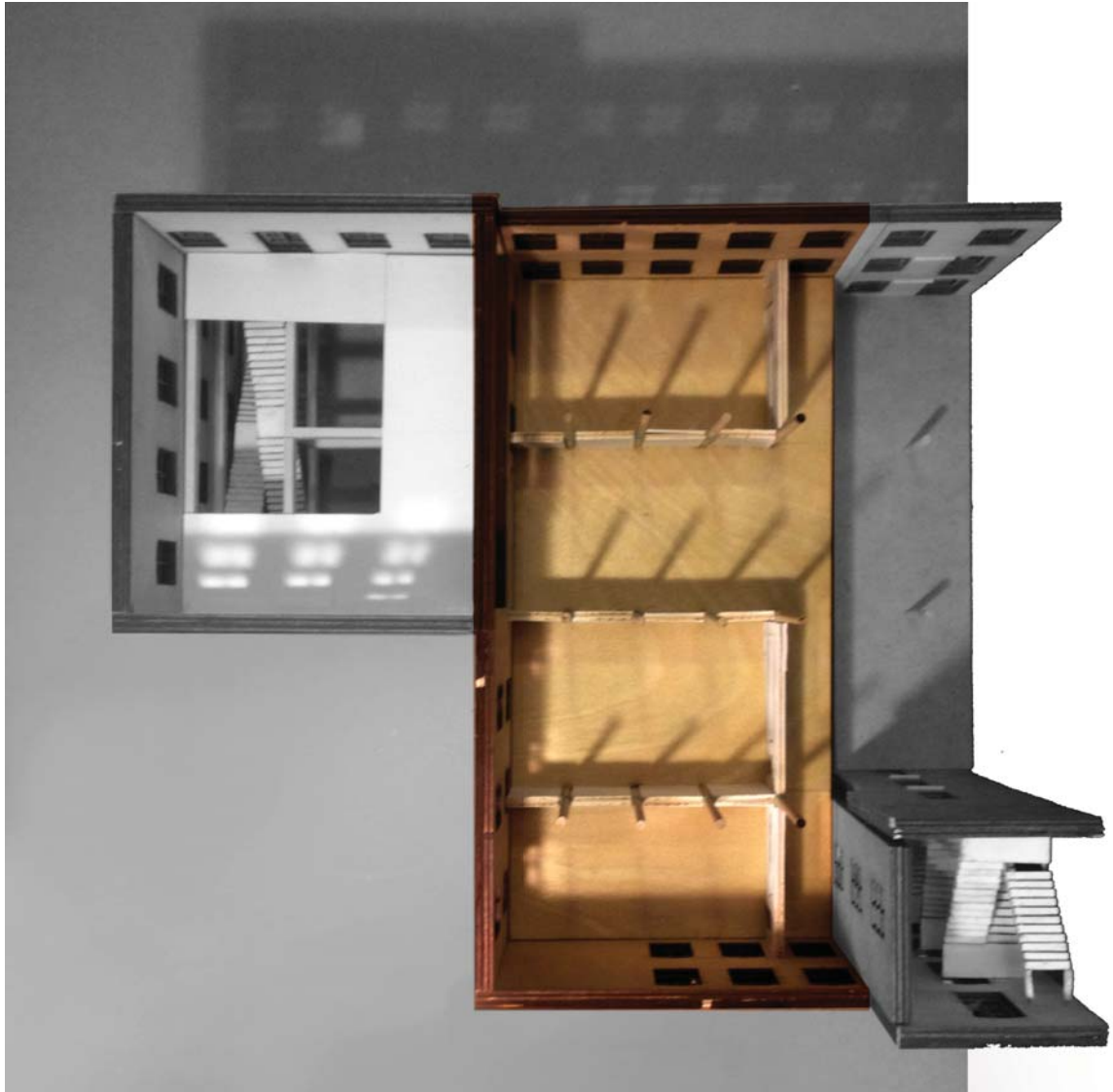
Courtyard and entrance to faculty centre



Top floor faculty offices and meeting room.

