

Stewardship of the City

A Diachronic Approach to Ottawa's Federal Brownfield Network

by

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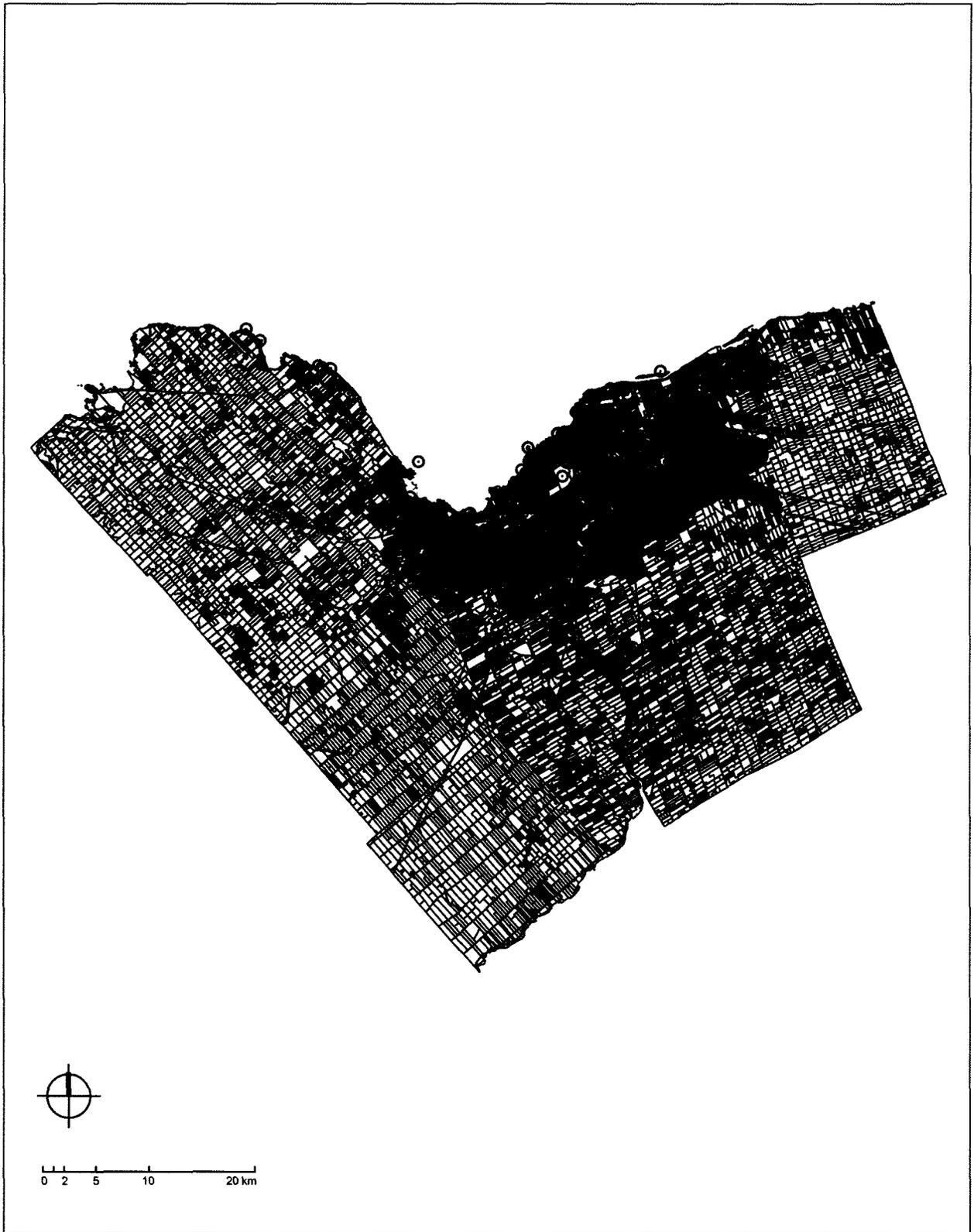


