

**Adapting to the Island:  
The Architectural Reuse of a once active British Naval Facility for Bermuda**

by

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Submitted in partial fulfilment of the requirements  
for the degree of Master of Architecture

at

Dalhousie University  
Halifax, Nova Scotia  
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**DALHOUSIE UNIVERSITY**  
**SCHOOL OF ARCHITECTURE**

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## **ABSTRACT**

This thesis explores the possibilities of adaptively reusing an existing site to provide new services and work spaces for the local artistic community within a once heavily used British naval ship building and repair station, but now a major centre of tourist activity on the island of Bermuda. This thesis examines how a courtyard and two large stone storehouses can be refurbished and made useful again rather than torn down. There exists a strong national bias to maintain and preserve the heritage of the place. By understanding both the site's inherent value, varying levels of design can be proposed that not only transform the site but also bring forward a new sense of place. The adaptive reuse design and the program chosen is a synthetic response to the inherent cultural and historic values of the place, providing spaces that meet needs of the present artist and artisan communities of the Dockyard.

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To the artists and future artists, as both my clients and my inspiration.

## CHAPTER 1: INTRODUCTION

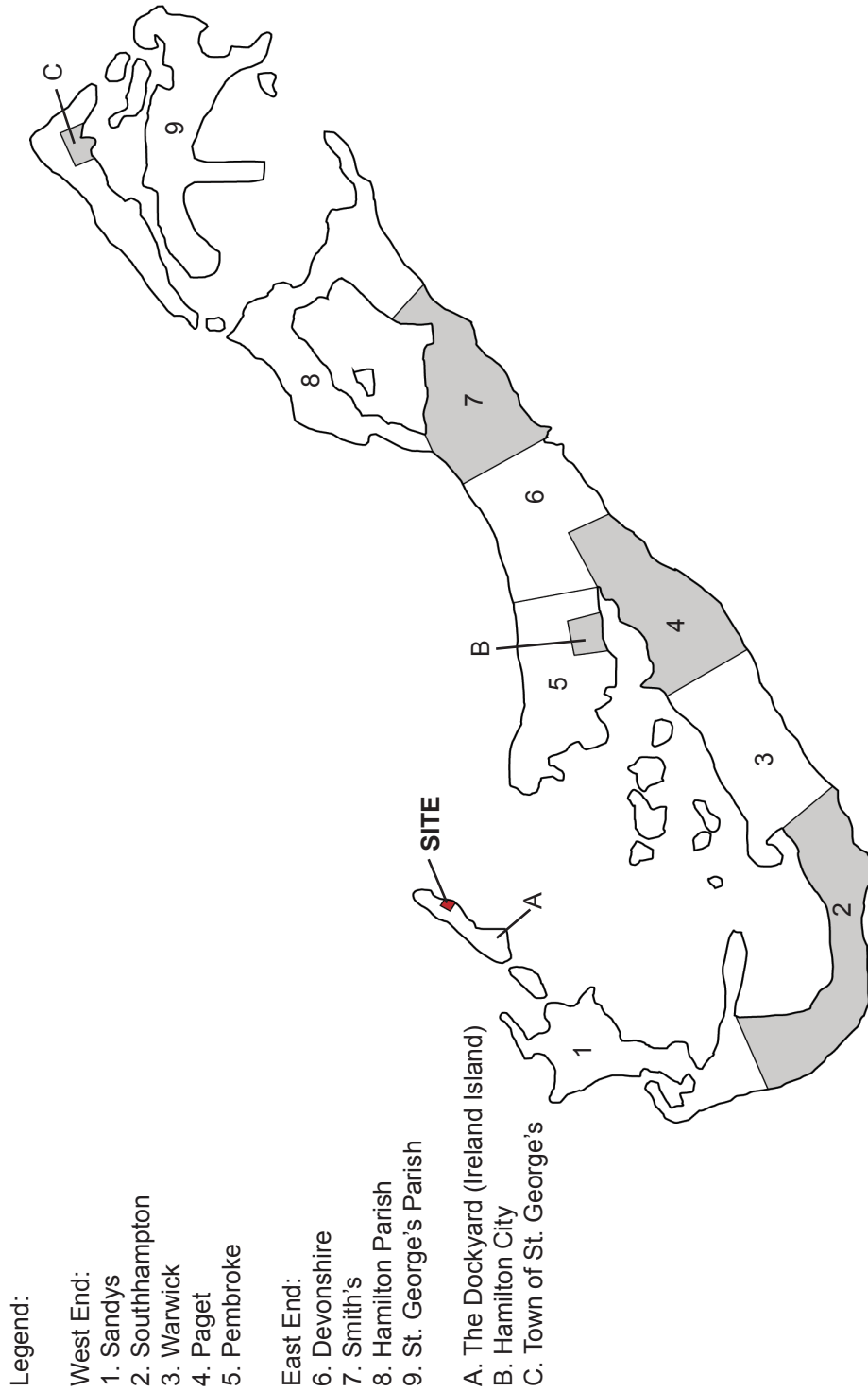
### History



Bermuda's location relative to the rest of the world.

The Island of Bermuda was first officially settled in 1609, by Admiral Sir George Somers and the first capital of St. George was established in 1612. The island embarked on a variety of economic adventures, including the salt trade, farming and agriculture, and ship building. The ship building industry began to boom with many farmlands replaced by *Juniperus Bermudiana* (Bermuda Cedar) (Stranack 1977, 1). Both its value and resistance to erosion made the Bermuda Cedar an ideal material for the building of Bermuda sloops and ships.

Losing most of its fortifications in North America with the signing of the Treaty of Paris in 1783 and fearing reprisal from the newly independent Americans, England looked to the colony of Bermuda as a defensive position (Stranack 1977, 1). The Royal Engineers were sent to Bermuda to investigate its defensive potential, and to chart its waters looking for potential passages for ships to enter the Island. This mapping led to the discovery of two major passages: Murray's Anchorage in the East End near St. George's; and the Grassy Bay, a second anchorage in the West near Ireland Island (the Dockyard) (Stranack 1977, 3). In 1784, English ships arrived in Bermuda passing through these channels with great expectations of the defensive opportunities that could be developed. Admiral George Murray oversaw the development of several depots in the East End and considered establishing a more permanent fortification on Ireland Island to protect the Grassy Bay passage. Due to inadequate funding and the outbreak of the Napoleonic

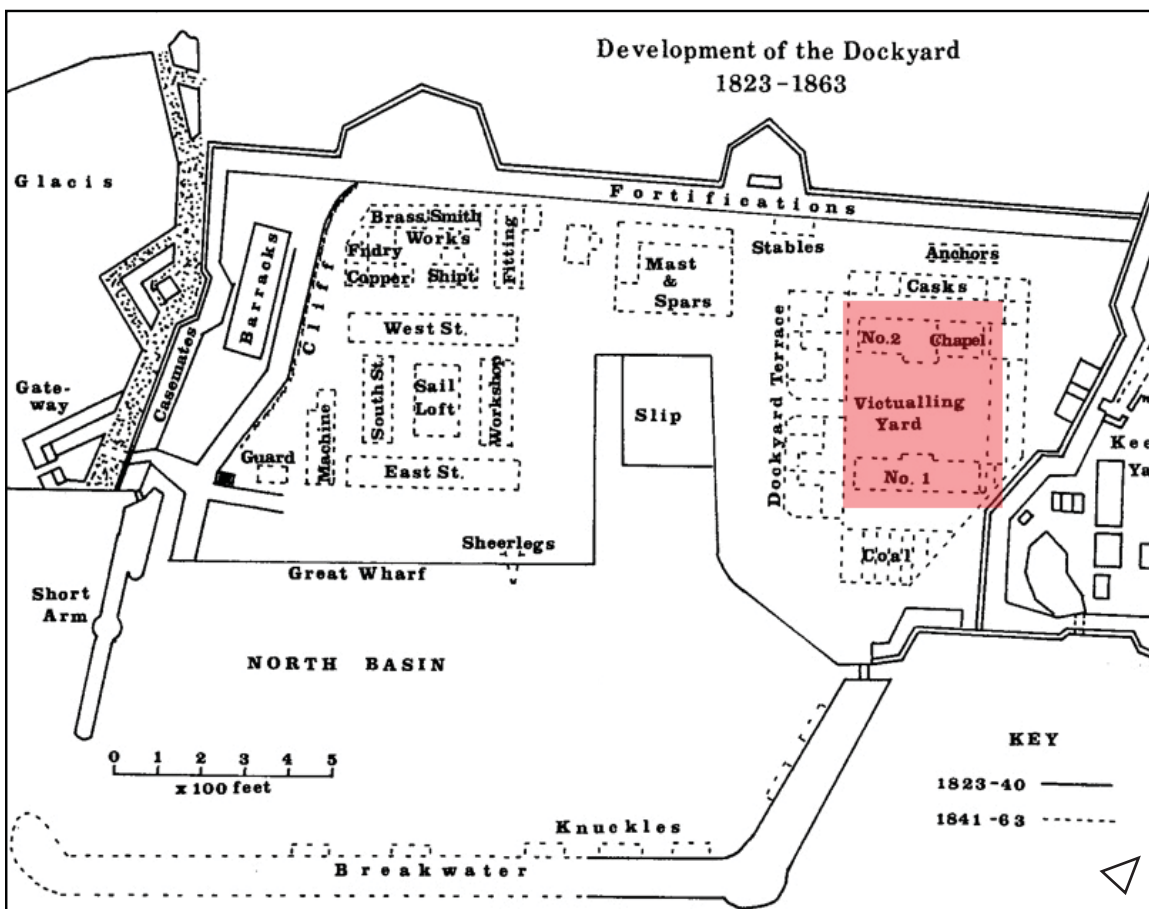
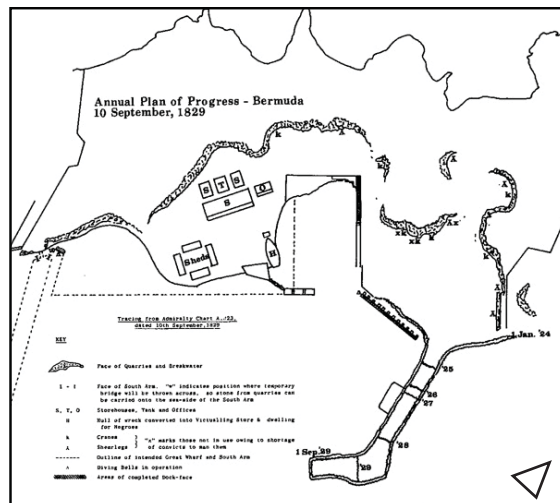
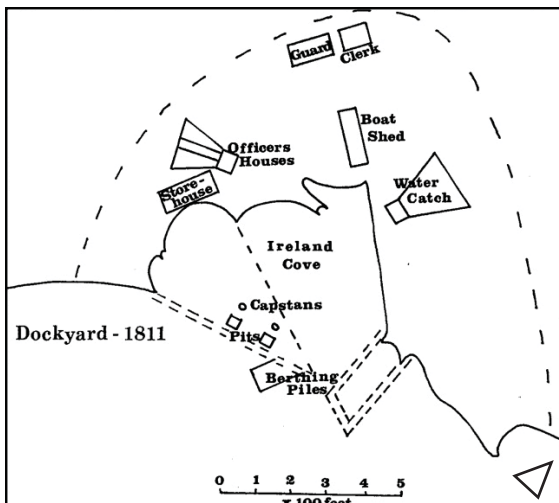


Map of Bermuda  
 Bermuda is divided into nine parishes (neighborhoods). Dockyard, Hamilton City (capital) and St. Georges are major nodes on the Island. From: Wikipedia (Bermuda).

War in 1804, plans for development of a permanent facility were postponed.

Construction of the Dockyard did not begin until 1811 and it was the responsibility of the Royal Engineers to oversee the construction. The earliest records indicate that the plan of the Dockyard was composed of a system of buildings, which were built to fit the existing conditions of Ireland Island then, and included a water catch, storehouses and officers' quarters. Construction progressed and soon the Royal Engineers excavated and created a swing bridge and dry ditch system, protected by a single Martello Tower, which protected the southern end of the island from approach (Stranack 1977, 6). Storehouses and Buildings were eventually relocated into their present day positions. Stone buildings replaced these original temporary wooden structure. Most of the land from the Southern end (Casemates) to the North (the Keep) was dramatically altered to raise and lower each section of the Dockyard to best suit its defensive opportunities. The work involved in constructing buildings, ramparts and changing the landscape was all done by the hands of both local craftsman, English artificers, and slaves (Stranack 1977, 12).

The Royal Naval Dockyard is composed of three sections: Casemates, the Dockyard and the Keep. Casemates locally refers to the barracks and officers' quarters built in the Southern end of Ireland Island between 1824 and 1842. It was originally used to house soldiers and sailors stationed at the facility, it was used as a prison facility until 1994 but since has been left empty. The Dockyard is the original location of settlement of the Naval Station, and now houses most of the stores and offices for the various businesses



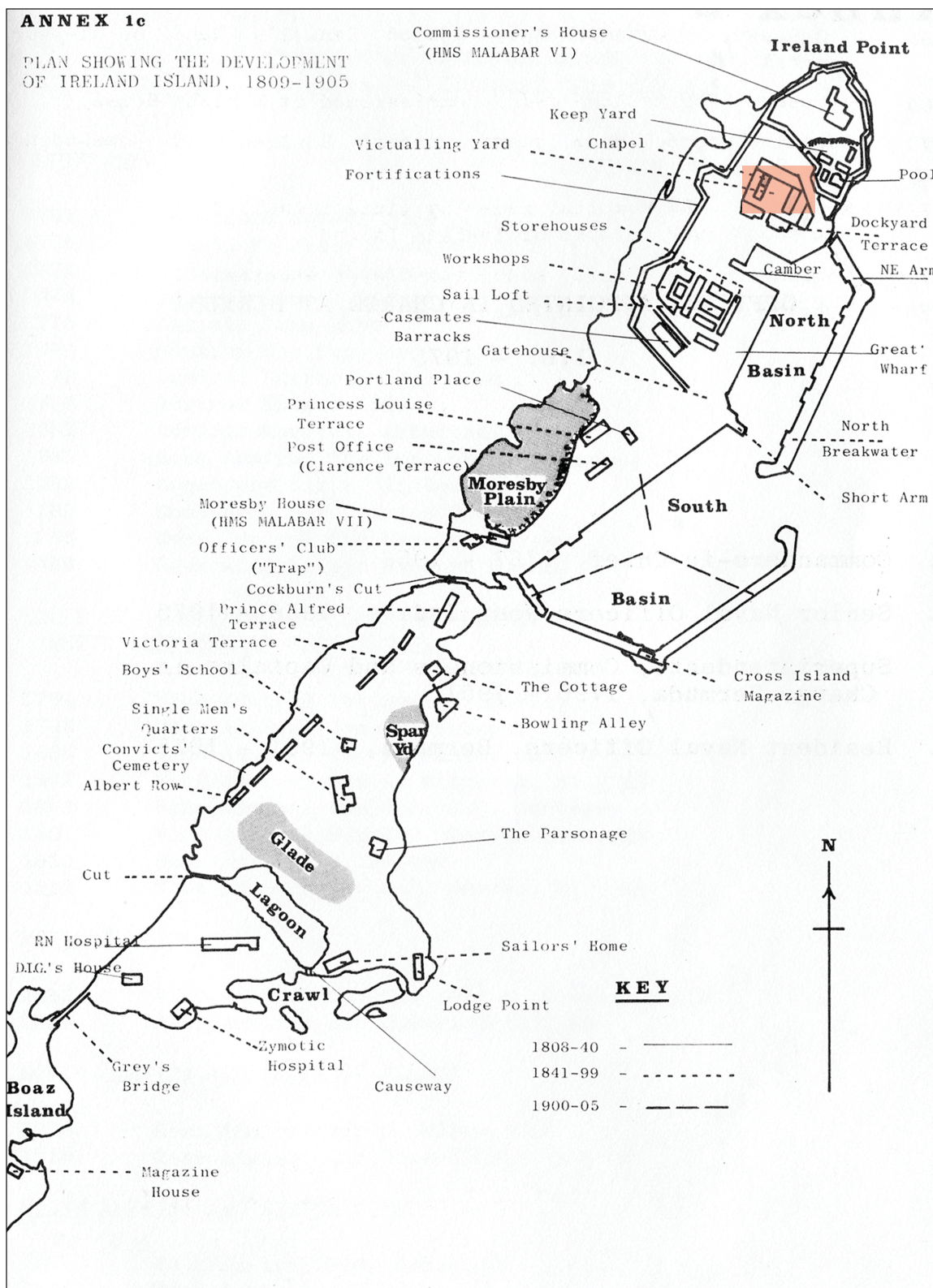
(Top Left) Dockyard 1812.

(Top Right) Dockyard 1829.

(Bottom) Dockyard 1863. Site highlighted.

All Images From: Stranack "The Andrew and the Onion"

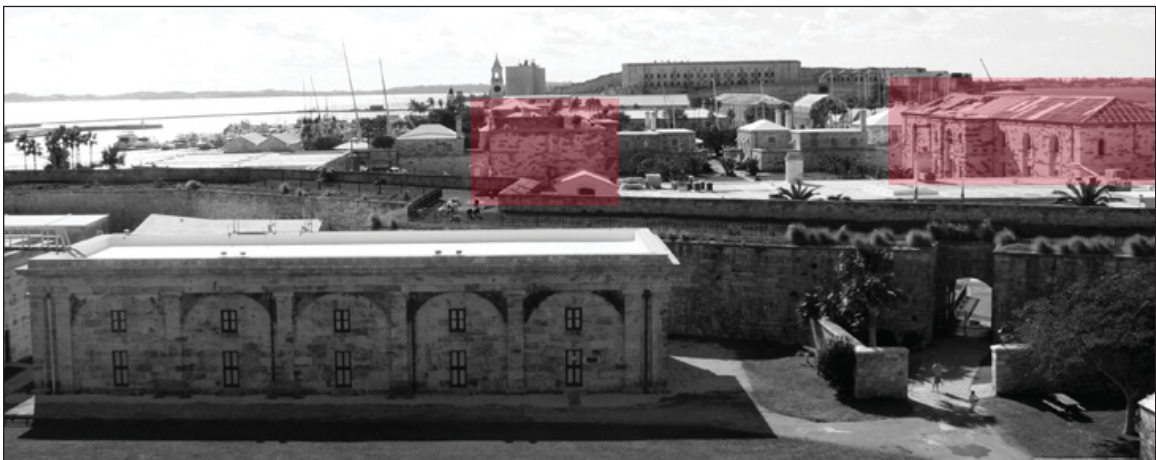




Plan of Ireland Island showing the development of the Dockyard and other naval facilities between 1809 - 1905. The Victualling Yard is highlighted.  
 From: Stranack "The Andrew and the Onion"

that occupy the area today. The Keep refers to fortified area on the northern tip of Ireland Island, and now includes the Maritime Museum, which is charged with preserving the seafaring history of the island. It originally housed the Commissioner's house and facilities for other officers stationed on Ireland Island. Important documents were also kept there. The Keep was constructed during the same time as Casemates. These three sections were originally marked by using large timbers from ships that were being taken apart. These timbers were later replaced by the stone walls which stand today (Stranack 1977, 12).

As World War II came to a close, cutbacks on military spending foreshadowed the end of the Dockyard. The Naval Station suffered further reductions until the eventual announcement of its closure in 1950. Its closure left the West End of Bermuda in a vacuum, greatly disrupting the social and sporting life of Bermuda (Stranack 1977, 26). Most people living in the West End of the Island depended entirely on their employment in Dockyard. Many had apprenticed and learned the skill trades of plumber, shipwright, mechanic, etc. This once thriving area, now offered little employment or opportunity, while the capital (the city of Hamilton), was



View from Commissioners's House, looking over Dockyard, Victualing Storehouses highlighted.





View of Commissioner's House from the water, looking North.

beginning to boom in the tourist trade. Today, the Dockyard has become the centre for most of the Island's artisans.

Since its closure, many of the stores and warehouses have been adapted for other uses, and life is slowly returning to the area. Weekly summer street festivals fill the air with the sound of music and laughter. An improved transportation system connects Ireland Island by both land and sea, including a ferry system that is greatly appreciated by both locals and visitors alike, and which as a bonus, offers a view of the Great Sound from the water. Other installments, such as theatre and exhibits, further contribute to the area's businesses and entertainment facilities. The Maritime Museum (now the National Museum of Bermuda), has had the greatest affect since the Dockyard's closure. The Maritime Museum occupies the professionally restored Commissioner's House, located in within the Keep area. Many of the original buildings have been preserved and made into exhibition spaces and libraries for the museum. The Maritime Museum maintains and exhibits the history of Bermuda and is a reminder of Bermuda's Naval History.



Originally for building and repairing of ships, today the mast and spar buildings house the Bermuda Clayworks Facility as well as other shops alike.

## Thesis Question

How can the reuse of an existing site be adapted to strengthen the present-day artists and artisan community, provide refurbished spaces for crafting and create opportunities for establishing new connections throughout the island and with other countries for artisans?



View of the Victualing Yard from the Southern entrance. (Right) Storehouse No. 1 (Left) Storehouse No. 2 both standing in disrepair.

## Area of Study

### The Location

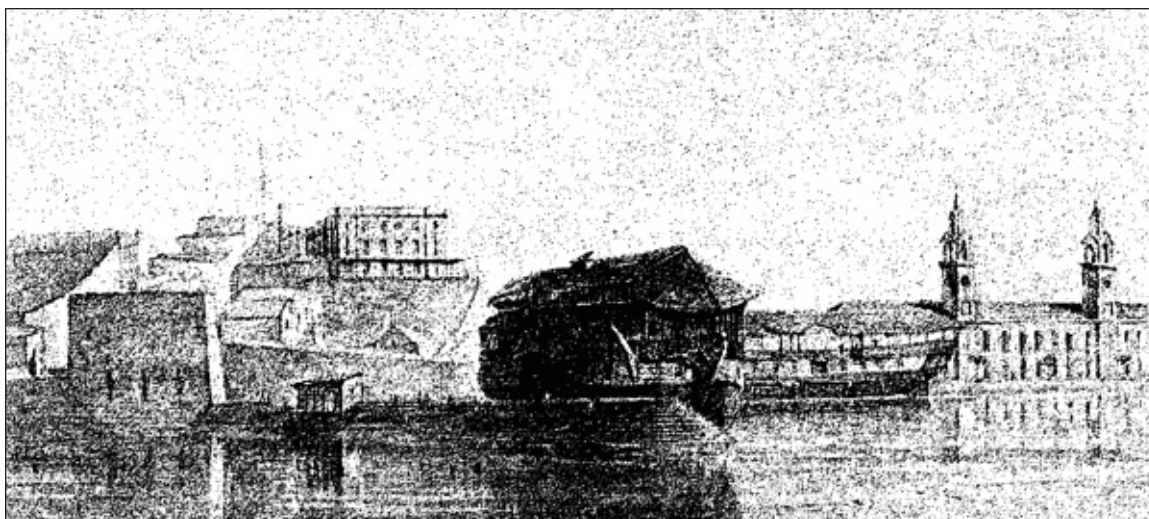
The project is located in the Royal Naval Dockyard on Ireland Island in the western end of Bermuda. The site for this project is the Victualing Yard, which includes two stone warehouses (each 14 metres wide by 66 metres long) a central courtyard and an adjacent courtyard to the East behind Storehouse No. 1.

### The Victualing Yard

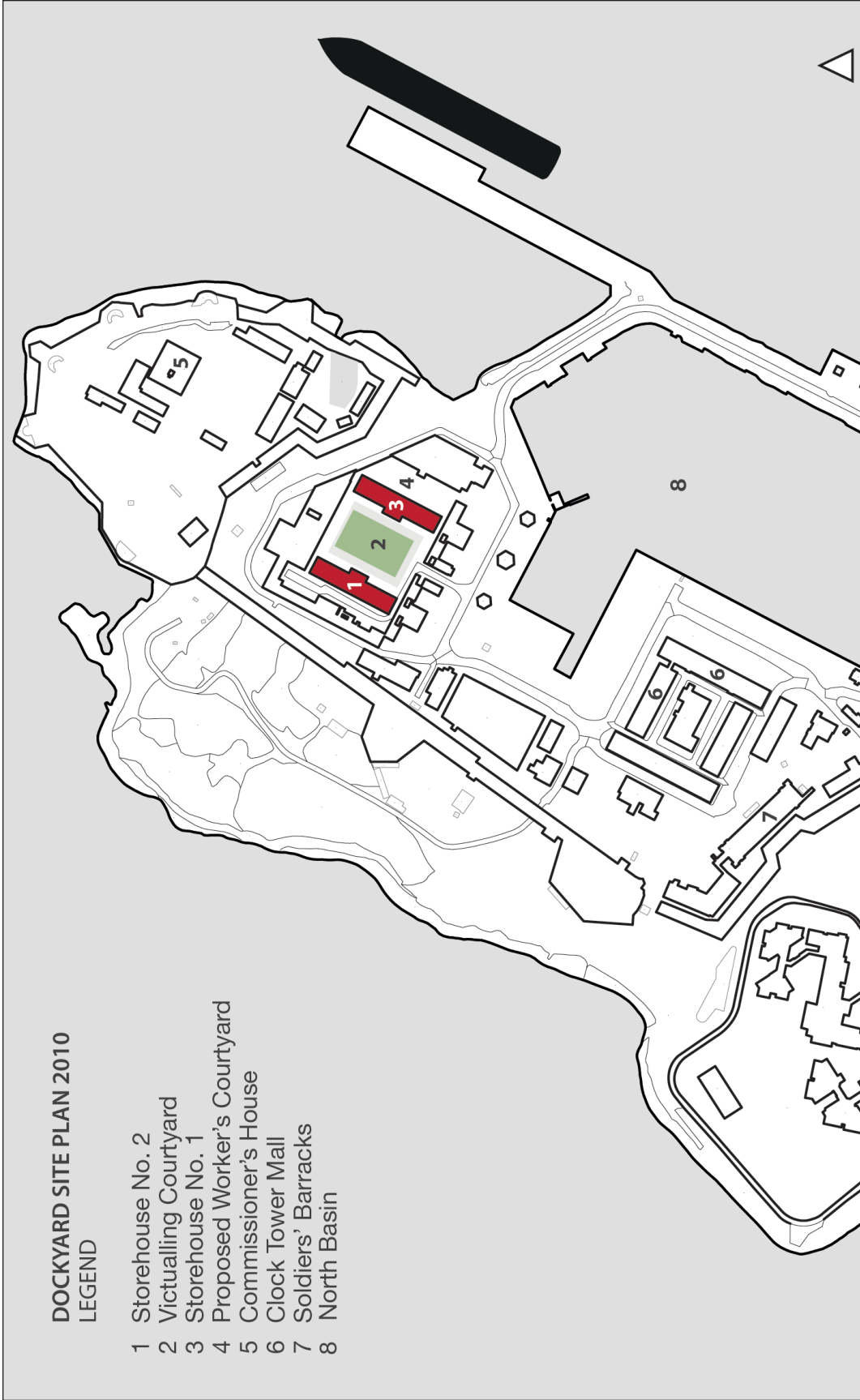
The Victualing Yard is an area of a Naval Station that stored food (in particular) and other items to preserve them. These items, or stores, were usually kept in large wooden barrels, that were regularly inspected by the Cooper to ensure that the stores were well preserved. The stores of the Victualing Yard of the Dockyard provisioned all personnel: service men, civilian and prisoners, stationed at the Dockyard. The Victualing courtyard is defined by a collection of buildings

that wrap around its perimeter, creating a single, secure point of entry.

Until 1853, all victualing stores were originally housed in large hulks berthed within the Dockyard basin. Hulks were large wooden ships, with multiple levels within that were ideal for temporary living and storage of both goods and people (i.e. slaves, workers and some officers) during the construction and land sculpting in the Dockyard (Stranack 1977, 102). By 1818, plans to construct a more permanent structure were underway, and the location chosen was based on the need to protect the stores of goods. The North Yard was selected for its future location, due to its relationship with the berthing areas and the dock slip. The new Victualing Yard comprised of two large two story buildings and other one and two story buildings wrapping around an open space, resulting in a protected courtyard with controlled access points on a single main axis.

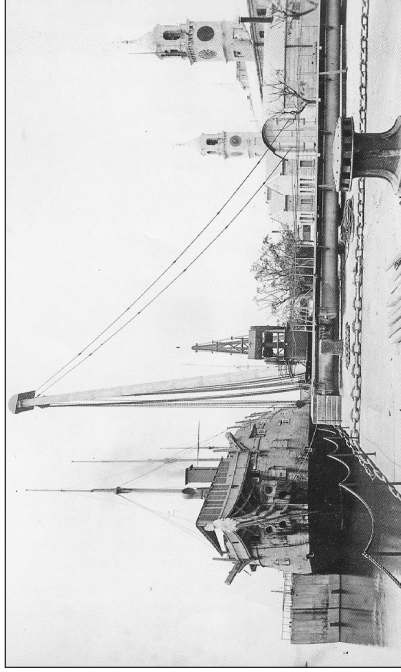
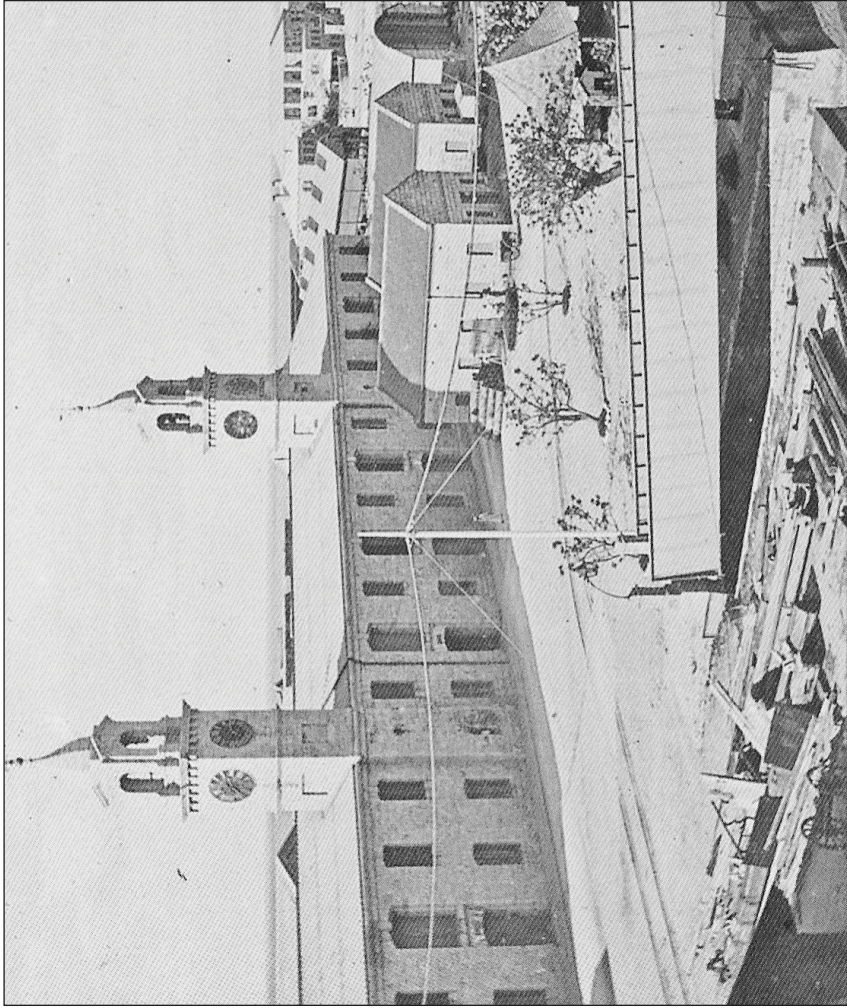


Large wooden Hulks became temporary storage space for both people and goods.  
From: Stranack "The Andrew and the Onion"



Site Plan  
 Victualling Yard and Storehouses Highlighted.

