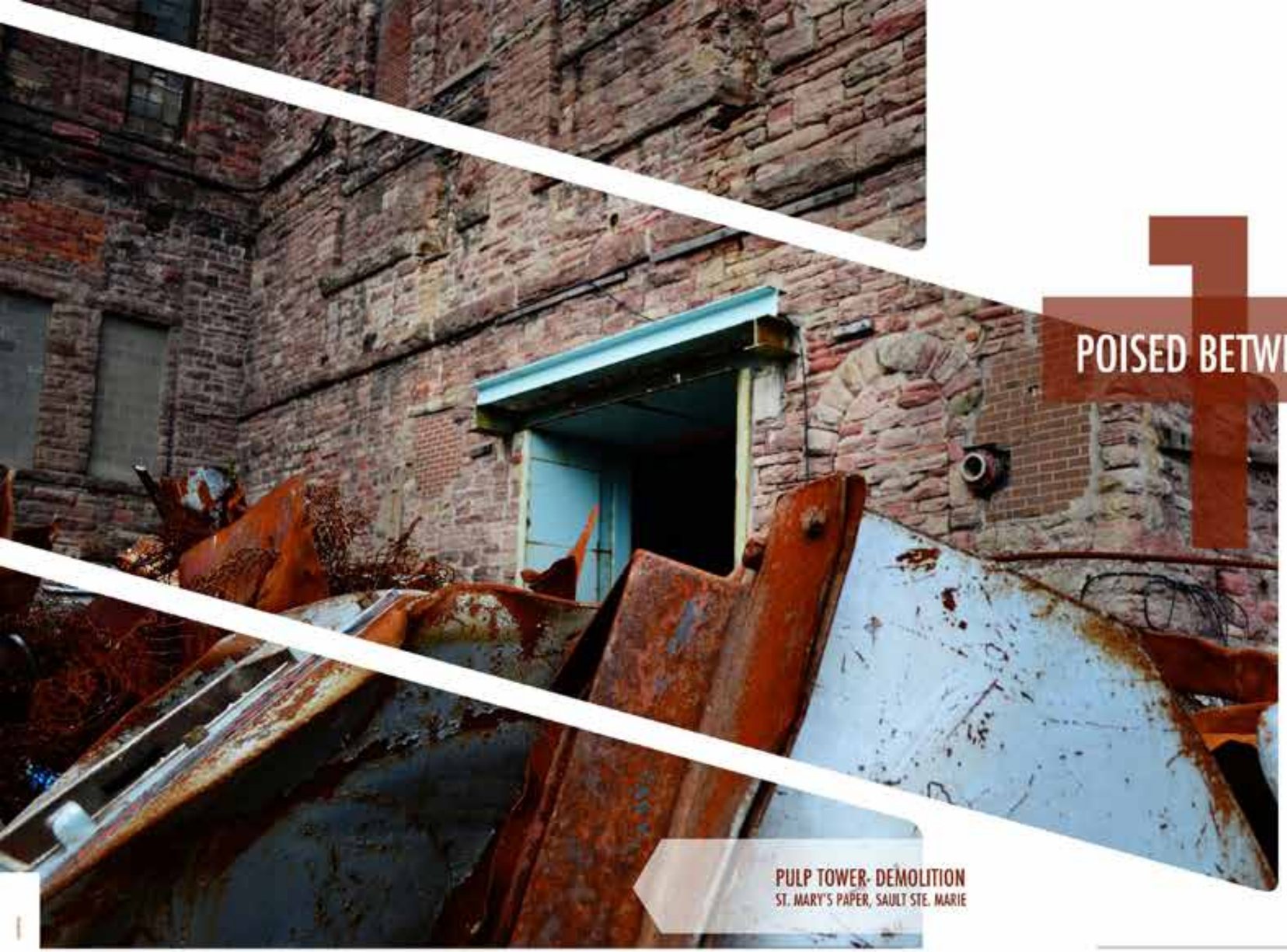
kasey ▪ camire

KC

BETWEEN DOMINANCE & DEMISE

REVITALIZATION OF FORMER
ST. MARY'S PAPER MILL
SAULT STE. MARIE, ONTARIO

13/
14



PULP TOWER- DEMOLITION
ST. MARY'S PAPER, SAULT STE. MARIE

1 POISED BETWEEN DOMINANCE AND DEMISE

Between Dominance and Demise speaks of the industrial ruin as an entity that is in the state of the in-between, which will be elaborated in this thesis. Due to the inevitability of immense changes in technological advancements, the industrial complex is suspended from regular activity. Such an uncertain position is considered to be in a state of transformation for both the physical construct and the community that it pertains to. For many communities, the struggles of adapting to the uncertainty of the post-industrial landscape can often inhibit their regeneration. Many elements must be addressed when re-purposing the industrial ruin, including a sensitivity to social, physical and architectural histories. Consequently, these landscapes are often replaced by contemporary modes of construction that do not consider the past or remain vacant. How do we maintain connections to our industrial heritage, to the memory of place, if it no longer appears to be embedded in the social and physical networks of surrounding communities?

Growing up in small and heavily industrial cities, I have witnessed the psychological and morphological impact of industrial decline on a community. This thesis will focus on the utilization of the former St. Mary's Paper Mill, located in my hometown of Sault. Ste. Marie. The premise of the thesis is to challenge manners to dissociate the modernist understanding of the industrial ruin as a plague to future progress and will propose the importance of maintaining the industrial phantom as a foundation for future growth. The thesis emphasizes that it is only until people see the potential of the past and its persistence in the present state that they begin to comprehend that life does not end with production.

1 introduction

The first chapter covers the project abstract and introduction. This text is to get a sense of the project background, my influence and my story.

pages 1 - 2

2 phantom

I took part in many site visits during the sites demolition in 2012. My first impressions of the site, and the publics commentary became the primary source of inspiration.

pages 3 - 6

3 site analysis

An extensive amount of research went into the site analysis. With the help of Riversedge Development, I had access to site and building plans dating back from 1895 to present.

pages 7 - 12

4 bio-energy plant

In accessing the need for growth within the city, I determined that a bio-mass plant would be best suited to fulfill the lost function of the former mill and its processes.

pages 13 - 20

5 remediation

Water and ground pollution can often set back post-industrial developments. This chapter focuses on economically feasible remediation processes.

pages 21 - 26

6 ie? campus

Sault College's Energy and Environment Institute is the fastest growing program on campus. As a result, there is a need for expansion off campus in the midst of the industrial sector

pages 27 - 36

THE PHANTOM SITE

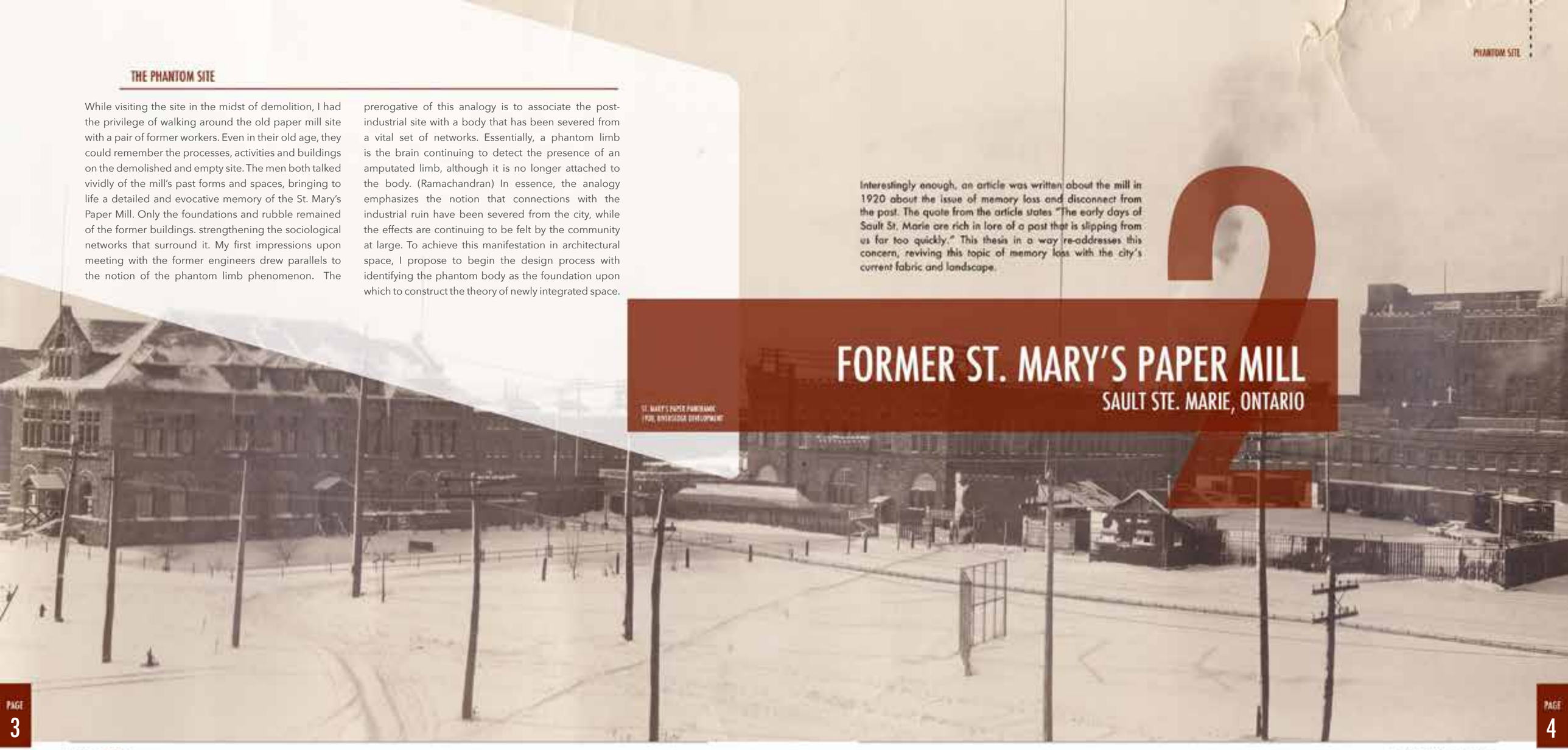
While visiting the site in the midst of demolition, I had the privilege of walking around the old paper mill site with a pair of former workers. Even in their old age, they could remember the processes, activities and buildings on the demolished and empty site. The men both talked vividly of the mill's past forms and spaces, bringing to life a detailed and evocative memory of the St. Mary's Paper Mill. Only the foundations and rubble remained of the former buildings. strengthening the sociological networks that surround it. My first impressions upon meeting with the former engineers drew parallels to the notion of the phantom limb phenomenon. The prerogative of this analogy is to associate the post-industrial site with a body that has been severed from a vital set of networks. Essentially, a phantom limb is the brain continuing to detect the presence of an amputated limb, although it is no longer attached to the body. (Ramachandran) In essence, the analogy emphasizes the notion that connections with the industrial ruin have been severed from the city, while the effects are continuing to be felt by the community at large. To achieve this manifestation in architectural space, I propose to begin the design process with identifying the phantom body as the foundation upon which to construct the theory of newly integrated space.

Interestingly enough, an article was written about the mill in 1920 about the issue of memory loss and disconnect from the past. The quote from the article states "The early days of Sault St. Marie are rich in lore of a past that is slipping from us far too quickly." This thesis in a way re-addresses this concern, reviving this topic of memory loss with the city's current fabric and landscape.