Fig. 1

Ottawa Federal Contaminated Sites (with Greenbelt), 2011

Abstract

In several Canadian cities, economic outsourcing practices have resulted in a de-industrialization of the urban fabric. Migration of production has led to a surfeit of formerly industrial properties, referred to as *brownfields*, sitting empty. They are “abandoned, idle or underutilized commercial properties where past actions have caused known or suspected environmental contamination, but where there is an active potential for redevelopment.”¹

Exploring Gianni Vattimo’s notion of *il pensiero debole* (weak thought) as a point of departure, the thesis proposes leveraging the practice of phytoremediation (the use of trees and plants to sequester or degrade contaminants) as a generative agent for a larger urban process of redevelopment and stewardship. Challenging the temporal frame within which architectural design traditionally operates, the project suggests a 50-year vision of how a network of federally owned brownfield sites in Ottawa might be cultivated.

Notes:

¹ National Round Table on the Environment and the Economy. *Cleaning up the Past, Building the Future* (Ottawa: NRTEE, 2003), ix

To Dr. Steve Fai, for the conversation, the scotch, and putting up with all prior iterations of this work.

To my family, for their enduring support when it was needed most, as well as those loved and gone.

And to my friends.

Thank you.

This is what I mean when I say I would like to swim against the stream of time: I would like to erase the consequences of certain events and restore an initial condition. But every moment of my life brings with it an accumulation of new facts, and each of these new facts brings with it consequences; so the more I seek to return to the zero moment from which I set out, the further I move away from it.....

Italo Calvino, *If on a Winter's Night a Traveler*

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Prologue

As Canada outsources its heavy manufacturing to the rapidly growing powerhouses of China and India, helped along by the Knowledge Revolution and the growth of the service industry, a progressive abandonment of industrial sites in and around major urban centers has led to large areas of developed land sitting idly vacant. Vacancy, in this case, does not always refer to the absence of buildings. Quite often, the buildings which once gave meaning and purpose to the land they occupy are still standing. It is a vacancy of use. Most recently, the global economic crash has had a devastating effect on Ontario's economy, crippling the manufacturing sector and creating a budget deficit of 18.7 billion dollars, projected to last until 2018.¹ This decline in industry has led to the abandonment of industrial land, a pattern which will most likely continue into the foreseeable future. These sites, commonly referred to as *brownfields*, are defined by Canada's National Round Table on the Environment and Economy (NRTEE) as "abandoned, idle, or underutilized commercial or industrial properties where past actions have caused known or suspected environmental contamination, but where there is an active potential for redevelopment."²

Part 1 begins with a macroscopic examination of brownfields as a categorical urban condition. By looking at the etymological origins of the term itself, born from the slowly evolving cultural shift in North American and European thought towards an environmental consciousness during the 1970s, and taking a brief but comprehensive look at Canadian policy at all three levels of government, the thesis situates brownfield development within a much larger political and cultural landscape. Narrowing focus to the scale of the city, we shall then examine perceived urban benefits of brownfield remediation, with specific interest given to the environmental, social and economic implications as outlined within Ottawa's official municipal policy.³ Concluding with an overview of available techniques for remediating contaminated land, Part 1 summarizes the newly emerging practice of phytoremediation as an ecologically-based, long-term approach to site healing and development.

Utilizing Ferdinand de Saussure's method of *diachronic analysis* as an over-arching temporal paradigm, Part 2 draws an implicit, analogous relationship between Gianni Vattimo's concept of *il pensiero debole*, or weak thought, and architectural development through time. While critically comparing Vattimo's idea with subsequent direct and indirect interpretations (Ignasi de Solà-Morales' *weak architecture*⁴ and Jeremy Till's *thick time*⁵, respectively) the thesis speculates on what a "theory of weakening"⁶ might entail when applied to the remediation of urban sites, suggesting that building be conceived not as a relatively singular temporal event, but rather as an *event-process*. Instead of seeking a universal architectural or remedial solution at a specific point in time, this strategy is one which unfolds and adapts to continuously shifting site conditions. In order to further augment this diachronic understanding, works by John Hejduk and Cedric Price, along with the Dining Hall of New College, Oxford, will serve as precedents. While the projects all explicitly acknowledge time as a dominant force, the relationship between architectural determinacy and contextual contingency manifests itself uniquely in each.