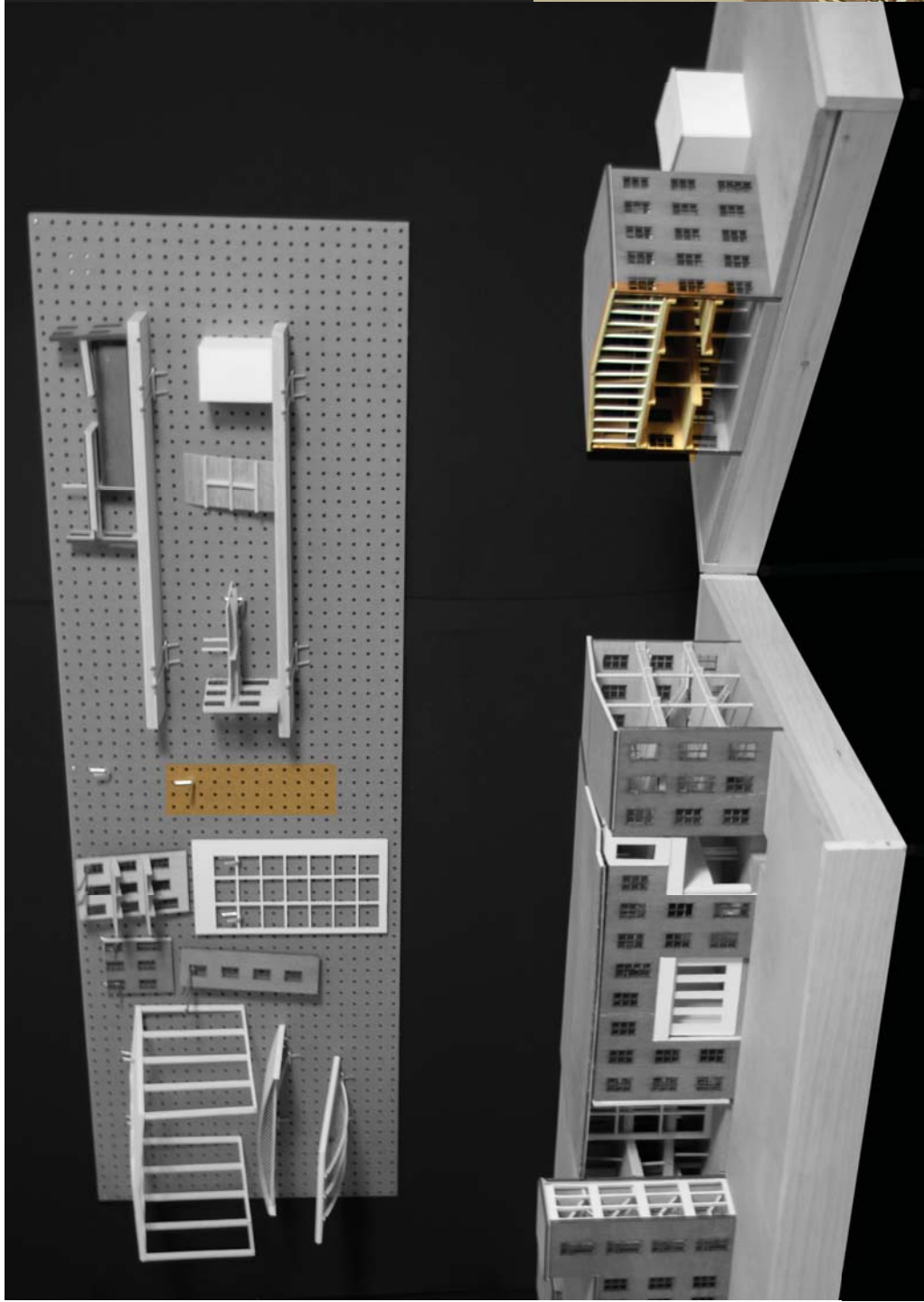


Plan view of faculty offices.