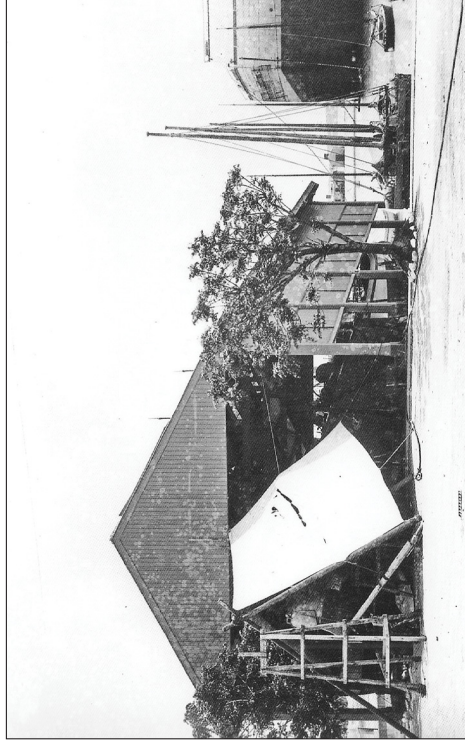
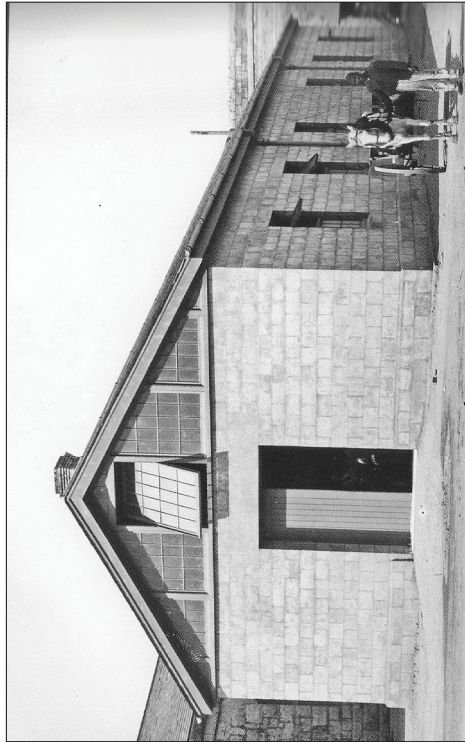
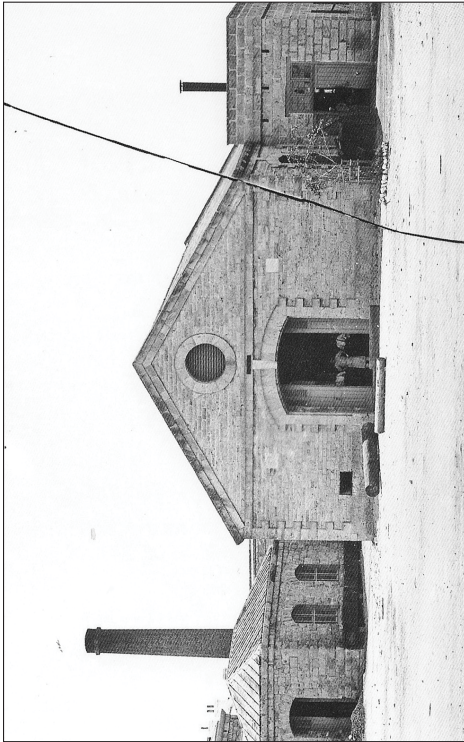




### Historic Images of Dockyard

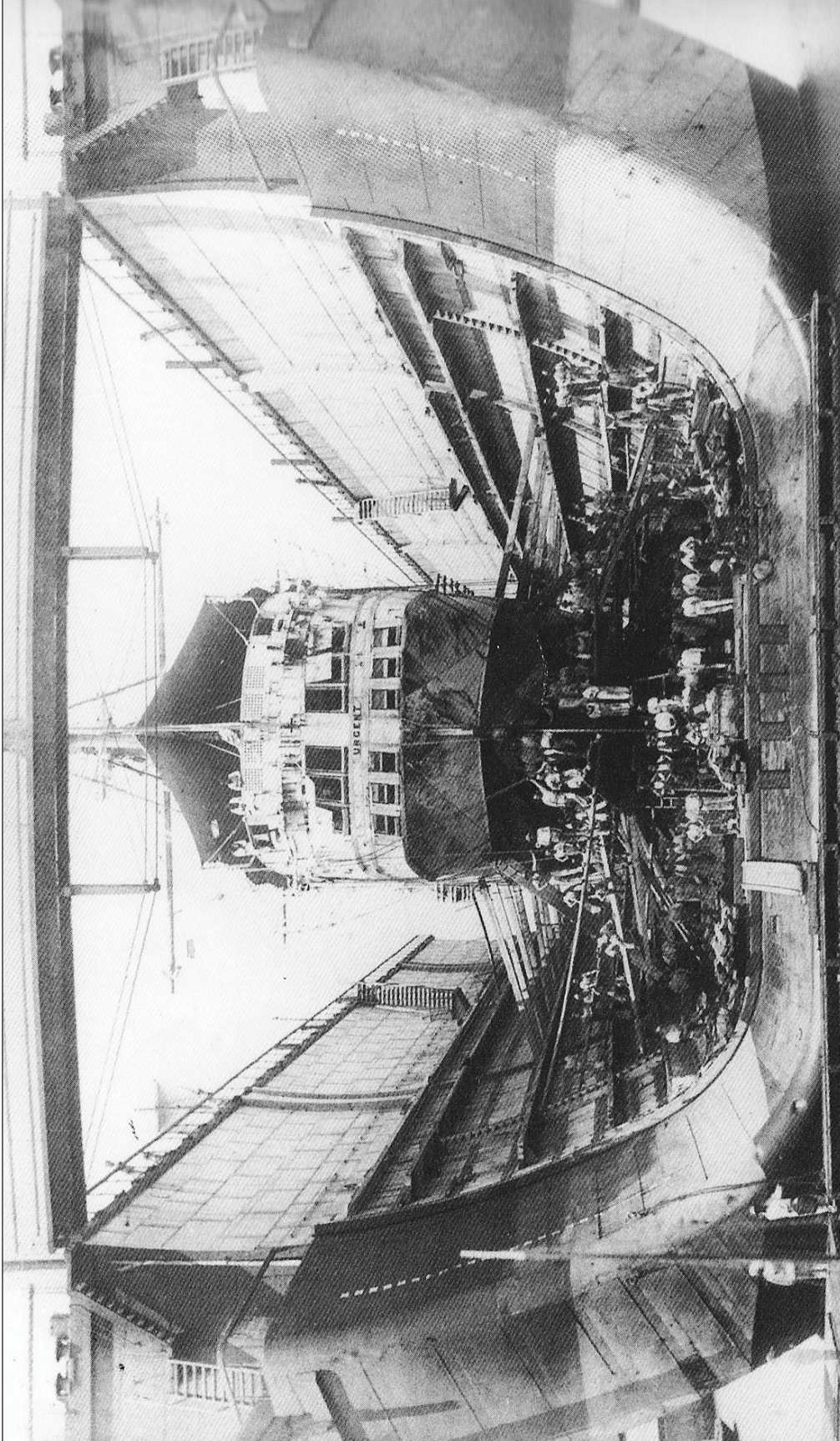
(Left) The Eastern Storehouse (the Clock Tower Mail) was apart of a warehouse complex that housed naval store for warships. (Top Right) The Dockyard Gate, about 1900, guarded by police with the work yard visible in the background. (Bottom Right) Shear Legs provided the Dockyard with heavy lifting capability until 1930, the Eastern Storehouse visible on the right hand side. From Brockman "Bermuda: Growth of a Naval Base"





(Top Left) The Saw Mill, today is the Dockyard's Police Station. (Top Right) The Mast and Timber Store (Bermuda Clayworks and Storage Areas) provided workshops for rigging, repair, cable testing and joinery. (Bottom Left) The Torpedo Shop (today a scooter rental business) built and repair smaller ships called torpedoes. (Bottom Right) The Shed used for hauling and repairing smaller ships such as tugs, pinnaces and launchers (destroyed). From Brockman "Bermuda: Growth of a Naval Base"





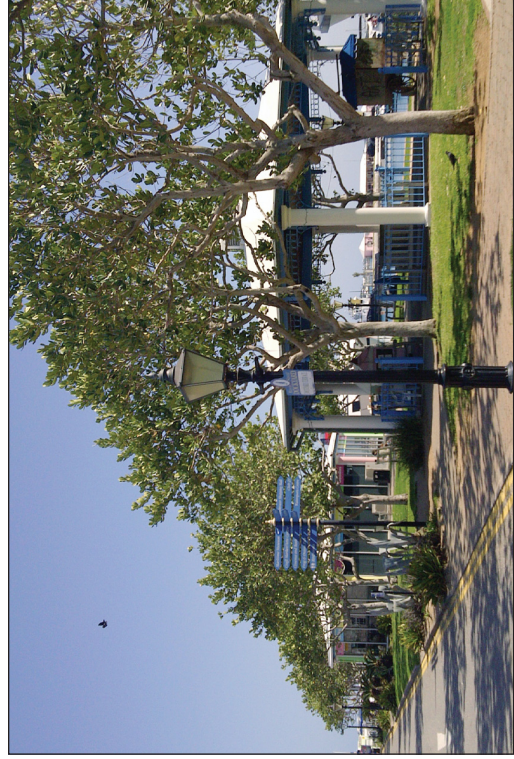
Historic Images of Dockyard  
HMS Urgent in the Floating Dock for repair or maintenance. The dock, towed out of England in 1869, was the single most important facility in the Bermuda Dockyard. From Brockman "Bermuda: Growth of a Naval Base"





Present Day Dockyard  
(Top) Panorama of the Dockyard Harbour, which today is frequented with private vessels and cruise ships serving as a backdrop. (Bottom) View from Commissioner's House looking over the Dockyard.





Present Day Dockyard  
(Top Left) The Clock Tower Mall. (Top Right) Looking north towards the Camber (boat slip) to the Mast and Timber Store. (Bottom Left) Couple enjoying a warm winter day's walk along the boat slip. (Bottom Right) Small gazebos decorate the Northern side of the Boat slip.





**Present Day Dockyard**

Many of the buildings have been maintained in their original state, or have been covered up by the 'Bermudian Image.' (Top Left) "Bone Fish" Bar & Grill. (Top Right) Oleander Scooter Rentals. (Bottom Left) Boat Repair yard. (Bottom Right) Makin' Waves Retail Shop.





Present Day Dockyard  
(Left) The Clock Tower Mall provides ground level retail and cafe spaces, with offices and other public amenities on the floor above. (Right) Another wing of the mall creates an interior ground level street that is flooded with natural day light.





#### Present Day Dockyard

(Top) Private Vessels and Boating Tours activate the harbour during the summer months.

(Bottom) Ferries provide an efficient means of travelling all over the Island, and are in service all year round.

## Cultural Context

There is a deep-rooted relationship that ties the Dockyard, with its traditions in both the arts and crafts, to an international network of professionals. Throughout its occupation of the area, the British Navy brought with it a capacity of technology and a capability of skills that provided many local Bermudians with both a livelihood and a trade. At one time, this provided the basis for a widespread communication network. The design of this thesis seeks to reestablish that link.

During the British occupation of the Dockyard, many local Bermudians were employed there and taught a skilled trade. These skills translated themselves into both livelihoods and professions that brought to Bermuda a high degree of craft and skill. Many locals were trained to become carpenters, metal workers, plumbers, etc., by professionals who brought their outside knowledge and experiences with them. This relationship, in time, established an informal network of international communication and cultural exchange, which ensured that new skills and ideas were always interchanging. This exchange of knowledge ended abruptly when the Dockyard closed its doors in 1950, disrupting the livelihood of over 1,000 locals living in the West End of Bermuda. Many Bermudians who depended on the Dockyard as an outlet for both their social and economic lives found that their skills no longer had a role. They were lost in the void that the Dockyard's absence had created.

Within this period of discontinuity, the state of the Dockyard and its buildings fell into disuse. Without the previous level of activity, the once active port became stagnant and its buildings fell into disrepair from storms and lack of mainten-

ance. Without the presence of the British Navy, many of the skilled trades found that the same international communication was no longer present in Bermuda. Therefore, they had to move away to find other opportunities. Without the presence of this active network, many skill trades relocated to receive additional training because the Island no longer offered this opportunity. Thus, for locals, the Dockyard lost its importance as a hub for international networking by skilled professionals.



What was once the Stables, today is the home of the Bermuda Glassworks. They publicly produce all their goods on site.

By 1980, tourism in Bermuda had peaked, and is still today the Island's second largest industry. Cruise ships became symbols of this very exciting time in the country's life, as they provided an injection of new life at the docks throughout the Island. Bermuda became internationally known as a major vacation destination throughout the world. Such a new found interest led to the revitalization of the Dockyard. Newly repaired buildings were instantly filled by dozens of shops and restaurants, adapting the roles these buildings once had to fit the requirements of the present. With this new sense of purpose, the Dockyard became an attractive location for many local artists to set up their shops and to feature and sell their artwork and handcrafts to tourists during the summer months.

Skilled laborers, which made up the original fabric of the Dockyard, have long since vanished. Their departure was marked by a period of disjunction and disuse. However, emerging from the place of skilled trades is a new artisan community. Many of these artists live and work in the West end of Bermuda, and have made the Dockyard the informal centre of this artist community (Faulker, 2010). Within the



stonewalls of this fortification various crafts such as glass blowing, ceramics, and jewelry making are vividly celebrated and publicly displayed.

This new artist community, however, lacks the same connection to the greater international world that was prevalent during the British occupation of the Dockyard. The act of training was successful at that time due to the constant dialogue that existed between skilled trades and professionals. It is this greater connection to an international network of professionals that this thesis seeks to reestablish within the present day artist community. By providing spaces in which one can live and teach, international artists and students can cohabitate with many local Bermudians, bringing back the cultural exchange of knowledge that is lacking in the Dockyard today.



(Top) During the summer the Craft Market has live demonstrations of wood working and jewelry making. (Bottom) The display area of the Bermuda Clayworks presents the artist's design proudly.

The Art School and the Artists' Residence seeks to reestablish the connection between the local artist community of the Dockyard with an international network of professionals. Thus this thesis design will provide a pivotal role in the development of young Bermudian artists, as well as become a destination for large art exhibitions and gatherings. The Art School will provide the Island's first and only Fine Arts institution dedicated to ceramics, jewelry and glassblowing, and will be open to both local students and professionals as well as those traveling internationally. Presently, only a few students are trained on the Island by professionals, in inadequate spaces, without any formal institution available. Therefore, many students seek their education and opportunity outside of the country, and the presence of formal teaching and work spaces is needed by the present day artist community. The Artists' Residence will provide live/

work accommodations for international students and professionals. By living and working year round, their presence will provide a constant level of activity and be supported by a substantial system of ferries and buses such that they are not cutoff from the rest of Bermuda. These international professionals will provide the influx of technology and experience that was once successful in the original network model. They will be required to hold classes and workshops with students, and in return they will be provided with private live/work spaces to develop their individual projects. The combination of both the first Fine Arts school and residence will create a new sense of place that ultimately can change the perceived usage of the Dockyard from a Tourism driven community to a centre for the arts in Bermuda.

Positioning the Dockyard to become part of a greater global network of artist communities provides a strong opportunity for individuals to develop their skills through design while promoting year round activity that is independent of cruise ships. By developing public spaces, both indoor and outdoor, for displaying the production of art and to create permanent exhibition areas, this thesis design seeks to strengthen the current artisan community.



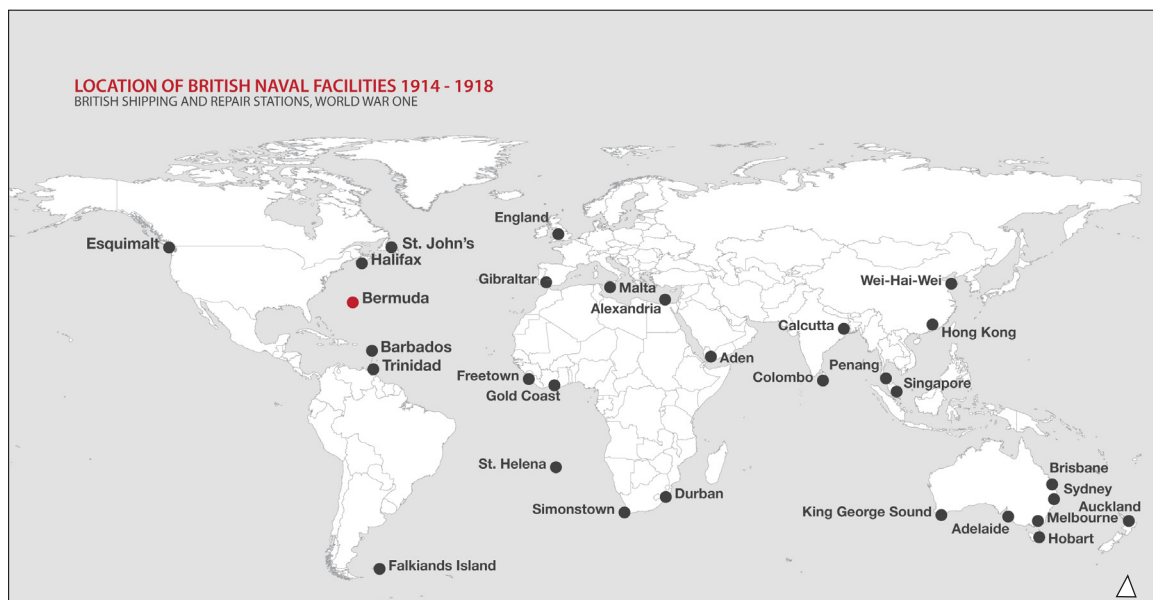
Bermuda Clayworks designs and produces their ceramic crafts on site. The owner teaches students during the winter months, who in turn, work for her during the busier seasons.

## **Network Mapping**

The mapping exercises of this thesis study the global networks of the past and potential future. They make a fundamental comparison between the historic heritage of the Dockyard and the potential to reestablish a network of learning that made the Dockyard a special place. These studies comprise a networking exercise that identify the larger community of professionals with which this thesis site is connected.

One of the initial studies looks at the Dockyard's relationship as a Repair and Ship building station to other British facilities around the world. This reveals the network of skills and technologies that trained many local Bermudians in a skilled trade and provided a consistent influx of professionals and knowledge. The absence of this network disrupted the lives of many, and forced many to leave the Island to seek opportunities elsewhere. The original network made the Dockyard a vibrant and exciting place to learn; a characteristic that has never been replaced.

The second mapping exercise is a comparative study that illustrates the potential network that this design seeks to tap into. The locations noted are communities that practice within the following visual arts: ceramics, jewelry and glass-blowing. This illustrates the potential for the Dockyard to become a destination for an international artist community. By providing gallery spaces and residences, the Victualing Yard will promote a continuous year round level of activity and use of the Dockyard.



### Mapping of Historic and Potential Networks of Professionals

(Top) Mapping of British Naval Fortifications World Wide during World War One, connecting Bermuda to system of professionals.

(Bottom) Mapping of a potential network of Artists using two established groups, Res-Artis and Trans-Artists, with studios world wide.

## Survey of Uses

Mapping both the original and present day qualities of the site, highlights the shift in the buildings' roles and importance within the Dockyard. The buildings of the most notable value and importance are: Casemates Barracks, the Clock Tower Mall (the Eastern Store Yard), the Victualing Yard and the Commissioner's House located in the Keep. The Maritime Museum incorporates all the buildings that are found in the Keep. These buildings initially had a high level of importance that is complimented well by the importance associated with institutional programs, like a museum. Art galleries and studio spaces provide a mid level importance because they preserve the act of crafting, while gift shops and other store types have less importance than the actual building they occupy. Clock Tower Mall provides a mix of both high and low level importance by housing a development office and public hall on its upper floors, as well as providing shops and restaurants on the ground level, while both the Casemates Barracks and the Victualing Yard are presently abandoned.

With an appropriate use of the Victualing Yard site, such as the proposed Art School and Artists' Residence, presents a greater opportunity to positively shape the culture of the Dockyard and Bermuda as a whole, than to allow the continued disuse of such a valuable area to occur with program of little importance. Retail shops and restaurants presently have little value and importance to this area. Cruise Ship Tourism will dry out and the infrastructure left behind will be allowed to disintegrate because there will be nothing to sustain businesses. To continue to support this mentality will eventually end in catastrophe. The Bermuda Maritime

Museum was the first truly important step in bringing back value, and this energy must be kept alive. By injecting a high level program of importance, the Dockyard area will begin to break away from its uniform dependence on the cruise ship tourism. A program of a school and residence will capitalize on the latent potential of the area and open up the possibilities of spilling over to other abandoned spaces within the Dockyard. The culture of the West End can shift into the art centre of the Island, continuing a proud tradition of excellence in craft that is apart of the Bermudian culture.





Mapping the Historic Uses  
 Mapping of the original uses of each building, coded by the type of work. This diagram reveals the organization structure of the Dockyard. Repair shops were located along the boat slip, were vessels could be hauled up for repair. Storehouses were placed near the major berthing areas for the immediate off-loading of goods.



Mapping the Current Uses  
Noting the current uses, identifying the importance of each use and locating those buildings that are presently abandoned.



## Heritage Value

### Description

Development in the Dockyard Area is controlled by a set of standards and guidelines found within the 2008 Bermuda Development Plan (BDP) which are enforced by the Department of Planning, within the Ministry of the Environment of the Government of Bermuda (Government of Bermuda 2008, 1). This document sets out consistent guidelines for any new development or construction within the area such that new adaptations respectfully integrate within the existing fabric of the Dockyard.

In combination with BDP for the Dockyard, the Standards and Guidelines for the Conservation of Historic places in Canada by Canada's Historic Places (CHP) is also used in this project to define the scope of design work (Canada's Historic Places, 1). In conjunction with the guidelines of the Bermuda development plan, the CHP Standards offers another level of guidance and enforcement to preserve the major defining qualities within an Adaptive Reuse project. Using the CHP guidelines provides a restrictive set of standards that maintain the qualities of the existing building throughout the adaptation processes. In contrast, the BDP of the Dockyard allows for the "Bermuda Image" (Government of Bermuda 2008, 13) to be applied to the adaption of buildings, both interior and exterior, which provides the worst examples of adaptation within in the Dockyard. The BDP is loosely drafted and allows for deviation from the intentions that the CHP guidelines set out to uphold. This is because the BDP for the Dockyard is still underdeveloped and still needs to be refined and sharpened to get it to the same level as the CHP standards. The steps of conserva-

tion and adaptations are precisely laid out in the CHP standards which provide a better tool to measure the successfulness of any adaptive project. One such standard offers guidance for restoring or repairing spatial or visual qualities of the original design of the architectural project and removing those features that are alien. This can be discerned through proper investigation and understanding the original context of an adaptive reuse project. They are clearly laid out to both educate and inform design teams that are dealing with buildings or places with historic or cultural value.

However, these standards limit the scope of design by enforcing a set of values on all new construction. Design should be appropriate to the siting as the setbacks of newer construction must come in line with surrounding buildings to maintain a defined street edge. New development is restricted to four stories, with a limited colour and material palette (i.e. earth tones, steel and stone, etc.) that matches the industrial and military aesthetic of the place (Government of Bermuda 2008, 5-6). Most importantly, this report claims that any adaptive design must preserve the character defining elements of that building. Character defining elements are the specific attributes of building, such as its



Existing Conditions  
(Left) Storehouse No. 1. (Right) Storehouse No. 2.

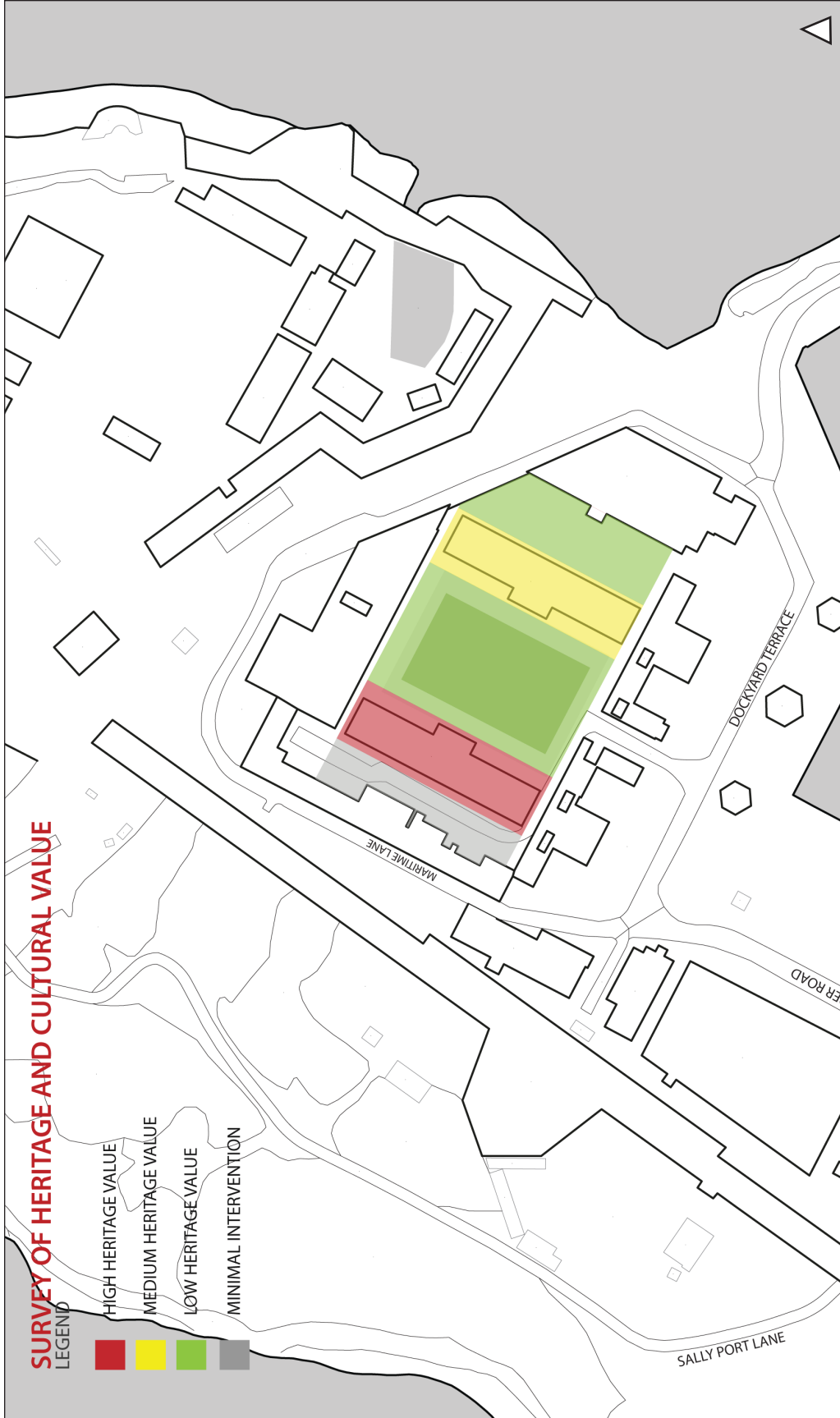
structure or form, which reveal both its original context as well as its historical value (Government of Bermuda 2008, 3). Overall these limitations ensure that the Dockyard can be read as a continuous grouping of buildings and open spaces.

Guidelines such as these must be addressed to provide a solid design basis. By first identifying the important features of a building, they establish an hierarchy of elements defined by importance. By identifying that the outer stone walls of Storehouse No. 1 have a greater importance than maintaining the original floor level, the designer is given greater freedom in creating newer floor levels. The purpose of any standard or guideline is to maintain those most important qualities of the building, regardless if the program for the building is effective at all. It would be then up to the Architect to develop a program that makes effective use of the building.

### **Heritage Value**

The main elements that contribute to the heritage value of the Dockyard may be listed as follows:

- The Victualing Yard played an important role throughout the life of the Dockyard, as it was the place where the food and goods for all service men were kept.
- The buildings are representations of British Naval Architecture that developed overtime, adapting to the climate and natural conditions of Bermuda.



Survey of existing site for Heritage and Cultural Value.  
This diagram illustrates the levels of inherent value. The higher the value the least amount of alterations to the character defining elements may take place.





The Victualing Yard in its original state (Left) Storehouse No. 1. (Right) Storehouse No. 2. View of the Victualing Yard from the southern rampart of the Keep during British occupation of the Dockyard. From: Bermuda Maritime Museum Archives.



(Top) A single bay of Storehouse No. 1 looking towards No. 2.

(Bottom) Detail of stonework on the exterior side.

- Through an analysis of its construction, the buildings are a unique object in their use of masonry construction in combination with steel structural members.
- Dockyard represented a high point in the culture of the island, as it presented jobs and opportunities for locals to work and be trained in a skill or trade.
- Dockyard provided a major source of income for the Bermuda. It was a major hub for the social and sporting life of local residents.

### Character-Defining Elements

The main elements that define the character of the Victualing Yard are:

- Its overall location and its relationship to the rest of Ireland Island.
- Cast iron columns that run down the centre of each wing of the storehouses, provide both structural support for the floor above as well as acting as a truss system transferring shear loads to either side during high winds.
- The build up of very large exposed masonry buildings in the Dockyard illustrates an extreme contrast to the typical Bermudian homes. This presents a very different visual environment within Bermuda, one that feels foreign and alien (a feeling of stepping into an entirely different world).
- Surrounding buildings shelter the lower half of the building, while the upper floors have clear views on all sides.



- Limestone blocks which were used for the construction of both storehouses were quarried directly from the site. These were then laid on grade with mortar directly on the bedrock as the foundation. The masonry walls of buildings in Dockyard are up to a metre thick.
- The low-pitched hip roofs are supported by slender steel trusses, which are left exposed to be seen from below.
- Large double swing doors and windows allowed goods to pass effortlessly through the building.
- The buildings' relationship with the site; large volumetric buildings that are organized around a central axis that bisects the large courtyard into halves.
- The scale of the main courtyard complements the massing of the two storehouses.