2

FORMER ST. MARY'S PAPER MILL

SAULT STE. MARIE, ONTARIO



ST. MARY'S PAPER PANORAMA
(FOR ARCHIVAL DEVELOPMENT)

1895-1901

1895-1901

1895-1901

1895-1901

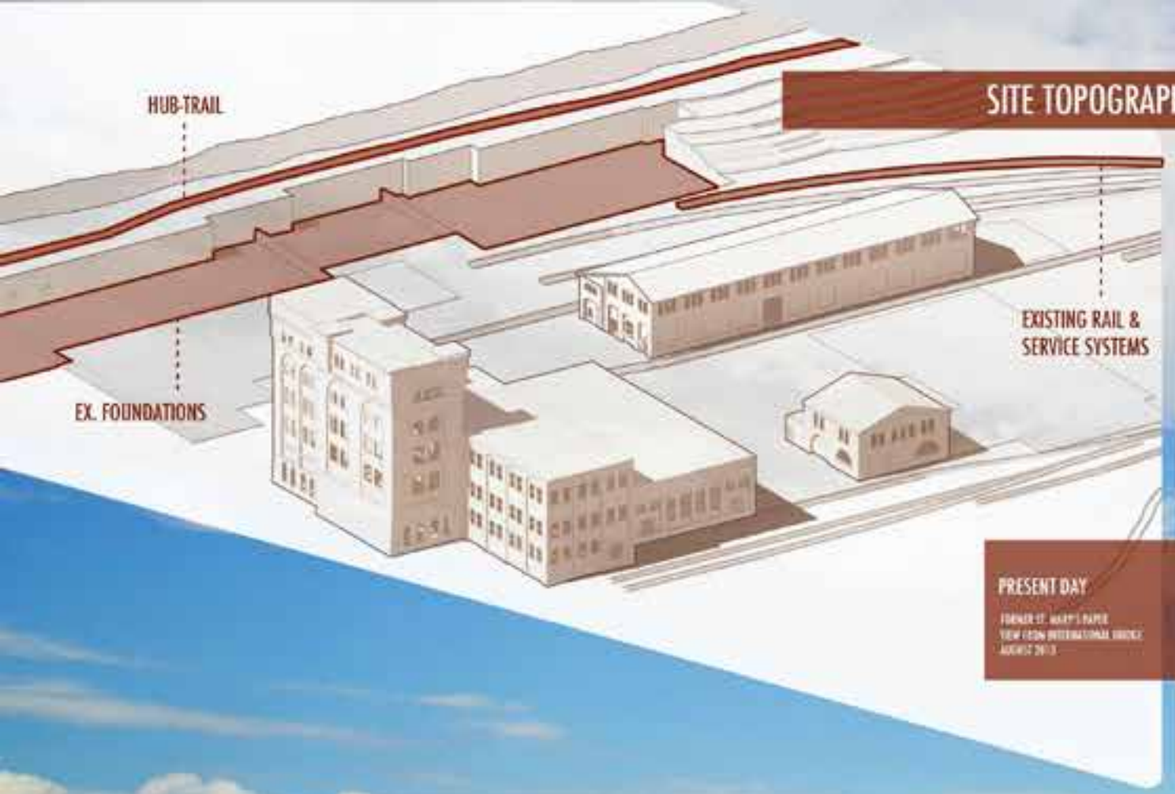
2012-2013

PAPER MILL TIMELINE

DOMINANCE TO DEMISE

The St. Mary's Paper Mill has been around for over a century, whereby the site has a rich history as the foundation of city growth. Prior to 1895 the site was used as a trading post, and in 1901 the construction of the mill had begun to take fruition. During this time, one historical character stood out- a man whose ambitions and plans are still visible in the present story of the city's fabric, namely F. H. Clergue. Clergue was truly a pioneer and had constantly pushed Canada's pulp and paper industry to the forefront. Through his vision, the mill's industrial buildings were quite unique and experimental. The Sault Ste. Marie mill was really the first of its kind. He developed new processes and machines that eventually became common practice among North American paper industries, and at one point had risen to be the leading paper mill in Canada.

Clergue's legacy saw many successes throughout its history, however there were times when production suffered substantially. This brought about strikes and even closures, although production remained intact and the life of the industry was sustained. It wasn't until the 1980's that the mill began to see the effects of lower demands in the paper industry. This period was really the beginning of the process of ruination that has effected the present landscape and image of the mill. While many efforts were targeted at sustaining capital investments for the company and production began to look promising a few years after the most recent deficit in 2003. Shortly after, the needs and demand for paper production decreased so rapidly that the mill was forced to close permanently in 2011. The mill was then bought out by the Riversedge Development Inc. in March of 2012 and the site was then slated for demolition.The collection of industrial structures were carefully removed from the site to reveal the historic sandstone buildings of the Clergue era that had been swallowed by layers of building additions.



SITE TOPOGRAPHY

PRESENT DAY

FORMER ST. MARY'S PAPER
VIEW FROM INTERNATIONAL BRIDGE
AUGUST 2013

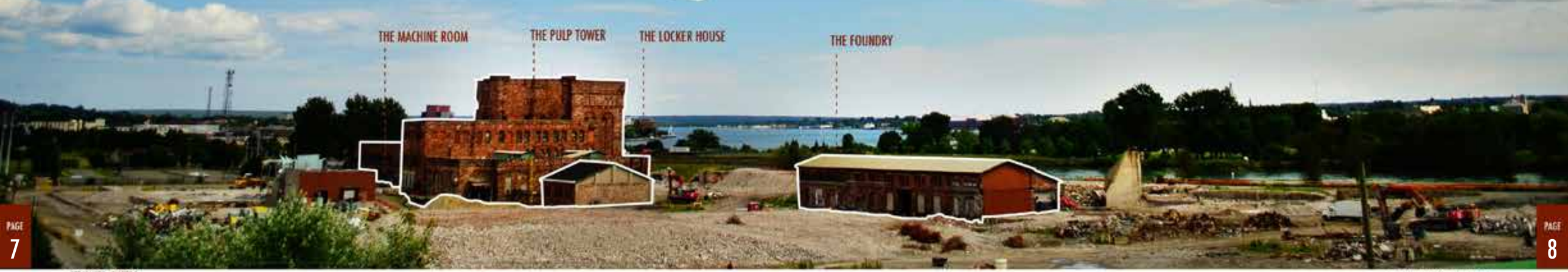
3

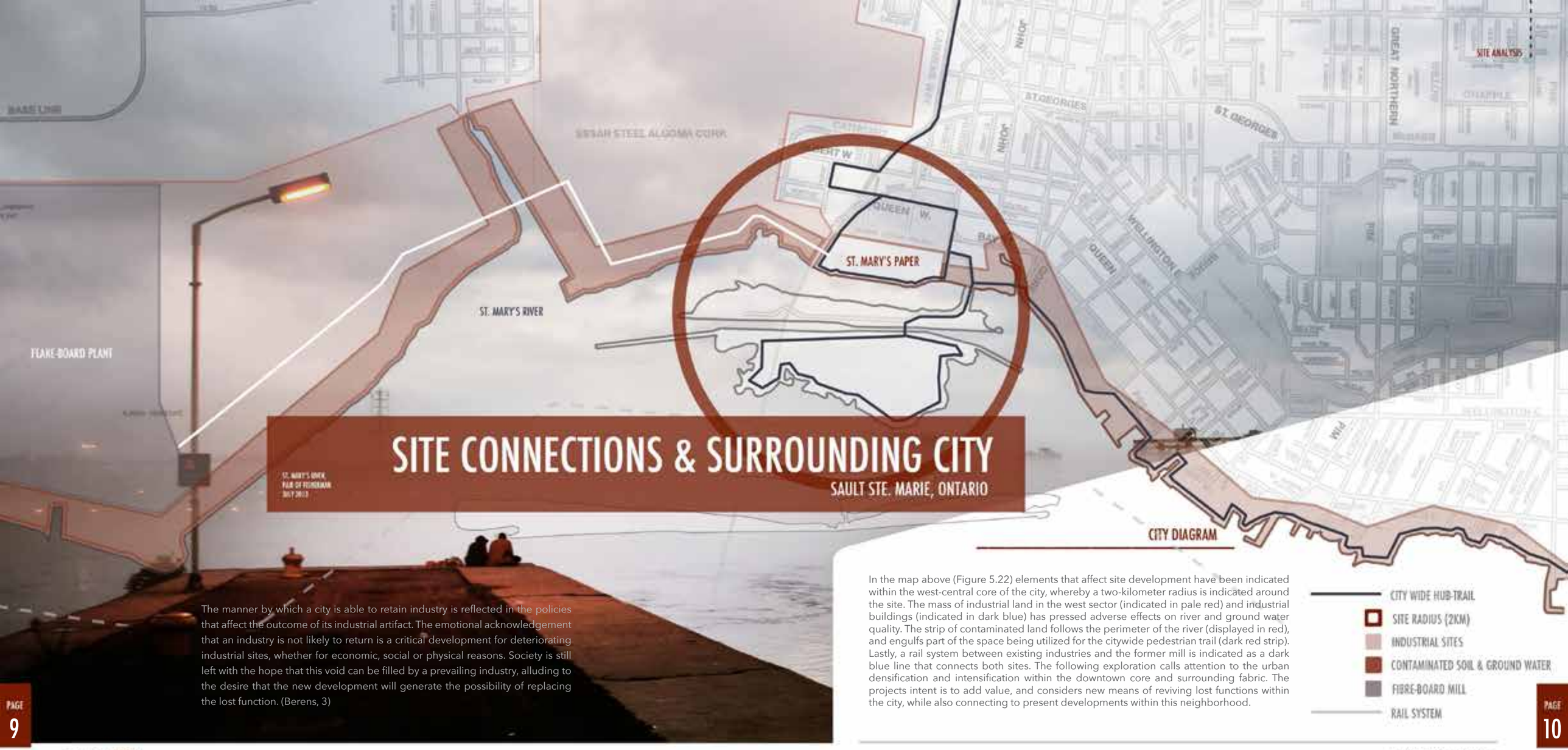
REMAINING PAPER MILL SITE

SITE ANALYSIS

SITE DEMOLITION

As they began demolishing the industrial structures of the St. Mary's Paper Mill, the old sandstone buildings of the Clergue era had emerged once again. Many changes occurred throughout the mill's operation. However, the original sandstone architecture that Clergue developed at the end of the 1800's and early 1900's have been preserved and their use remained constant for several decades. These buildings still exist presently on the site, and are the source of recognition for nostalgic memory. The value of these historic buildings is undeniable; their re-adaption has been steadfast, as they are presently being used for a variety of social programming that extends towards the community. This segment of the thesis focuses on the faintest signs of ruins and the spaces brought about through careful demolition and voiding of industrial infrastructures. For this reason, the research called attention to the mill's past plans; speaking with former workers enabled the story of place to be uncovered in its physical state, while also bringing to light the social fabric amongst machines and laborers.





SITE CONNECTIONS & SURROUNDING CITY

SAULT STE. MARIE, ONTARIO

ST. MARY'S RIVER
PLAN OF FEINKNAM
JULY 2013

The manner by which a city is able to retain industry is reflected in the policies that affect the outcome of its industrial artifact. The emotional acknowledgement that an industry is not likely to return is a critical development for deteriorating industrial sites, whether for economic, social or physical reasons. Society is still left with the hope that this void can be filled by a prevailing industry, alluding to the desire that the new development will generate the possibility of replacing the lost function. (Berens, 3)

In the map above (Figure 5.22) elements that affect site development have been indicated within the west-central core of the city, whereby a two-kilometer radius is indicated around the site. The mass of industrial land in the west sector (indicated in pale red) and industrial buildings (indicated in dark blue) has pressed adverse effects on river and ground water quality. The strip of contaminated land follows the perimeter of the river (displayed in red), and engulfs part of the space being utilized for the citywide pedestrian trail (dark red strip). Lastly, a rail system between existing industries and the former mill is indicated as a dark blue line that connects both sites. The following exploration calls attention to the urban densification and intensification within the downtown core and surrounding fabric. The projects intent is to add value, and considers new means of reviving lost functions within the city, while also connecting to present developments within this neighborhood.

industrial plague

As a result of derelict sites along the river and diminishing water quality within the St. Mary's River and municipal wells, the city has enacted a Remediation Action Plan to which will address water remediation in the city. The city has become pro-active over the years, calling attention to the issues and impacts that heavy industry has placed over our landscapes and downtown developments.