Part 3 introduces the project site areas; the Booth Groundwood Pulp Mill No. 1 located on the south-eastern shore of Chaudière Island, and a collection of five sites on the periphery of LeBreton Flats, currently listed as part of the Federal Contaminated Sites Inventory (FCSI). Providing a historical overview of Chaudière Island and chronicling its trajectory from a dominant industrial hub to contemporary urban wasteland, Part 3 helps to locate the subsequent thesis project within a broader temporal context.

Applying the theoretical construct of *event-process* as a generative framework for the urban redevelopment of the Booth Mill and contaminated sites in the LeBreton area, Part 4 outlines the thesis project in two parts, each with a differing, yet inter-related, relationship through time. With respect to the Mill, it is proposed that the building initially be renovated from its current derelict condition into a laboratory responsible for applied phytoremediation research, as well as providing environmental site testing and monitoring services. In conjunction, the contaminated site network will provide ground for the Mill on Chaudière Island to conduct urban phytoremediation field research and testing.

Envisioning the project as an evolving process¹, following the framework established in Part 2, the next phase of the thesis design proposes converting remediated (or partially remediated) brownfield sites into softwood timber plots, with the intent to provide historically significant buildings within the city their own source of lumber for renovation and maintenance purposes. Facilitating this process, and as part of a “weakened” architectural network, the project suggests a series of multi-function and multi-state pavilions. The Dry Pavilion and the Waterblade Pavilion each play a specific role in the overall phytoremediation and timber-growth processes taking place on site. Concluding the scope of this design exploration is the House of Revelry, a pavilion designed to be built as part of Canada’s bicentennial celebration in 2067. While not intended to be a definitive termination of this particular urban process, it is here where the projective gaze of our architectural prognostication rests.

Notes

¹ Tavia Grant, ‘Facing Years of Deficits, Ontario Freezes Wages’ *Globe and Mail*, March 25, 2010

² Christopher de Sousa *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam: Elsevier, 2008), 2-3

³ City of Ottawa *Brownfields Redevelopment Community Improvement Plan*, (Ottawa, ON: City of Ottawa, 2010), iii

⁴ Ignasi de Sola-Morales *Differences* (Cambridge, MA: MIT, 1997), 57

⁵ Jeremy Till *Architecture Depends* (Cambridge, MA: MIT, 2009), 95

⁶ Gianni Vattimo, *Belief* (Stanford, CA: Stanford University Press, 1999), 40-1

1.0 introduction

The term *brownfield* dates to the 1970's, when it was coined as part of the phrase *brownfield expansion*, used by the American steel industry in referring to the modernization of existing plants.¹ Since then, much debate has gone into the definition and as to what conditions denote a property as brownfield land. Canada's National Round Table on the Environment and the Economy (NRTEE), in 1998, described brownfields as "abandoned or under-used properties where past actions have caused real or suspected environmental contamination" and as sites which "are mainly located in established urban areas, where existing municipal services are readily available..."² The most recent definition of the term in a Canadian context is that put forward by NRTEE in 2003: "Abandoned, idle, or underutilized commercial or industrial properties where past actions have caused known or suspected environmental contamination, but where there is an active potential for redevelopment."³

Symptomatic of a wider public environmental consciousness awakening during the 1970s, contaminated land issues garnered community outrage and interest with high-profile cases like the Love Canal incident in upstate New York. A site once used as a hydro corridor between the upper and lower Niagara Rivers was turned into a chemical dumpsite, then covered with earth and sold by its owner, the Hooker Chemical Company, to the city in 1953.⁴ Shortly thereafter, roughly one hundred homes and a school were built on the site, and twenty-five years later residents made the discovery that toxic chemicals were leaching through the soil and percolating up into their backyards.⁵ President Jimmy Carter declared a state of emergency at the site, prompting the US federal government to temporarily relocate approximately seven hundred families from the area. The Love Canal site was added to the Environmental Protection Agency's (EPA) list of sites needing cleanup in 1983, which in turn had been enabled by the Superfund initiative legislated in 1980.⁶ Within Canada, the Sydney Tar Ponds is another extreme case of brownfield land. Situated on Cape Breton Island in Nova Scotia, the site is considered to be one of the largest contaminated areas in North America, due to a longstanding tradition of steelmaking dating back to 1901.⁷ Production ceased in 2001,

and in 2004 the federal government partnered with the province of Nova Scotia to undertake a 400 million dollar, 10-year remediation plan.⁸ It is estimated that 700,000 tonnes of contaminated sediment exist over an area of 31 hectares.⁹