The Character-Defining elements of each space varies. Due to the lack of upkeep, many of the areas within the Victualing Yard have weathered and eroded to different de-



Existing Conditions

Today the remains of Storehouse No.1 frame the sky above



Storehouse No. 1 sits in ruins, as nature slowly begins to reclaim the land.

grees. For this reason, there is a varying set of qualities that must be conserved to maintain its cultural and historic significance. The level of value for each major area of the thesis site must be separately addressed to develop a meaningful reasoning for each design intervention into the existing site.

## **Storehouse No. 1 - Art School**

### ***Defining Characteristics***

- Is the most heavily damaged of the three major spaces.
- The thick masonry outer walls are essentially the only part of the structure that remain today.
- There is no trace of any of the roof or upper levels.
- Most of the cast-iron column trusses are still extant, but have been heavily weathered by the elements over time.
- All doors and windows either were removed or were destroyed by passing storms.
- The storehouse can be summarily described as a ruin.

### ***Analysis***

The value of this storehouse lies in its walls and these must be maintained. What occupies the inside space has no link to the original typology of the building. Also the original systems and structures do not determine the design extents or limitations. So long as the majority of the visible exterior skin of the building that is maintained, there is no limitation on the use to which the internal space is put. This part of the thesis is an experimental project.



## Storehouse No. 2 - Artist Residence

### *Defining Characteristics*

- The majority of the building's original structure has been maintained.
- Some damage has occurred in the roofing section of one half of the building.
- Currently the northern wing is used as an upholstery shop, and prior to that it was a small church. The rest of the building's ground level is used for various storage purposes.
- The roof structure and column trusses have all been maintained, but will require further inspection to analyze and determine their structural capabilities. Any replacements will need to match the existing.
- Doors and windows have received minor damage. The existing doors and windows are constructed in a wooden panel method, composed in sections of thirds and further subdivided into halves. The top two sections are glazed to allow for natural daylight to penetrate. The ground floor door sashes are arranged in two over four sections (total of 24 panes per individual door). Each set of doors on the ground level are thirteen feet tall by seven feet wide. The upper floor windows are shorter in comparison with a more pronounced arch at the top, and with a total number of twenty-two panes of glass. These upper floor windows are sized at 10 feet tall by seven feet wide, and accented by exterior stone railings.



(Top) The original roof Structure of No. 2 remains mostly intact.

(Bottom) The majority of the original doors and windows are still in place, with minor damage.



(Top) Freight Elevator,  
Second Floor.  
(Bottom) Stair Connecting  
both floors.

- The building has been altered to include a new stair system as well as a freight elevator.
- There is a minor collapse of a floor in the southern wing of the building.

### ***Analysis***

This storehouse has the highest degree of value in comparison to Storehouse No. 1 because the majority of the original elements are still maintained in the existing layout of this building. This requires the design to adapt to the limitations set by the current conditions of the building. Therefore, this part of the thesis is considered to be a refurbishment and restoration project, since the existing structure will be maintained.

### **Main Courtyard**

#### ***Defining Characteristics***

- The existing courtyard has been maintained and upgraded with planting, due to its heavy traffic of pedestrians that use the major axis as a traveling point.
- Is of sufficient size to permit standing away from the surrounding buildings at a reasonable distance to appreciate their scale.
- Opened air space, provides opportunities for outdoor dining during the summer, or relaxation places to sit under trees.
- Flexible space that can hold larger functions, if required.

***Analysis***

The value of this space lies in its openness and major axis, which allows the thesis to adapt and shape the courtyard to provide a new purpose, keeping in mind that scale of buildings and views to them should be maintained. This part of the thesis design is open and is restricted to maintaining the visual site lines as they relate to both the buildings and overall space.





Existing Conditions  
Storehouse No. 2 today is used for storage of cycles for the nearby rental company. View  
of the Ground floor.





Existing Conditions  
Photomontage. The South wing of the Storehouse No. 2 has suffered roof damage as a result of recent storms and lack of upkeep.





Existing Conditions  
Up until recently, Storehouse No. 2 was used as an upholstery shop and the remnants of a chapel still exists on the farthest back wall, centre. North wing, upper floor.



## Levels of Construction

Identifying the major characteristics of each space helps define the appropriate methods of construction for each space. The Main Courtyard allows for a high degree of construction and alteration. The process of its design will revolve around excavation, and remodeling of its current surface to provide beneficial spaces. The key design move will be the layering of subsurface systems that will benefit the two larger programs.

Storehouse No. 2 represents an intermediate level of construction due to the building being in a relatively good state, i.e. it still maintains its defining features (structure, walls and details). The design of this space will revolve around adding on or integrating light wood frame and/or concrete installations to define the new spaces with minimal alterations to the facade.

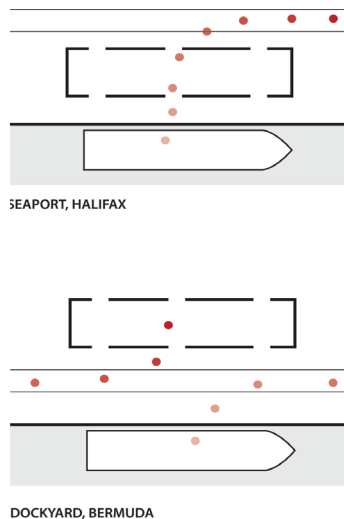
Storehouse No. 1 provides an intermediate level of adaptation that will drop in new program elements, conceptually like crates delivered to a site. The existing walls will relate to the new program as a shell, allowing the new work to function independently, creating new levels and spaces. This intermediate level of construction will use concrete and steel as the primary building materials.



Levels of Construction Diagram  
(Left) Storehouse No. 1. (Centre) Main Courtyard. (Right) Storehouse No. 2.

## Ship-to-Building Relationship

Various studies revealed the dynamic effect the ships' presence had on the day-to-day life of the area. Three ship relationships were considered: ship to dock; building to ship; and ship to businesses.



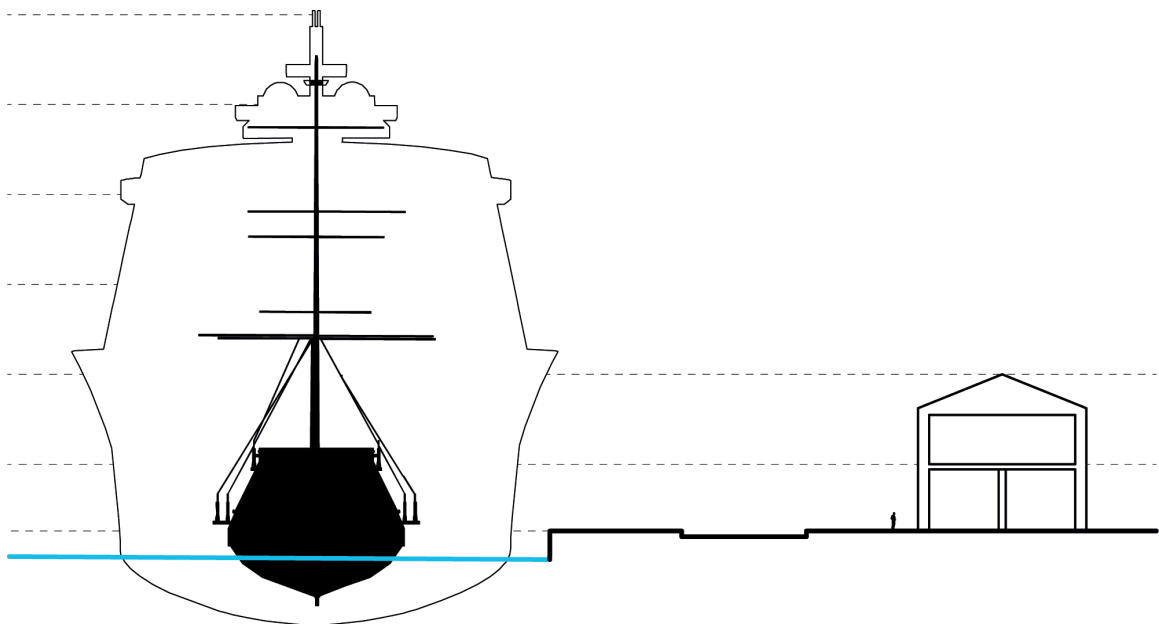
Study of the Ship to Building relationship in comparison plan. (Top) Seaport, Halifax. (Bottom) Dockyard, Bermuda.

The first study looked at the off-loading of goods, the transportation and the act of storing. In Dockyard, ships berthed alongside and off-loaded their goods directly on the dock, or on some form a transport (generally a horse-drawn cart). Goods were then transported to the storehouses. This discovery indicated the importance of that first threshold, the dock. The dock area was an active and dynamic space where goods are processed before being moved to the storehouse. Today the dock is a strategic place for people to interact and for people to sell their goods to passing tourists. In contrast, when a ship docks in Halifax, goods are loaded directly into the storehouse where they are then processed and transported away.

The second relationship is the sectional relationships between the building and the ship. The typical heights of most buildings in Dockyard are up to two stories, at the most. The typical storehouse typology of the thesis site is 10 metres tall which proportionally matched the height of most sailing ships. The modern cruise ships of today have disrupted that relationship and buildings have been dwarfed.

The final relationship, which will be discussed in further de-

tail to follow, is the presence of the modern cruise ship and their impact on businesses. The Dockyard has become a tourist destination and represented as such. The presence of these ships affect the area dramatically, and it is during cruise ship season that businesses will sell more of their goods and services. Businesses see the summer months as a prime selling season. Many people even work seasonal businesses to capitalize on this opportunity. This creates a pattern where the Dockyard is very active during the summer months but relatively unused and quiet during the winter.



Study of the Ship to Building relationship in Section.



## The Present Artist Community

The proposed adaptations of this thesis take into account the cultural and heritage impact that the Dockyard has had on the lives of local Bermudians. For properly adapted buildings to be reused successfully, there must be a community present in the area to support them. It is the Bermuda Artistic community that will greatly benefit from the spirit of this thesis. Many artists already have made homes and businesses in the West end of Bermuda, making the Dockyard area an informal centre of this community. The crafts of glass blowing, ceramics, etc., are already currently practiced and celebrated within the stone walls of this fortification. This study explores the shift in the type of work the artist could do throughout the year, and identifies a need for flexible spaces that can change from season to season.

Repercussions stemming from the closure of Dockyard affected the livelihood of over 1,000 locals living in the West end of Bermuda. As Ian Stranack observes:

Many were dependent on their employment at Dockyard and learn “The high standard of the present artisans in the Island is due directly to this excellent background, for which no real replacement has yet been found. The apprentices working in the yard when it closed were taken to English dockyards and housed and paid until their training was completed, when they were returned to Bermuda at Admiralty expense (Stranack 1977, 102).



Diagram of the yearly Artists' life cycle. Organized by the four seasons of the year. Based on: Tuan 1977, 94

This thesis looks at the current life cycle of artists in Dockyard as a point of departure, and to use as a guide to determine what spaces and amenities are needed. The life cycle of the artisans in Bermuda can be described by four phases corresponding to the four seasons (Faulker, 2010). The four phases of the year are: design (autumn); mentoring (winter); production (spring); and selling (summer). In autumn,

the cruise ship season ends, many local practitioners begin working on their individual projects and furthering their own developments. By the winter, some businesses may take on one or two students, or whatever space allows, and the artists will train the students in their specific craft. Each student will work on their own development with guidance from the artist. It is the hope of the artist, that these students will be prepared to assist him/her during the coming months of spring. Spring time is a period in the year when personal development is put to one side, and the students will assist the artist to produce goods that will be sold to the tourists when they arrive in the summer. When the ships finally arrive in the summer months, shops and businesses alike open up their doors and start selling their goods, it is the time of year when the artist can make the biggest profit. Once this season ends, the cycle is repeated.

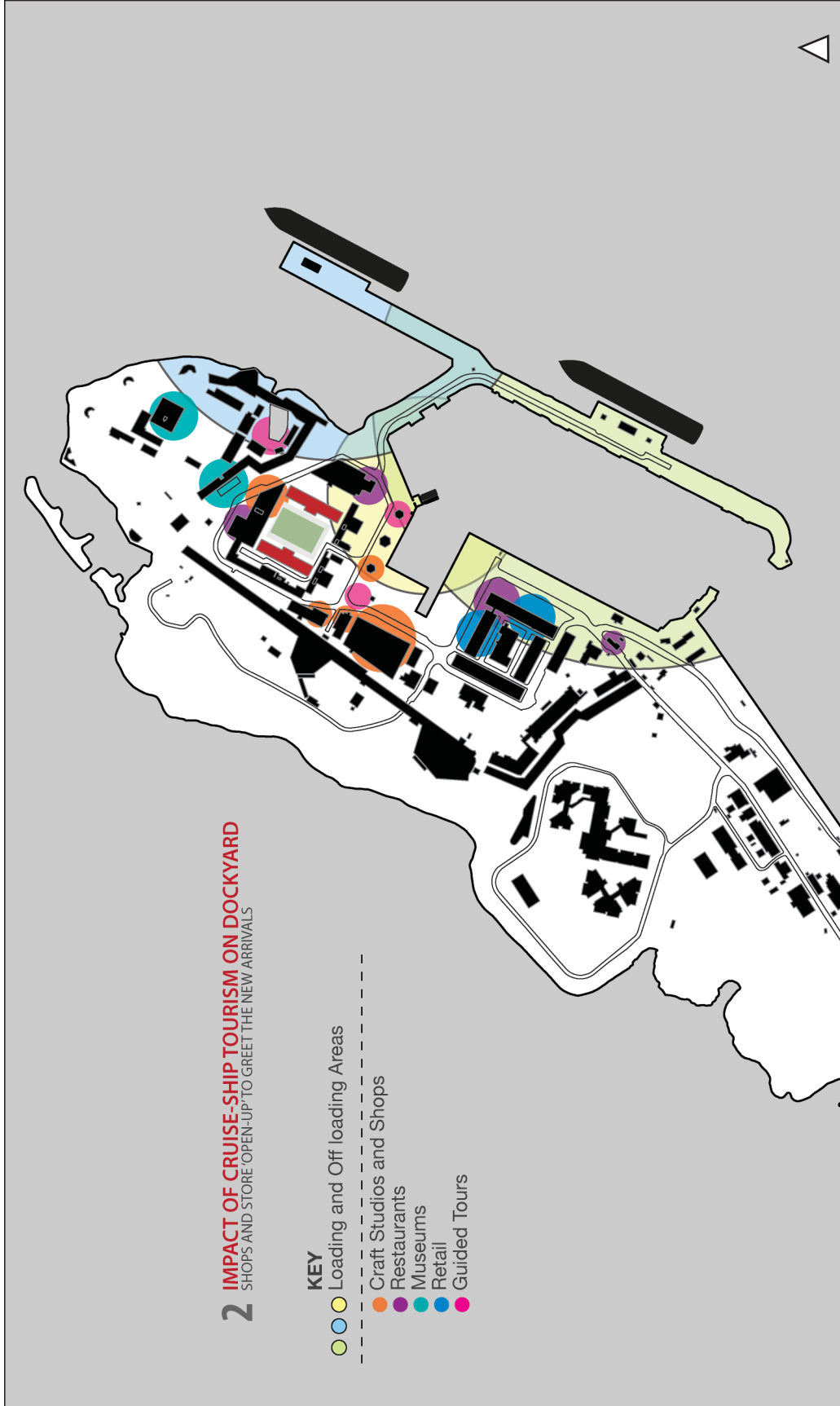
The mentoring phase is an inspiring aspect to the overall cycle. Artists actively train the next generation in a professional setting. Training is not limited to a local setting as there are many foundations created to provide a network of residences and studios worldwide (notable groups: Res-Artis and Trans Artists). This provides students with the opportunity to travel and see the world, while providing them with affordable and comfortable places to work and sleep. Tying into this existing network of students and professionals would provide the ability to bring in temporary instructors that would have both their own live/work space where to hold larger classes of students. This in turn would assist in the development of young aspiring artists.



**1 IMPACT OF CRUISE-SHIP TOURISM ON DOCKYARD**  
WINTER SEASONS - LITTLE ACTIVITY (WITHOUT CRUISE SHIPS)

The Impact of the arrival of Cruise Ships - Winter  
With the cruise ships gone, most activity comes from those working in the area. Many artisans will close up shop and begin taking on students or working on their own designs.



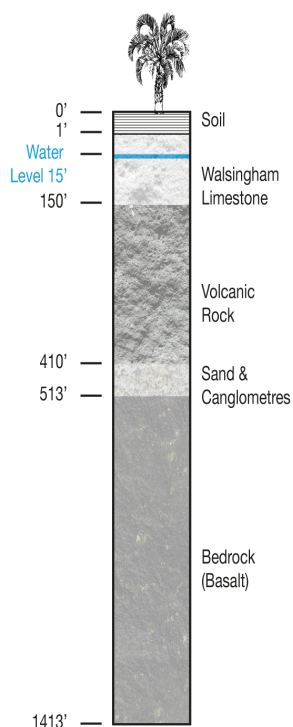
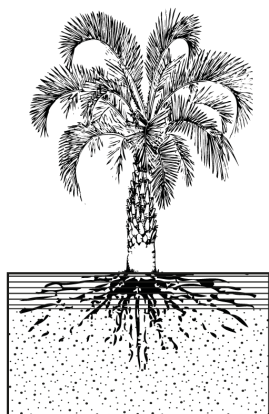


The Impact of the arrival of Cruise Ships - Summer  
With the presence of cruise ships, many shops, businesses and attractions become available. This provides an exciting atmosphere that makes the area come alive.

## Site & Program

### Geology

The underlying geology of Ireland Island was dramatically altered when the area was first settled by the British Navy. Large volumes of earth were removed from the Dockyard area to build up sections of the Keep and Casemates, elevating them to a commanding vantage point looking out over the water. The soil conditions that are present in the Victualing Yard today comprise a thin layer of topsoil, up to about one foot thick in most places. Underlying this layer is a layer of limestone, particularly known as Walsingham Limestone. Walsingham Limestone is the oldest type of limestone on the island, and is prone to cave formation. The current water table is at 4.5 metres from the soil level, a fact that the subsurface construction will need to be aware of. Beyond this limestone are a number of other geological strata, including: volcanic rock; compressed sand conglometres; and basalt (or bedrock).



(Top) Study of Palm Tree roots as the move through the top layers.

(Bottom) Study of the Geology of the Existing Site.

### Pathways

Most of the movement patterns in the Dockyard are a mixture of pedestrian and vehicle traffic. All vehicle traffic enters and exits from the south western direction, through the original gate to the Dockyard. There are several parking lots dispersed around the area; most people will park their car and then walk for the rest of their stay in the Dockyard. When entering the Dockyard, the roadway is organized so that cars flow in both directions until they reach the Victualing Yard. At this point, the road will condense to a single, one way lane that loops around the surrounding buildings of the Victualing Yard (the Cooperage, coal storage building,

and the private residence), linking back up to the main road leading back out to the main gate.

The Dockyard is connected to a substantial public transportation network, providing an accessible means of traveling publicly. There are three types of public transport available. Ferries connect the Dockyard to the town of St. George's and the City of Hamilton, running most days every hour, providing views of the Island from the water. Buses actively run every fifteen minutes to half hour, providing a scenic route along the shorelines. Due to the restriction on the vehicle population in Bermuda, scooters are the only forms of personal transportation that are rentable. Priority to rent is given to tourists, and together with the ferry systems they provide a workable alternative to the car.

Because of its close proximity to the Ferry Terminal, the courtyard of the Victualing Yard is a major pedestrian thoroughfare, providing an easy route to the major entertainment areas of the Dockyard (pool hall, theatre, arcade, etc.). The major axis of the courtyard is defined by a single stone pathway, broken up by plantations of flowers and bushes. The courtyard is used during the summer months for outdoor dining from the nearby restaurant, and sometimes used by small families and groups for lounging. The space is underutilized and its scale would provide adequate space for the display of large artworks, without disrupting the current way people move through the space.



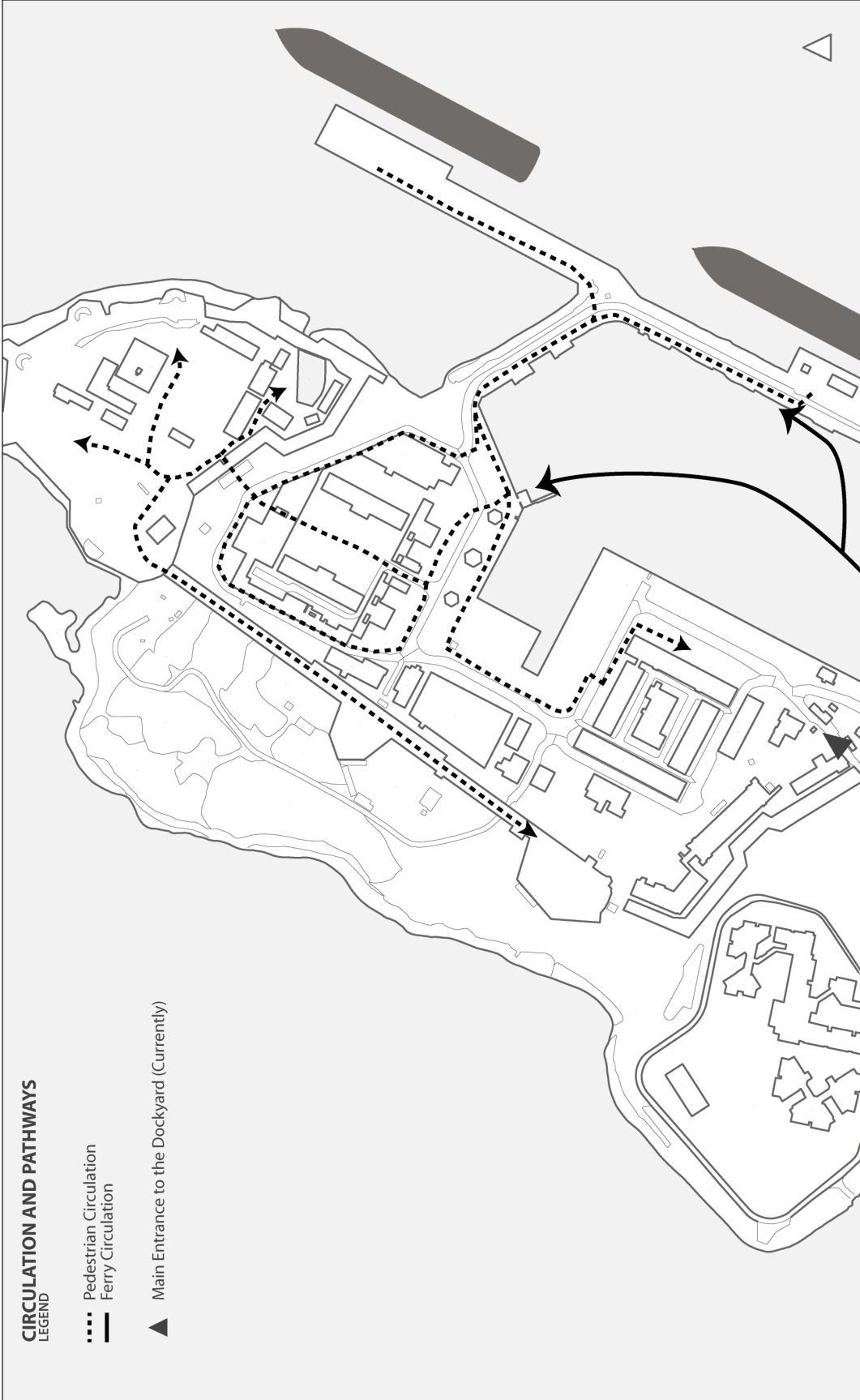


Diagram of Pathways  
 The Victualing Yard is a major pedestrian thoroughfare, providing easy route to the major entertainment areas of the Dockyard.



Views from the street.  
From: Du Toit Architects.



Original building condition.  
From: Du Toit Architects.

## Precedents

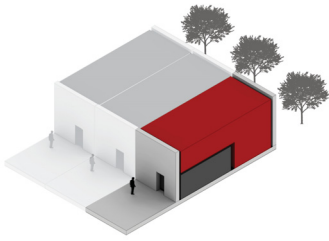
### Artscape's Wychwood Barns - Toronto, Ontario

The Artscape Wychwood Barns, designed by Du Toit Architects, is an adaptive reuse project that makes use of four abandoned street car repair barns, once belonging to the Toronto Transit Commission (TTC). This project aims to deliver community spaces such as a farmers market and un-programmed spaces as well as private residences for low income artists (Artscape Wychwood Barns).

The Artscape Wychwood Barns is composed of four, five originally, barns of varying lengths that run side by side to one another. The four barns house separate functions: Farmers Market, Community Spaces and private studios for the artist. These programs are tied together in a single barn which was converted into an 'interior street.' The site work provides many outdoor activities and spaces for gathering that add another level of depth to this project.

The architects received a high volume of community involvement in the design processes for this project, which showed that the community had a sense of attachment to these buildings, and, by their involvement, showed that they wanted the reuse to be successful.

The layout of the studio spaces is based on modular system of 15 blocks that span the entire width of a single barn (14 metres) and is organized into two functional spaces: individual work spaces and private live/work loft spaces. The individual work studios are accessible via the 'interior street,' and provide a small workspace and storage. The private studio is a double height space, the bedroom sits in

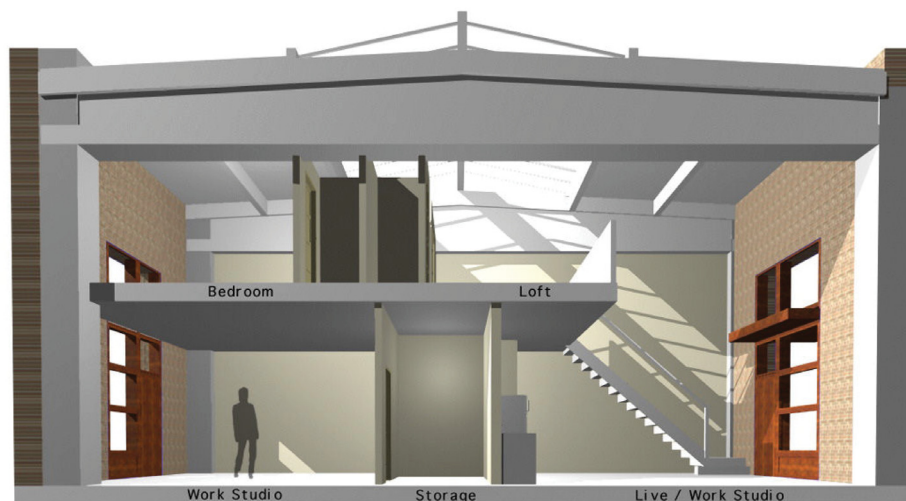


■ PRIVATE LIVE/WORK STUDIO  
 ■ INDIVIDUAL STUDIO

This diagram illustrates the relationship between the two spaces (interior vs. exterior).

the loft space above, and the work spaces and kitchen at grade level. The private studio is accessible from the street and grants views into the ‘interior street’ and with ample day-lighting being provided from a roof skylight which runs over the entire length of the barn.

The Artists’ Residence seeks to apply the lessons learned from this precedent in the private live/work studio spaces. The private residences will provide both a public front, supporting openness through the common lounge and workspaces, as well as provide workspaces and entrances for artists looking for seclusion and focus. Providing a public face promotes the concept of community with common spaces and work areas. Common work spaces are an important part of the program where groups of individuals, willingly, can work in a larger space and on communal projects. In addition, providing a private side for artists who would rather work in seclusion helps to maintain their feeling of ownership over the space. Ground level studios will have their own entrances and privately accessible outdoor balconies.



Conceptual section showing live/work spaces.  
 From: World Architecture News.





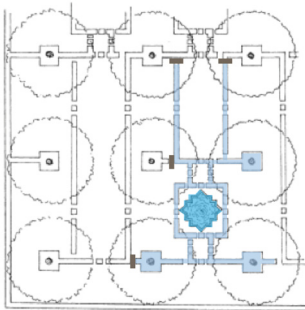
Water is ever present in the various palaces throughout the complex.  
From: Wikipedia (Alhambra)

## Alhambra and Moorish Gardens - Granada Spain

Nestled in the hills, the Alhambra overlooks the city of Granada, Spain and was built during the 14th century by Moorish rulers. The Alhambra was once a fortification that expanded to include a series of places, vivid gardens and hidden water features. It is divided into three major sections: the Alcazaba which was the original fortress, housing the soldiers, overlooking the city; the Nasrid Palaces which “handled the day to day life of the sultan and his subordinates,” (The Alhambra: a virtual walking tour) it is here that fountains play a prominent role in the architecture; and the Generalife, which were the gardens of the Alhambra, the source of water for the entire Alhambra and a place of retreat for the sultan.

In Islamic architecture, water plays a crucial role in both the physical and spiritual life of Muslims. The entire city was organized around a central irrigation system that starts at the River Darro. The Darro is the major source of fresh water, and was partially split to allow a single major channel to run throughout the Alhambra, starting at the Generalife in the East. It is this water source that connects and feeds the three major sections of the complex, irrigates the many gardens and fountains, as well as provides the homes and places with a fresh supply of water. Water is used as a means of climate control, either heating or cooling a space based on the season. Fountains and pools, during the winter, provide a reflective surface that allows the low light of the sun to pierce the interior of many of the buildings. In the summer time, water is used to cool and humidify the hot, dry air. Water is allowed to spill over the edges of the fountain, and fall to the hard surfaces where the sun begins to

evaporate, releasing water vapor in the air to add humidity in the air. Planes of water that are shaded allow the hot air to be cooled, affecting the microclimate of the space, making it a pleasant space for resting.