ALGOMA STEEL & RIVER,
SAULT STE. MARIE
SEPTEMBER 2013

BROOKFIELD WIND FARM
GRIMS CAP, ONTARIO

SAULT STE. MARIE, ONTARIO

RENEWABLE ENERGY INDUSTRY

CITY GROWTH

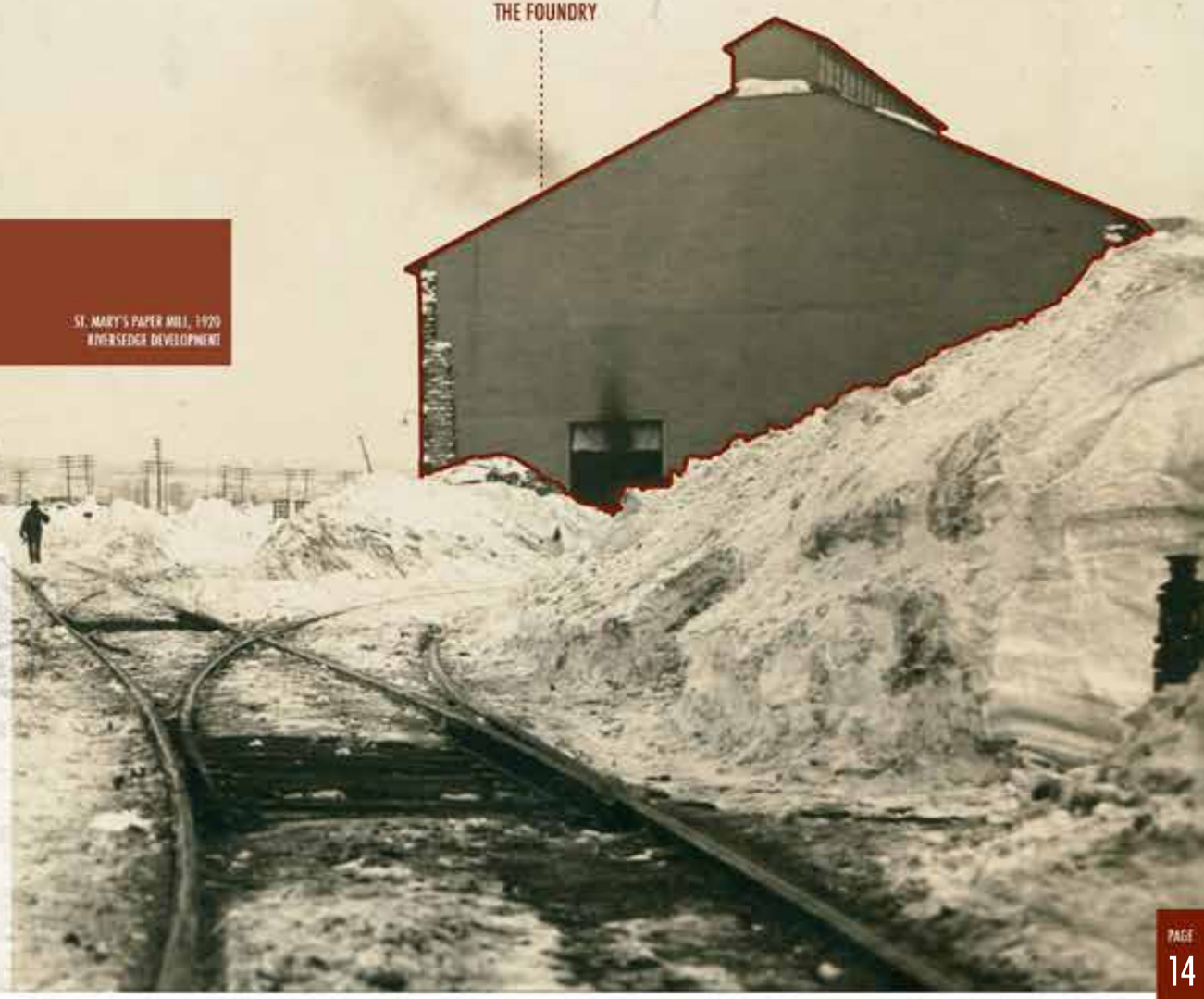
Recently, the city's primary source of growth is a result of our flourishing renewable energy industry. The city of Sault Ste. Marie is becoming the capital of renewable energy in North America. Our landscapes house some of the largest solar and wind farms in Canada. This growing industry has attracted a great number of interests towards the educational sector and Sault College, including the expansion of its Institute of Energy and Environmental Studies. To date, it is the fastest growing program and brings in the highest percentage of out-of-town students.

The city is also looking to take advantage of our forestry industries, and natural resources in partnership with solar and wind energy providers to create a start-up biomass plant that they have proposed to be housed on the former St. Mary's paper site. We are however plagued by the toxicity of former and present industries; the city has therefore called for solutions towards a healthier lifestyle for the surrounding community.

Brookfield

SAULT COLLEGE

4 MIRROR INDUSTRY: BIOMASS PLANT



ST. MARY'S PAPER MILL, 1920
RIVERSEDGE DEVELOPMENT

My first impressions upon meeting with the former engineers drew parallels to the notion of the phantom limb phenomenon. The prerogative of this analogy is to associate the post-industrial site with a body that has been severed from a vital set of networks. Essentially, a phantom limb is the brain continuing to detect the presence of an amputated limb, although it is no longer attached to the body. (Ramachandran) In essence, the analogy emphasizes the notion that connections with the industrial ruin have been severed from the city, while the effects are continuing to be felt by the community at large. To achieve this manifestation in architectural space, I propose to begin the design process with identifying the phantom body as the foundation upon which to construct the theory of newly integrated space.Over the past months, I visited the former St. Mary's Paper site often during its demolition phase, trying to immerse myself in the project and to

REVIVING PHANTOM CONNECTIONS

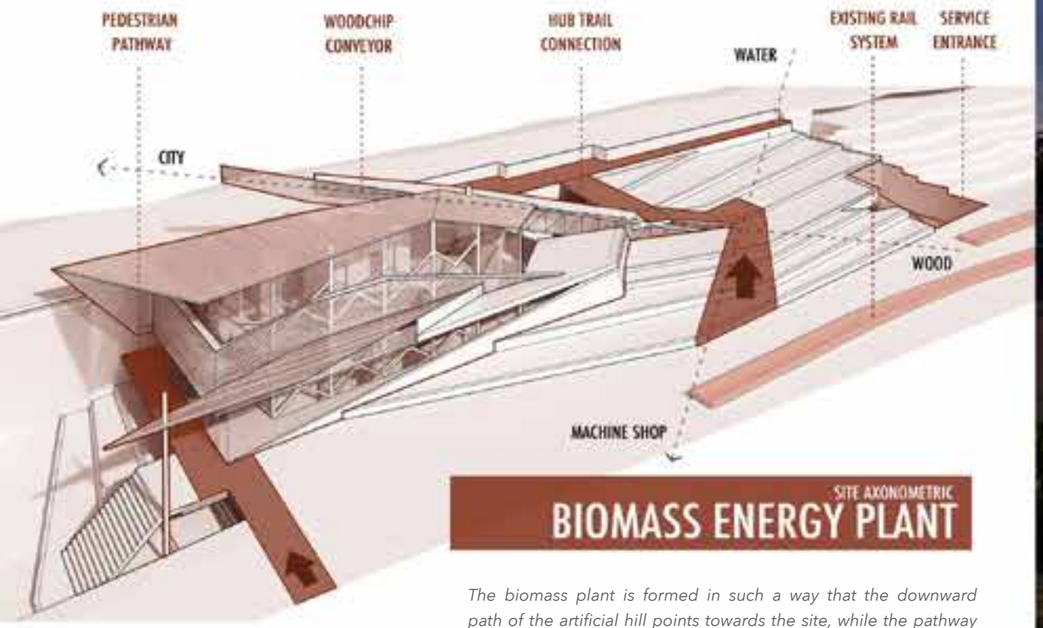
take note of the activities on site. Studying the mill's past plans allowed for a greater understanding of what was lying beneath the rubble, I was beginning to understand the image so many former workers had drawn up and how the traces of these forms remained visible. Most importantly, it was the industrial processes- the flow and movement of raw materials to final product that claimed the story of how this space was conceived. Taking note of each industrial stage and process, the phantom network was emerging and uncovering how it had once seeped out into the city's fabric; demonstrating how it had once entwined in the dense assemblage of local connections, that has created the intimacy of our local economic and social fabric.

BIO-ENERGY PLANT

RIVERFRONT DEVELOPMENT

In this industrial context, the region is akin to stable arrangements of suppliers, transporters, materials, and other networks that are sewn into the infrastructure, which maintains local economy and development. The post industrial site is not seen as something fixed, but rather it is composed of numerous associations and entwined into various networks that stretch to the boundaries of the site. The methodology adopted will explore the social and physical remnants of the ruin that promote retention among the solidity and continuity of networks that bind urban bureaucracies, local industries and communities.Upon studying the site topography and networks in detail, these unique conditions pose a suitable setting for the Biomass Facility proposal. This program re-enforces the method of mimicking or mirroring the lost functions of the former buildings along the bank by taking advantage of the remaining infrastructures set in place

BUILDING AXONOMETRIC
PRELIMINARY MASSING



SITE AXONOMETRIC
BIOMASS ENERGY PLANT

The biomass plant is formed in such a way that the downward path of the artificial hill points towards the site, while the pathway of raw-materials entering the building lead upward towards the city. This strategy is to reinforce the balance between a space that encompasses both city recourses, raw materials and production with the flow of people and community into the site.

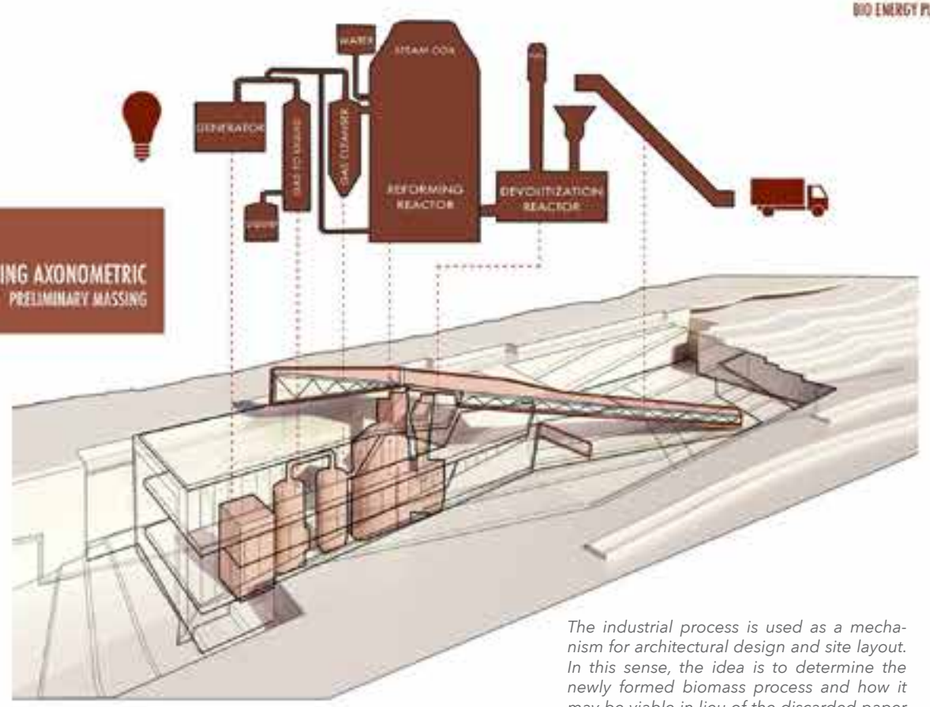
NIGHT PERSPECTIVE
south

PHANTOM INDUSTRY

BIOMASS PROCESS & FLOW

BUILDING AXONOMETRIC

PRELIMINARY MASSING

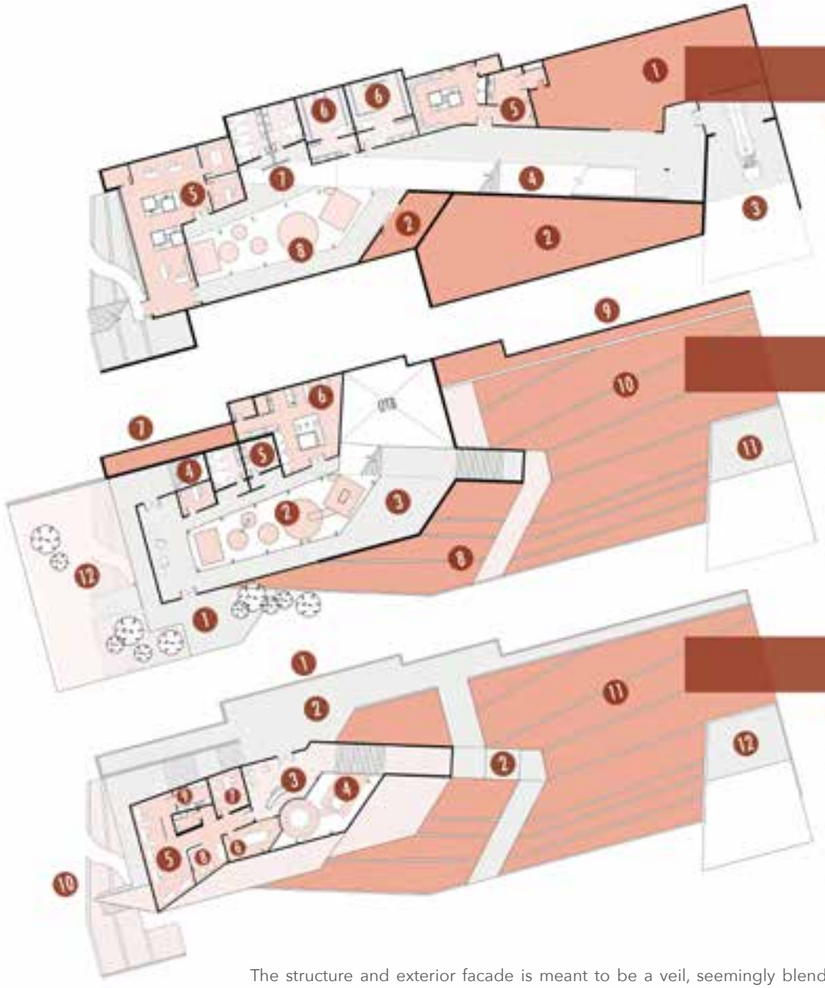


The industrial process is used as a mechanism for architectural design and site layout. In this sense, the idea is to determine the newly formed biomass process and how it may be viable in lieu of the discarded paper mill buildings.