As the geographer Christopher de Sousa remarks, the term *brownfield* “avoids the negative connotations with the word contaminated and constitutes a semantic counterpart of *greenfield*, a clean agricultural land site within the urban periphery.”¹⁰ The spectre of contaminated land and its associated risks, cleanup and extra labour costs have traditionally kept buyers and potential real-estate developers at bay, but an increase in governmental initiatives is making re-development of these sites more investor-friendly and potentially more lucrative. Global living trends, to which Canada is no exception, are also adding further interest and subsequent pressure for brownfield redevelopment. It is estimated that 80% of Canadians live in 33 urban centres of over 100,000 people each.¹¹ With cities increasing in population, inevitable strains on housing stock, as well as “hard” and “soft” municipal services like roadway infrastructure or local schools are bound to reveal themselves. As a result, incentives at the local level of government in conjunction with provincial support are giving increased encouragement for residential development of brownfields, focusing on economic benefits and lining municipal coffers with an increased property tax base.

One of the biggest categorical barriers to re-using brownfield properties has been the cost and associated risk of remediation activities. Sites which have hosted decades of industrial activity, especially those pre-dating the environmental movement and push for increased regulation of the 1970s, are left with hidden scars buried within their soil and groundwater. While traditional methods of site cleanup have relied heavily on energy-intensive practices such as topsoil removal and soil capping, contemporary thought regarding “sustainable” development is beginning to question the validity of such approaches. Emerging remediation techniques which promote in-situ cleanup, such as phytoremediation (the process of using tree or plant species to remove, sequester or degrade contaminants) and bioremediation (utilizing bacteria compounds to metabolize common pollutants such as petroleum products) are gaining traction as cost-effective, innovative solutions.

The legislative framework surrounding brownfield redevelopment is fairly complex and consists, for the most part, of partnerships between provincial and municipal levels of government. While the federal government has constitutional rights over matters of the environment, it relegates primary legislative power on this issue to the provinces, which in turn are responsible for developing their own laws.¹² Limited federal involvement is also symptomatic of a recent political trend of 'downloaded' responsibility.¹³

It is not without irony that the most comprehensive public-access database in Canada details brownfield properties owned or leased by the federal government. The Federal Contaminated Sites Inventory (FCSI) is a descendant of the National Contaminated Sites Remediation Program (NCSRP) which sought in the early 1990s to develop a uniform system of data-gathering with regards to brownfield properties across the country. The NCSRP was established through the Canadian Council of Ministers for the Environment (CCME), a collective body incorporating provincial environment ministers designed to liaise with the federal government.¹⁴ The program was designed to focus on high-priority "orphan sites," for which no liable party could be found. Under this initiative, a total of 45 sites across the country were remediated, and 55 other projects were undertaken in order to demonstrate and field-test remediation techniques.¹⁵ The outcome of this collaboration was a partial failure, because the provinces refused to agree on the potential scope and use of such an inventory.¹⁶ Although the NCSRP was dissolved in 1995, one of the successes of the program was the implementation of a documentation and classification system for contaminated sites which the federal government had assumed ownership or tenancy of. From 1995 onwards, the next stage of federal involvement in brownfield classification and monitoring was through an inter-departmental group of site custodians, known as the Contaminated Sites Management Working Group (CSMWG).¹⁷ In 2002, governmental auditors including the Auditor General and the Commissioner of the Environment found the group to have both a lack of financial efficiency and any overtly clear mandate, pressuring the federal government to retool its approach.