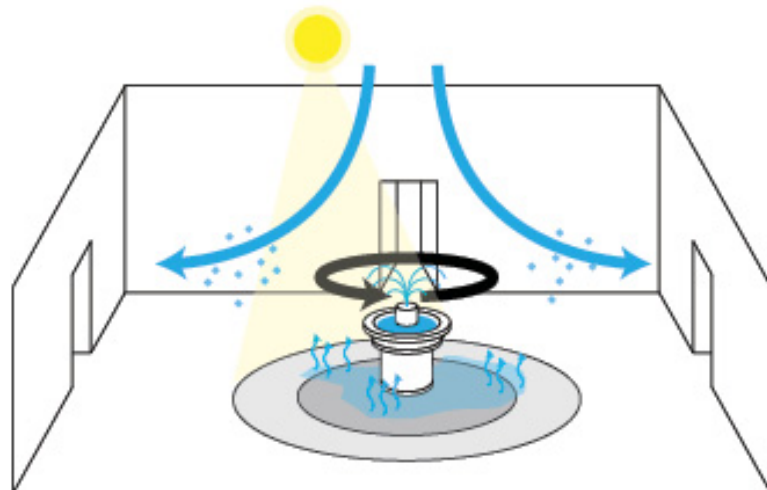
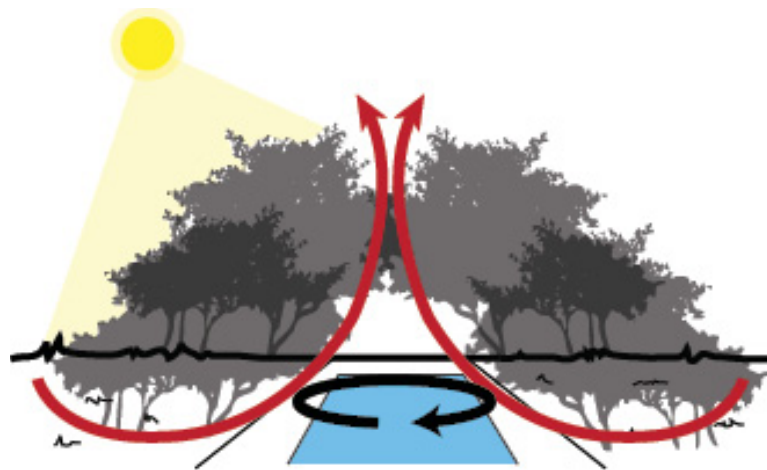


Irrigation channels laid out as circuits. A central water feature irrigates the orange trees in Seville, Spain.  
From: Sullivan 2002, 202

In other Moorish gardens, water is used in combination with certain plant types and irrigation methods to manage the microclimate. In the Patio do Los Naranjos inn Seville, Spain, large orange trees are laid out in a gridded pattern, in sunken basins connected to fountains by a stone network of irrigation channels (Sullivan 2002, 202). Citrus trees, especially orange trees, are commonly found in other Moorish gardens such as the Great Mosque in Cordoba, Spain. Water is displaced from the central fountains, and moves along stone circuits, allowing the bases of these orange trees to become flooded with water. The whole system is managed with a series of wooden blocks, that act as check valves, to ensure that each tree receives an adequate supply of water. The orange trees themselves actively cool the surrounding air through a natural process of transpiration. Transpiration in combination with the trees' natural smells helps keep the surrounding air cool and fresh.

The courtyard and green spaces, which surround the two storehouses, will apply the lessons of this precedent through their design in the layout and treatment of spaces. The major area will include a grove of orange trees that support the conceptual idea of an orchard. The use of citrus trees serves two very important roles. First, these groves of trees will be irrigated with the grey water produced by each building, reducing the demand to use collected rainwater. Second, citrus trees have the added benefit of creating both

shade and control microclimates creating cooled spaces through their natural processes. Additionally, the courtyard spaces will be treated as exhibition spaces, where the process of crafting and the displaying of art is public through the use of pavilions and large outdoor plinths. The courtyard spaces will be treated to attract both insects and birds, promoting the presence of life within the courtyard, through the use of specialized planting (butterfly bushes, etc.).



Diagramming water as a cooling mechanism

(Top) Shaded sources of water provide a natural cooling effect.

(Bottom) As water is allowed to evaporate on hard surfaces, the water vapor humidifies the dry air.



(Top) View of NSCAD Port Campus from public side, the building presents a new industrial look to the Seaport Area.

(Bottom) The interior private workspaces offers ample day light and plenty of working area.

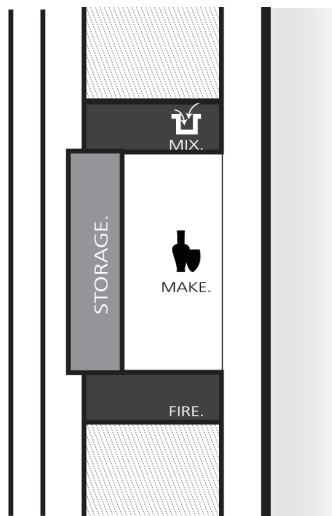
From: MLS Architects 2007

## NSCAD Port Campus - Halifax, Nova Scotia

In 2007, the Nova Scotia College of Art and Design (NSCAD) expanded its facilities and acquired a new property at the Halifax Seaport. The project was an adaptive reuse of an existing warehouse facility, used for the storage and processing of goods taken directly from the ships that berth parallel to the docks. The new NSCAD Port campus is a multilevel structure, designed by Mackay-Lyons Sweetapple Architects, and was constructed to support the college's foundation year programs (ceramics, sculpture, wood working, metal working etc.) The building attempts to tackle a design that has two main facades that must be addressed; a public street side and a private harbor view. The process of working in each of the above mentioned crafts order the design and layout of each level.

The NSCAD Port Campus is designed with the process of craft in mind. The overall layout of the building's major spaces is oriented to the private facade, overlooking the Halifax Harbor. The student workspaces are flanked by a storage bar and bookended by service and support spaces. This layout forces the attention to the private views offered. This layout allows the process of each craft to be enforced and its parts ordered logically. The idea of "Mix-Make-Fire" (Forest 2011) is laid out, specifically, in the ceramics level. This philosophy ensures that base materials, like clay and plaster, are kept separate from one another at each end. This ensures that materials are kept pure and reduces the chance of contamination, resulting in a better quality of work. The ceramics department of the Port Campus is kept on a single level, ensuring that the processes are continuous and clean up is kept to a minimum. A single continuous floor





PLAN

“Mix-Make-Fire” method employed in the ceramics department of the NSCAD Port Campus.

plan reduces the need to travel between floors, thereby reducing the chance that common corridors are dirtied. Clay is stored and mixed in one of the service blocks, worked by the student at his/her workspace, left to dry on a shelf, and then finally taken to the other service block where it is fired and finished.

Maintenance and upkeep present a major issue particularly in the ceramics department. The process of mixing, making and firing in ceramics produces a huge level of effluent that has to be dealt with efficiently, to ensure that the health of the occupants is maintained. Venting systems are spread out over the entire floor plan and range from general space ventilation systems, and specific task ventilation. The “dirtier” the job the greater the need for immediate ventilation. The ceramics department uses a combination of air filtration and sediment traps to separate the finer particles of clay, etc., before they are expelled from the building. This ensures that the area outside is not affected by pollutants being released in the air, especially because the Seaport area has become such an active public hub for day to day life.

The Art School will apply the lessons of this precedent through the design of its internal spaces. Concrete floor levels will be created in parallel with new steel structural systems, developing contemporary heights and spaces. Studios will be arranged around “Mix-Make-Fire” (Forest 2011) concept to generate a continuous floor level that is bookended by service and support spaces. Transition between these spaces is marked by the Pilot Projects. Their role is to provide vertical circulation between the multiple floors, and provide a publicly accessible route to the roof top

garden. The Pilot Project will house the various repetitious mechanical services (i.e. bathrooms, ductwork, etc.) within a single bay. Galleries and outdoor work yards will provide a public face for the buildings that displays the working and exhibition of art.



Panoramic of the interior qualities of the student studios, third floor NSCAD Ceramics department.

## CHAPTER 2: DESIGN

### Design Approach

The current conditions that exist on the site, place many design constraints and limitations on the architectural intervention. All buildings are “physiological entities.” (Littlefield 2007, 9) They are physical representations of moments past, that seamlessly becomes part of a person’s memories and experiences through simple everyday interaction. Heritage buildings are so important because they remind us of another time, and through conservation efforts we often permanently display these built forms under a “glass case,” keeping everything how it once was.

Buildings that become museums unto themselves give up a great opportunity to become useful again. Adaptive Reuse seeks to take what was once important and make it useful again, with inserted programs that often run counter to the buildings’ original intentions. To adapt a building requires that you first listen, and in doing so the “act of ‘listening’ makes the building an agent in its own reinvention.” (Littlefield 2007, 10) Through proper interventions that begins by understanding what qualities define the value of the proposed building, architects may pose solutions that promote a new use for the building while still preserving its original voice.

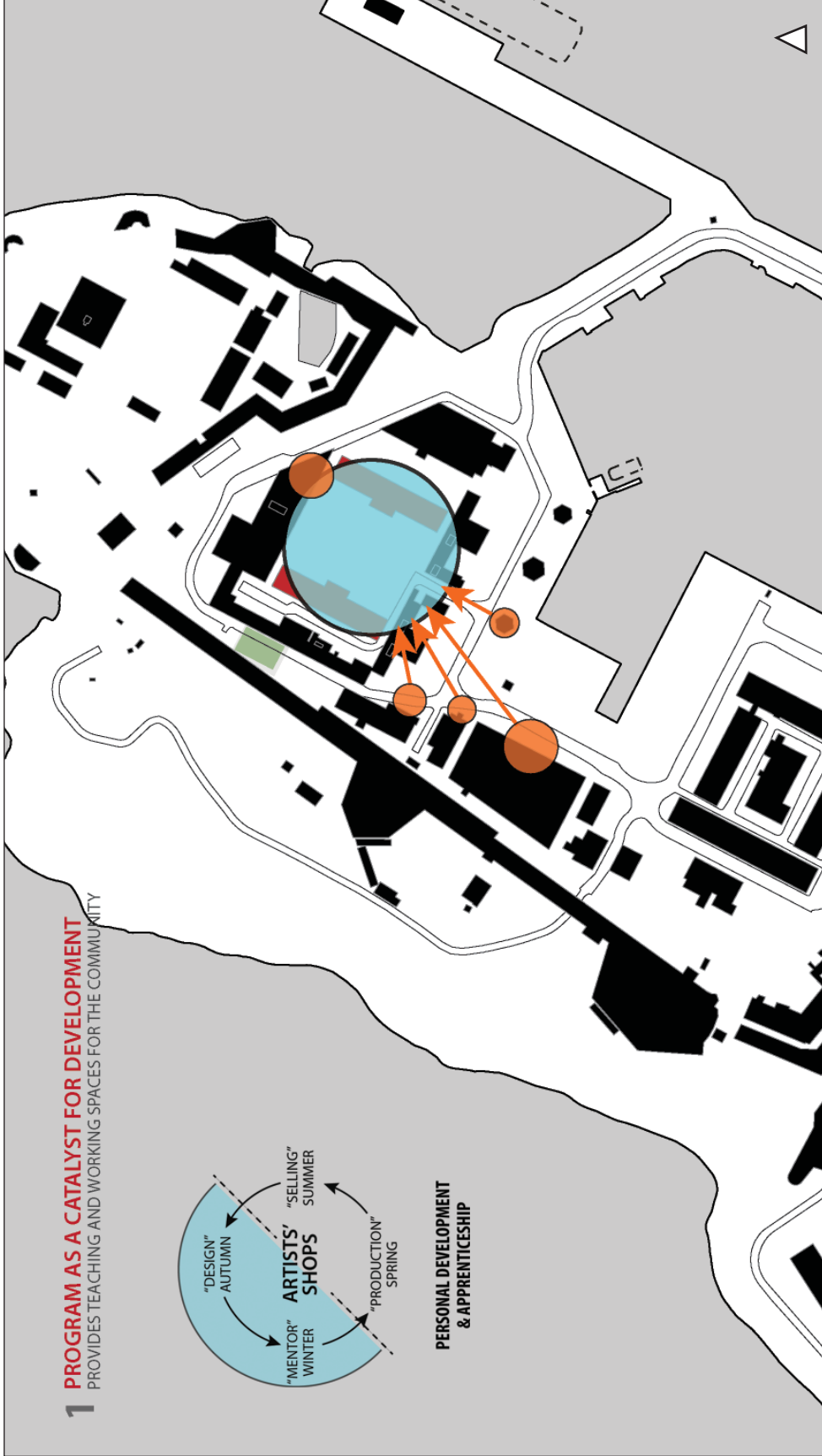
History provides a foundation on which Architecture builds upon, but to which it should not be limited. Adaptive interventions can both be minimal and radical at the same time, each method has its own right. Architecture can be found in both small installations that follow the lines, while others find tremendous value that break away from the grid. It is

the role of those responsible to shape these spaces far beyond the Architect-Client agreements and construct modern networks within the contemporary world (Chafe 2009, 27). This is the spirit of this thesis and the basis for the adaptive reuse of the Victualing Yard of the Royal Naval Dockyard of Bermuda.

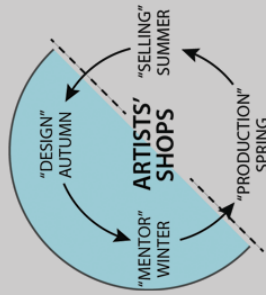


This image illustrates the thesis design's relationship (Red) with the existing storehouses (White), to create an Artists' Residence and Bermuda's first Fine Arts School. The thesis design will also improve the outdoor courtyard spaces, which will become linking elements between the two the two major programs together.



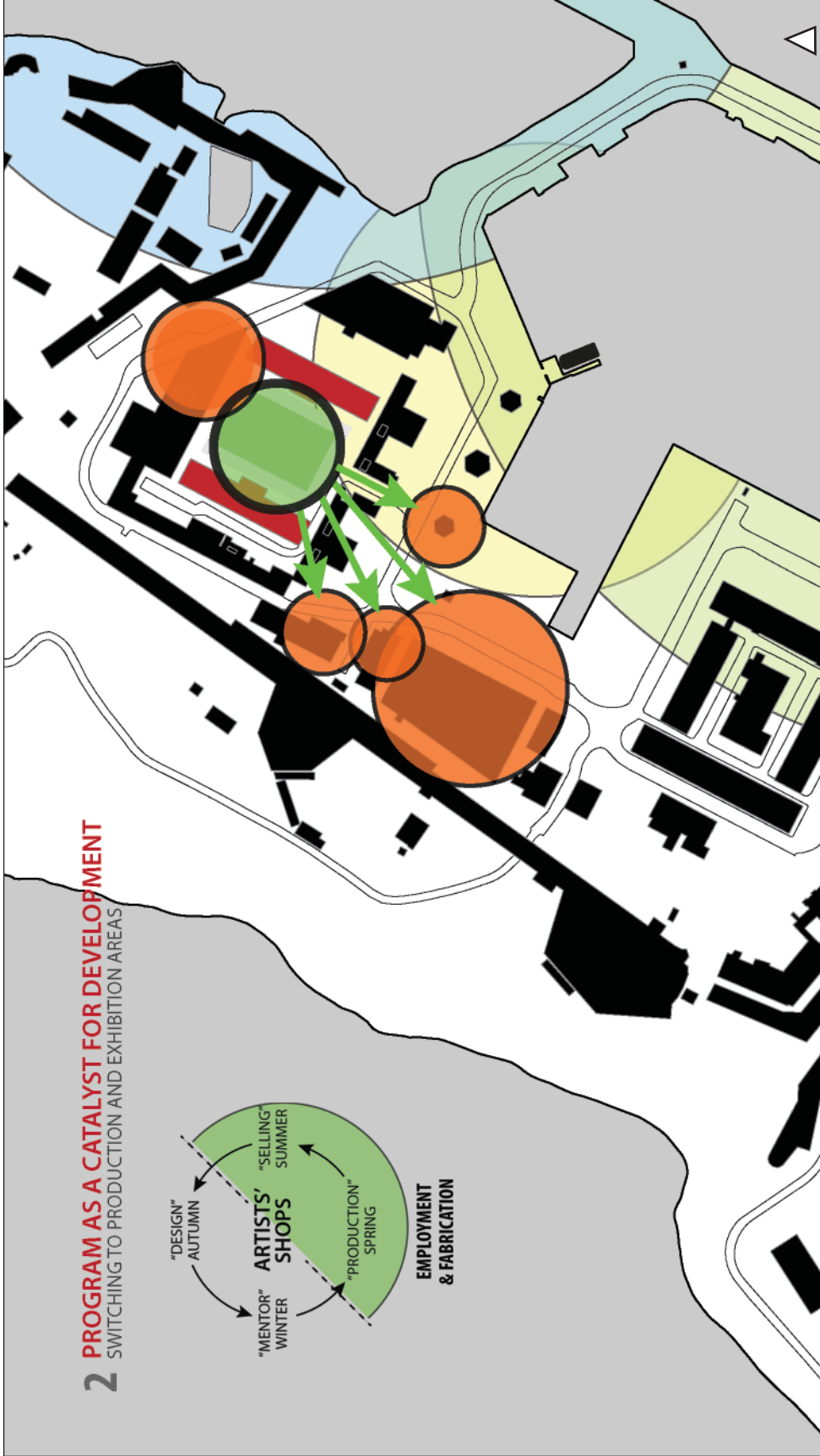


**1 PROGRAM AS A CATALYST FOR DEVELOPMENT**  
PROVIDES TEACHING AND WORKING SPACES FOR THE COMMUNITY

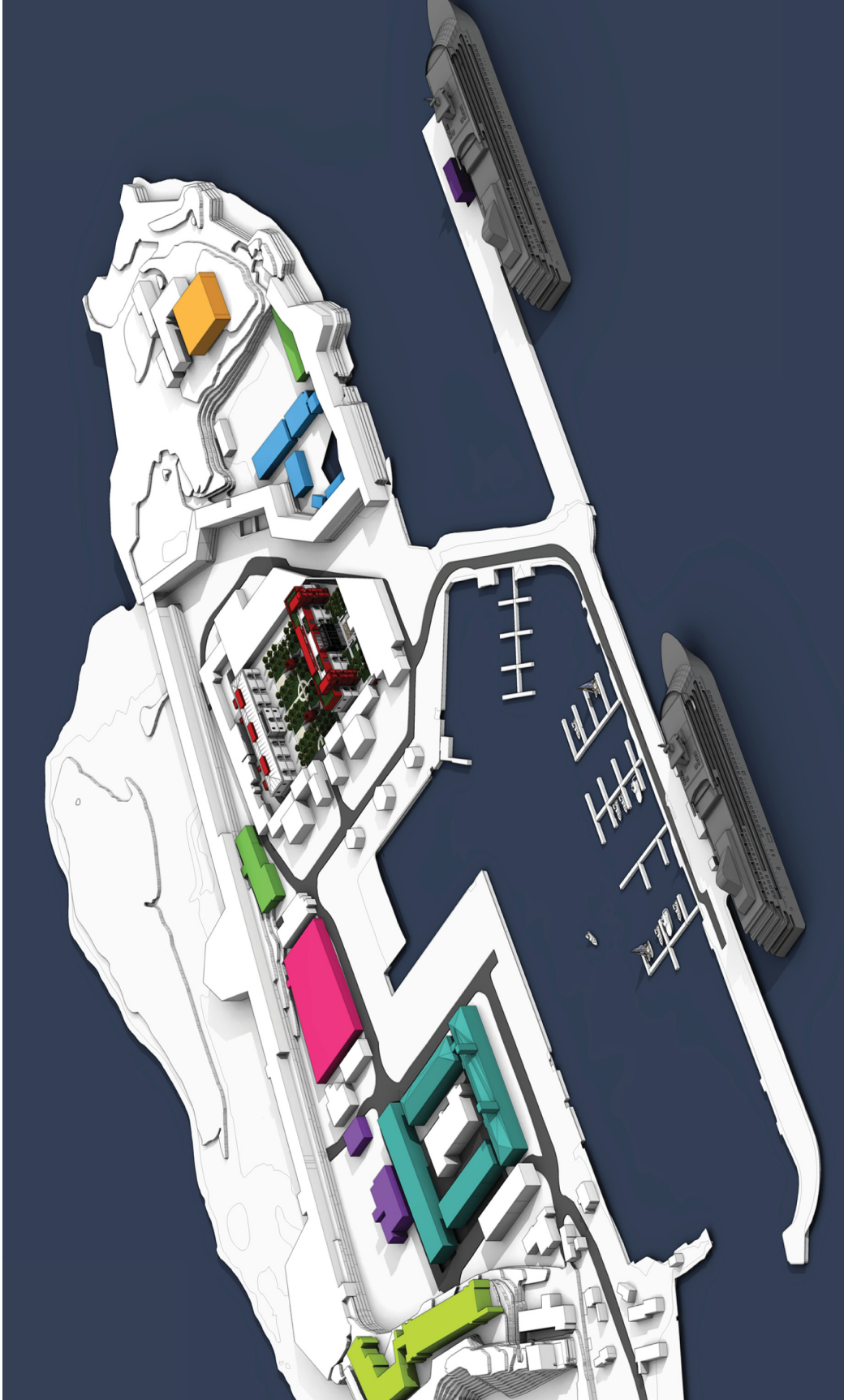


PERSONAL DEVELOPMENT  
& APPRENTICESHIP

New Cruise Ship and Program Relationship - Autumn & Winter  
During the quiet season, professionals will host classes and workshops, instructing students within a craft. International students and professionals will be encouraged to use the major spaces, providing a consistent level of activity through to the summer. When not displaying student work, the public gallery will feature work from visiting artists.

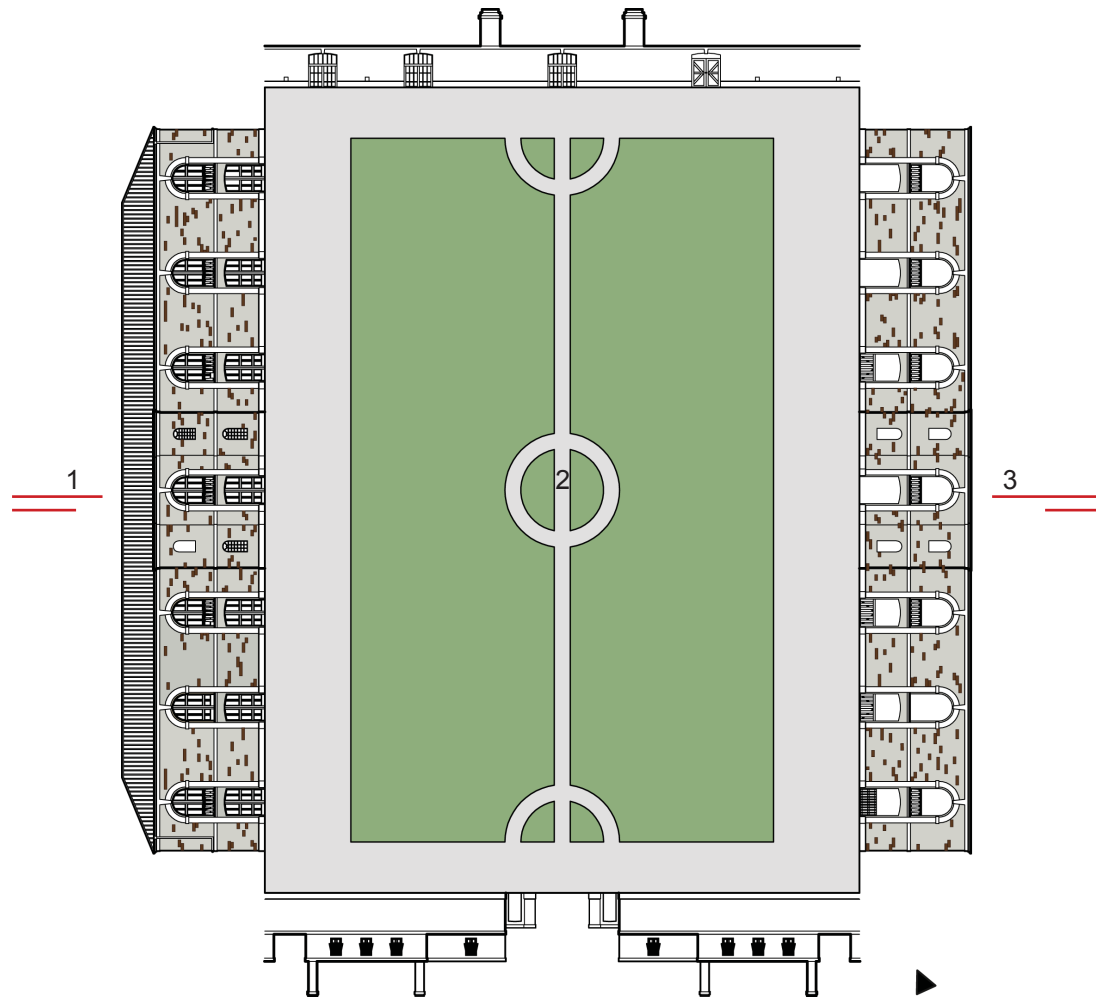


New Cruise Ship and Program Relationship - Spring & Summer  
During the active season, the program will switch to support the local artist community, by providing work and production spaces. These spaces assist in their day to day routines of the local professionals. Also, apprenticeship will allow willing students to gain experience through the work place, as an added level of personal development. This is also the time of year when international art exhibitions will be on display for public view, this can lead further into art festivals and other larger gatherings within the Dockyard.



The Dockyard  
This image depicts the thesis design in relation to the rest of the Dockyard area. From left to right: Casemates Barracks (Light Green); Clock Tower Mall (Teal); and Commissioner's House (Orange).

## Existing Conditions



Key:

1. Storehouse No. 2
2. Main Courtyard
3. Storehouse No. 1

Existing Courtyard plan and Building Elevation

The Victualing Yard is arranged around a single main access which provided a secure point of entry.



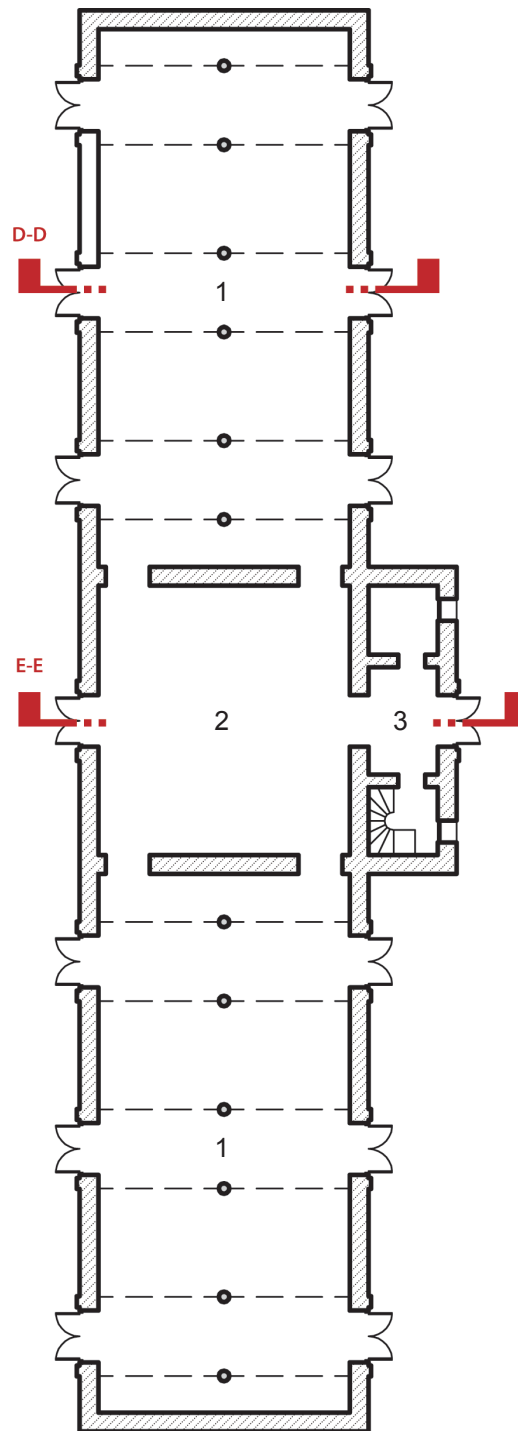


Key

- 1. Storehouse No. 2
- 2. Storehouse No. 2

Site Cross Section

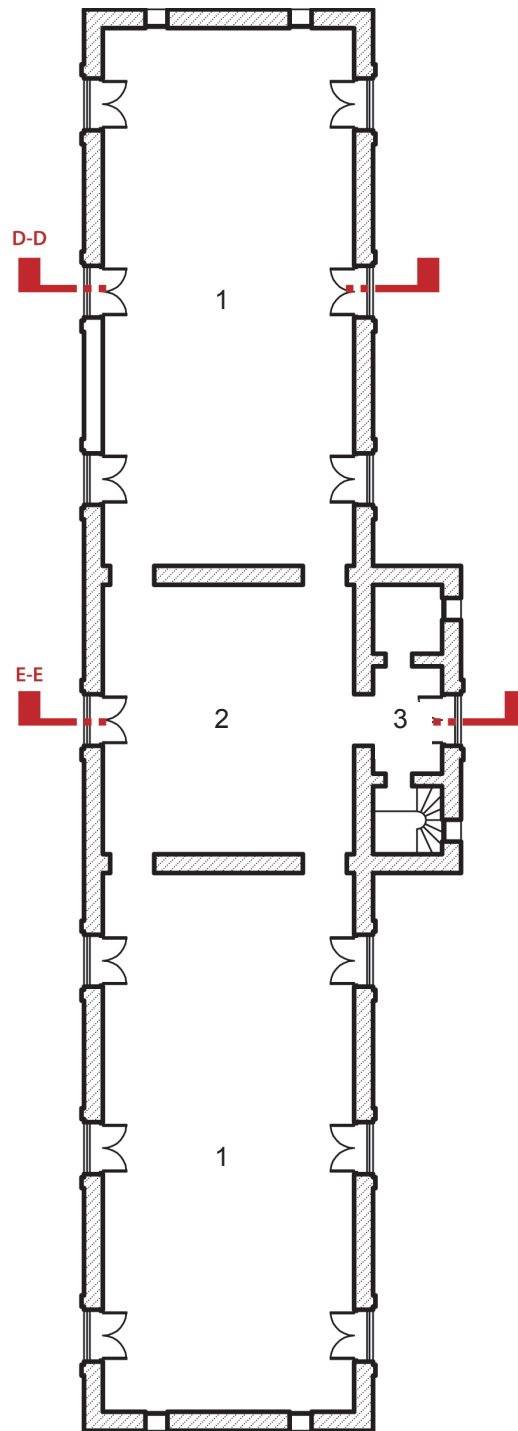
The Cross Section of the Victualing yard illustrates the underlying strata of geology as well as the relationship between the building and the ship.



- Key:
1. Storage Wing
  2. Central Core
  3. Vestibule

#### Typical Ground Floor Plan

The length of the building is divided along the centre by the steel column-trusses. A small vestibule provide both circulation and additional storage.