MAN + MACHINE

Biomass energy production is a method of extracting energy by incinerating biomass products, which is then converted into either fuels or electricity. These products can range from compost to wood chips and agricultural byproducts, although wood remains the largest biomass energy source today. The energy created is clean and efficient, producing a substantially low emission of unfavorable toxins. Water is needed in the production of biomass energy in order to create steam that is then converted into electricity.

With this, the proposed biomass plant would generate power for the site along with neighboring communities. The plant would generate an incentive, as it would lower hydroelectric costs for the surrounding neighborhood. The site's proximity and existing railway connections with the operating fiberboard mill, (approximately 0.5km from the site) is an ideal source of raw materials for biomass production. Wood chips and other byproducts from the fiberboard mill would be transported by rail and utilized in the biomass energy production on the former St. Mary's Paper site. The biomass plant will also utilize the existing water in-take that once fed the former hydraulic grinder and beater room buildings. By refortifying existing connections and networks with the site, the livelihood of industrial heritage is therefore being maintained. These physical traces, although muted, can continue to connect past industrial uses with present state developments.



LEVEL 1

STORAGE + OFFICES

(1) Wood-Chip Storage; (2) Water Storage; (3) Service Entrance/Ramp; (4) Wood-Chip Conveyor; (5) Laboratory; (6) Locker Rooms; (7) Washrooms; (8) Machine Room.

LEVEL 2

OBSERVATION + LABORATORY

(1) Elevated Pathway; (2) Machine Room; (3) Observation Deck; (4) Office; (5) Washrooms; (6) Laboratory; (7) Duct/Pipe Space; (8) Hub-trail Connection Pathway; (9) Retaining Wall; (10) Remediation Park; (11) Service Entrance.

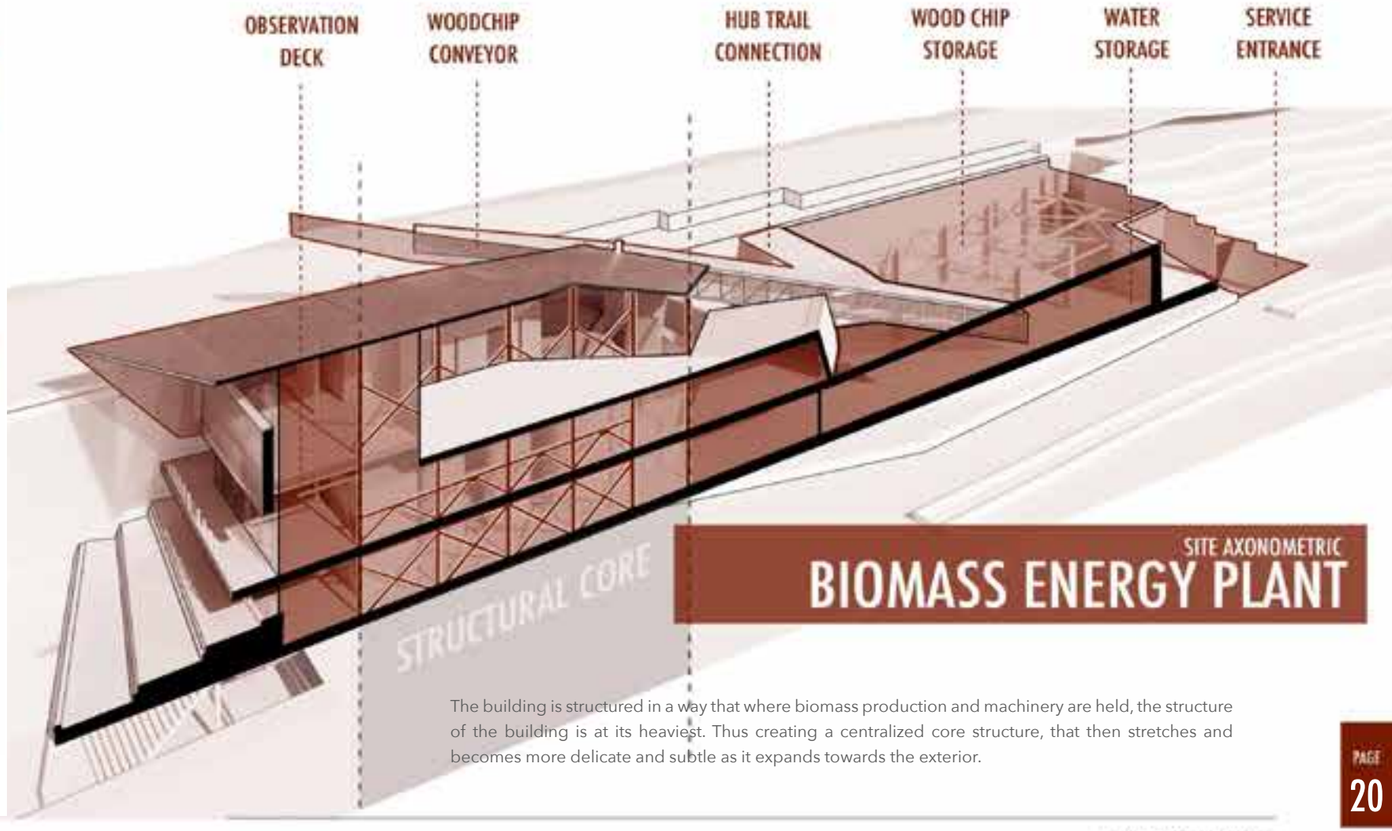
LEVEL 3

RECEPTION + OFFICES

(1) Existing Retaining Wall; (2) Pedestrian Hub-Trail; (3) Reception Desk; (4) Machine Room Atrium; (5) Open-Concept Office Space; (6) Boardroom; (7) Office; (8) Office Library; (9) Kitchenette; (10) Landscape Basin; (11) Remediation Park; (12) Service Entrance.

The structure and exterior facade is meant to be a veil, seemingly blending into the industrial and natural landscape, alluding to the ghostly presence of the former mill's built environment. The design is intended to integrate principles of industrial flow as well as to express the notion that this space holds strong connections to industry within architectural space.

The perimeter of the former foundation was strategically utilized for the basement level of the Biomass Facility. These foundation walls provide the enclosed space; its original fabric has not been changed. A landscape feature can be seen to the far left, and allows light into office spaces and the machine room. Space for wood chip and water storage are provided in conjunction with existing service pathways. While these spaces do not require light, they are strategically placed at the rear of the building.The ground level of the Biomass Facility primarily encompasses the observation deck, atrium for the machine room and the begging of the ascent for the remediation park hill and hub-trail pathway. The existing retaining wall can be seen at the rear, whereby the laboratory has direct contact with its surface and water-intake resource. From the laboratory and observation deck, views are provided towards the conveyor element and wood chip storage. In this sense, one is able to view the entirety of this industrial process from the ground level. An exterior deck wraps around the building between facility and landscape basin that provides access to the southern sector of the building. The second floor of the Biomass Facility is uniform with the level of the St Mary's River edge. The retaining wall acts as a barrier between the narrow strip of lands before the rapids and the pedestrian pathway. The remediation park hill allows for the safe passage of pedestrians from the top of the river edge to the interior of the site. At the final level of the facility, office spaces are provided for professionals in the renewable energy sector for the city. A reception desk is placed at the level of the pedestrian pathway to accommodate any individual seeking to take part in the observation deck exhibit found on the ground level.



SITE AXONOMETRIC

BIOMASS ENERGY PLANT

The building is structured in a way that where biomass production and machinery are held, the structure of the building is at its heaviest. Thus creating a centralized core structure, that then stretches and becomes more delicate and subtle as it expands towards the exterior.

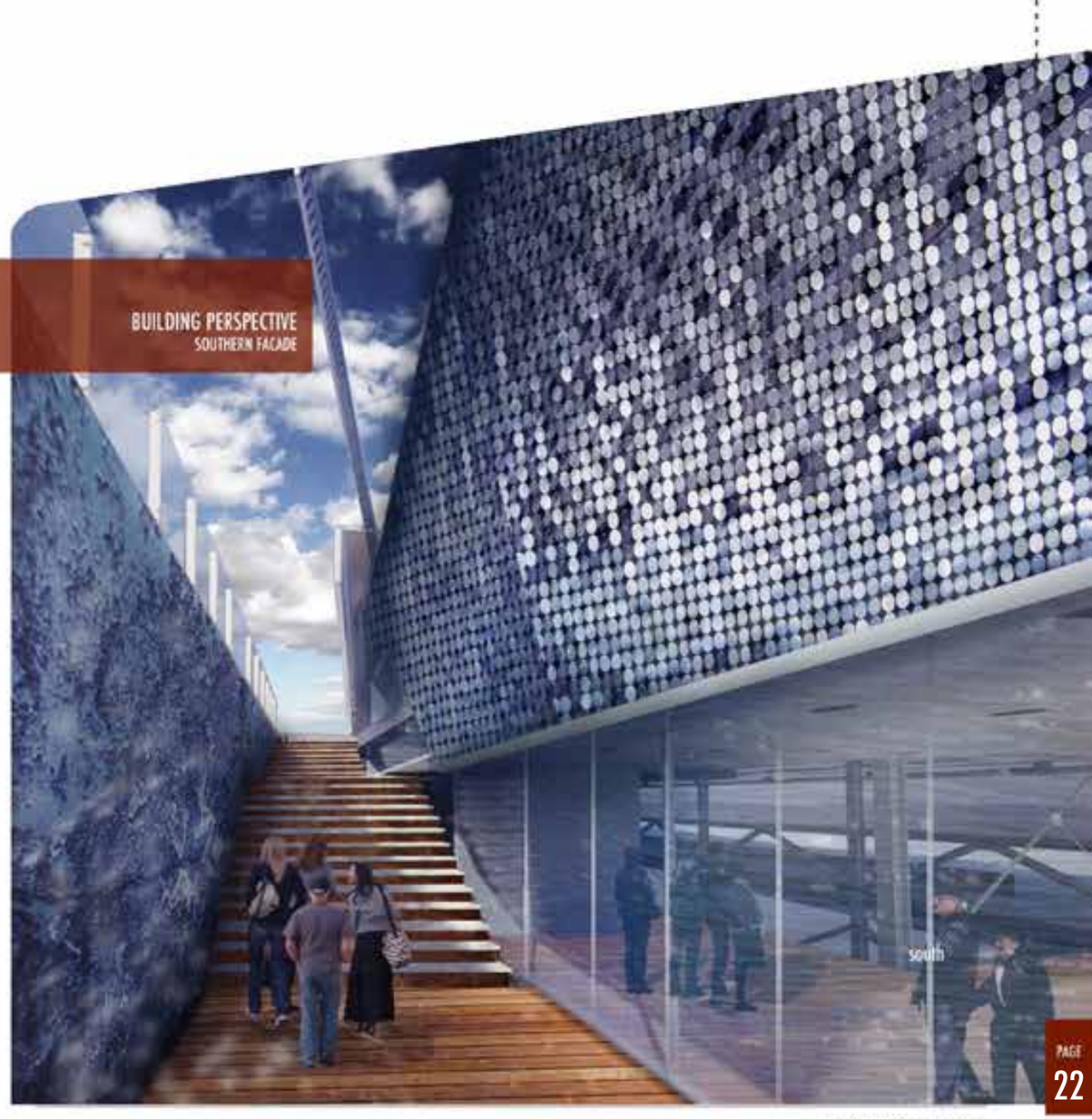
IN-BETWEEN SPACES

BIOMASS FACILITY

The exterior design embodies the creation of an arresting presence to beckon visitors, while simultaneously creating an awareness of how the building's pristine natural landscapes are conserved and re-adapted through biomass production. Sited between the existing foundation and neighboring wetland park, the building presents a low and subtle profile within the landscape that does not impede views towards Whitefish Island and the International Bridge. The 14,000 square foot structure is partially capped by a vegetated roof, which is intended to blend with the surrounding landscape. The biomass plants sits quietly under the artificial hill, and protrudes upward to allow light into the interior spaces. The location beneath the landscape takes advantage of the existing foundations, and is used to create the basement level of the facility. As such, the foundation transforms into a basin and is used partially as a landscape feature, along with the basement space of the facility. The strategy is to allow light to penetrate within the basement levels, while setting a natural environment for those working within the building.

The building is strategically peeled away only slightly from the former retaining wall, as the pedestrian pathway slices through a portion of the building along the southern face. This section of pathway presents the in-between space of the old structure and new intervention, whereby the former foundations are exposed to one side and the Biomass Facility façade to the other. The movement of the perforated aluminum panels gently dances in the wind and reflects light towards the corroding former retaining wall. A spectacle of chipped paint, rust and crumbled sections of the wall are mixed with a mosaic of refracted light as pedestrians move past. Their presence oscillates the billowing façade, bringing life and energy to the ruin and new intervention.