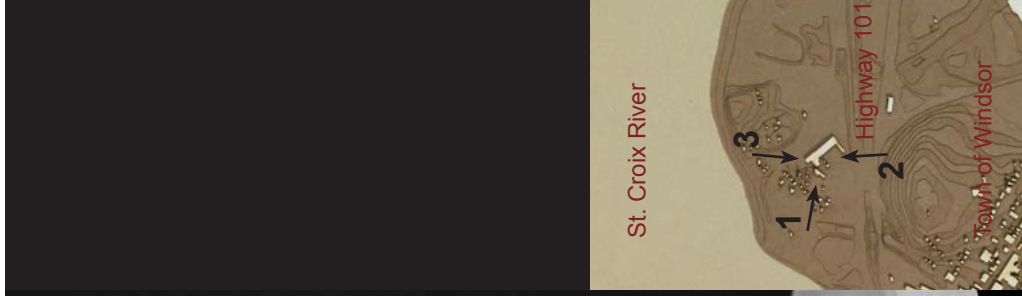


Second floor class rooms in faculty centre

**Student Centre**

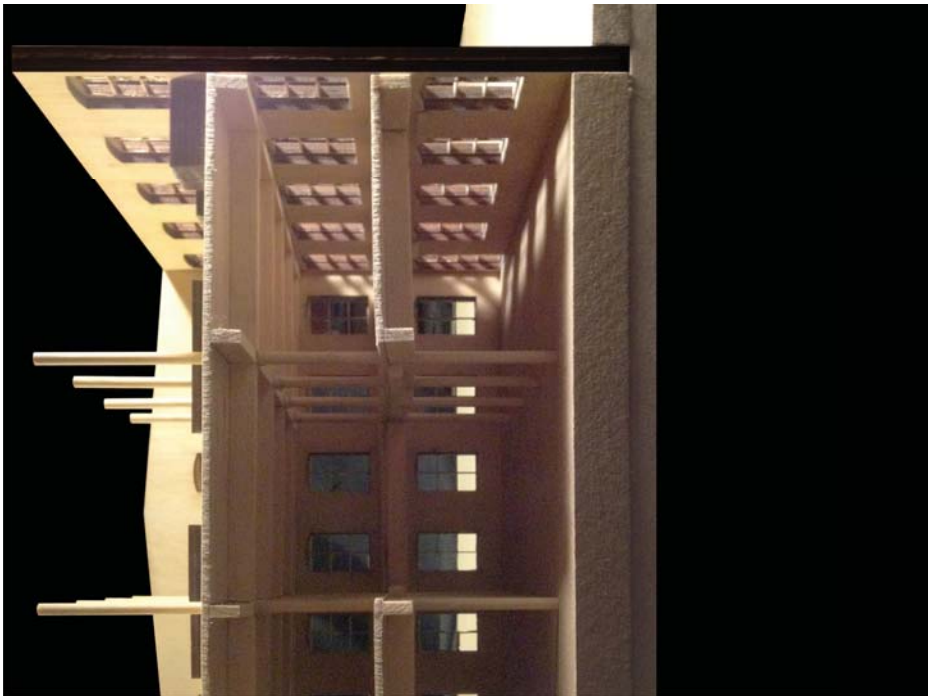


Student centre - View from 2



Key Plan



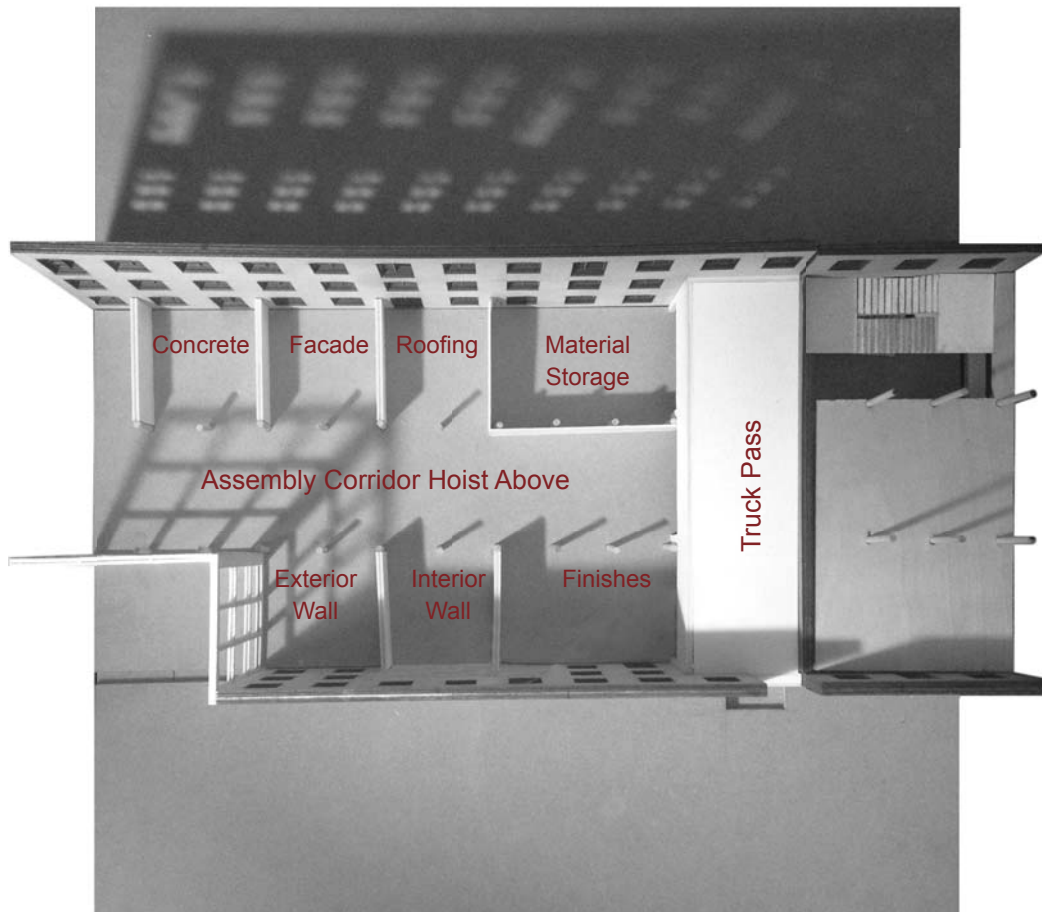


Wood shop on lower floor open to work shop on mezzanine level above.