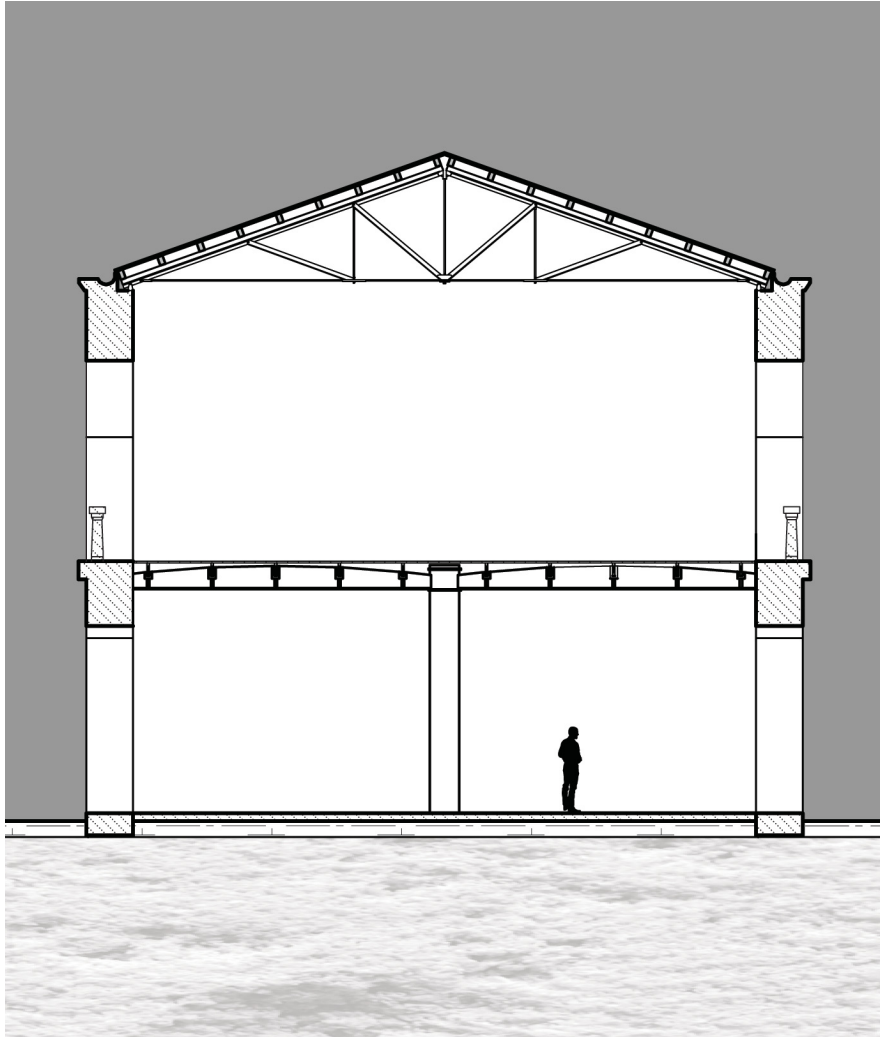


Key:

1. Storage Wing
2. Central Core
3. Vestibule

Typical Upper Floor Plan

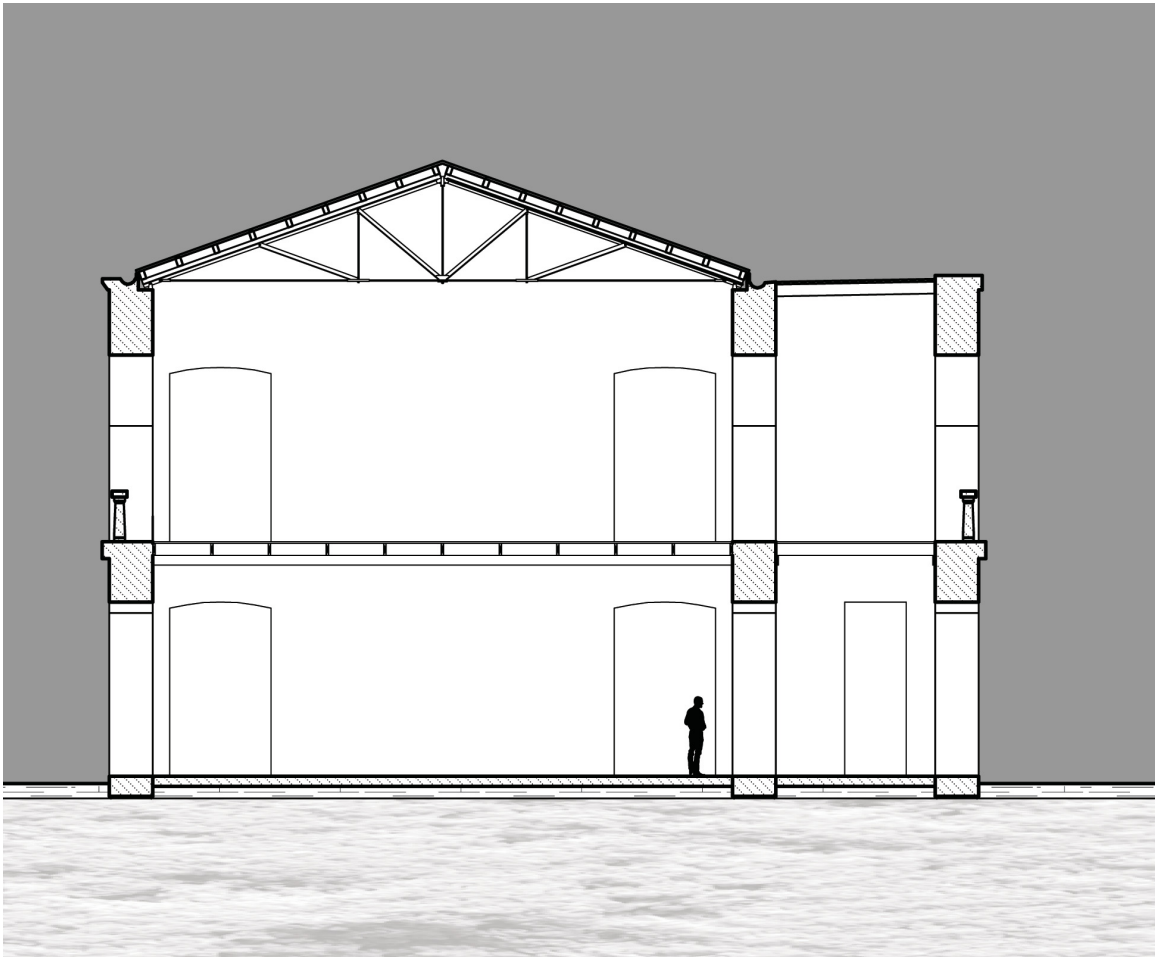
The upper floor plan is an open space place, divided into sections by the central volume.



#### Existing Section D-D

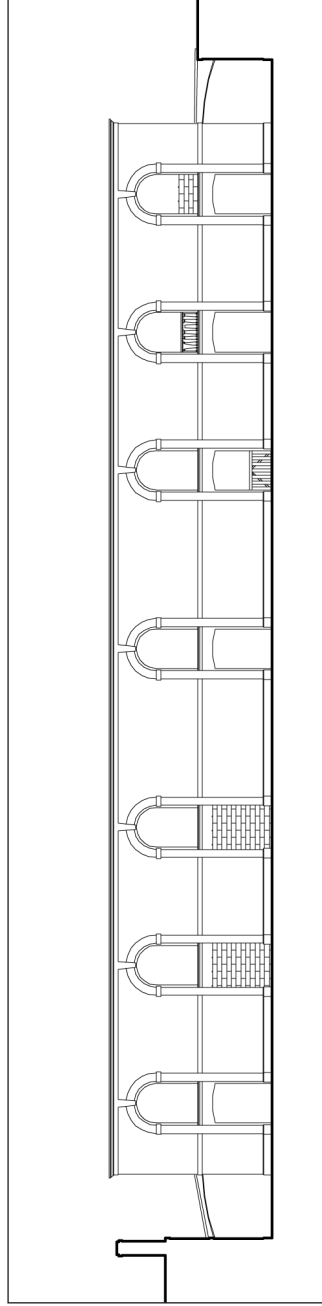
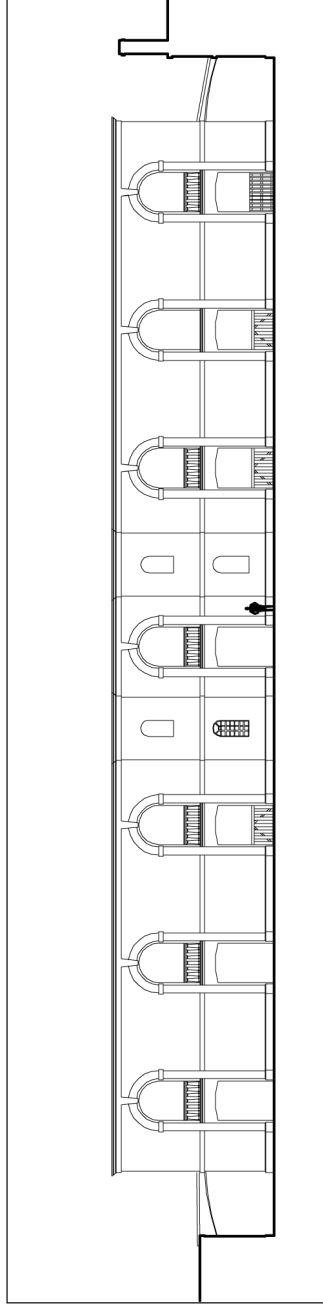
This illustrates the column-truss which provides the structural support in conjunction with the thick masonry walls. The eaves condition provides a stone gutter to collect rainwater from the roof, and a light steel truss system supports the roof.



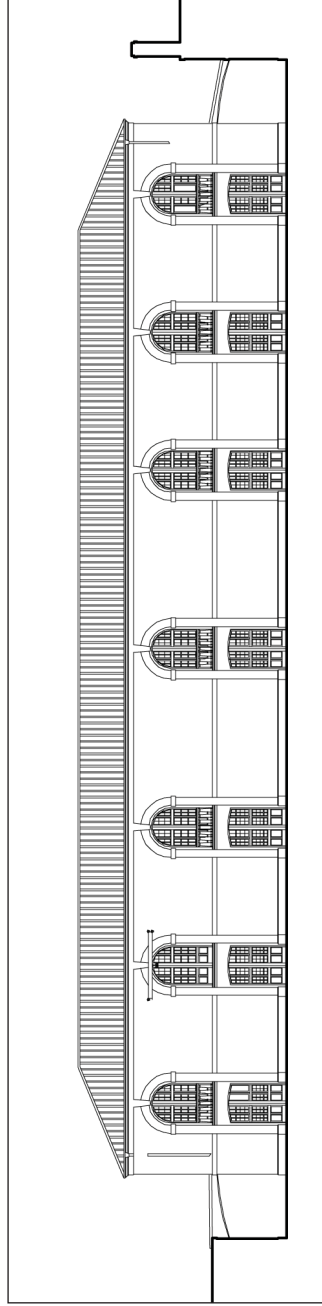
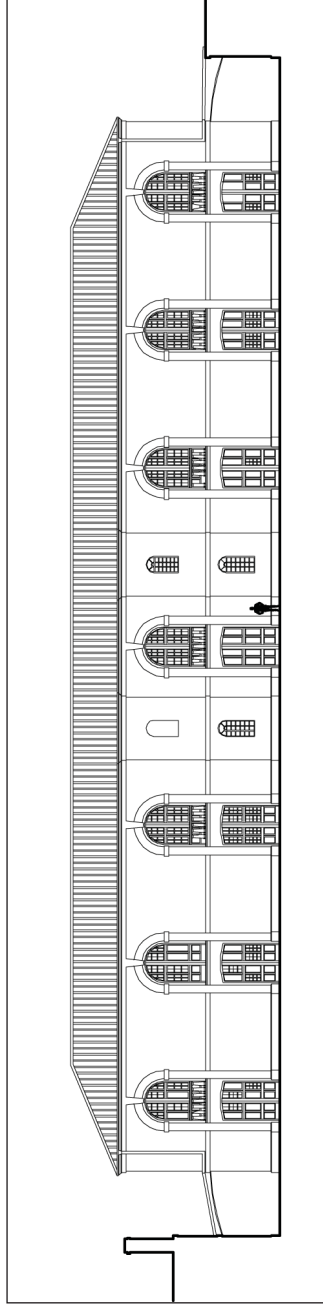


Existing Section E-E

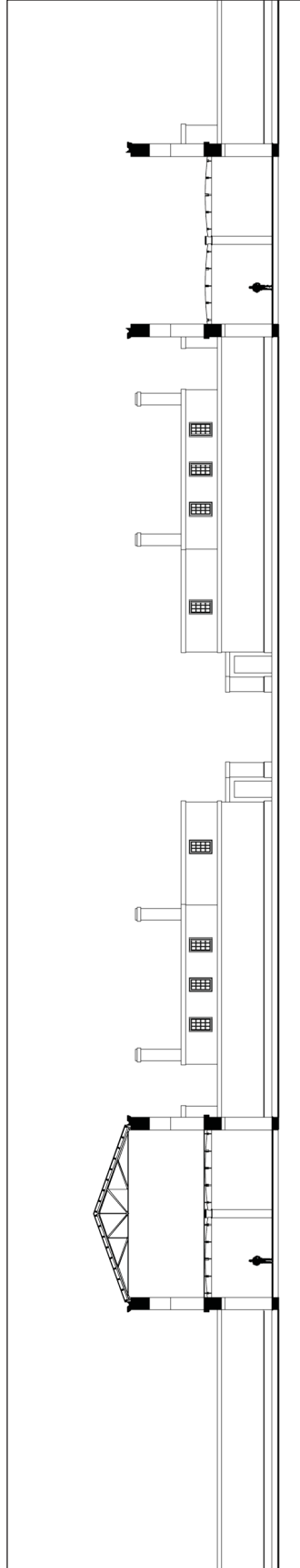
This illustrates the central core of the typical storehouse. Note the small vestibule to the right, which provides a vertical circulation connecting the two floors (not shown).



Existing Elevation - Victualing Storehouse No. 1  
(Top) Northern Elevation, facing the Main Courtyard. (Bottom) Southern Elevation.

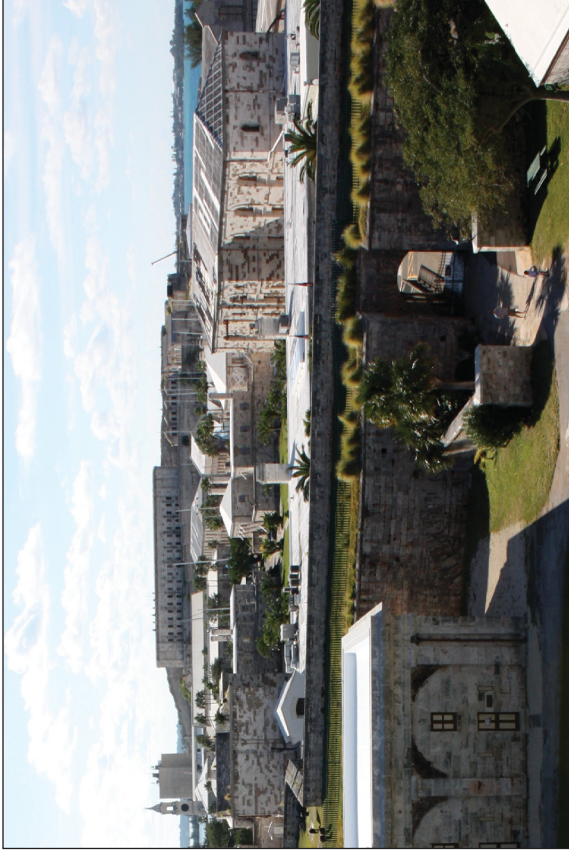


Existing Elevation - Victualing Storehouse No. 1  
(Top) Southern Elevation, facing the Main Courtyard. (Bottom) Northern Elevation.



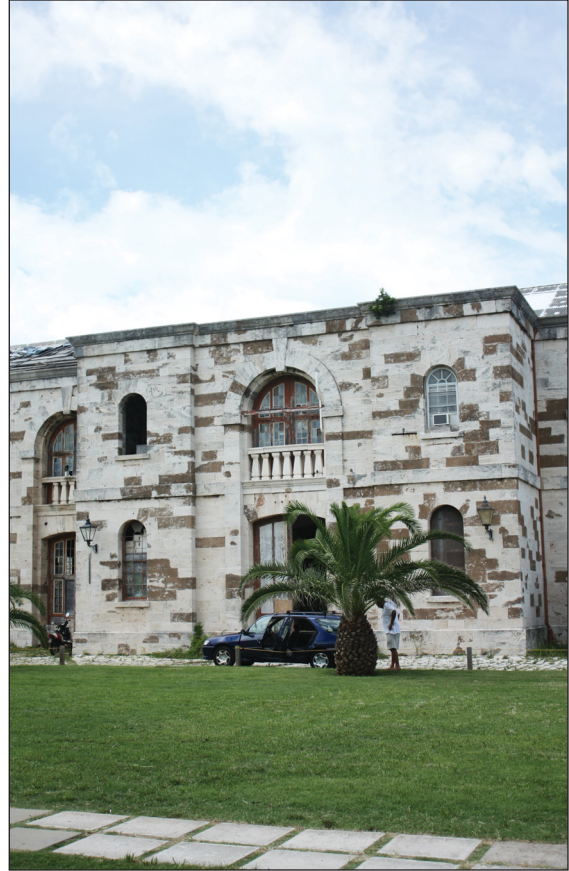
Existing Site Section  
(Left) Storehouse No. 2. (Right) Storehouse No. 1.





Existing Photos  
(Top Left) The formal entrance the Victualing Yard, the private residences become the sentinels. (Top Right) The Victualing Yard from the Keep. (Bottom) Panorama looking towards Storehouse No. 1 from No. 2.





Existing Photos

(Top Left) Storehouse No. 1 Main Entrance. (Top Right) Storehouse No. 2 Main Entrance. (Bottom Left) Standing at ground level in the Vestibule looking through the roof of No. 1. (Bottom Right) Rusted Handrail and Stone Steps of No. 1.





#### Existing Photos

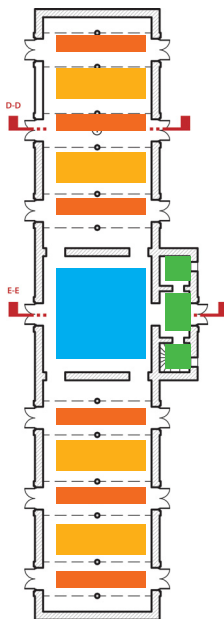
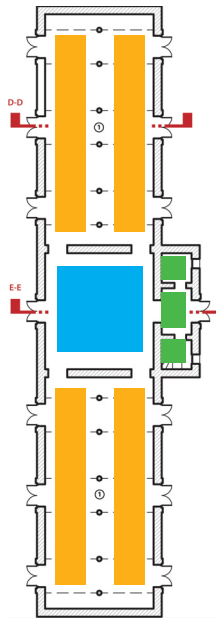
(Top Left) Silhouette of existing window against expose stone, interior. (Top Right) Mechanical winch. (Bottom Left) Roof truss connection details. (Bottom Right) Floor joists connection detail to column truss system. All images were taken within Storehouse No. 2.

## Spatial Analysis

The various studies and survey of the existing conditions clarify the organizational structure of each of the spaces and offers potential avenues of exploration that ultimately will lead to a unifying organizational design for the entire project.

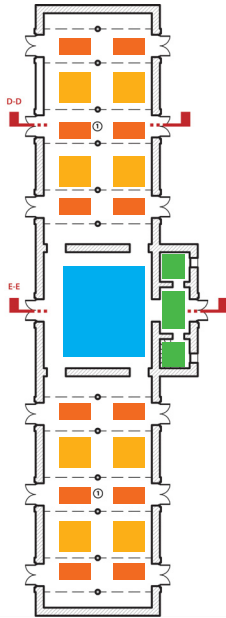
The typical storehouse is an elongated rectilinear volume whose openings and structural members begin to divide and organize the overall building into micro-spaces. The organization is quite clear that the larger volumes are bisected into wings by a central core. While the upper floor is an open floor plan, organized only by large double swing doors on both the East and West sides of the building, the ground level plan is organized by pairs of steel column-trusses. There are a total of two members for every opening running the full length of a single wing. The central core, other than providing vertical connection, suggests little more than being a buffer zone between the two storage wings. The high floor to ceiling spaces may suggest spaces stacked on top of one another, or smaller volumes within the greater volumes.

The courtyard is a fairly free space positioned to create a single main axis. This defining element therefore divides the space into halves; while the positioning of the main doors of the storehouses suggests a secondary axis. Presently this secondary axis may be purely a visual connection between the two buildings, as there is no a defined pathway to suggest otherwise. The perimeter of planting and a shift in surface treatment defines the courtyard as a singular connected space.



(Top) Long Axis.  
(Bottom) Short Axis.





Further analysis develops the idea of 'Individual Crates.'

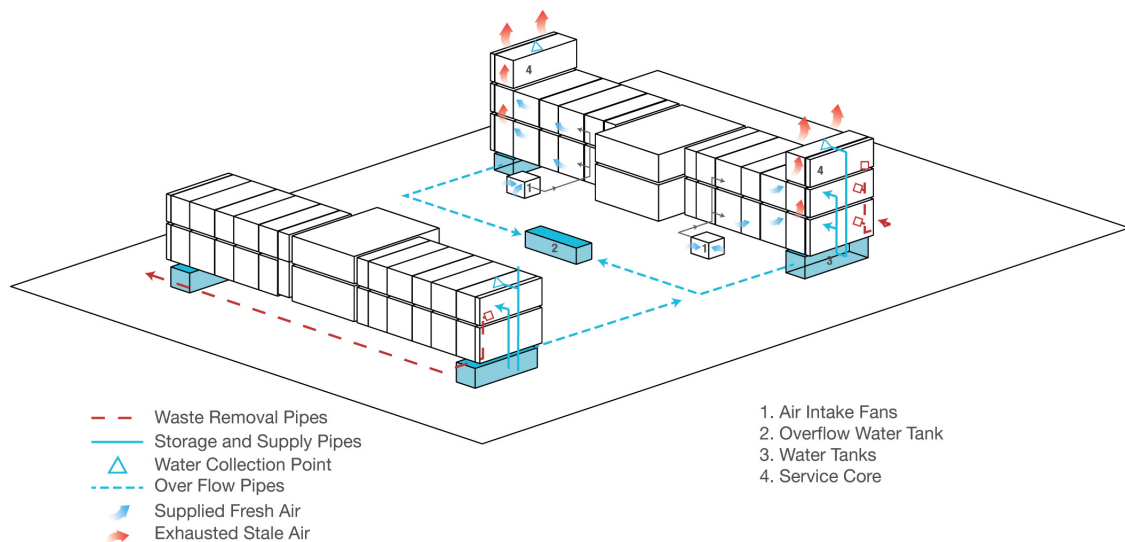
An exciting concept of organization is one that conceives the new individual spaces within the separate program as if they were “boxes” or “crates” that can be dropped in on site. In Storehouse No. 2 the existing floor to ceiling heights, which must be maintained, are very high, but provide opportunities for full height spaces in communal areas while allowing more intimate spaces to exist in “crates.” The existing columns should not be modified and therefore create limitations on the design. In contrast, Storehouse No. 1 can be conceived as a single crate that is allowed to slide up and down within the context of the existing walls, which allows this program to break the tight fabric of the existing conditions. Extensions of the columns into the landscape and tying this concept back to view spaces as crates will maintain a connection between the building and the landscape.

In the case of Storehouse No. 1 and the Courtyard, studies in the manipulation of the ground plane may have tremendous positive effects on the value of the project as a whole. Earlier studies conceived the courtyard as not only being a layering of bedrock but also as levels of the mechanical systems that would share between the buildings.

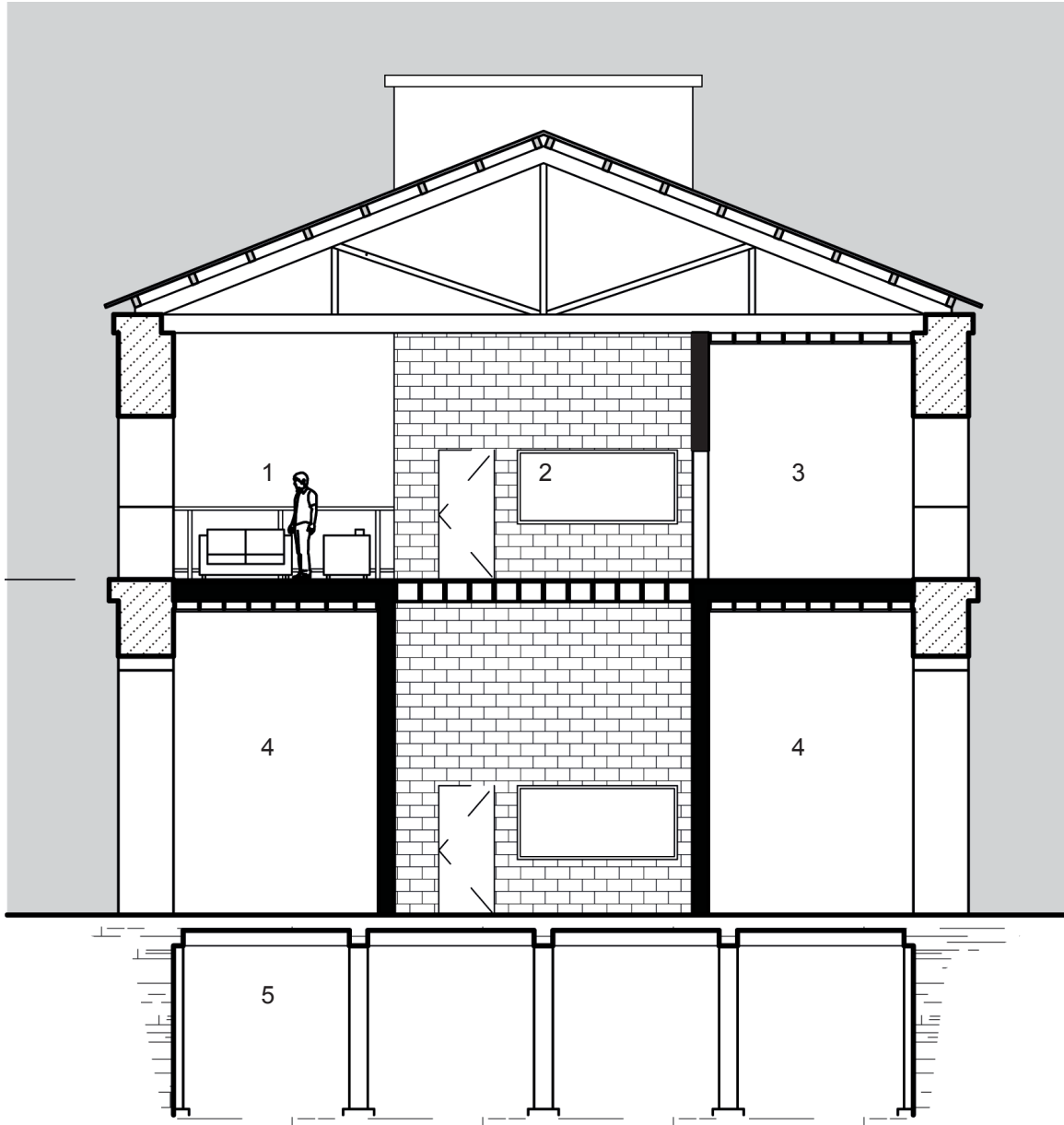
## Pilot Project

The guiding design idea of the Pilot Project was to develop a single bay of Storehouse No. 1 which is to be the Art School. This storehouse, from the beginning, was coined as the experimental design in comparison to the Artists' Residence. The Pilot Project is a mechanical system that can be conceptually dropped into a single bay, and house all the repetitive functions of the intended programs (i.e. washrooms, mechanical rooms, etc.) as well as major functions such as water collection and ventilation.

The success of the project depends on how one handled the initial challenges posed by the existing conditions, which brought to light issues of new and old and developing levels of construction. In later design iterations, the pilot project evolved and has become a public access point to the Art School's green roof and an outdoor balcony for the Artist Residence. The pilot project marks points within the design that puncture the existing stone wrapper of each building.

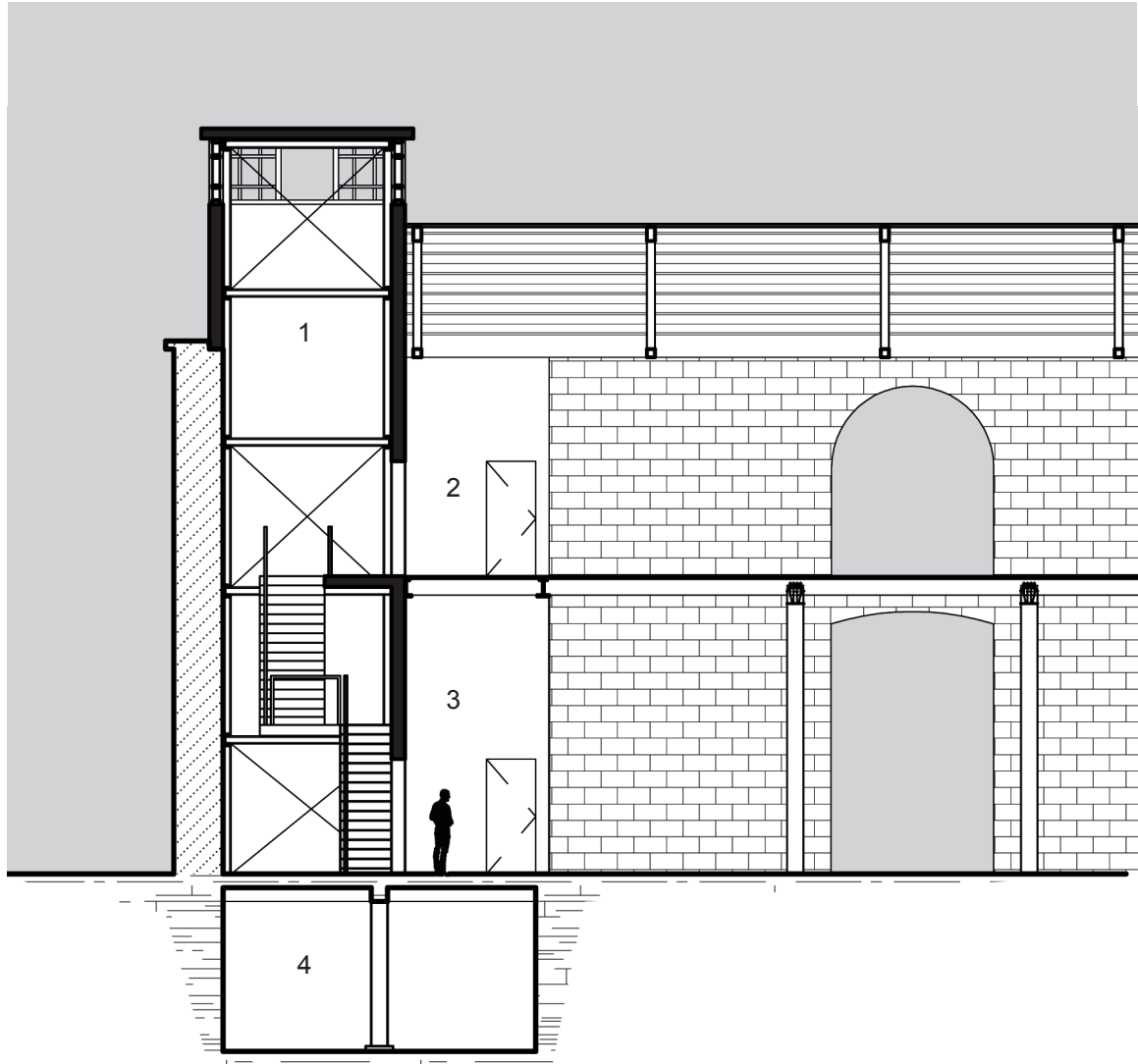


Earlier metabolism study for the new programs. Functions of ventilation and water storage issue were addressed. Storehouse No. 1 Seen on right hand side of image.