This strategy of peeling the building away is to not only to allow for pedestrian egress but also to maximize the amount of light entering the offices and industrial spaces. Landscaping next to the pathway is used to promote greener spaces along the riverfront, as well provide passive solar strategies with the use of shade from trees. Vantage points and sightlines into the interior of the facility are open for the public to view as they pass by the building and over the artificial hill. Thus emphasizing that the community' presence is one that is welcomed; accessibility is encouraged, whereby the site thrives on such social and communal companionship.



BUILDING PERSPECTIVE
SOUTHERN FACADE

5 REMEDIATION LANDSCAPE: CLEANSING ROOF

BUILDING SECTION

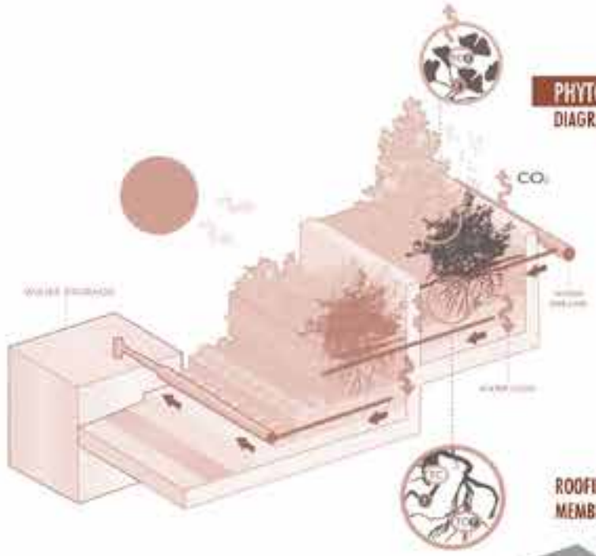
The process of remediating on site through phyto-remediation, cuts de-contamination costs by 60-80%.*

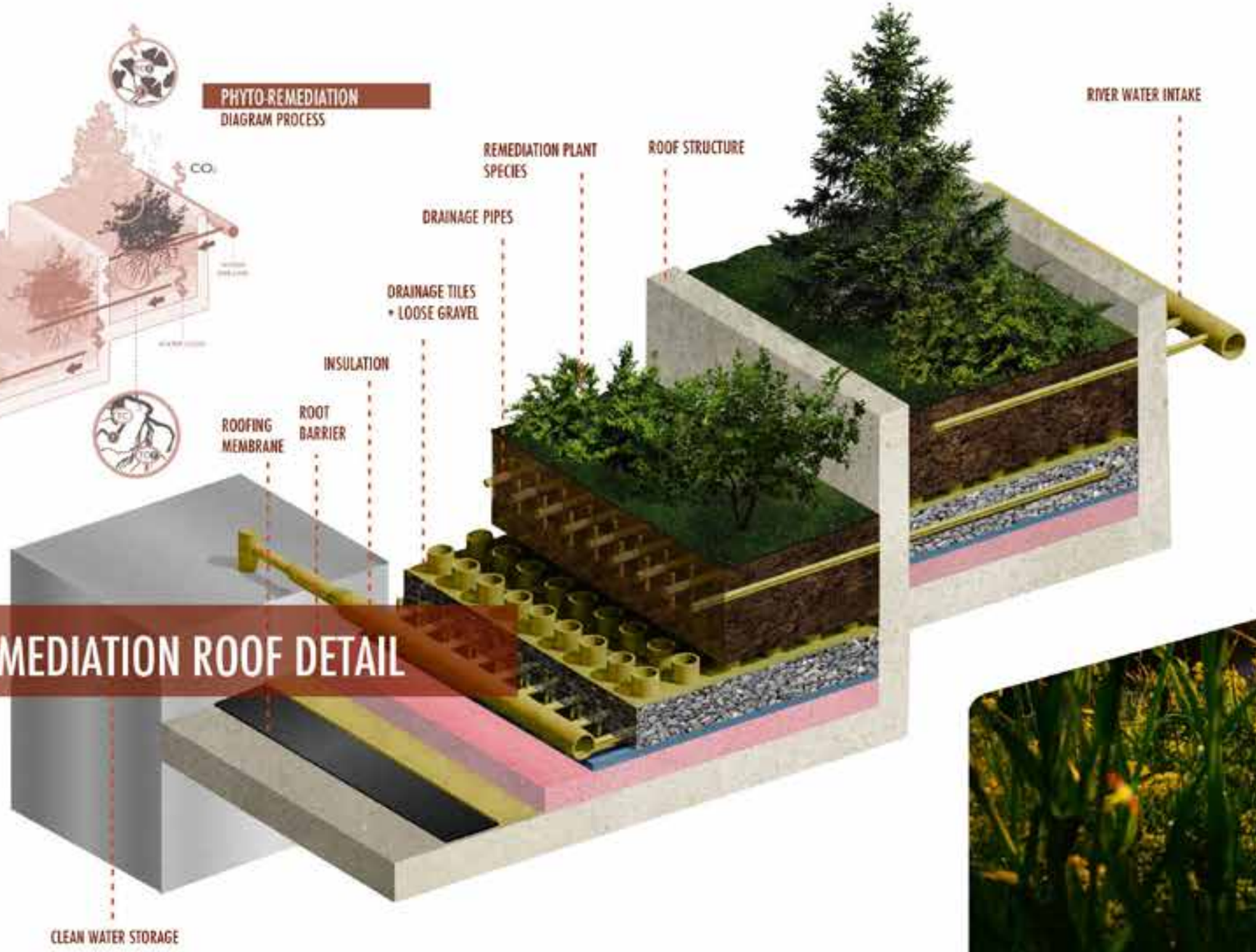
The most commonly utilized process for cleaning brown-field sites is referred to as the landfill process. Typically, contaminated soil on site is removed and transported by disposal trucks to a landfill site. The process therefore does not remediate the land, but simply displaces it. It is in essence, an "out of sight and out of mind" approach to remediation. In recent years, phytoremediation has emerged as a cost effective and sustainable technique for addressing land contamination. Although the properties of this process have been well known for decades in natural landscapes, it is only recently that it is being used in the context of the city. This particular method can be simply employed on site, therefore cutting transportation costs that are associated with landfill remediation techniques. Generally, the cost related with phytoremediation consists of 60-80% less than landfill processes. (Hollerung, 8) The economically feasible properties of this process are indeed persuading for investors seeking to develop prime contaminated land. The complication of such phytoremediation method is that you render valued and expensive land into parks, which typically do not generate income. Developers therefore are reluctant to use this process, unforgiving of sought-after park and landscaping spaces. The project proposes that when paired with a building development, the green roof system can therefore clean on-site contamination and eliminate the cost of landfill processes. The intent is to create a functional space that has the possibly of producing income while creating usable designed spaces. The roof system was strategically paired with the Biomass Facility, since plants that have decontaminated both soil and water can then be harvested and disposed for biomass energy production. My intention is to create a sustainable cycle between green roof and biomass production.

REMEDIATION PARK

This thesis, although focused on the developments of the St. Mary's paper site, addresses the impacts of industry on the city at large. The strategies proposed in the thesis are intended to give rise and breathe life into such municipal acts. The methodology for remediation used in this thesis will assess methods to incorporate building developments on brown-field sites and pair it with cost effective manners of remediating contaminated soil.

REMEDIATION ROOF DETAIL

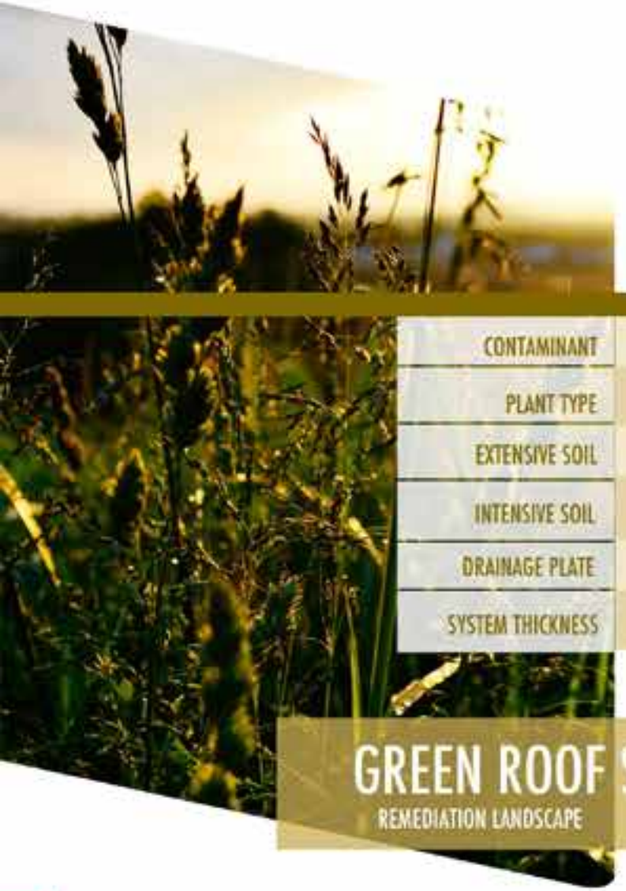




The detail illustrates the roof system infrastructure and construction materials. Water passing through the hydraulic system is filtered through different layers of soil and drainage membranes. Attention is placed on protecting the structure of the roof, as it is sealed with both root barriers and roofing membranes. Root depth poses an interesting condition for the green roof structure, as the depth of soil is strategically design to accommodate certain plan species.

REMEDIATION PROCESS

The architectural intervention proposes a functional green roof system; it utilizes the process of hydraulic controlled phytoremediation to decontaminate soil found on the site and contaminated water from the St. Mary's River. The way that it functions is that the stepping down allows for water to be passed through a series of canal systems while the plants leach out any toxins through osmosis or photosynthesis. The diagram to the left shows that water entering the site from the river is contaminated. Through a simulated hydraulic controlled remediation, water travels downwards and is cleansed until it is collected into clean water storage units for the use of biomass production. This mimics the slope of a hill that would be needed to de-contaminate both ground water and soil. Lastly, a detail of the roof was composed to give a sense of each layer and component. Water is carefully filtered through different layers of soil and drainage components, as shown in the section. A series of pipes were strategically designed to capture and move the water downward to reach water storage tanks, located in the basement of the Biomass Facility and subsequently used in the industrial process.



	ipomea alphina	common wheat	common ragweed	blue sheep fescue	pine, pinus	sunflower	willow tree
CONTAMINANT	Cu (Copper)	Pb (Lead), Mc (Mercury)	Pb (Lead), Mc (Mercury)	Pb (Lead), Mc (Mercury)	TCE (Trichloro-ethlene)	As (Arsenic)	TCE (Trichloro-ethlene)
PLANT TYPE	Sedium, Herbs	Sedium, Herbs, Perennials	Sedium, Herbs, Perennials	Sedium, Herbs	Grasses, Shrubs, Trees	Grasses, Shrubs, Trees	Grasses, Shrubs, Trees
EXTENSIVE SOIL	3"	5"	5"	3"	-	-	-
INTENSIVE SOIL	-	-	-	-	12"	12"	12"
DRAINAGE PLATE	1"	1-1/2"	1-1/2"	1"	2-1/2"	2-1/2"	2-1/2"
SYSTEM THICKNESS	4"	7"	7"	4"	15"	15"	15"