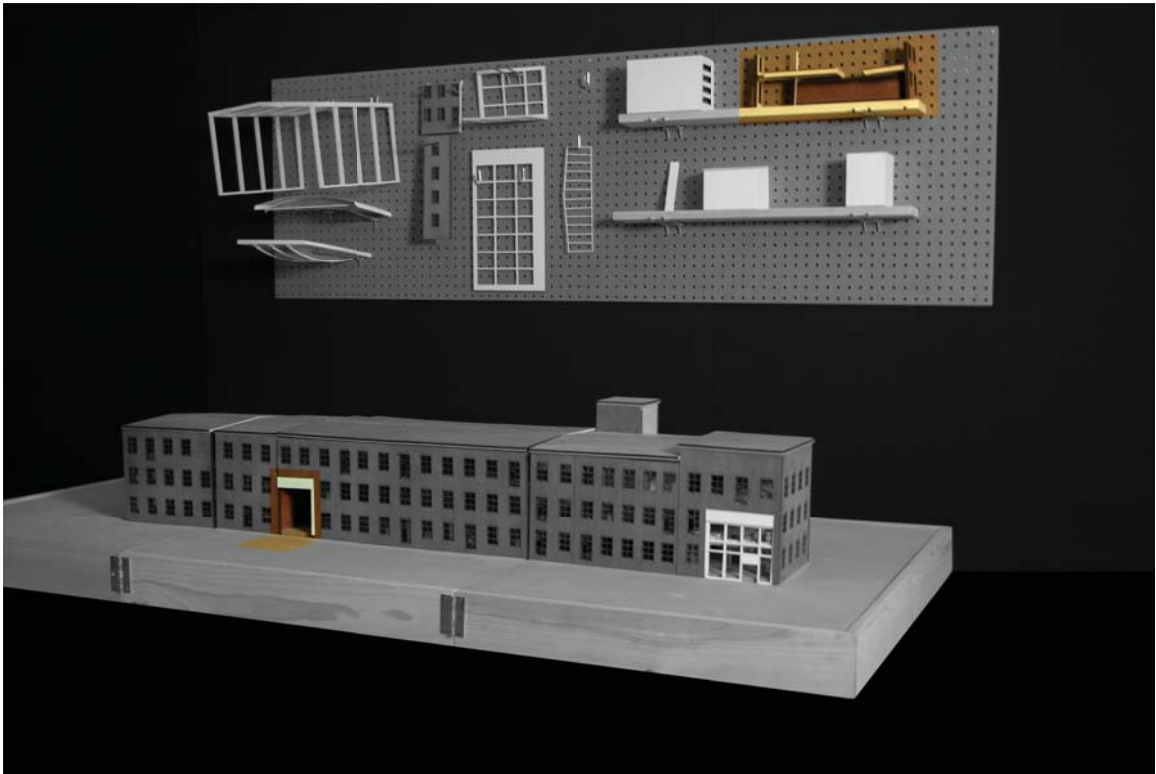


Student studios on top floor

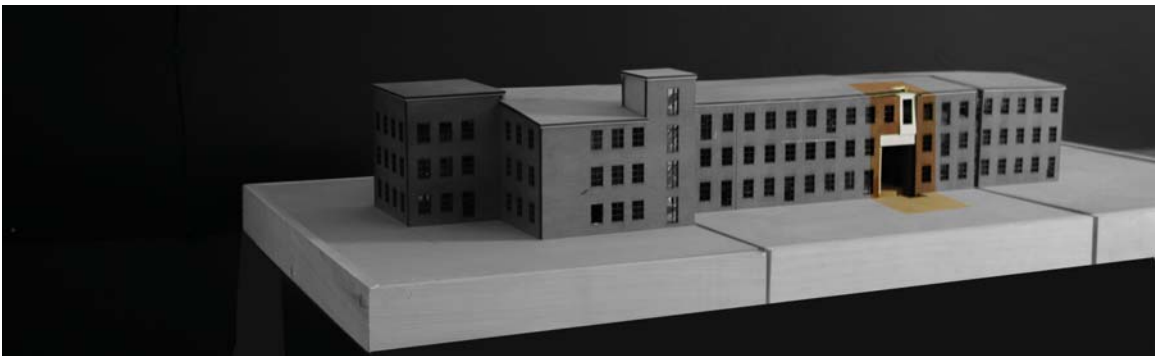
### 3.1 Project 1 - Modular Home



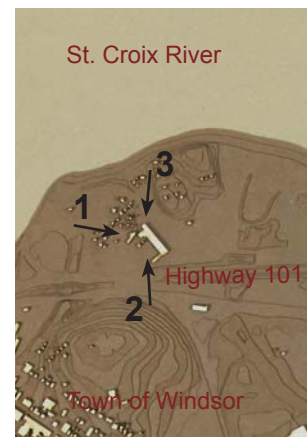