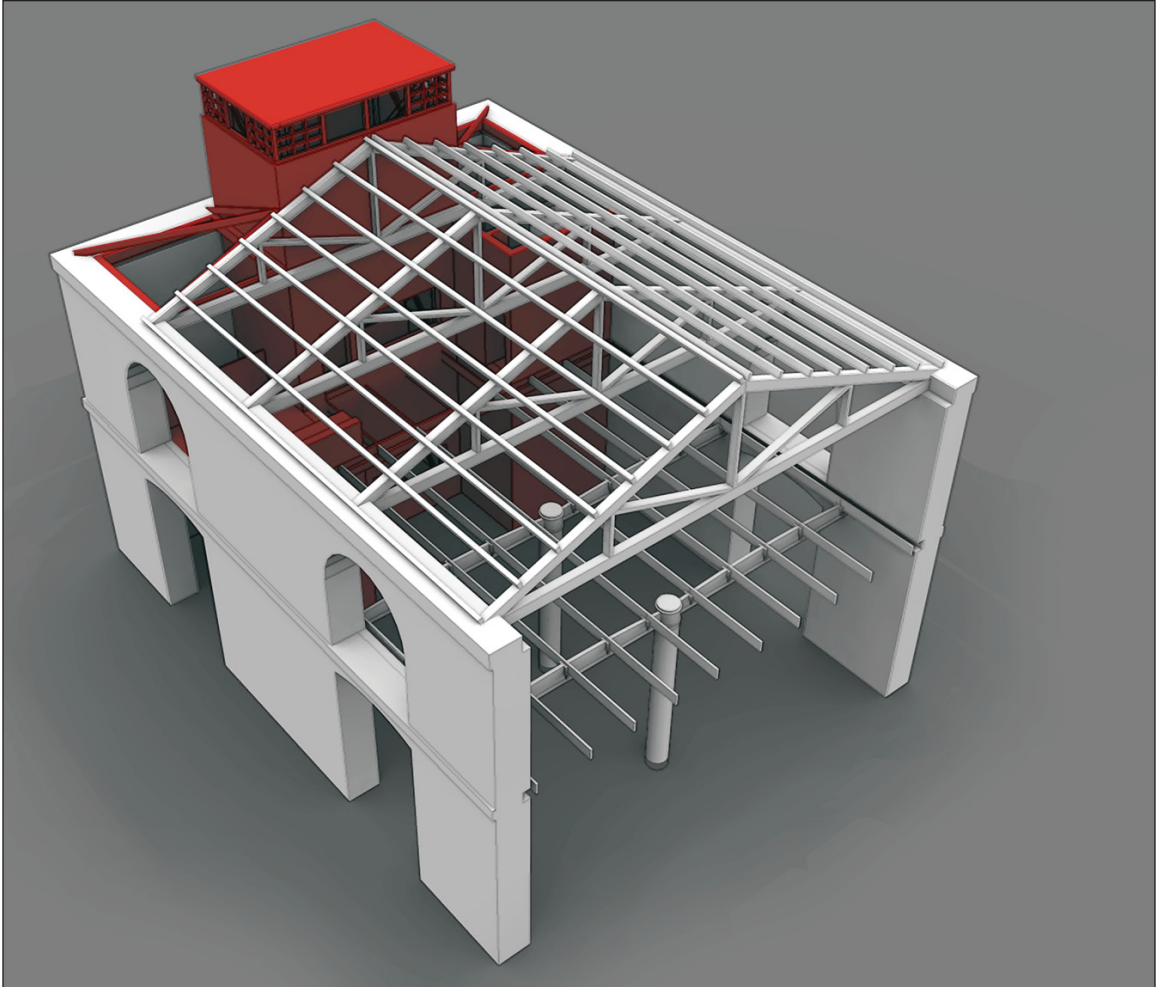
Cross Section

1. Kitchen Lounge
2. Stairwell and Stack Ventilation
3. Washrooms
4. Mechanical and Electrical Rooms
5. Water Tank

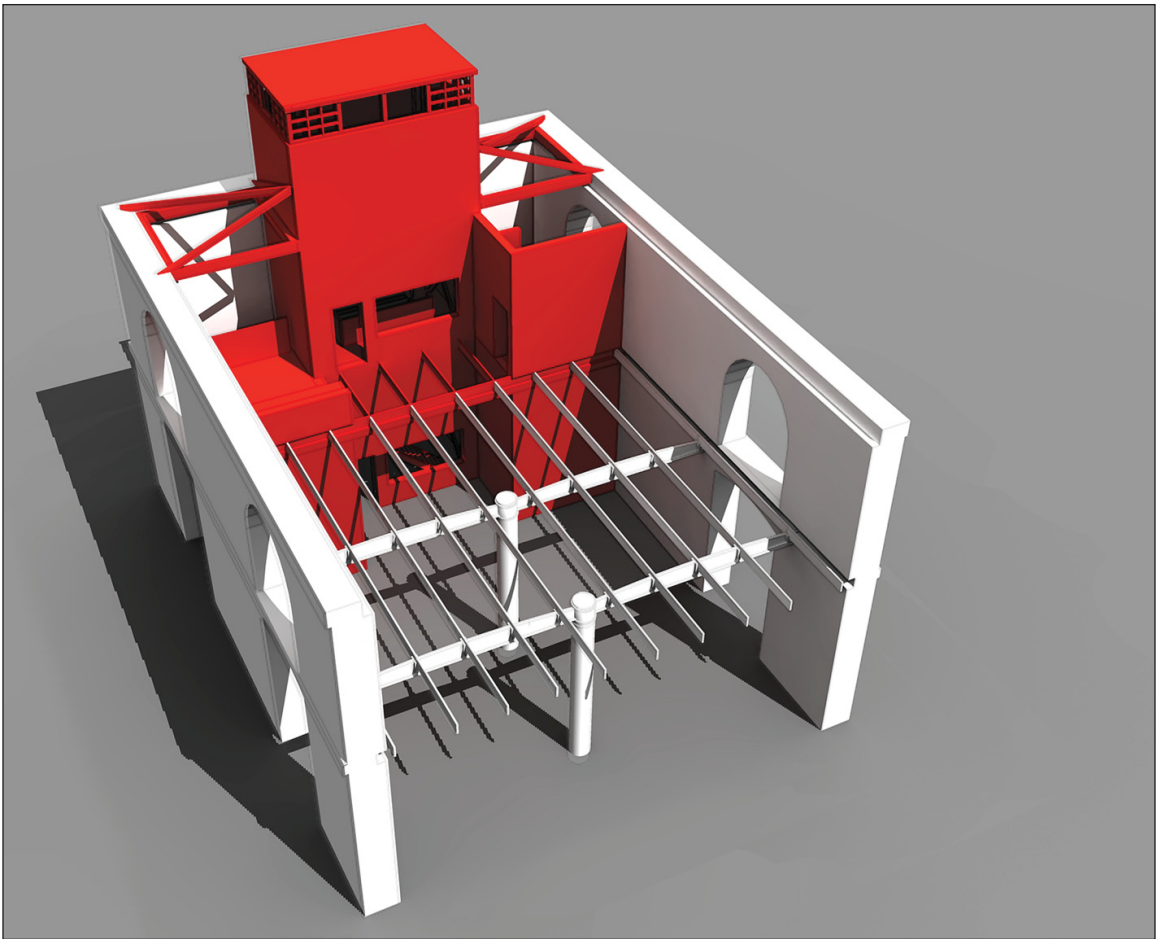


- Longitudinal Section
1. Stairwell and Stack Ventilation
  2. Washrooms
  3. Mechanical Room
  4. Water Tank

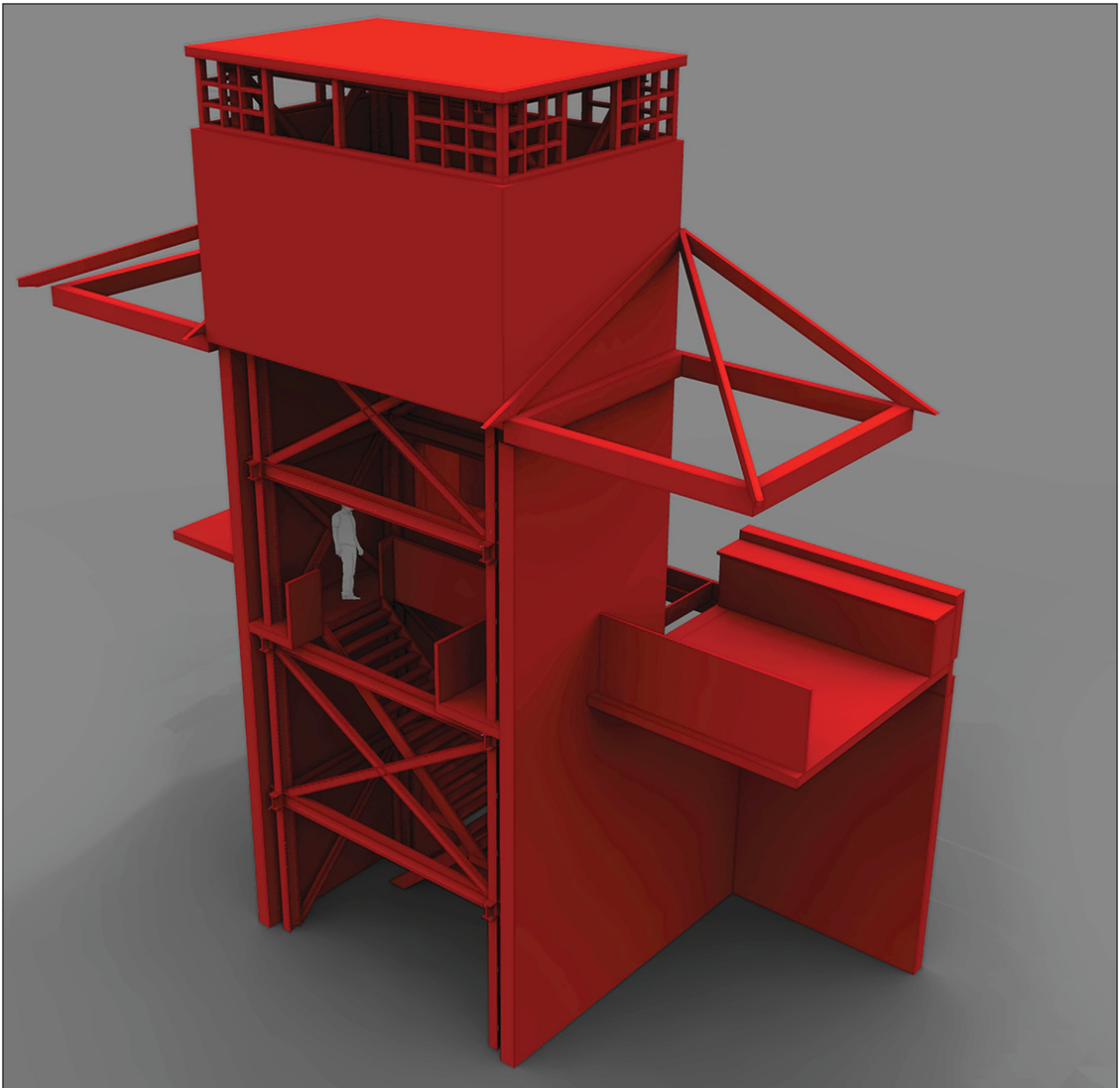




Pilot Project  
Conceptual "service bay" plugged into the typical storehouse building.

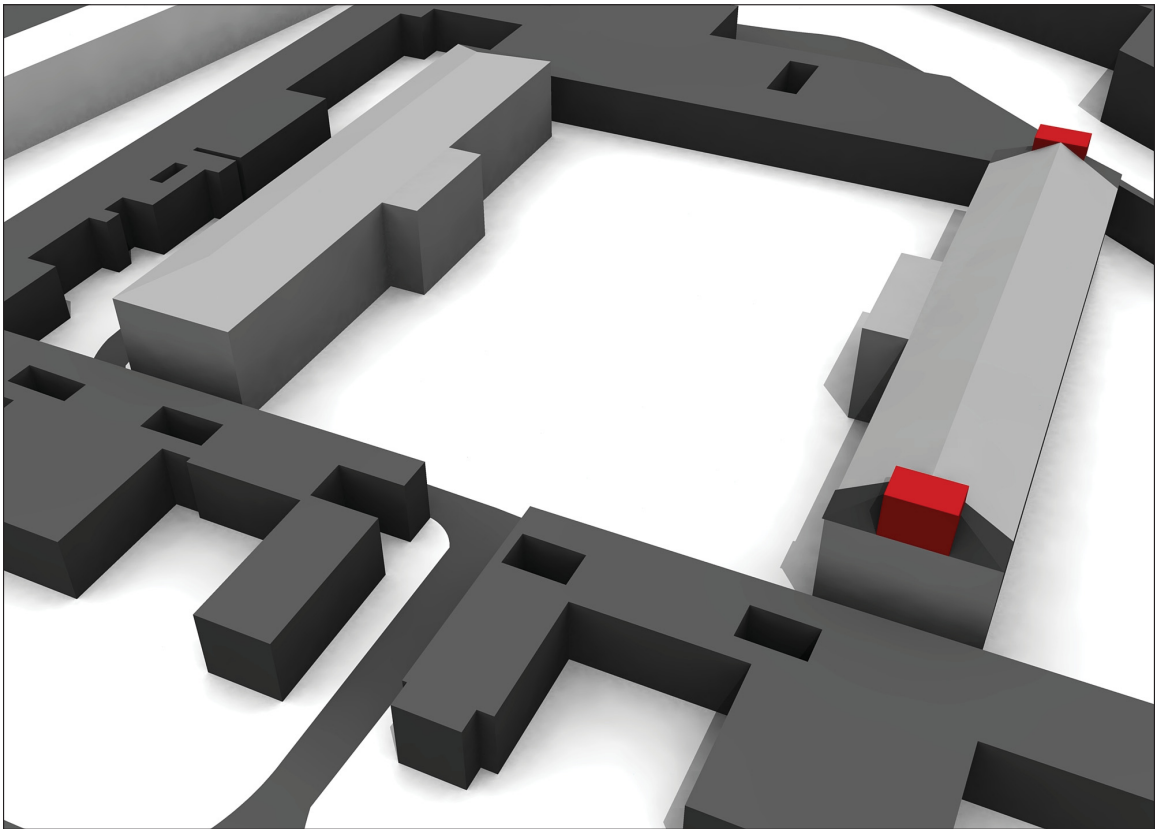


Pilot Project  
Conceptual "service bay" plugged into the typical storehouse building.



#### Pilot Project

The service bay provided a new vertical connection, doubling as well as ventilation mechanism.

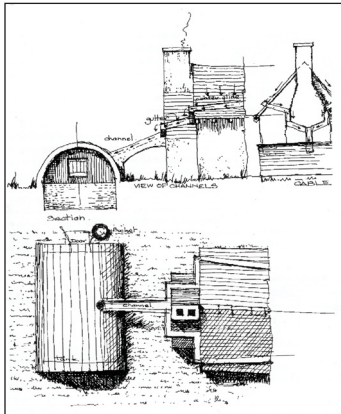


Pilot Project  
A Conceptual study model of service bays becoming chimneys.



## Metabolism

Similar to the underlying geology of the site, the design uses a layering of multiple systems that tackle the critical issues of the project: rain water harvesting; air cooling and ventilation.



Traditional above-ground cistern and water catchment system. Water is caught from the roof and directed by channels, called glides, to the water tank.

From: Bermuda National Trust "The Traditional Building Guide."

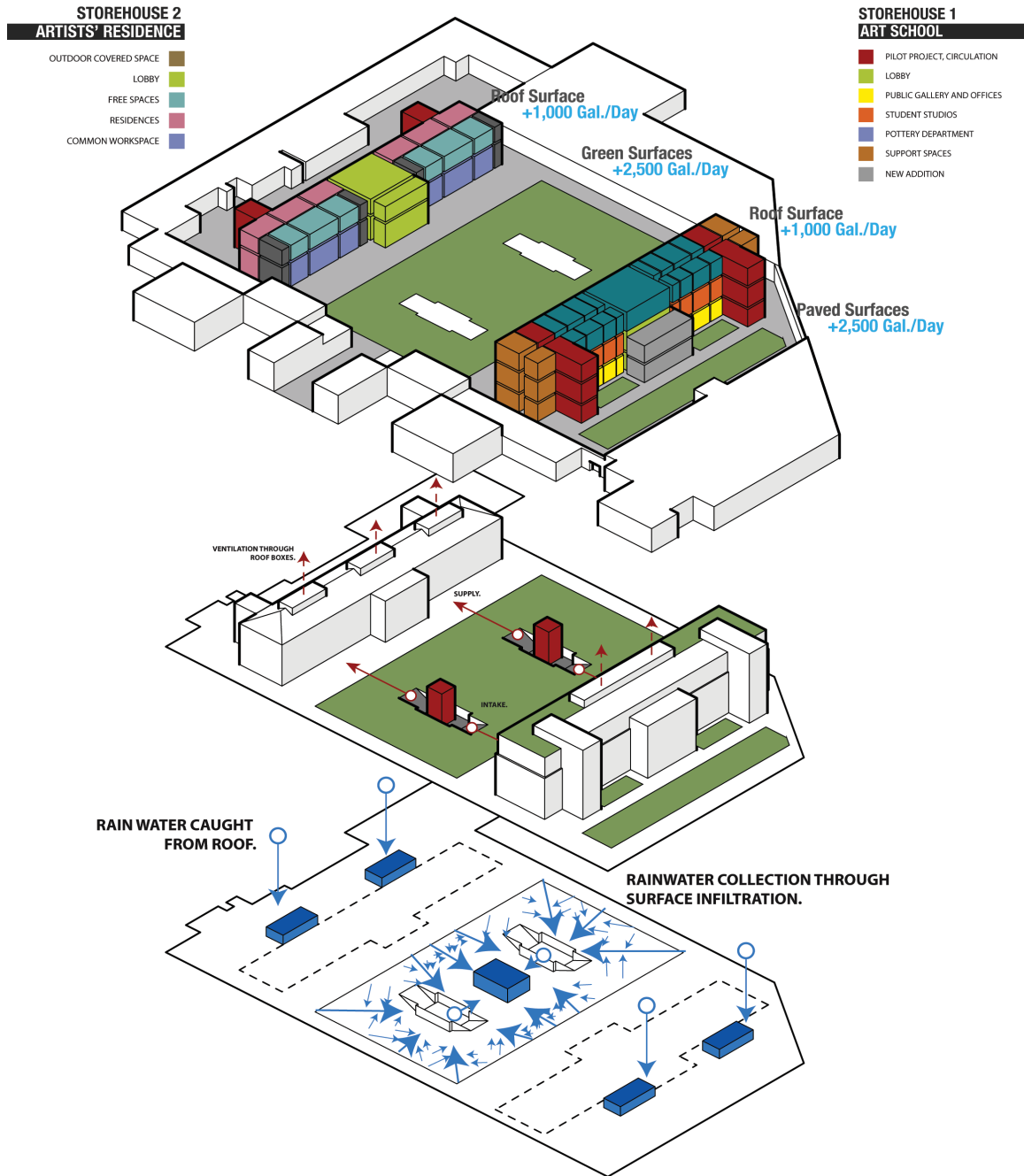
On an island, access to an adequate supply of fresh water is critical to survival. Traditionally, rain water that falls on roof surfaces is collected and stored in underground tanks, where it is naturally cooled and kept clean. This tradition continues to this very day in all buildings in Bermuda. This collected rainwater provides the drinking water for the two buildings. Additionally the "green" and "paved" surfaces act as another means of water catchment. Water deposited on the Main Courtyard enters an underground system of drainage channels which directs the collected surface water to a central tank in the middle of the courtyard. Large Display Pavilions sunken into the ground serve as an intermediate deposition area. Water that enters these pavilions infiltrates through permeable surfaces and is picked up again and diverted to the central tank. This collected surface water from the courtyard is used only as "grey water" for the mechanical systems of each building.

The main courtyard also features a large planting of trees, particularly citrus trees. Through transpiration, the trees passively cool the spaces below the drip line, creating a pleasant micro climate. Along with this feature, citrus trees offer a means of handling the grey water that is produced from the courtyard and the buildings. This grove of trees is laid out in a gridded pattern, each within in its own stone planter, connected in a circuit back to a fountain which provides water for irrigation. The majority of the water used for

irrigation will come from grey water, and conserve potable water for times of drought.

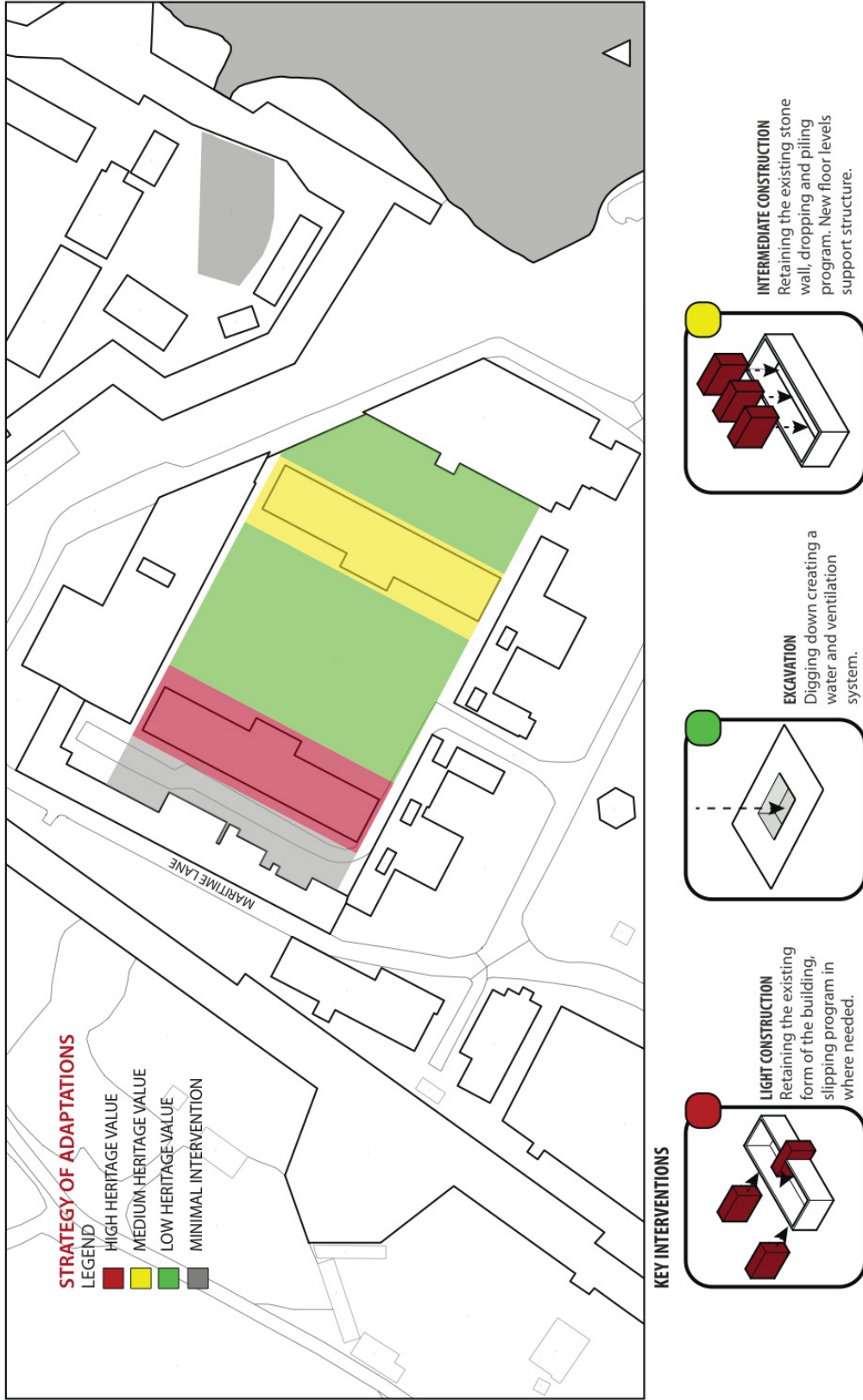
The second critical issue is air cooling. Fresh air is supplied with the use of Earth Tubes. Air is first drawn from the outside through a system of pipes buried under the surface, up to ten feet below grade. Air is drawn at the Large Display Pavilions, through the stair system. As air moves through these pipes, the subsurface temperature difference extracts the heat from the air, thus precooling the air before it enters the building. During the summer months, cooling loads on many buildings throughout the Island are extremely high. Using Earth Tubes provides a passive means of extracting heat out of the air potentially drastically reducing the energy needed to cool each building.

Each building implements a passive means of ventilation. Within the Art School program, the new floor plates are pulled away from the existing stone walls. This allows the entire building to be naturally ventilated by the stack effect. Air passes up the sides between the old and the new and then collects in the upper roof area. The Artists' Residence uses the central core and openings in the second floor level to allow air to naturally rise. From there, mechanical louvers allow the predominant South Westerly breeze to pass over and draw the air out naturally through the new roof boxes.



**Metabolism of the Site**

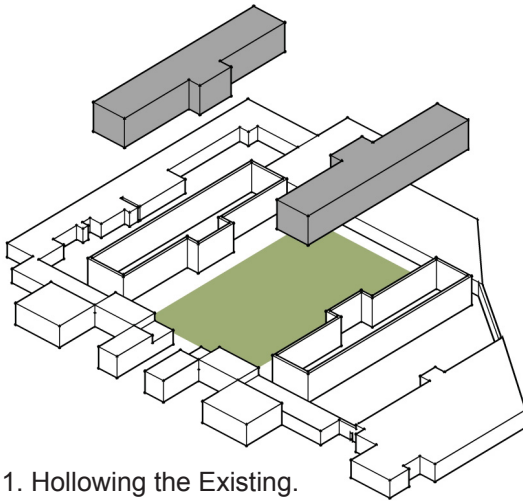
This diagram illustrates how the Main Courtyard will be adapted to precool incoming air and collect and store rainwater.



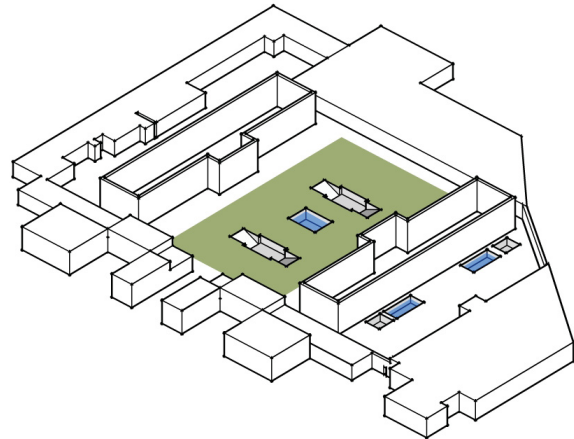
Adaptation Strategy  
 This diagram illustrates the key design moves in reference to the existing historic value of the site.



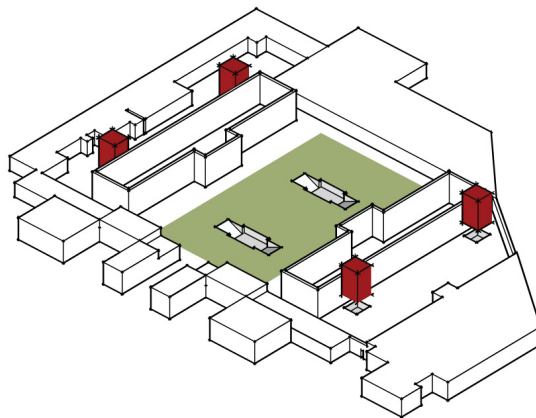
## Key Drawing



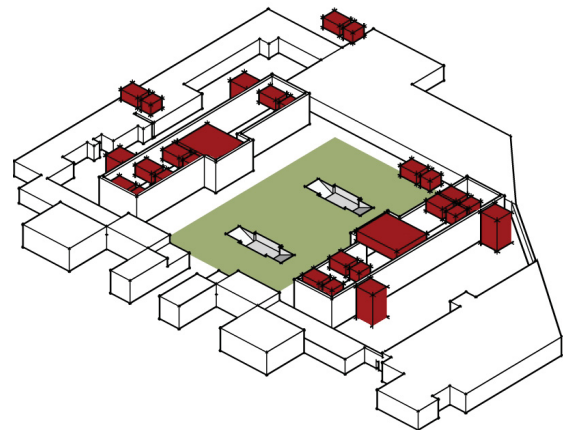
1. Hollowing the Existing.



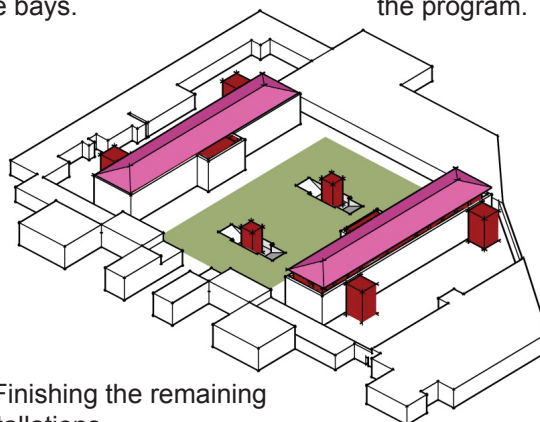
2. Revealing the Strata, Excavating the Landscape.