GREEN ROOF SPECS & PLANT TYPES

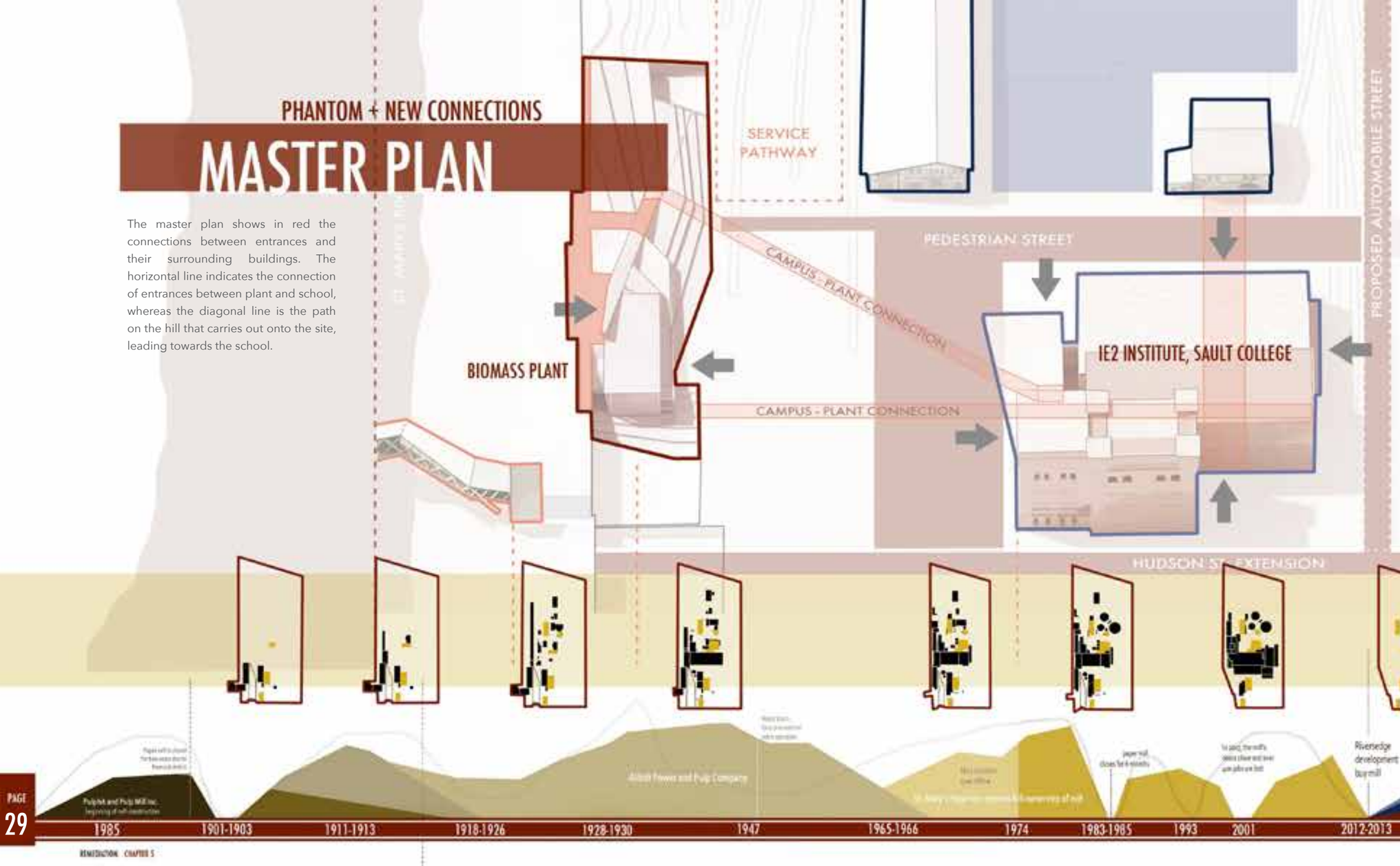
REMEDIATION LANDSCAPE

The following chart indicates which contaminant each species of plant is able to bind with, the type of plant- or root size, and the depth of soil needed for the species to thrive in a green roof system. The limitation of use with phytoremediation in a landscape project can only optimize the process based on the plants root depth. The proposed green roof controls and studies the appropriate root and soil depth in each canal system, whereby the plant is able to decontaminate the full extent of the soil. This chart is particularly useful, since the depth of the biomass roof landscape varies. With this, I was able to give specifics as to which plants would be situated where and how many different species were needed in each level to address and cleanse each contaminant listed above.

PHANTOM + NEW CONNECTIONS

MASTER PLAN

The master plan shows in red the connections between entrances and their surrounding buildings. The horizontal line indicates the connection of entrances between plant and school, whereas the diagonal line is the path on the hill that carries out onto the site, leading towards the school.

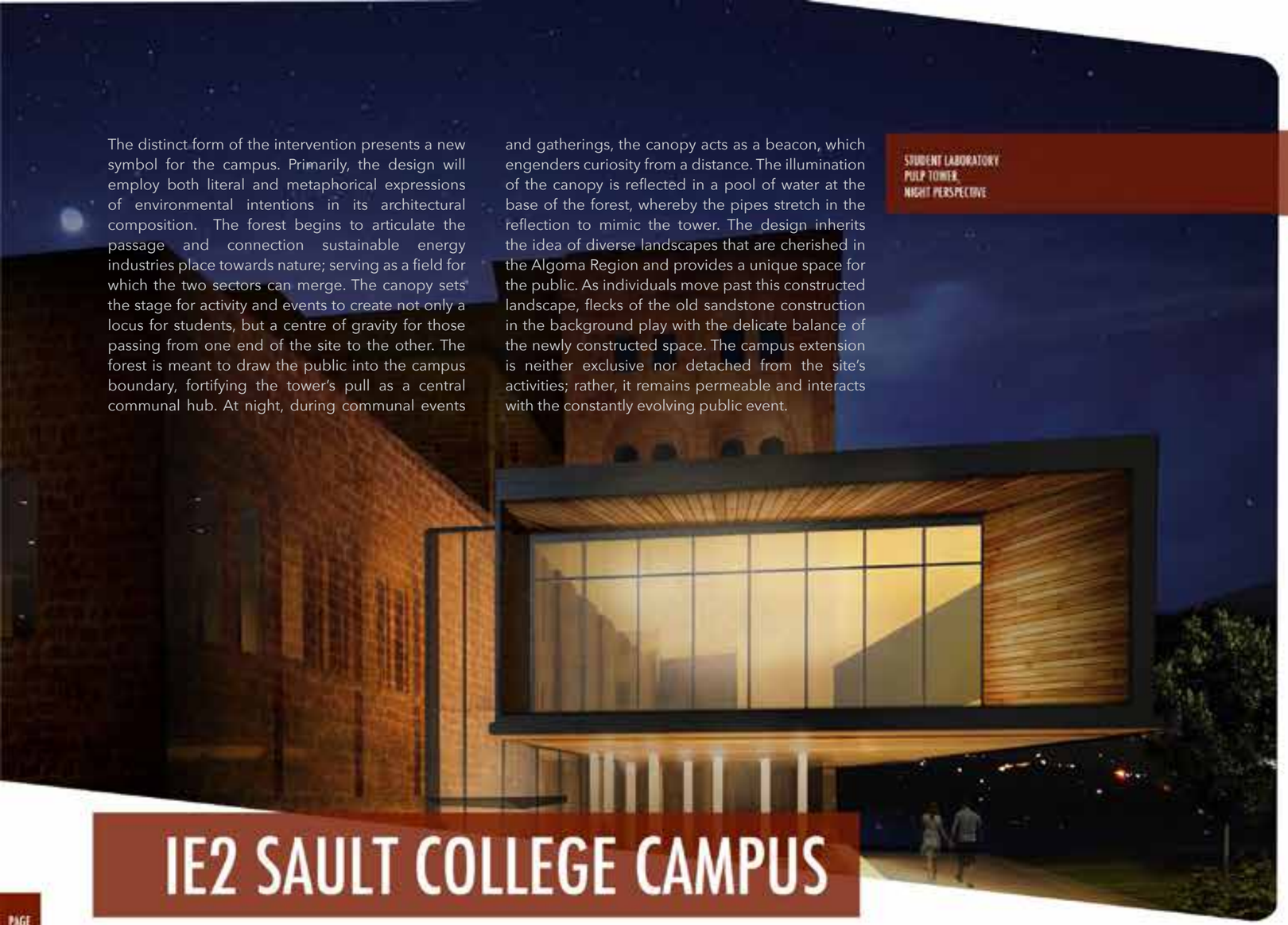


SITE DEVELOPMENT

The diagram below was created to map out the various periods and changes that the site has gone through. It's a way of understanding the life of the site in respect to time. The middle band is the timeline, and what I've done is divided and categorized groups of important key years. the graphs you see above the band shows the activity of the site, it shows when they were producing more or less paper or showing at what points the mill was closed. Each hue of green and yellow represent the different ownerships of the mill throughout its operating time. The plans at the top correspond to the period. This is to show the development and critical mass of the site with respect to time. The idea is to highlight what has lasted or has been created over the years, with regards to site development.

By looking into past plans, I was able to draw up and manifest the phantom spaces of the site. In doing so, I was able to understand the lost functions and salvage any remaining connections to the site. This graphic proved to be useful in analyzing where future developments should take place on site.

The distinct form of the intervention presents a new symbol for the campus. Primarily, the design will employ both literal and metaphorical expressions of environmental intentions in its architectural composition. The forest begins to articulate the passage and connection sustainable energy industries place towards nature; serving as a field for which the two sectors can merge. The canopy sets the stage for activity and events to create not only a locus for students, but a centre of gravity for those passing from one end of the site to the other. The forest is meant to draw the public into the campus boundary, fortifying the tower's pull as a central communal hub. At night, during communal events and gatherings, the canopy acts as a beacon, which engenders curiosity from a distance. The illumination of the canopy is reflected in a pool of water at the base of the forest, whereby the pipes stretch in the reflection to mimic the tower. The design inherits the idea of diverse landscapes that are cherished in the Algoma Region and provides a unique space for the public. As individuals move past this constructed landscape, flecks of the old sandstone construction in the background play with the delicate balance of the newly constructed space. The campus extension is neither exclusive nor detached from the site's activities; rather, it remains permeable and interacts with the constantly evolving public event.