Floor plan of module home construction

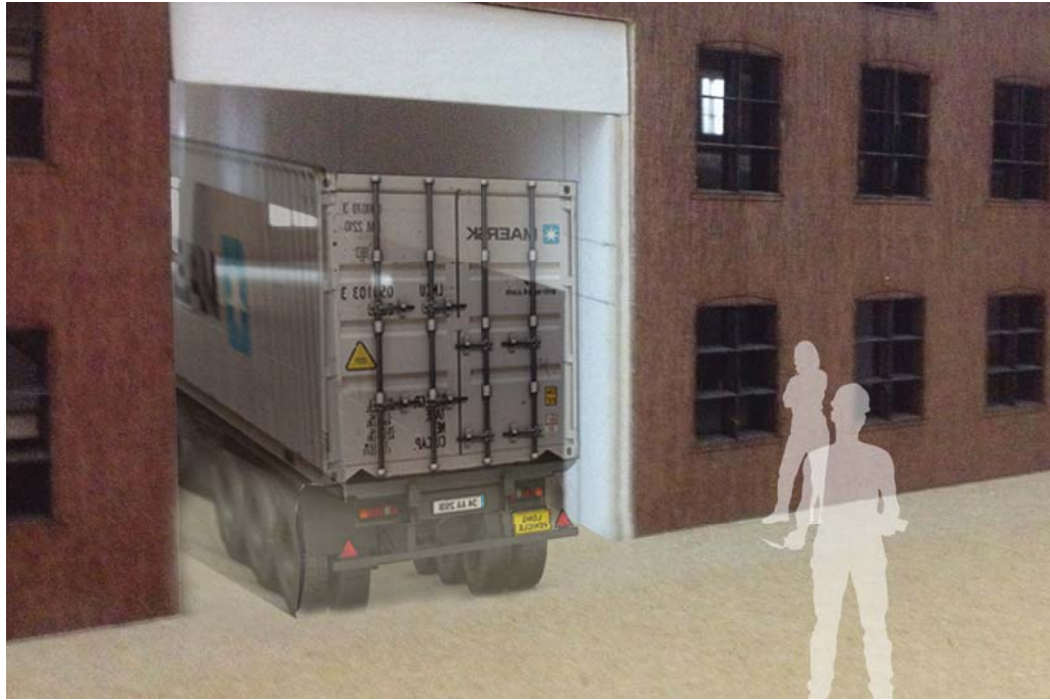


Truck pass - View from 3



Truck pass - View from 1



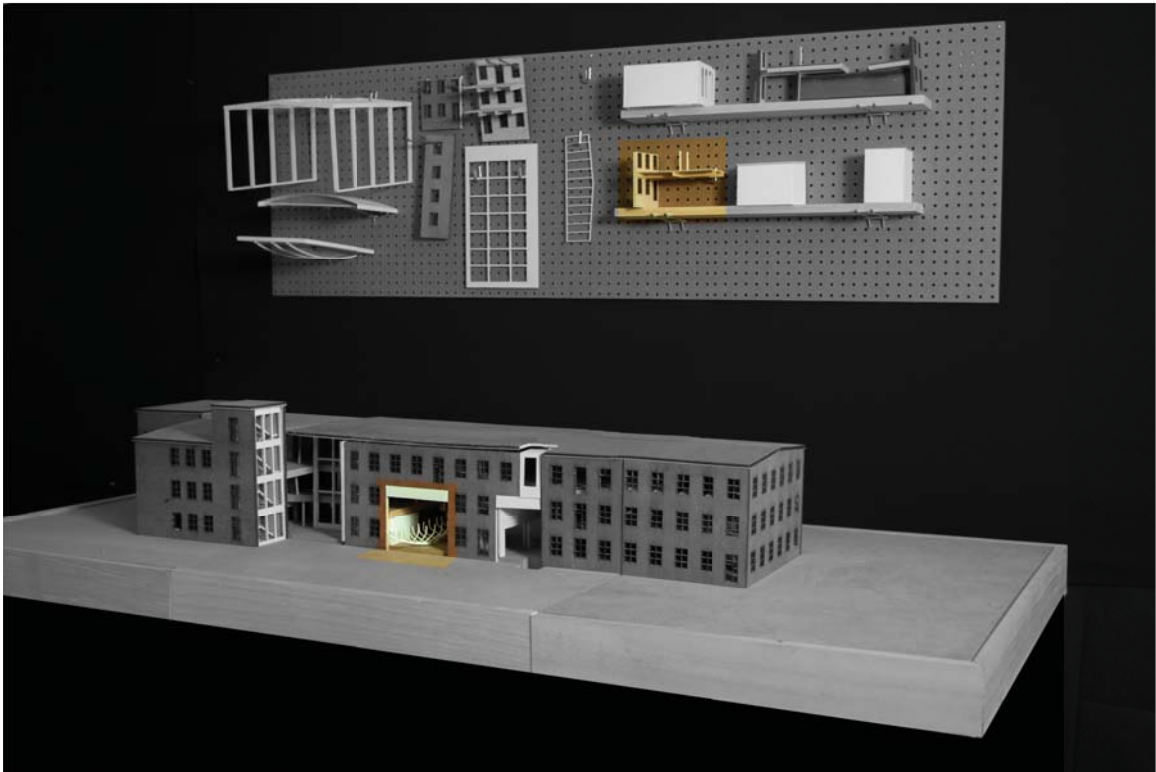


Truck pass on back side of building.