3. Dropping the Pilot Projects, balconies and service bays.



4. Dropping the crates, installing the program.

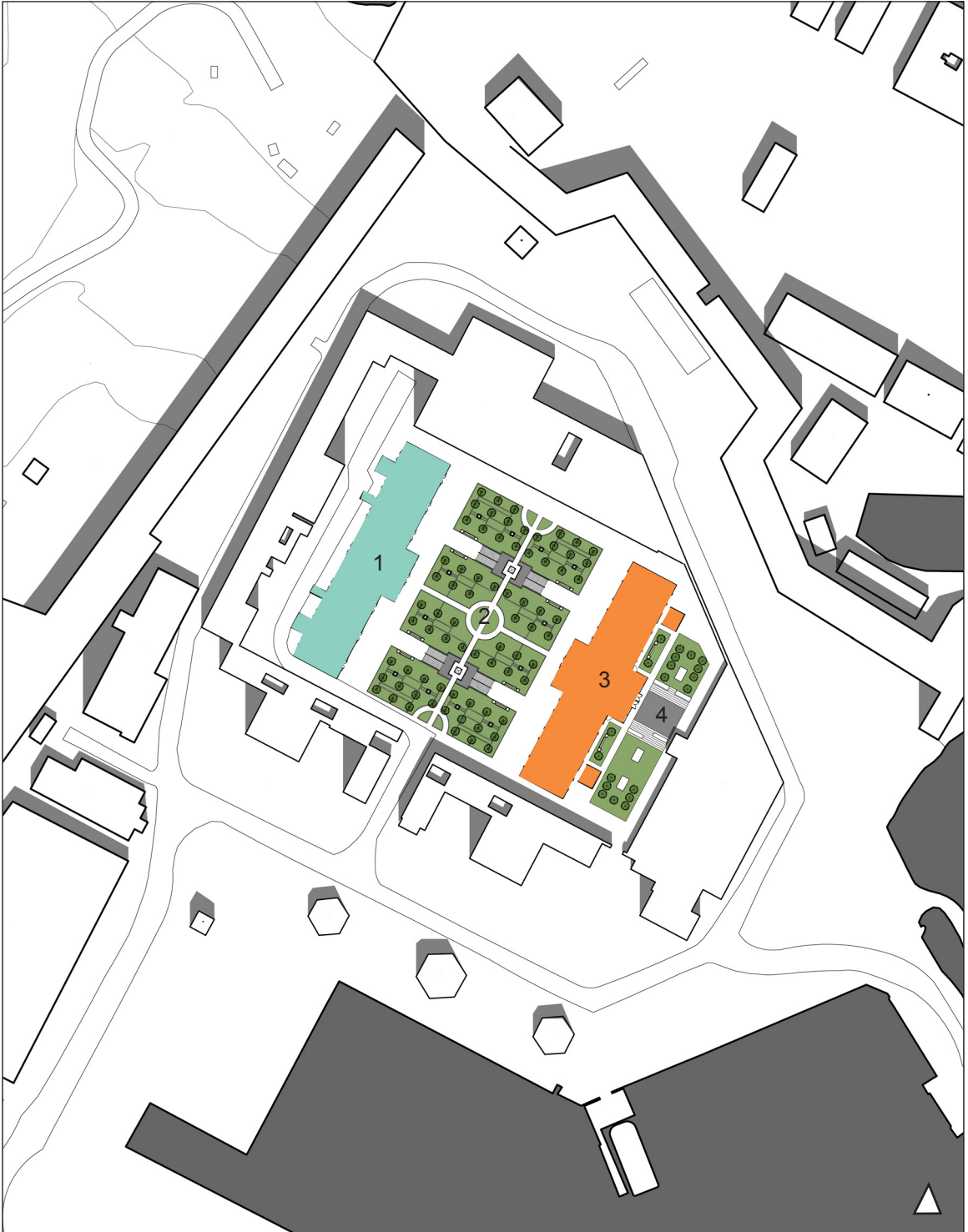


5. Finishing the remaining installations.

### Method of Assembly

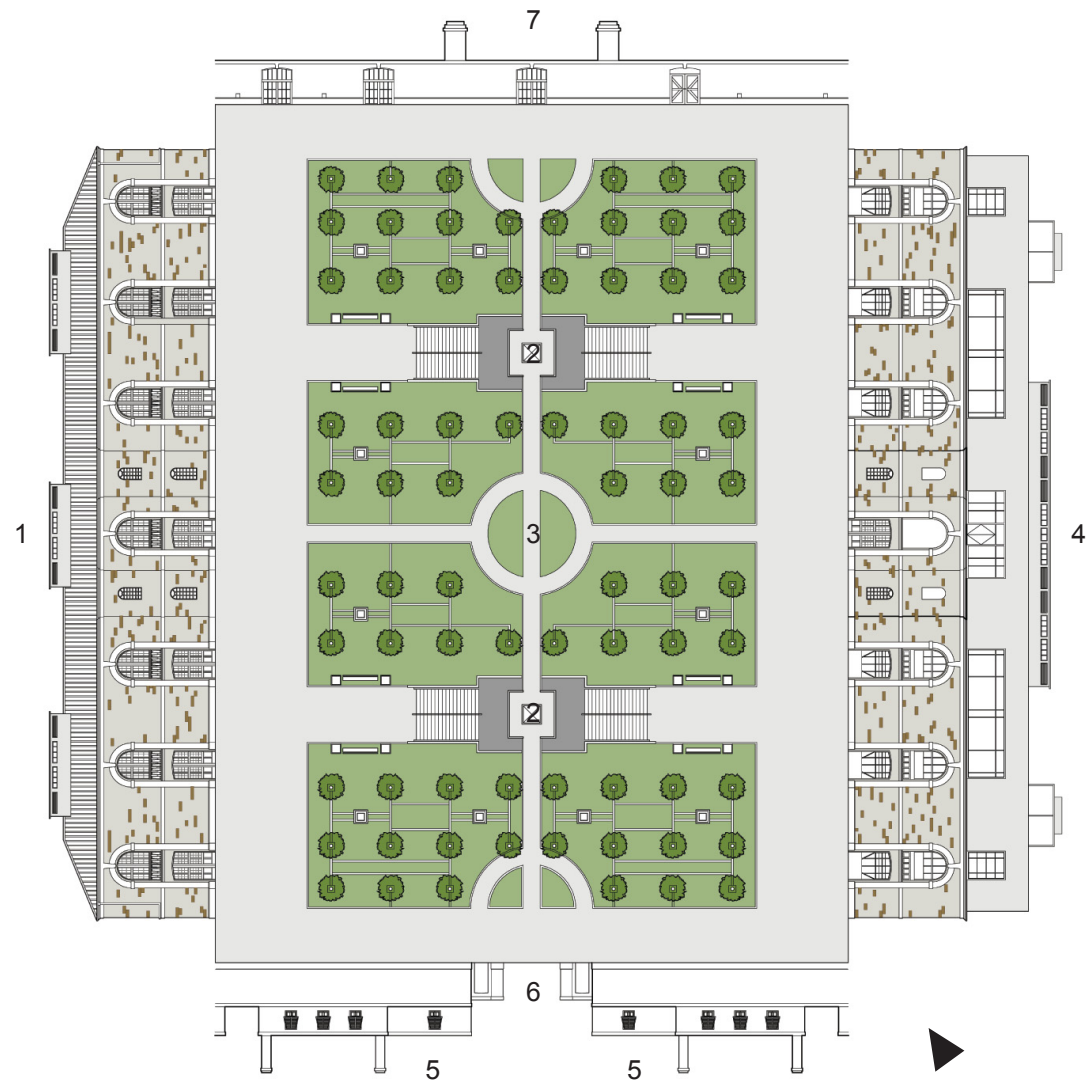
This diagram illustrates the conceptual steps of construction and identifies the major design moves within each space.

## Program



### Site Plan

1. Artists' Residence
2. Main Courtyard
3. Art School
4. Large Work Yard

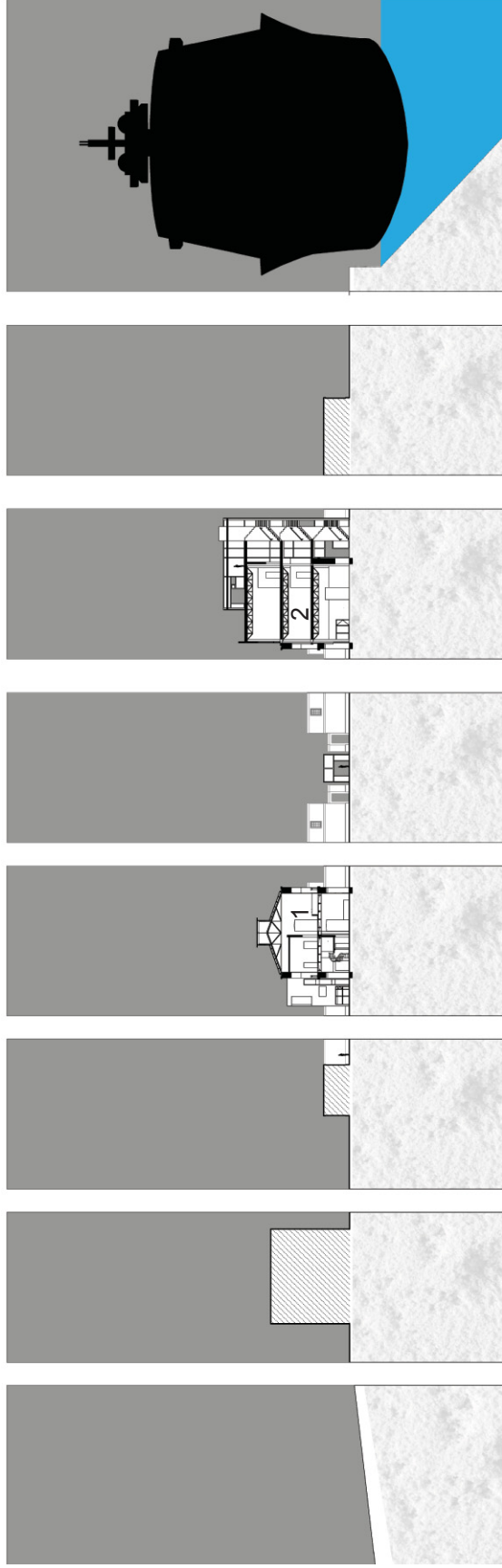


Key:

- |                       |                       |
|-----------------------|-----------------------|
| 1. Artists' Residence | 5. Private Residences |
| 2. Display Pavilions  | 6. Main Entrance      |
| 3. Main Courtyard     | 7. Cooperage Building |
| 4. Art School         |                       |

Proposed Courtyard Plan and Building Elevation

The Artists Residence will maintain the visual qualities of the existing building, with the addition of three ventilation roof boxes. The Art School will create a new level of studio space, with contemporary windows and doors. The major axis of the main courtyard is preserve, accented by new site work.

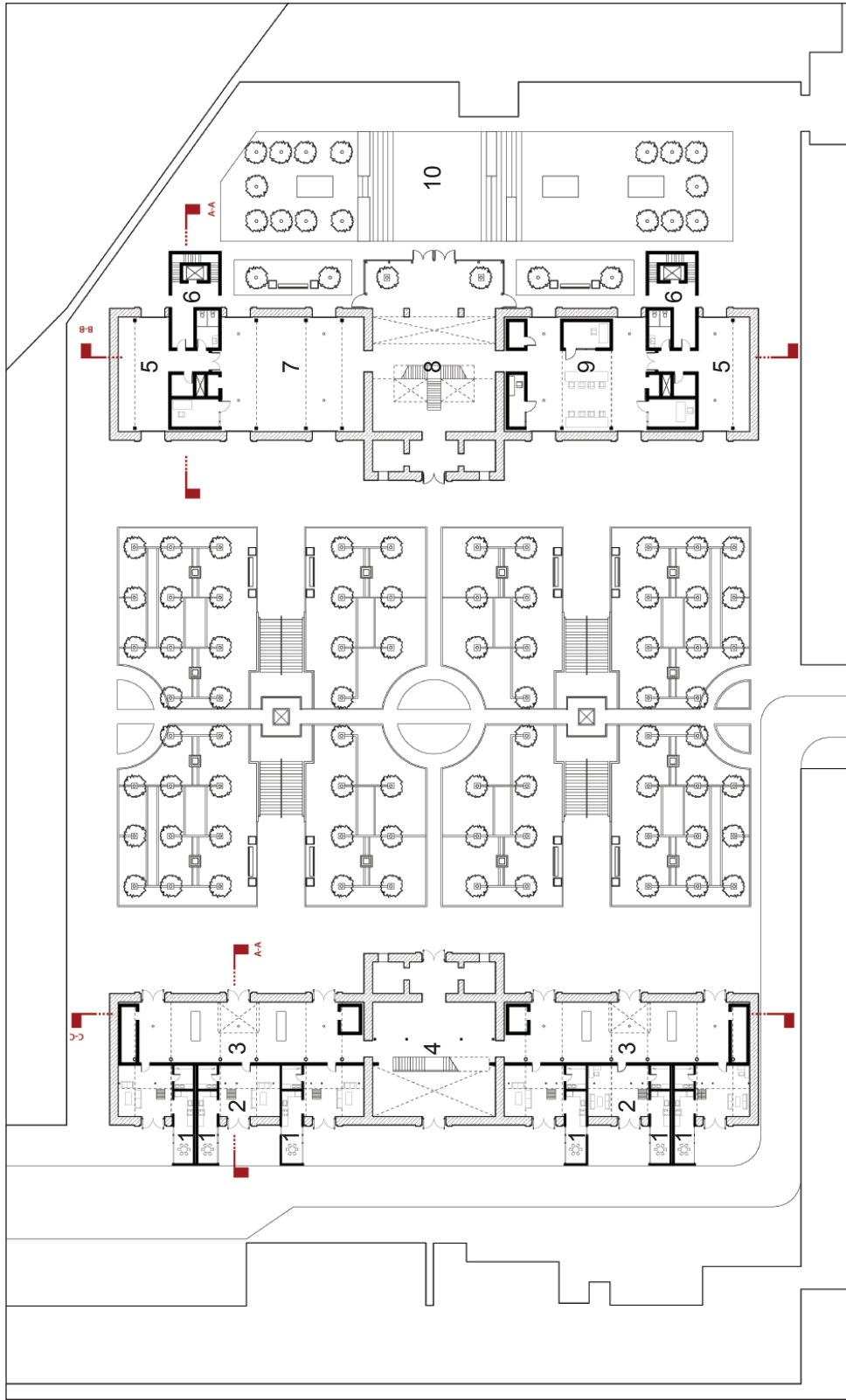


- Key:
- 1. Storehouse No. 2 - Artists' Residence
  - 2. Storehouse No. 1 - Art School

Proposed Site Cross Section

The Art School will provide a green roof which is publicly accessible through the circulation system (the Pilot Project), and which grants views of the harbour. The Artist Residence will be light intervention that maintains most of the existing structure of the storehouse, but adds on private balcony spaces (side opposite main courtyard). Ground level spaces are open to the public from the courtyard (i.e. galleries and common workspaces).

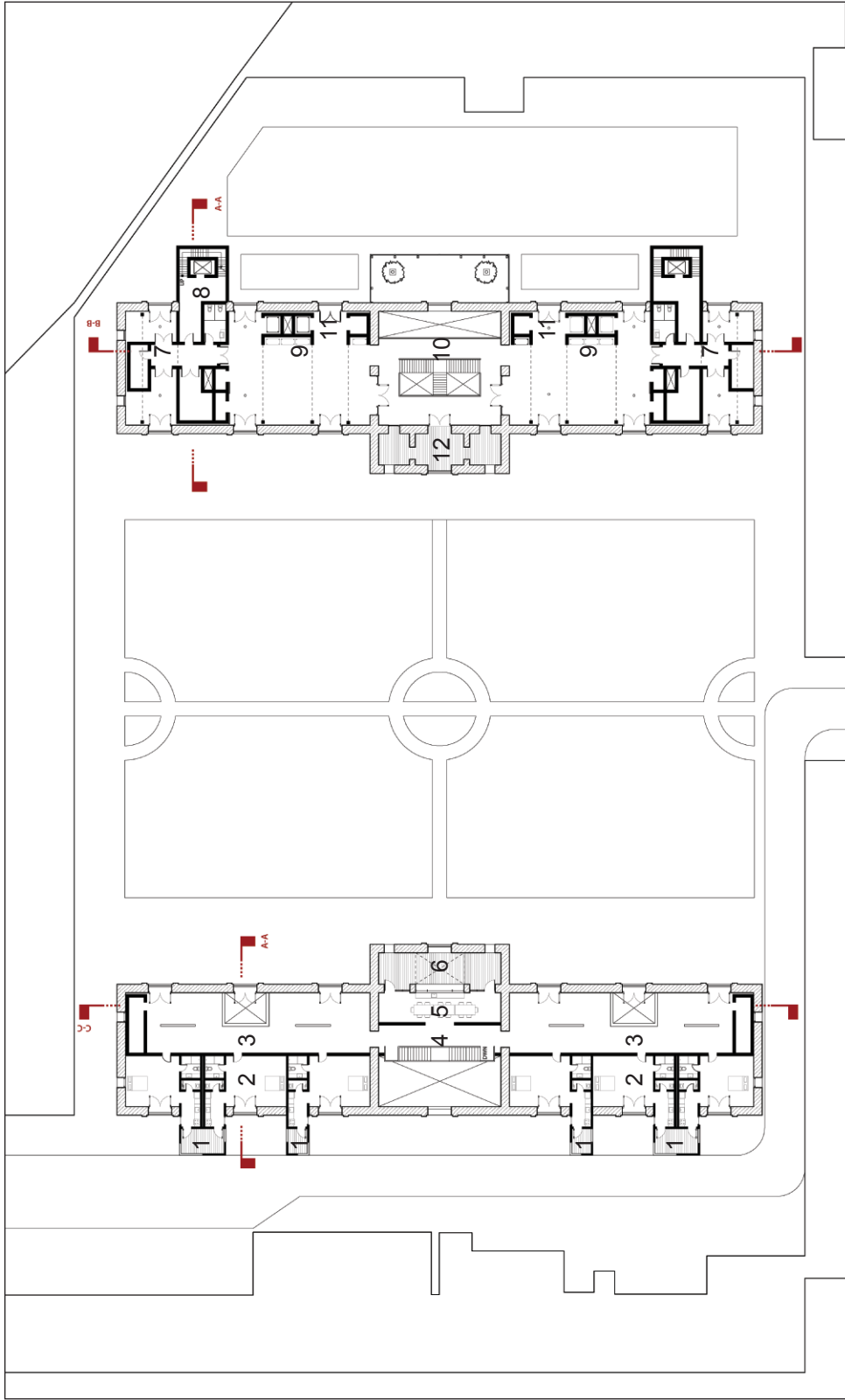




- Artists' Residence - Ground Floor**
- 1. Pilot Project - Kitchens
  - 2. Private Loft Residence
  - 3. Common Workspace
  - 4. Lobby

-  Old
-  New

- Art School - Ground Floor**
- 5. Storage and Support
  - 6. Pilot Project - Service and Circulation
  - 7. Public Gallery
  - 8. Lobby
  - 9. Faculty Offices
  - 10. Outdoor Work Area



**Artists' Residence - Second Floor**

- 1. Pilot Project - Balconies
- 2. Private Residence
- 3. Free Spaces



Old

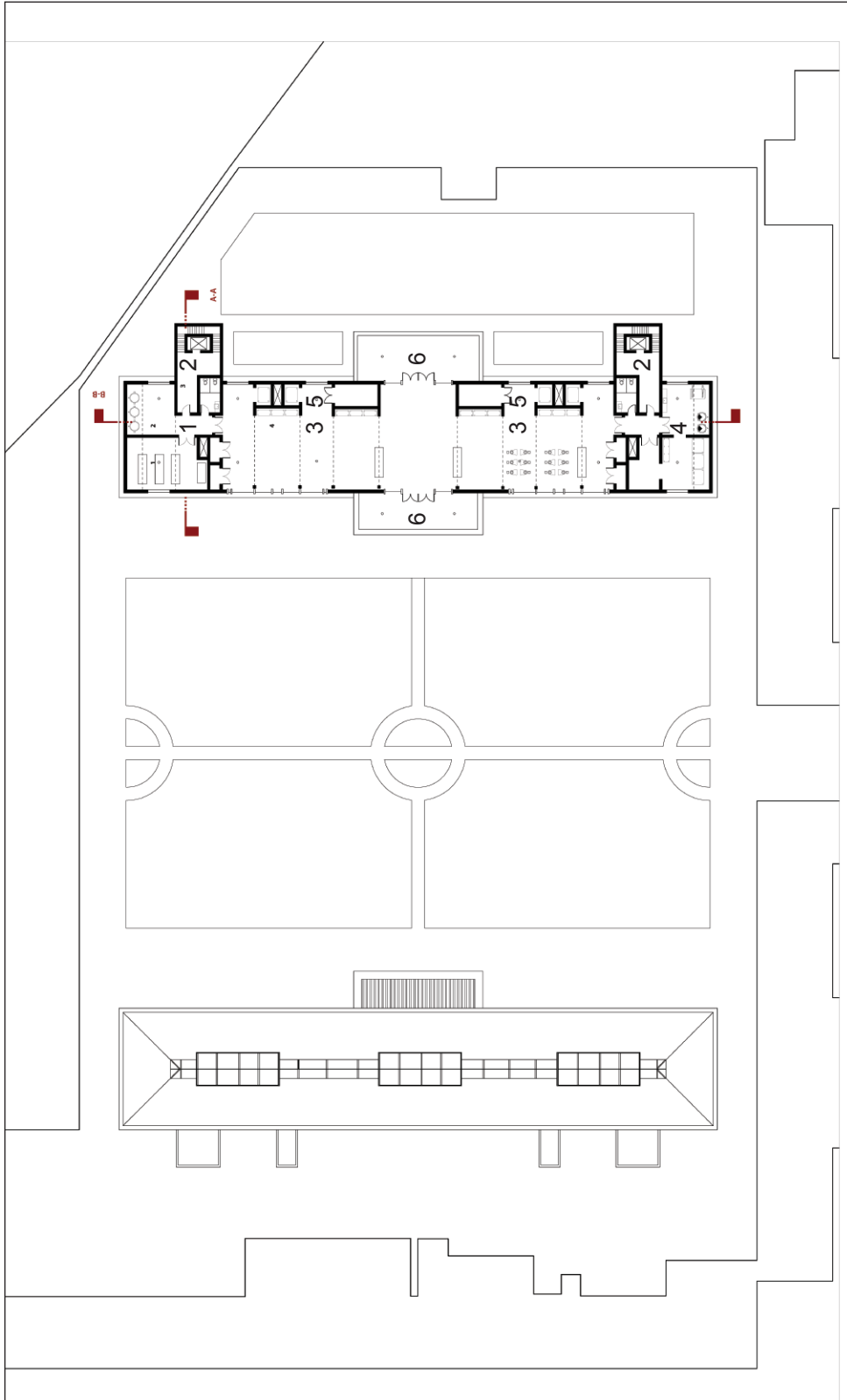


New

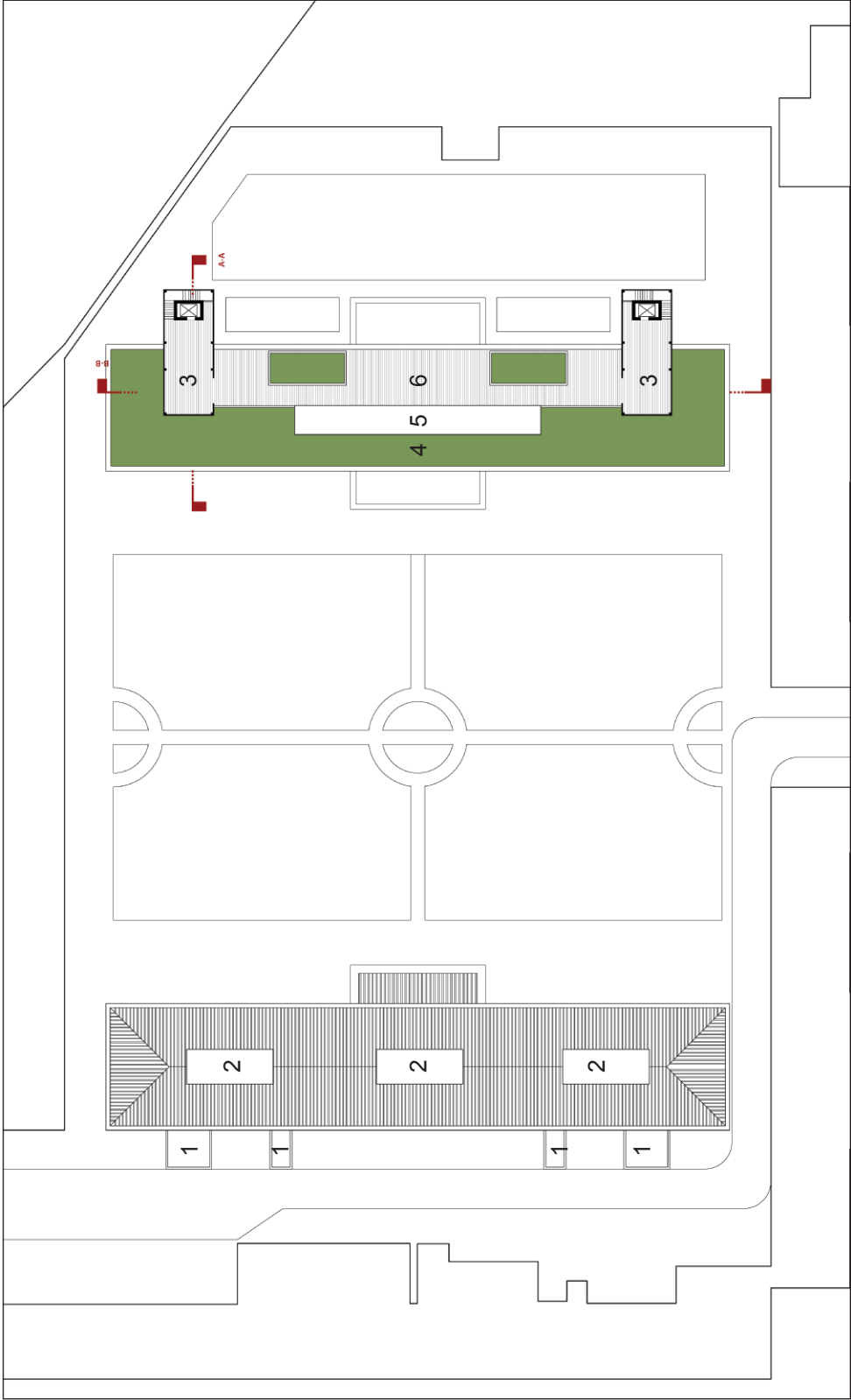
**Art School - Second Floor**

- 4. Lobby and Circulation
- 5. Dining Room
- 6. Outdoor Balcony
- 7. Storage and Support Spaces
- 8. Pilot Project - Circulation
- 9. Student Studios
- 10. Lobby
- 11. Storage and Drying
- 12. Outdoor Balcony





- Art School - Third Floor
- 1. Kiln and Finishing Rooms
  - 2. Pilot Project - Circulation
  - 3. Ceramics Department
  - 4. Material Mixing Rooms
  - 5. Storage and Drying
  - 6. Outdoor Area
- Artists' Residence
- Old      New

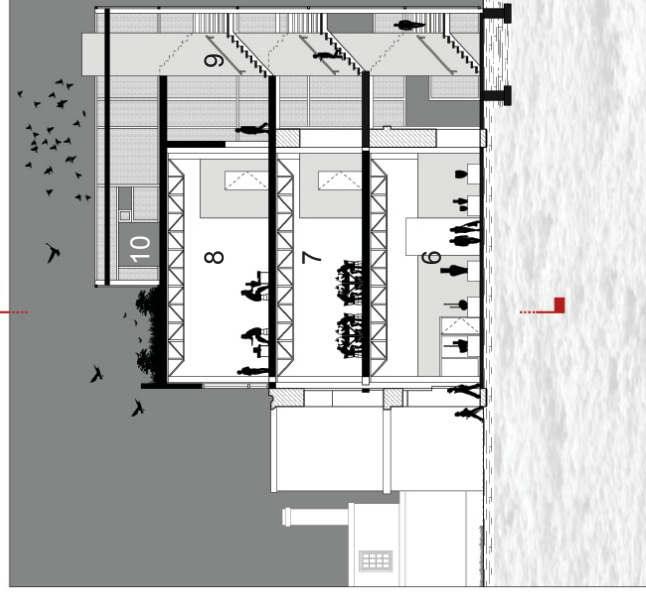
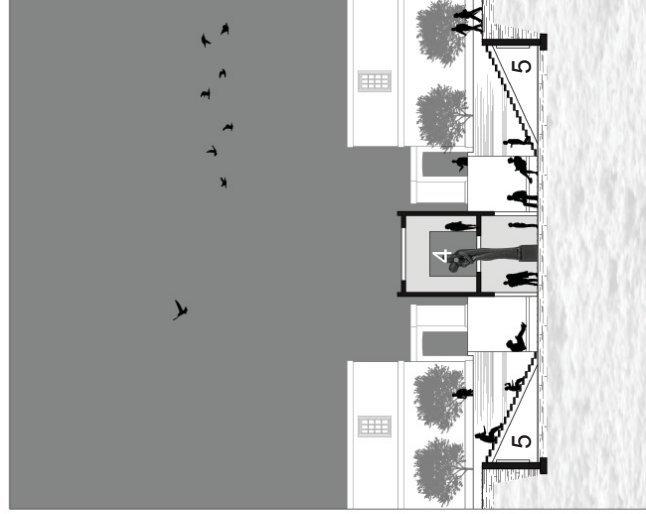
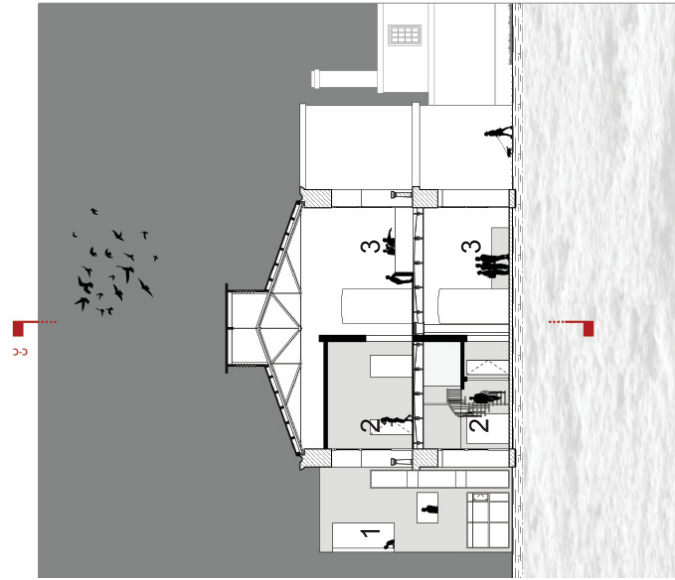
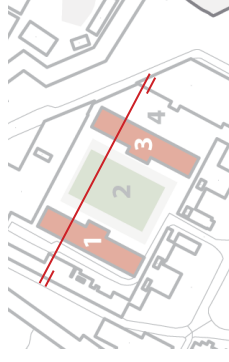


Artists' Residence  
 1. Pilot Project - Balconies  
 2. Ventilation Roof Boxes

Old      New

Art School - Roof Pan  
 3. Pilot Project - Roof Access  
 4. Green Roof (Insect At-  
 tracting Plants)  
 5. Ventilation Roof Box  
 6. Outdoor Decking

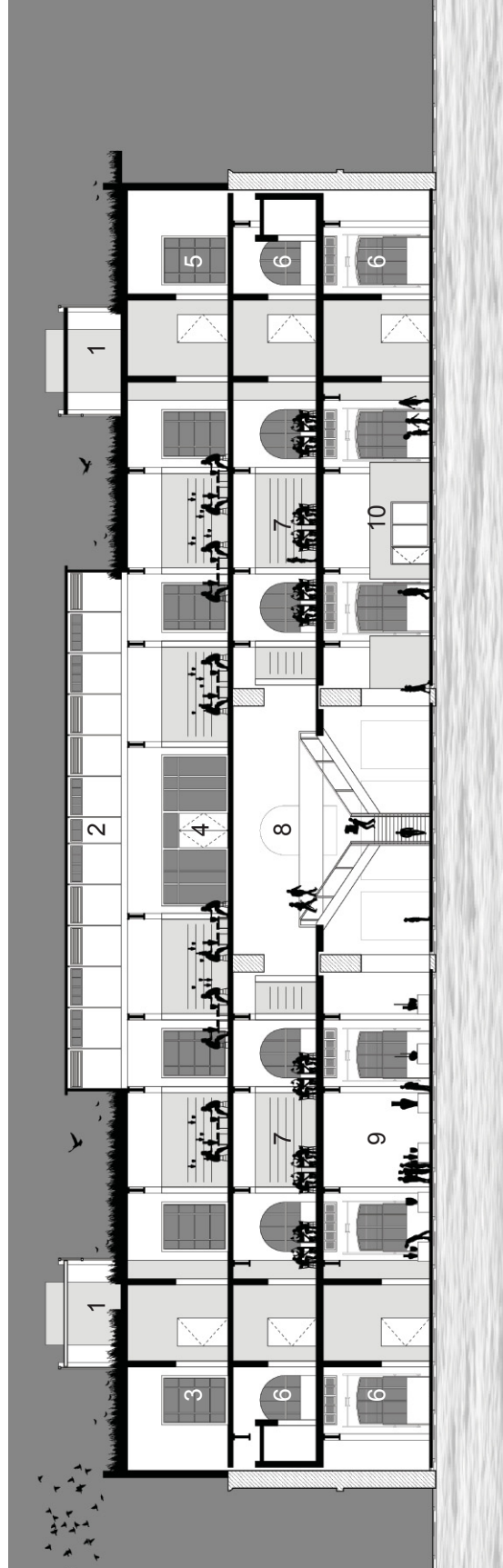
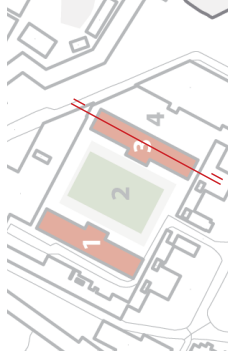