STUDENT LABORATORY
PULP TOWER,
NIGHT PERSPECTIVE

IE2 SAULT COLLEGE CAMPUS

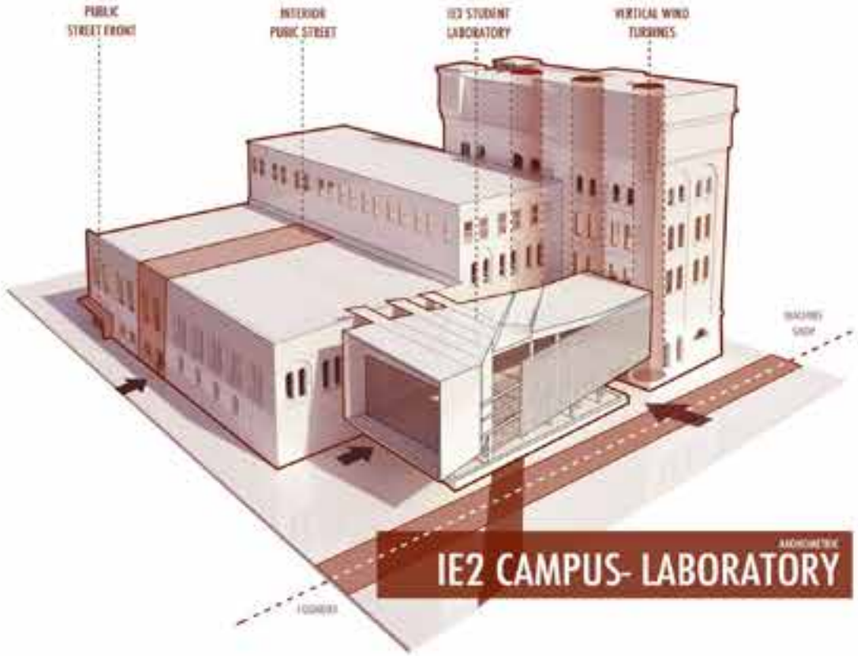
STUDENT LABORATORIES

BUILDING AXONOMETRICS

6

CAMPUS BOUNDARIES

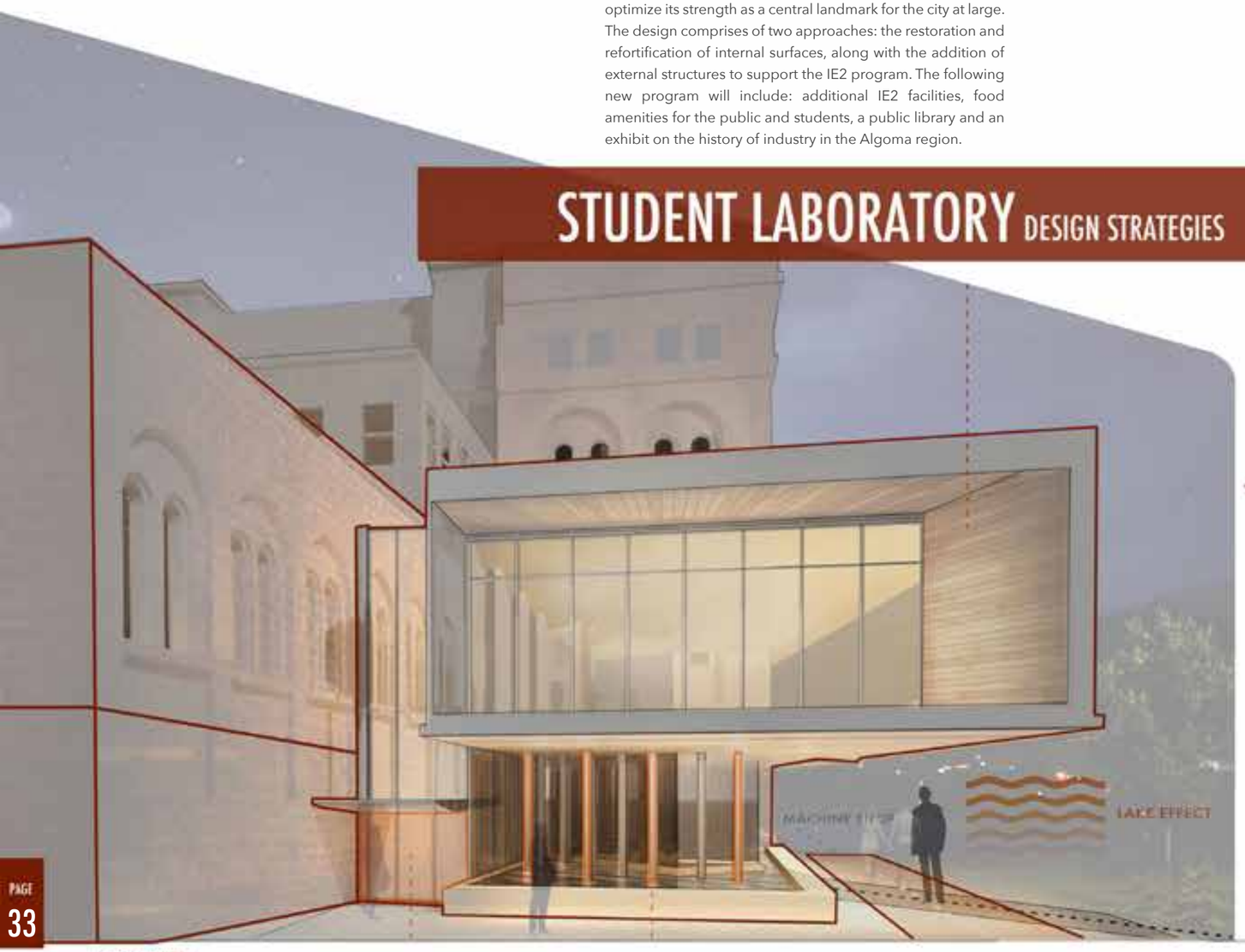
The addition to the Pulp Tower is to create a campus edge as a model for future development, while also providing a focal point that presents itself as a gateway into the campus. The addition will be situated within the rear court of the Pulp Tower; strategically, the building's length will take advantage of its southern orientation.



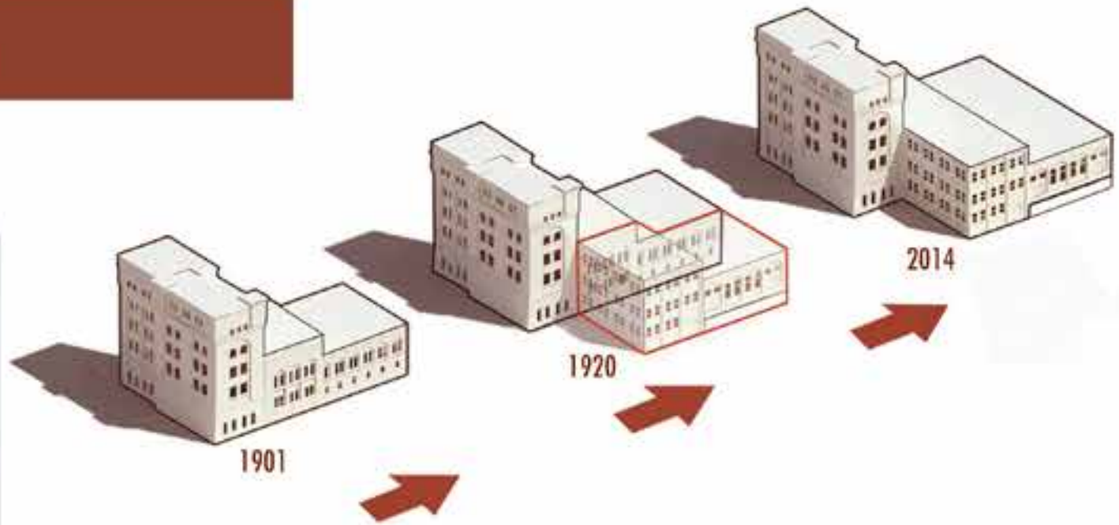
AXONOMETRIC
IE2 CAMPUS- LABORATORY

The intervention is set to re-adapt the Pulp Tower and optimize its strength as a central landmark for the city at large. The design comprises of two approaches: the restoration and refortification of internal surfaces, along with the addition of external structures to support the IE2 program. The following new program will include: additional IE2 facilities, food amenities for the public and students, a public library and an exhibit on the history of industry in the Algoma region.

STUDENT LABORATORY DESIGN STRATEGIES



PULP-TOWER EVOLUTION



The original Pulp Tower of the former St. Mary's Paper Mill was built in 1896, however the present form has been greatly adapted over several decades. Originally, the warehouse and shop rooms of the Pulp Tower were support areas for the storage of paper calendar machines. Along the back interior walls of the warehouse, the old façade of a past tower iteration is still present within the centre of its space. The faint signs of in-filled windows, of awkward passageways and staggered floor plates are all indications of its evolutionary construction. Prior to 1920, the tower's shop component had been added to accommodate the installation of new and larger machinery. This addition remains to date, next to the tower. The priority of the intervention within the warehouse is to restore the former street along the old façade. The project has therefore been designed as a delicate balance between intervention and preservation. The enclosed space of the internal street consists of a total of 3800 square feet and has been created by pulling away a single floor plate from the load-bearing wall of the original warehouse facade. This atrium features a large glass-covered roof that floods light onto the former façade, alluding to the experience of the once open streetscape.

GROUND FLOOR

The ground floor is designed to accommodate a variety of different programs, featuring an interior street that acts as a central means of egress throughout the building. The enclosed space of the street consists of 3800 square-feet. The atrium features a large glass covered roof, whereby light penetrates onto the former façade and sets the atmosphere. In order to promote energetic flow within the ground level, commercial and public spaces make up the street front. This street front encompasses a café and public library by which these programs are provided with direct access and views into the interior street. A covered entrance to the east acts as a secondary street from outside the edifice, the strategy is to beckon visitors towards the internal street and draw attention to its centre. Given the relative footprint of the tower, it has been strategically designated as a circulation space that will double as an exhibit venue for the Museum of Industry and Innovation. Classrooms and an open lecture theatre are provided towards the southern sector of the Pulp tower. The proximity of these spaces with the tower extension begins to inform the campus boundary for the Institute of Energy and Environmental Studies (IE2).

(1) Café; (2) Library Reception; (3) Library Space; (4) Reception Office; (5) Tower exhibit; (6) Sunken Theatre; (7) Classrooms; (8) Internal Street; (9) Laboratory Staircase; (10) The Forest.

BASEMENT FLOOR

Within the central core of the building, a sunken theatre provides space for student presentations and communal exhibits. Thus alluding to the conception of a grotto that is interwoven into the tower or belvedere. Views and entrances towards the grey water machine room are accessible from this level. A staircase, that can only be accessed by students, diagonally slices through the tower extension and leads towards student laboratories above. The intent is to expose student activity and the internal networks of the building.

(1) Sunken Theatre; (2) Laboratory; (3) Grey Water Machine Room; (4) Laboratory.

LIBRARY STAIRCASE
INTERIOR RENDERING

GROUND LEVEL

PUBLIC INTERIOR STREET

The design methodology for the second floor is to continue promoting public flow and density between each designated program, while also defining boundaries between sectors. Public egress within the building does not impede on its original fabric (bearing and existing walls are denoted as thick black walls on the plan below). Since the library is inherently a surveyed public space, the design strategy accommodates the influx of flow in a defined space. For this reason, a helix staircase provides circulation from within the library, while also allocating access from the interior street towards other sections of the building. The second floor level features a bridge system that traverses over the street, connecting the north and south sectors. Towards the rear of the building, student laboratories can be accessed through a central corridor or tower egress. The facility is divided into student laboratory classrooms and a private laboratory.

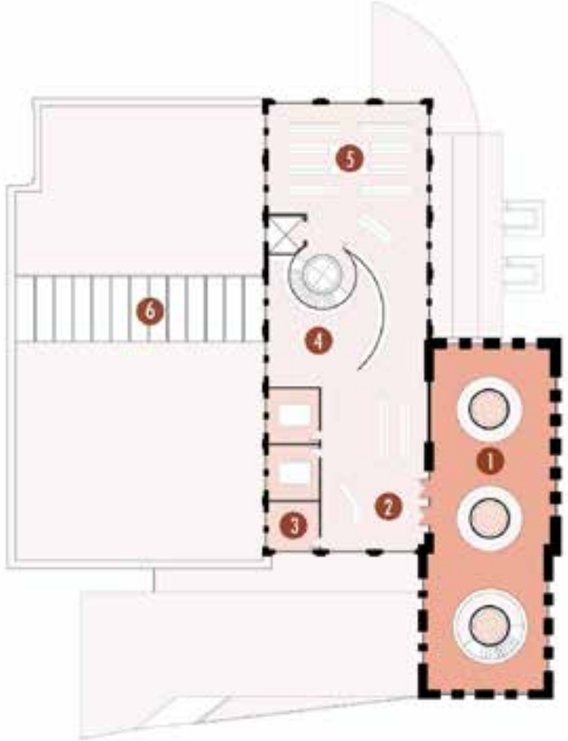
SECOND LEVEL

(1) Internal Street; (2) Public Library; (3) Recreational Rooms; (4) Offices; (5) Classroom; (6) Student Computer Room; (7) Classroom; (8) Student Laboratory Classroom; (9) Private Laboratory; (10) Student Café; (11) Tower Exhibit.

The seven-storey Pulp Tower is strategically re-adapted into circulation and exhibit spaces. Since the space in the tower is limited as a result of voids created by three dismantled pulp vessels (voids are indicated within the tower), an exhibit is paired with circulation space to encourage a higher volume of public flow. The exhibit showcases the industrial history of the city and Algoma region, beginning with agricultural innovation and ending with exhibits on sustainable energy industries. The final floor of the library extends above the internal street to then connect to the tower and student spaces. Since this space provides sunlight from each orientation, reading rooms and study spaces are located on this level.

THIRD LEVEL

(1) Tower Exhibit; (2) Library Reception; (3) Study Rooms; (4) Reading Area; (5) Library; (6) Skylight Roof.



INTERIOR RENDERING
TOWER EXHIBIT+CAFE

THIRD LEVEL

TOWER EXHIBIT SPACES

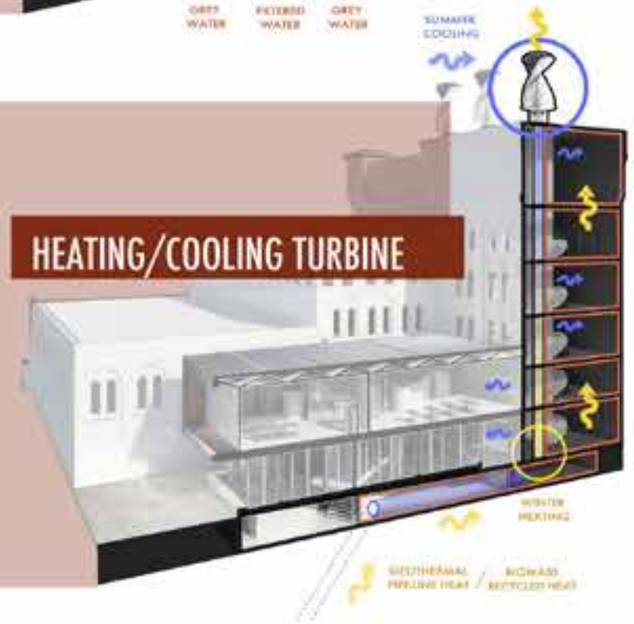
GREY WATER SYSTEM

The strategy for this intervention utilizes a grey water system that is exposed by the architectural composition and acts as a means for educating students while creating unique spaces for the community. In the student laboratory and private laboratory spaces, water piping is connected with a grey water system that leads water down through the artificial forest. The water is then filtered and cleaned in the machine room located on the basement level and redirected back to the laboratories. For this reason, pipes are exposed under the laboratory volume, uncovering the inner system and creating an added educational value.

HEATING/COOLING TURBINE

As prescribed in the mandate for Sault College's campus growth, they have proposed that an energy-generating wind turbine be constructed on the new campus grounds. While these turbines are quire loud and require an extensive amount of space, the design encompasses the use of vertical turbines used in constructed towers. . This wind-powered technology is designed to ventilate airflow through building ducts throughout the building, meanwhile generating electricity.