Truck pass on highway side of building

### 3.2 Project 2 - Schooner Construction



Schooner in shop - View from 2

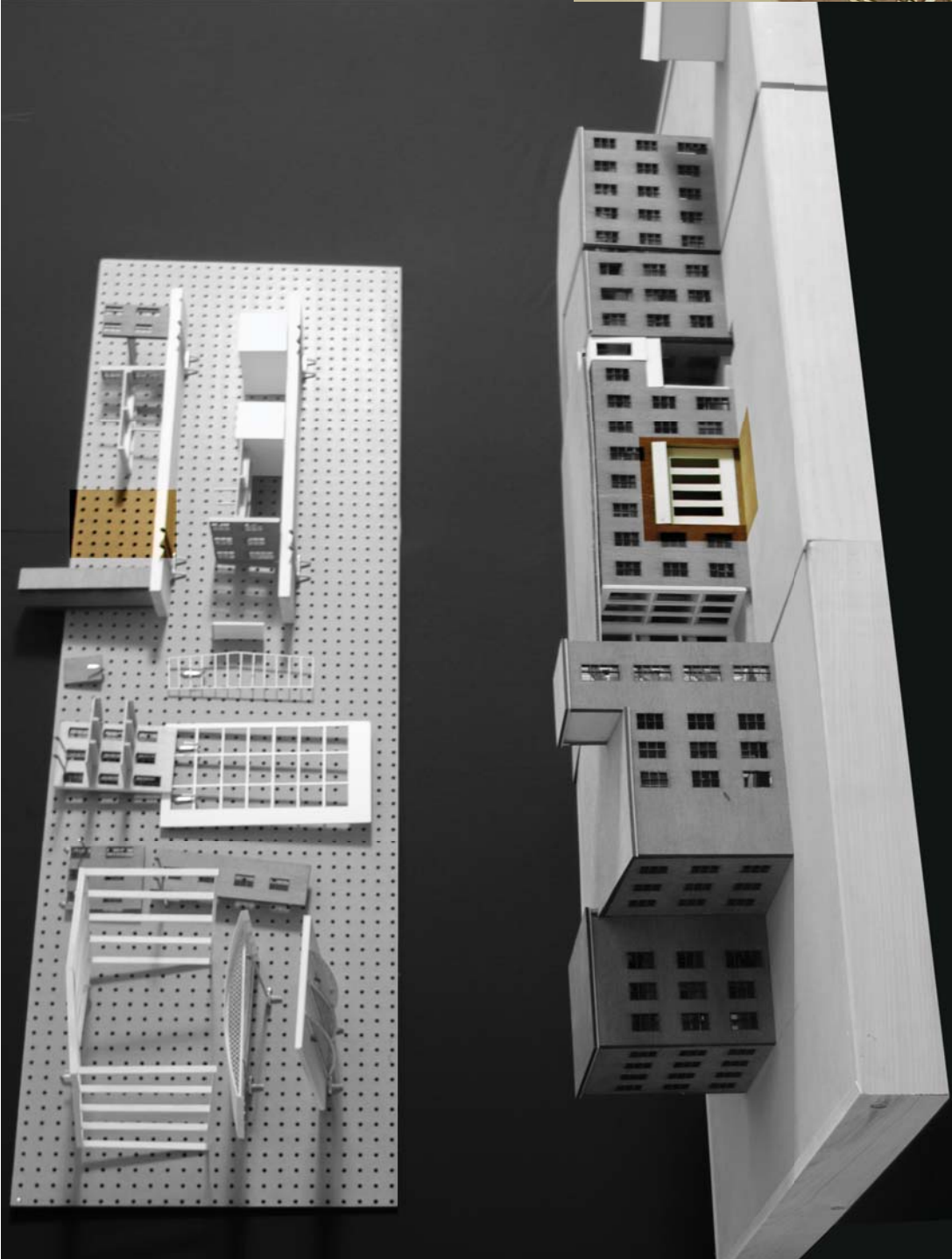


Extra super structure to accommodate length of schooner - View from 1





Views of space adapted to accommodate schooner construction.

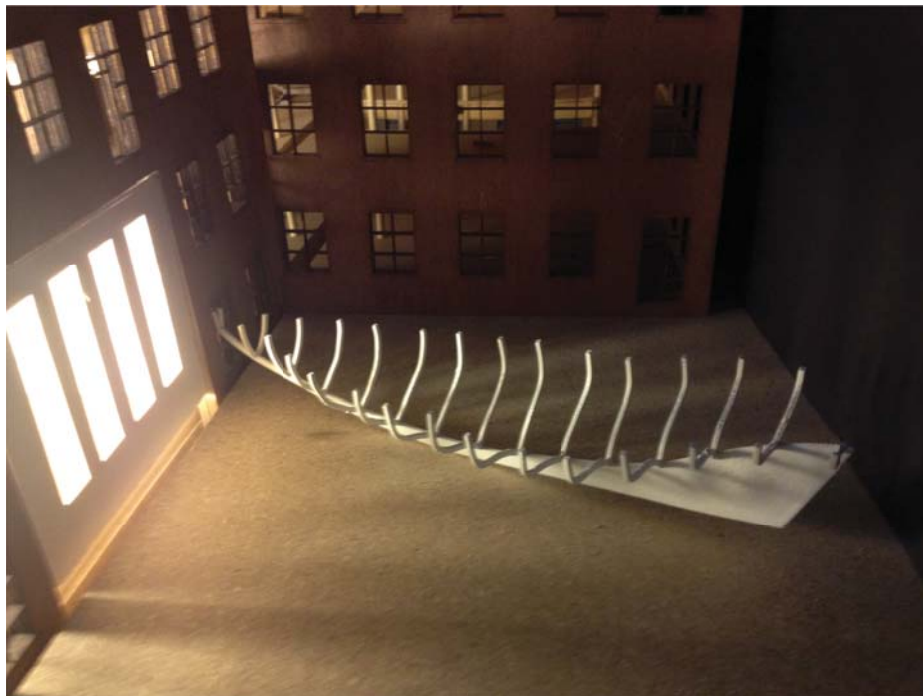


New wall added and shed addition converted to storage unit on edge of site - View from 1

Key Plan



Infill wall with steel beam to support brick.



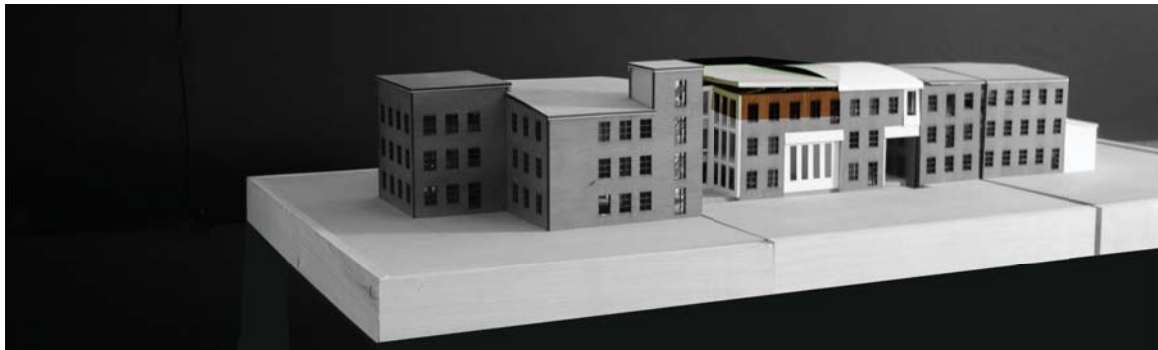
Schooner outside in preparation for launch