Proposed Cross Section

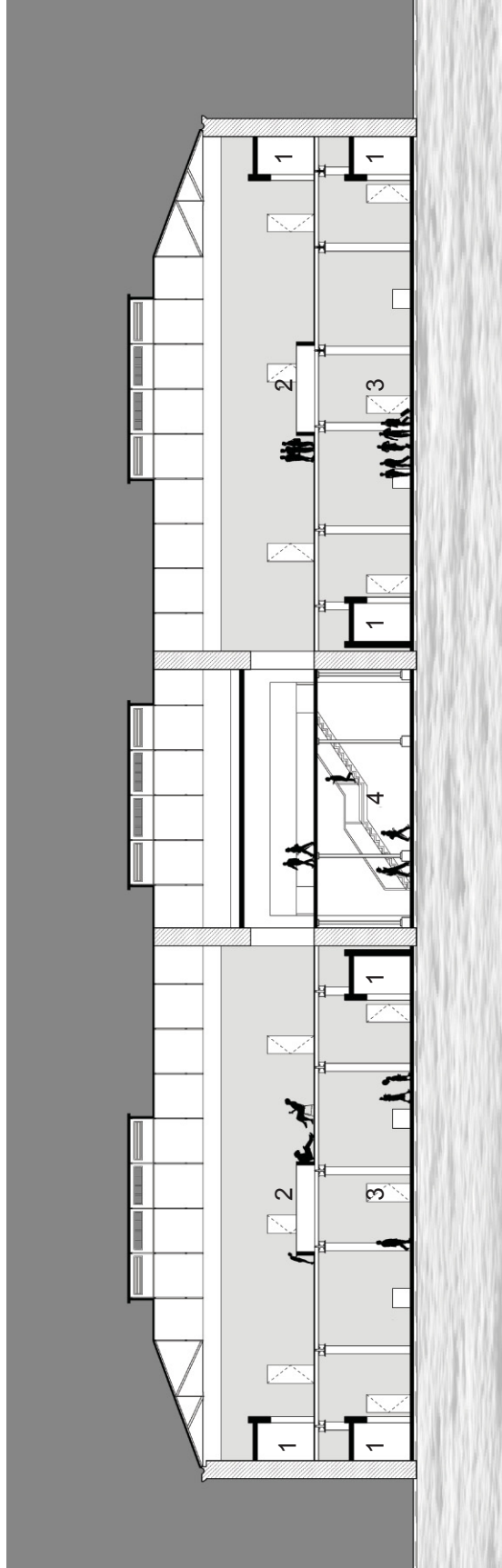
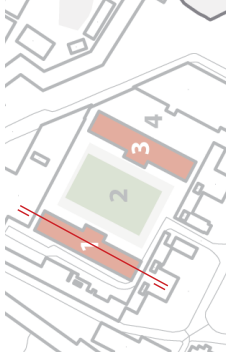
(Left)Storehouse House No. 2 Residence (Right) Storehouse No. 1 School

- 1. Pilot Project Outdoor Balcony
- 2. Private Residence
- 3. Common Work Space
- 4. Large Art Display Pavilion
- 5. Earth Tube Intakes (Through Stairs)
- 6. Public Gallery
- 7. Studio Gallery
- 8. Ceramics Department
- 9. Pilot Project - Service Bay
- 10. Green Roof



Proposed Longitudinal Section  
Storehouse No. 1 - Art School

- |  |                         |                     |
|--|-------------------------|---------------------|
| 1. Pilot Project - Public Access to Green Roof | 5. Material Mixing Room | 9. Public Gallery   |
| 2. Ventilation Roof Box                        | 6. Support Spaces       | 10. Faculty Offices |
| 3. Kiln Room                                   | 7. Studio Spaces        |                     |
| 4. Ceramics Department                         | 8. Lobby                |                     |



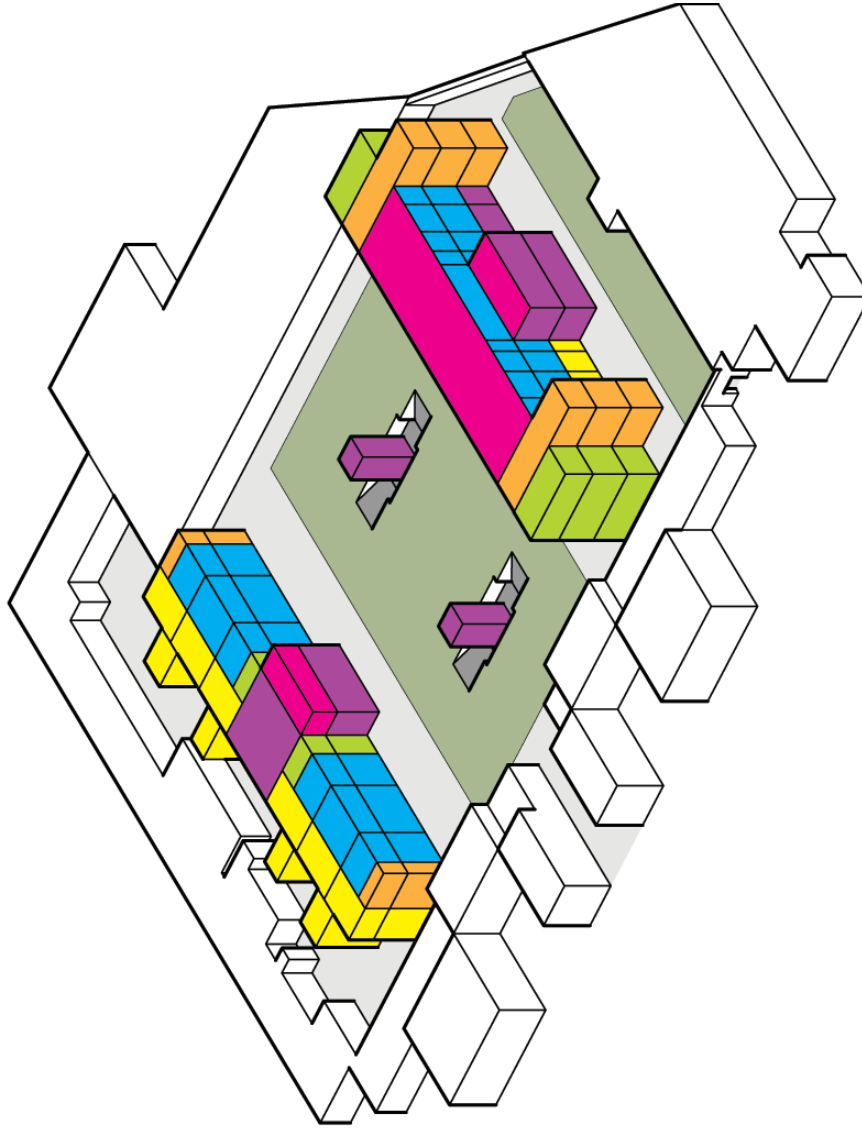
Proposed Longitudinal Section  
Storehouse No. 2 - Artists' Residence

- 1. Support Spaces
- 2. Free Spaces
- 3. Common Work Spaces
- 4. Lobby

## SURVEY OF THE TYPES OF SPACES DIFFERENTIATING THE TYPES OF SPACE WITHIN THE DESIGN

### REFERENCE KEY

- **BUILDING SERVICE**  
These areas support the daily needs of the building both mechanical and electrical.
- **PROGRAM SERVICE**  
Spaces that support the major activity areas of both programs by providing storage as well as other functions specific to the activity.
- **ACTIVITY**  
Areas that allow both individual and collective work to occur, such as studio spaces and common work spaces.
- **GATHERING**  
Lobbies, Galleries and Outdoor spaces that are open to the public and allow for groups of people to meet and promote discussion.
- **RETREAT**  
Are private spaces, namely residences and offices that are inaccessible to the general public.
- **OASIS**  
Semi-Publicly accessible areas of the program, such as the green roof, that provide outdoor recreation and vantage points.



### Types of Spaces

The above diagram illustrates the types of spaces between both buildings to demonstrate their relationships between spaces. Within the Artists Residence, activity and oasis spaces have a direct view onto the Main Courtyard while retreat spaces are secluded with framed views to the north. In the Art School the spaces are bookended by the Pilot Projects and other services spaces. The Art School is a more porous building which seeks to connect the Main Courtyard to the Outdoor Work Area.





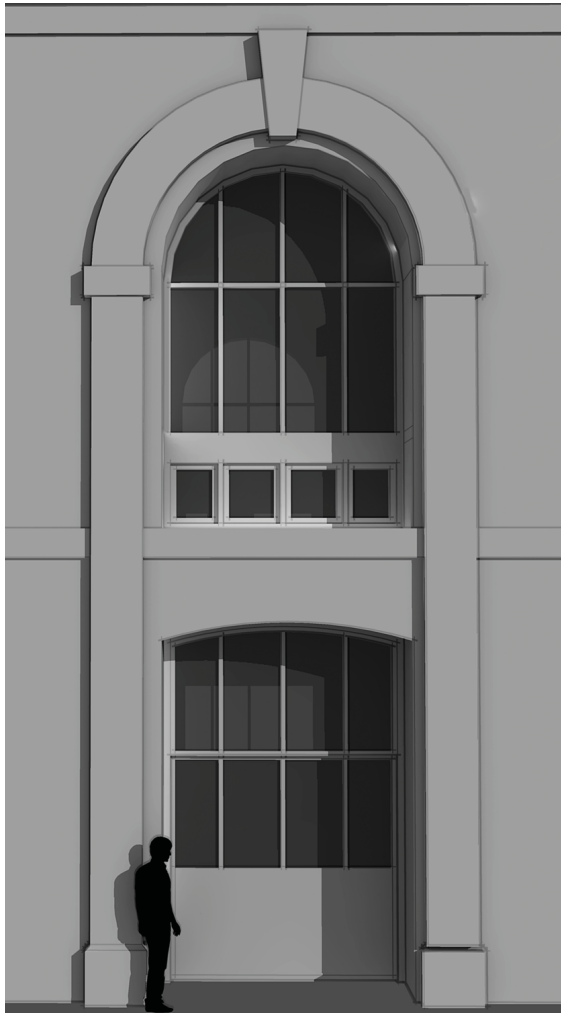
Closed



Open

#### Artists' Residence

Existing doors and windows will be restored, but altered to allow for a second hinge point in one door. This will allow for a scalable use, and provide a private entry system for ground level residences. Smaller operable windows will be installed in each panel to allow for ventilation, even when the door is closed (not shown).



Closed



Open

#### Art School

New doors and windows will be installed that take their design and scaling from its original context. Ground level doors will be designed to slide vertically, connecting the interior and exterior spaces. Small clerestory windows will be installed to allow for additional lighting of the ground floor spaces, while filling the void created by the new second floor level. Second floor windows will be fixed displays with treated glass to cut down on heating due to solar gain.



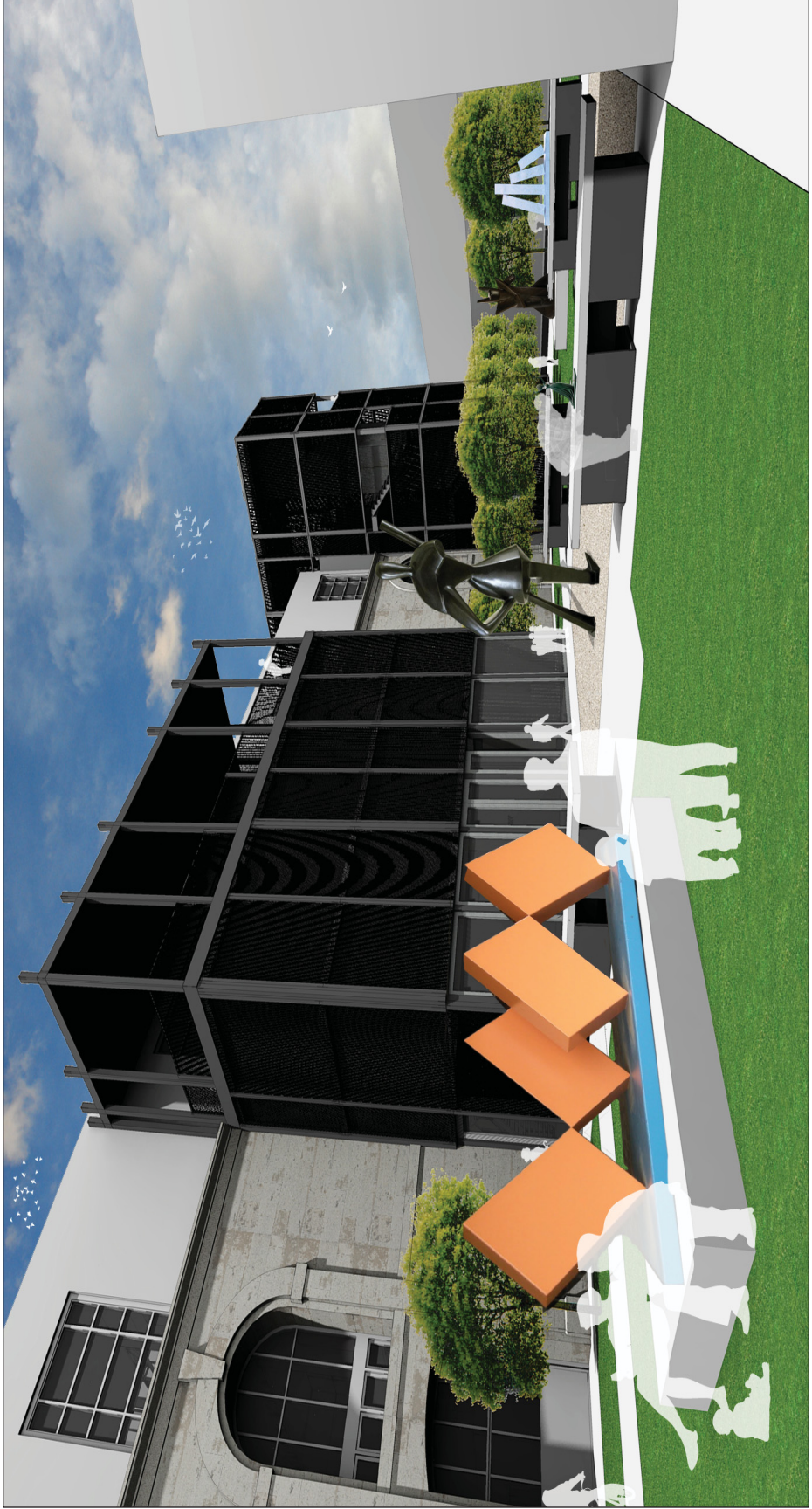
Overall View  
 (Foreground) Art School. (Background) Artists' Residence.  
 Note the Art School's Pilot Projects are perforated steel shells that provide public access to the green roof. The outdoor work area provides work benches and plinths to display artwork, and a secondary entrance (highlighted red) links this space and promote public usage.





Overall View  
(Foreground) Artists' Residence. (Background) Art School.  
Note the addition of the Pilot Project on the back of the Artists' Residence. They will be constructed using reinforced concrete block, and provide supporting services such as: kitchens, bathrooms, and laundry services. Also they are privately accessible balconies for each tenant.

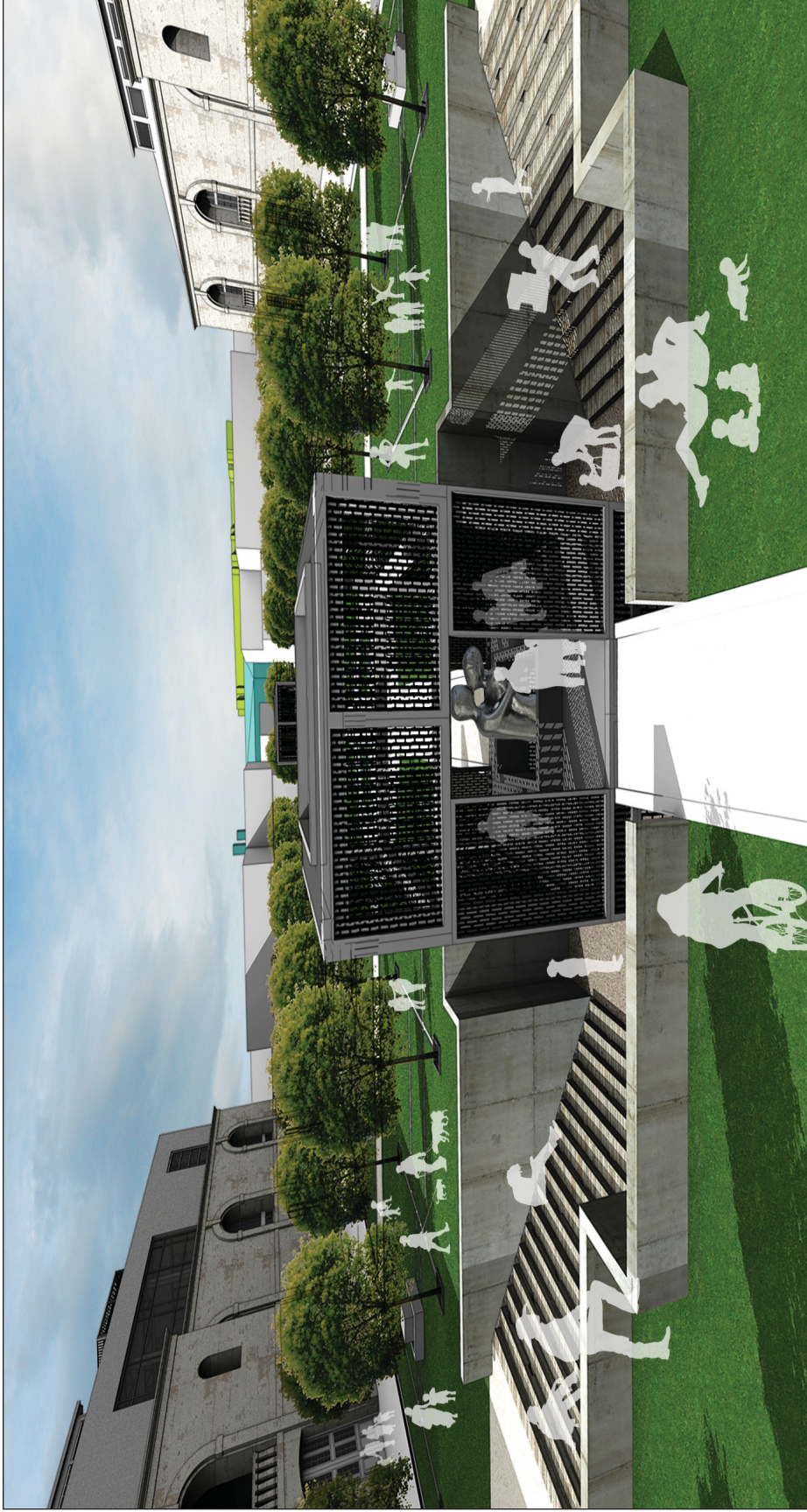




### Art School

The Outdoor Work Yard provides an opportunity for students and professionals to work outside during the warmer months. A central workstation will yield a graveled open space with workbenches, this space is bookended by green and display areas. A secondary entrance will be punched through the surrounding wall (between the Bone Fish Bar and grill and the private residence) to promote public use of this space. The green roof is accessible from this area using the Pilot Project elements.





**Main Courtyard**  
Perforated Steel Pavilions will be placed within the proposed courtyard, and provide intermediate water catchments and precooling air collection (through the steps) for the two buildings. A large orchard creates shaded areas for rest and play. These trees will be irrigated with the grey water produce by both programs to reduce the consumption of collected rain water. The proposed courtyard will inject program that will revitalize and produce a space of high importance.





Artists' Residence  
Common Work Spaces will allow multiple groups to simultaneously work together within a larger work area. Note the original steel structure is maintained as the wooden programmatic elements have been slipped in.





### Artists' Residence

The upper floor lobby will host a connecting bridge that provides the opportunity for conversation amidst the original stone work. This gathering is augmented by the communal dining room with direct access to the outdoor patio, which overlooks the main courtyard (not shown).





Artists' Residence  
(Left) Ground level live/work area. (Right) Lofted bedroom and bathroom connecting to  
an outdoor balcony (Pilot Project).



#### Art School

The ground level Public Gallery will provide exhibition space for international art shows and students' work. It is an open plan that uses large plinths to define space, depending on the need. When the new doors are lifted the outdoor work area, main courtyard and gallery will become a single connected space.





#### Art School

The Lobby will be publicly accessible and provide ground level access to the faculty offices and public gallery, and visitors may also access the second level to view students at work. The existing walls will be removed and a new addition will be created to draw the user through the space. The use of interior trees will reinforce the connection between the main courtyard and the outdoor work space, and enhance the overall activity within the Lobby. With the original window removed, the void in the wall and the stone railing pay homage to what once was.



### Art School

The third floor Ceramics Department will provide the 'Mix-Make-Fire' working space, while offering students with panoramic views of the surrounding area. The new form and steel structures are extruded volumes of the original form that provide the necessary work and teaching spaces needed by the present day artist community of the Dockyard.



## CHAPTER 3: CONCLUSION

The massive courtyard and stone buildings of the Victualing Yard are testament to the power and might of the British Navy. The period of Navy occupation trained many locals in a skilled trade, connecting them to a greater network of knowledge beyond the shoreline of Bermuda. The Art School and the Artists' Residence, proposed in this thesis reestablishes this forgotten connection, and provides the Island's first institution dedicated to the visual fine arts. Bermudian artists of today often have no alternative, but to leave the island to find opportunity. The provision of live and work spaces, allows students and professionals to add a year round presence that heightens the level of activity and use of the Dockyard, through gatherings, exhibitions and displays of work. Through the careful adaptation design and programming, the renewed Victualing Yard can fulfill the importance of its site, and symbolizes the relationship between of skilled trades of the past to the present and future artists of Bermuda.

Three key actions govern the many design decisions presented. First is the identification of the historic value and character-defining elements of each building, generating diagrams of the hierarchy of importance of each element. The main elements include the thick masonry walls and the scale and proportion of both the courtyard and the buildings. Determining the key elements sets the limitations for the design and creates opportunities for interventions that follow, or run counter to, the character of the existing condition. For example, the new third floor of the Art School is regulated by height restrictions, but at its simplest is a representation of the interior volume vertically extruded to

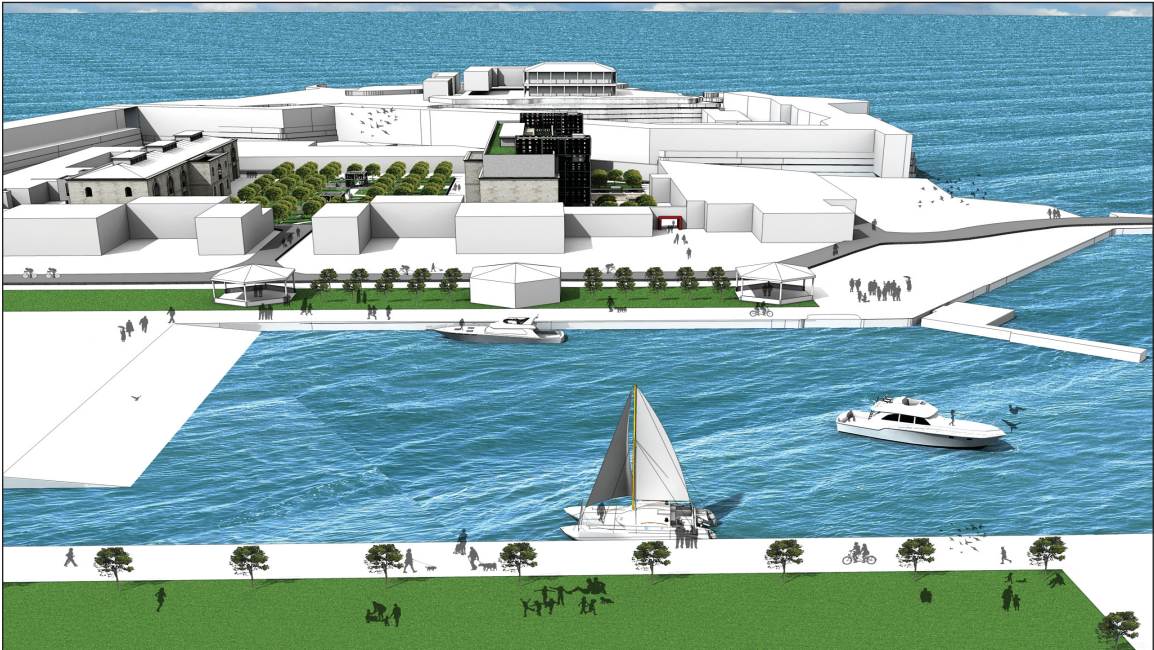
move past the level of the existing stone work. Interventions that run counter to the character are best illustrated by the manipulation of the new and existing doors and windows, providing flexibility of use while maintaining elements of the existing form in the final design. Through this approach, the doors of the Artists' Residence were made scalable to meet the user's needs.

Second, is a diagram for adaption that maintains the qualities deemed most important, being mindful of the construction process and limits that each space places on the design. Here the construction methods of the difference between the Art School and Residence becomes the premise for an intervention that responds to the existing conditions. As a result, the School is of heavy construction (steel and block) while the Residence uses smaller lightweight methods (wood). The Pilot Project provides a counter-intervention that uses the volume of the bay in its overall massing and through its programmatic uses allows it to slide pass the existing stone walls, breaking the grid.

Third, all interventions understand that the three main spaces (Art School, Artists' Residence and the Main Courtyard) must never be thought of as separate entities but rather as a synergistic whole, where the design of one will always inform the design of the other two parts. The Courtyard intervention emphasizes the importance of exhibition (which links the two buildings and their activities), while retaining its key character defining elements (its overall scale and major axis).

Adaptive Reuse Architecture varies in its scale of work, from small installations to large civil projects, but at the very

heart of each project is a connection between the old and the new that comes from the architect's reading of the defining qualities. In an ideal project qualities that make great space are never lost, but rather are highlighted, enriched and carried over through a new programming and uses of space. Adaptive Reuse is the great driver of change and re-invention in both the physical and social realms of the specific culture on its specific site and surrounding context. Injecting programs and uses that sometimes align and conform, and sometimes run counter to the original use of a space provide rich opportunities for revitalization of both a site, and its surrounding context.



### Lineage of the Dockyard

(Top) Representative image of the kind of activity within the Dockyard, between 1823-1950. From: Bermuda Maritime Museum Archives.

(Bottom) The new program will renew activity and use of the Dockyard throughout the year.



## REFERENCES

- Allen, Edward. 2005. *How Buildings Work: the Natural Order of Architecture*. New York: Oxford University Press.
- Artscape. Artscape Wychwood Barns (project). <http://www.torontoartscape.on.ca/places-spaces/artscape-wychwood-barns>.
- Bachelard, Gaston. 1964. *The Poetics of Space*. New York: Orion Press.
- Bermuda Maritime Museum, Sandys Parish, Bermuda, MA BX.
- Bermuda National Trust., and Department of Planning. 2002 *The Traditional Building Guide: Advice for Preserving Bermuda's Architectural Heritage*. Bermuda: Island Press.
- Brockman, Lt. Willam Eric. 2009. *Bermuda: Growth of a Naval Base*, ed. Dr. William R. Cooke. Bermuda: Bermuda Maritime Press.
- Canada's Historic Places (CHP). Standards and Guidelines for the Conservation of Historic Places in Canada (document). <http://historicplaces.ca/en/pages/standards-normes.aspx>.
- Chafe, Noel Paul. 2009. *Re-develop or Perish: the Adaptive Reuse of an Industrial Rubber Boot Factory in Holyrood, Newfoundland and Labrador*. MArch thesis, Dalhousie University.
- Du Toit Architects. Artscape Wychwood Barns (project). <http://www.dtah.com/projects/architecture/adaptive-reuse/wychwood>.
- Faulker, Sundee. 2010. Personal Communications. Bermuda Clayworks Ltd. Bermuda.
- Forest, Neil. 2011. Personal Communications. Ceramics Department NSCAD University. Halifax.
- Government of Bermuda. 2008. Development in the Royal Naval Dockyard (document). <http://www.planning.gov.bm/Documents>.
- Littlefield, David., and Saskia Lewis. 2007. *Architectural Voices: listening to old buildings*. Chichester, England: Wiley-Academy.
- Mackay-Lyons Sweetapple Architects (MLS). 2007. NSCAD University Port Campus (project). <http://www.mlsarchitects.ca/portfolio/featuredprojects/nscad>.
- Robert, Philippe. 1989. *Adaptations: new uses for old buildings*. New York: Princeton Architectural Press.

- Saudi Aramco World. The Alhambra: a virtual walking tour. <http://www.saudiaramcoworld.com/issue/200604/a.virtual.walking.tour.the.alhambra.htm#>.
- Stevenot, Kristal. 2009. *Architecture for Continuous Use: How the Adaptive Reuse of Halifax's Bloomfield Centre Can Preserve Collective Memory and Revitalize Place*. MArch thesis, Dalhousie University.
- Stranack, Ian. 1977. *The Andrew and the Onion: The Story of the Royal Navy in Bermuda. 1795-1975*. Bermuda: Island Printing.
- Sullivan, Chip. 2002. *Garden and Climate*. New York: McGraw-Hill Books.
- Tuan, Yi-fu. 1977. *Space and Place: the Perspective of Experience*. Minneapolis: University of Minnesota Press.
- Wikipedia. 2011. Alhambra. <http://en.wikipedia.org/wiki/Alhambra>.
- Wikipedia. 2011. Bermuda. <http://en.wikipedia.org/wiki/Bermuda>.
- World Architecture News. Wychwood Green Arts Barns (project). [http://www.worldarchitecturenews.com/index.php?fuseaction=wanappln.projectview&upload\\_id=1781](http://www.worldarchitecturenews.com/index.php?fuseaction=wanappln.projectview&upload_id=1781).