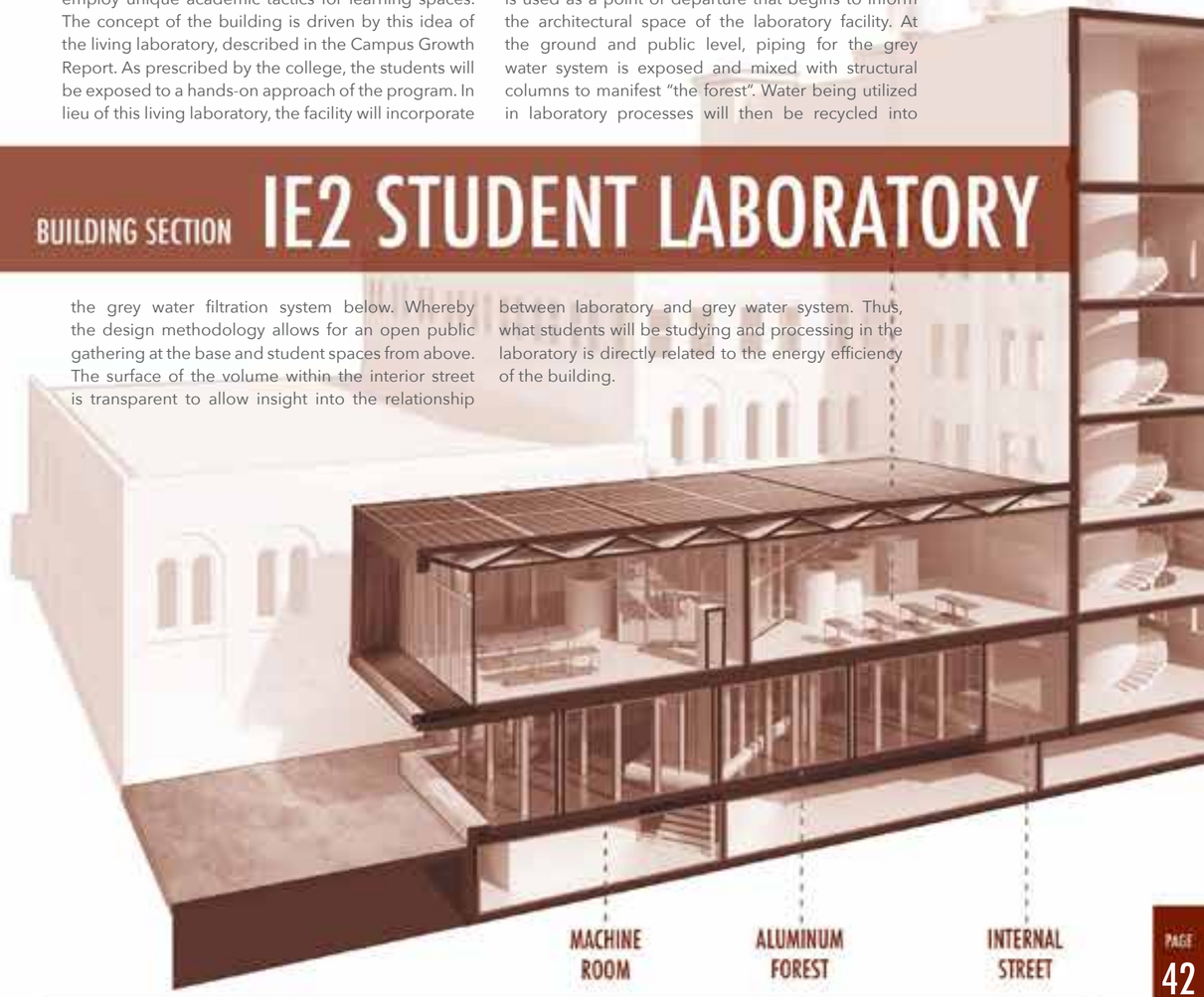
The tower serves as the ideal vessel to hold such vertical wind turbines that can be effortlessly paired with circulation spaces. Geothermal piping gathers waste-heat from the biomass production and channels its energy towards the tower during winter months to heat the space; while in the summer months, the wind turbines gather hot air from within and direct it outward. These turbines, through wind power, generate energy for the surrounding buildings and Pulp Tower.



BUILDING SECTION IE2 STUDENT LABORATORY

The Institute of Energy and Environmental Studies facility intends to provide an armature of green building systems, such as vertical wind turbines to employ unique academic tactics for learning spaces. The concept of the building is driven by this idea of the living laboratory, described in the Campus Growth Report. As prescribed by the college, the students will be exposed to a hands-on approach of the program. In lieu of this living laboratory, the facility will incorporate the grey water filtration system below. Whereby the design methodology allows for an open public gathering at the base and student spaces from above. The surface of the volume within the interior street is transparent to allow insight into the relationship between laboratory and grey water system. Thus, what students will be studying and processing in the laboratory is directly related to the energy efficiency of the building.

student curriculum with building techniques and constructions for the design of new laboratory spaces. In this particular intervention, the grey water system is used as a point of departure that begins to inform the architectural space of the laboratory facility. At the ground and public level, piping for the grey water system is exposed and mixed with structural columns to manifest "the forest". Water being utilized in laboratory processes will then be recycled into



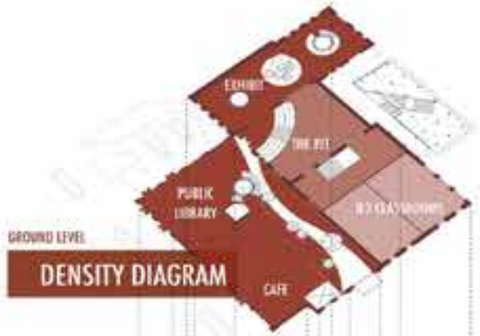
PULP TOWER

STUDENT LABORATORY FACILITY

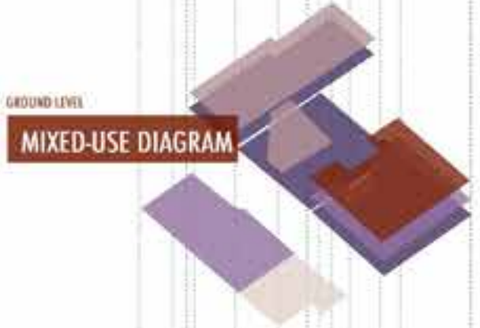
BUILDING PERSPECTIVE
SOUTHERN FACADE, THE FOREST

The space in which the forest rests was conditioned by the need to respect the original pathways and guidelines set by Clergue. For this reason, the campus boundary extends out over the pathway, creating the presence needed for a campus gateway. This cantilevered space runs the entire perimeter of the southern face, creating a sheltered corridor while resolving at the base to form the forest. The simplicity of the form articulates and integrates the two volumes of solid space above and open below. The result of such interior streets and public egress is to interconnect interior and exterior spaces, which trigger diverse activities and generate an informal opportunity for learning that creates a narrative between space and community. The profile of the building at the south is enclosed by a similar hinged sunscreen system used in the Biomass Facility.

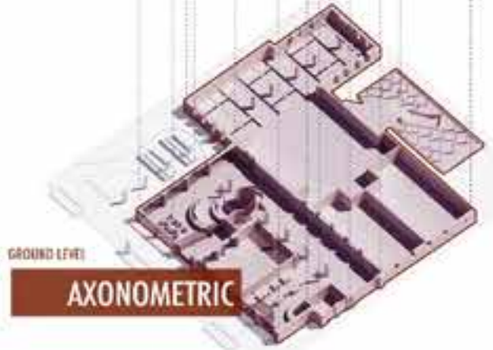
The horizontally mounted blades of the façade gently move with the wind. For the college, this articulated façade serves as a means to viewing directly the faculty of wind generated energy. With this, students are able to comprehend that the wind turbines generate more energy when the facade becomes illuminated and active. There is a direct correlation between outside environmental activity, and energy generation while also becoming a spectacle for those passing by. The façade not only regulates internal luminosity but also re-directs the sunlight towards the center of the square between the Institute of Energy and Environmental Studies facility and Biomass Facility. A rippling of light onto the square resonates (as seen in Figure 8.4.5) and injects life onto what had once been a dense assemblage of industrial buildings.



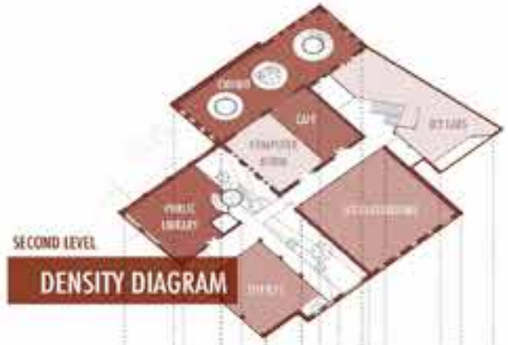
GROUND LEVEL
DENSITY DIAGRAM



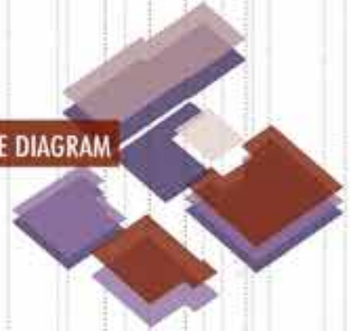
GROUND LEVEL
MIXED-USE DIAGRAM



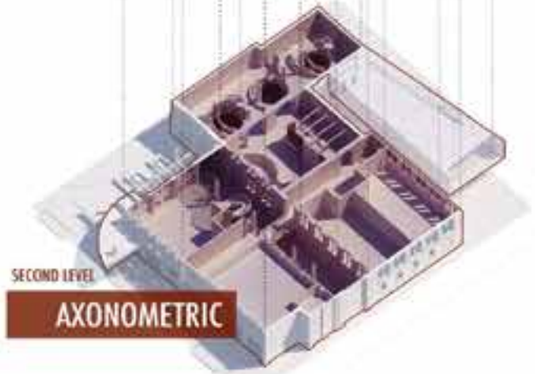
GROUND LEVEL
AXONOMETRIC



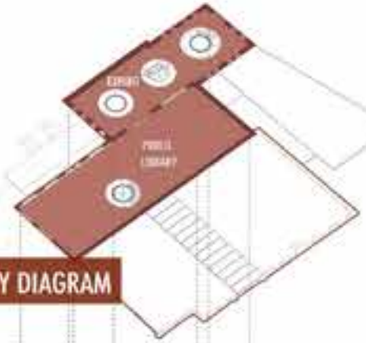
SECOND LEVEL
DENSITY DIAGRAM



SECOND LEVEL
MIXED-USE DIAGRAM

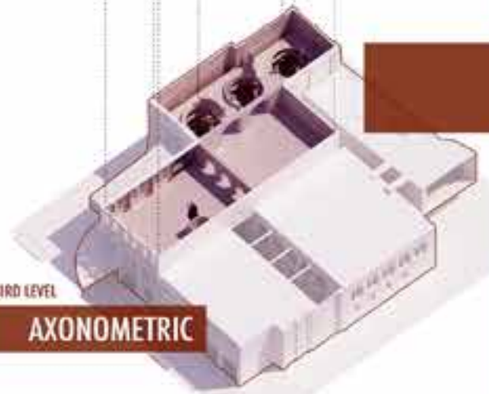


SECOND LEVEL
AXONOMETRIC



THIRD LEVEL
DENSITY DIAGRAM

THIRD LEVEL
MIXED-USE DIAGRAM



THIRD LEVEL
AXONOMETRIC

The following info-graphic diagram attempts to demonstrate and analyze various interwoven programs and the density associated with layering multi-use spaces. In order to sustain a sufficiency and thickness of occupancy in the building, certain programs mesh together with others. The premise is to design spaces that promote social encounters among varying demographics. This opportunistic overlap allows for the density of use to be strengthened, as the space is meant to generate communal energy.

MULTI-USE
PROGRAMMING

- ICI CAMPUS FACILITY
- PUBLIC/COLLEGE LIBRARY
- INDUSTRIAL INNOVATION EXHIBITS
- CAFE/ RESTAURANT
- COMMUNITY SOCIAL PROGRAMS

DENSITY
OCCUPANCY DIAGRAM

- HIGH DENSITY
- MEDIUM DENSITY
- LOW DENSITY

DENSITY + MULTI-USE
SUSTAINABLE SPACES

The diagram analyzes the location of each program, its multi-use and density associated with that space. The renderings at the bottom of the diagram give a sense of space and volumes found on each level. A simple outline of each dedicated space is then extruded from the rendering and assigned a color based on its program. If the space is used for a multitude of different programs, the diagram will present itself with layered outlines that are associated with the programs colors. The intent of this visual display is to demonstrate the multi-use of each expanse and the implied necessity towards spaces that must be stacked in order to generate a desired density. The final image above demonstrates the density associated with each space and its occupancy as a gradation that become darker in conjunction with heightened tenancy.

Carleton
UNIVERSITY