### 3.3 Project 3 - Roofing



Belfast truss - View from 1



Flat roof, Fish-belly truss - View from 1

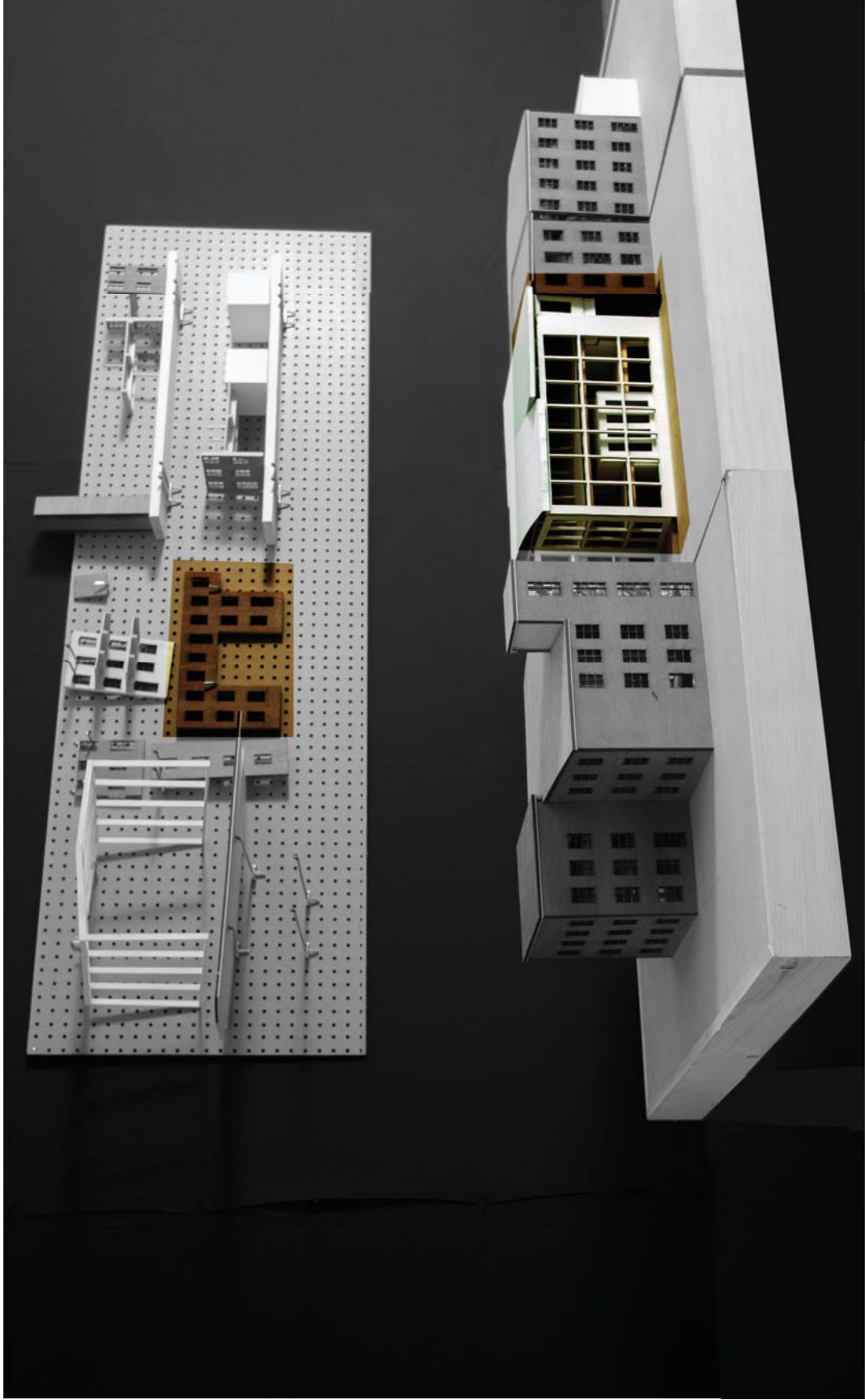


Key Plan



Interior images of roofing alterations

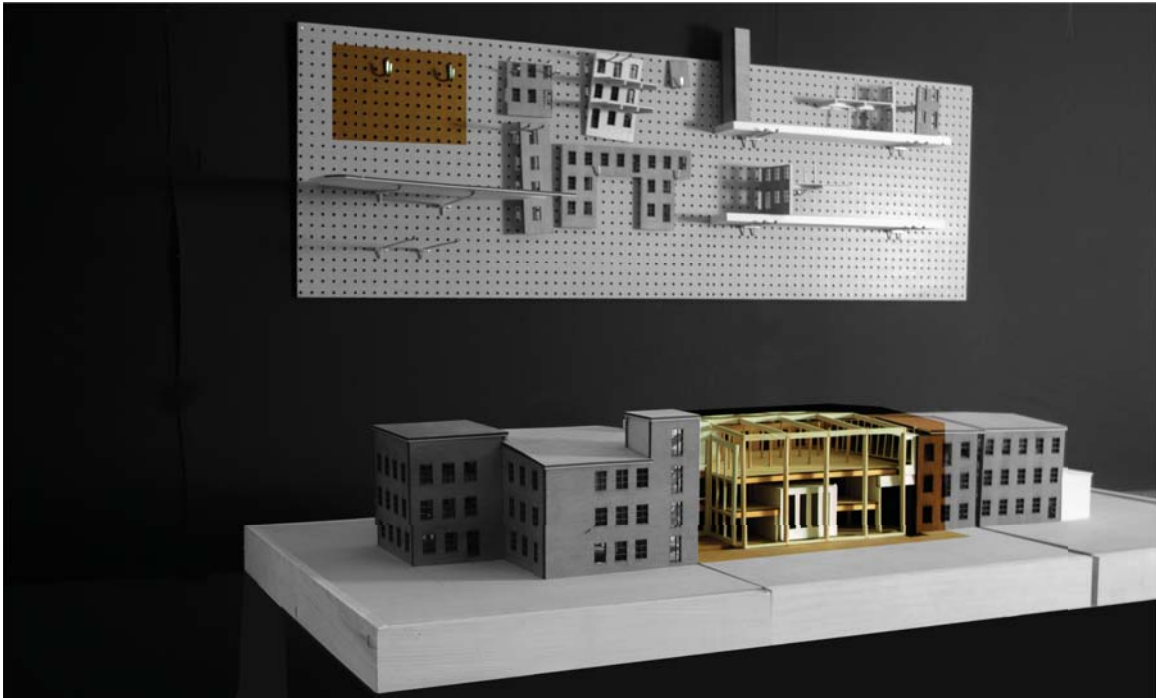
3.4 Project 4 - Facade Studio





Facade project

### 3.5 Project 5: Steel Frame



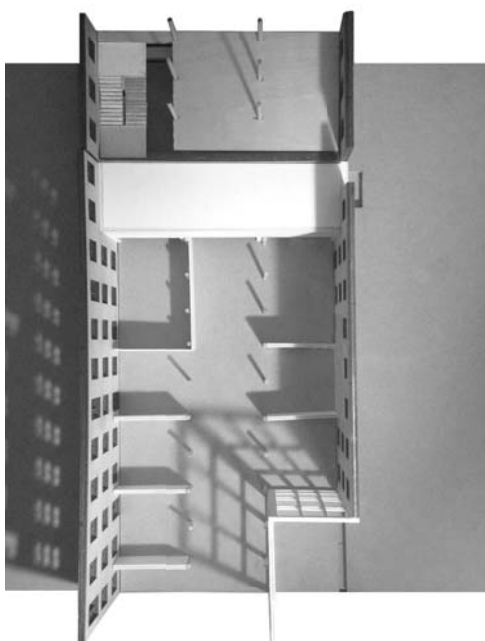
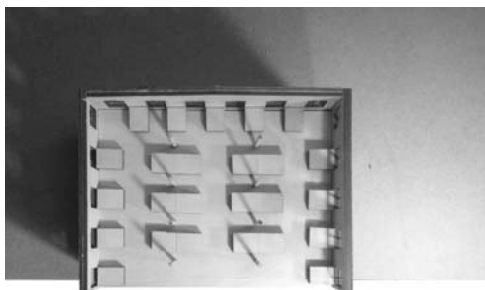
Steel frame over project incubator viewed from highway



Steel frame project - this is a sort of test of the rules. It fits within the rules set out if taken literally. Just as with the A.F. Therieau example it liberates the interior from envelope concerns and allows the students more freedom adapt the interior space and manipulate the existing brick facade. The rules were adapted as a result of this steel frame project to include the clauses with the Standards and Guidelines for the Conservation of historic Places in Canada . As well to right a report to consider the implications of the alteration. This project this would not comply with principals and guidelines, and it stretches the limits of the goals of this thesis.



Form of building after five possible projects



Plan view

## CHAPTER 4: CONCLUSION

There are several layers that this thesis is trying to address. The first level addresses the heritage value in the intangible qualities of a building culture. This thesis may not be a broad reaching answer to the question of preserving any building culture without stagnating it, but it does provide an example of one avenue to understand heritage in way that does not rely directly on preserving a particular artifacts. The premise of this thesis is not to discount more traditional methods of preservation, but rather to broaden our ability to understand building cultures in conjunction with these more traditional methods.

The second is understanding what the boat builders can offer the architecture community. This is where the concept of dynamic architecture comes in. The classic role of the architect is to design a building that will suit all the needs laid out in the design brief outlined by the client. When construction is complete the building is complete. It has reached Aristotelian actuality, or reached its full potential. From that day on the building is worn down by its users and becomes obsolete as technology advances and programmatic demands evolve or dramatically change. These static buildings generally make great photos for magazines, but do they actually serve their purpose to their full potential?

The boat builder looks at the building from the opposite side. There is no finished state. The building is constantly changing in response to the changing programmatic demands. At the same time the aesthetic qualities and durability leave something to be desired in many cases where the boat builder becomes the designer and builder of their



land-based infrastructure.

This thesis is an attempt to bridge these two worlds. To create an environment where new designers are connected to the building culture in a way that is not available in conventional architecture schools. At the same time it seeks to carry on traditions that have been embedded in Nova Scotian culture for centuries.

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