Currently, the over-arching federal program designed to assist the government in the assessment and remediation of its own property is the Federal Contaminated Sites Action Plan (FCSAP). This initiative is geared towards addressing “the risks that these sites pose to human health and the environment [and to support] other socio-economic outcomes, such as [the] training and employment of Canadians and promotion of innovative technologies.”¹⁸ As part of the FCSAP, and following criticism centering on the need for a centralized and more transparent way of gathering information on contaminated properties, the Federal Contaminated Sites Inventory (FCSI) was launched in 2002.¹⁹ This record consists in part of a public-access, online database of sites across the country, with details such as location, contaminant type, and taxpayer money spent on remediation or assessment.

Each province and territory is responsible for drafting its own Environmental Protection Act (EPA) which serves as part of the legislative structure governing brownfields redevelopment. The Ontario EPA grants the Ministry of the Environment (MOE) broad powers with regards to issuing cleanup orders to landowners or developers, in accordance with Canada’s ‘polluter pays’ principle.²⁰ This highly contentious issue of owner liability has traditionally been seen as one of the most significant barriers to the rehabilitation of brownfield properties.²¹ Liability, in this case, refers to the legal obligations of developers to ensure that their property meets environmental standards as established by the MOE. These standards are a detailed list outlining acceptable levels of contamination, per chemical or compound, for various categories of land use. Uses are subsequently broken down into Agricultural, Residential and Parkland/Institutional, or Industrial/Commercial/Community categories.²² Properties listed under Agricultural usage are subjected to the most stringent contaminant standards, while Residential and Industrial uses are respectively second and third with regards to the level of acceptable cleanliness.

As property law falls under the provincial jurisdiction, Ontario has taken steps to reduce the fear of liability by establishing legal parameters outlining the extent to which owners and developers are responsible for remediation. A key part of determining these limits is a Record of Site Condition (RSC) and, more specific to brownfields in particular, Environmental Site Assessments (ESA Phase I and II). Under Ontario laws, a

RSC must be submitted if a landowner desires to change the zoned use of a specific property.²³ This record is then digitally filed as part of the provincial Environmental Site Registry (ESR). It is important to note here that a comprehensive RSC provides a level of legal protection against liability for current and future property owners.²⁴ Encapsulated within the RSC are ESA reports which, in the case of normal (i.e. non-brownfield) development, are a legal document stating that contaminant levels for the property in question are either non-existent or fall within acceptable concentration guidelines as mandated within the Ontario Environmental Act.

Environmental Site Assessments can be viewed as a dual environmental and legal blueprint for the sites they describe. A Phase I ESA analyses the history of a site by looking at past uses and historical context, as well as surrounding properties to determine whether there is a possibility for soil or groundwater contamination. It is important to note that this process is non-intrusive, meaning that soil or water samples are not usually taken from the property.²⁵ If there is reasonable doubt as to the site's environmental integrity, then a Phase II ESA may be conducted. This is a thorough, intrusive study which takes soil and groundwater samples, and maps out any resultant contamination data. Phase II ESA's are like environmental diagnoses, confirming and determining the extent of contamination after an initial preliminary investigation.

At a local level, policy is consolidated within a Community Improvement Plan (CIP). These documents are proposals structured around specific urban areas or issues, and can be incorporated into municipal planning acts, as amended. A landmark CIP with regards to brownfields is the City of Hamilton Environmental Remediation and Site Enhancement (ERASE) CIP, first issued in April of 2001 and still in use in its amended 2010 iteration, which provides a comprehensive set of funding and tax-assistance programs in order to encourage private-sector redevelopment of contaminated land within the historic industrial district.²⁶ Given that Hamilton is one of the oldest and most heavily industrialized urban centres in Canada, it is perhaps understandable that other municipalities have taken longer to develop comparable strategies. The City of Ottawa passed its first Brownfields Redevelopment CIP in 2007, which was subsequently amended by council in 2010.²⁷ Like most municipalities, the City of Ottawa requires the completion of a Phase II ESA if a site is to be considered for funding under its existing Brownfields Development Plan. Specific incentive programs

offered are generally divided into two categories. Grant-based programs offer cash-payable assistance to cover initial capital costs such as environmental investigations and permit applications, while tax-based programs offer longer-term assistance in the form of subsidies.²⁸

1.3

Perceived Roles in Urban Development

When describing the urban benefits of brownfield redevelopment, policy documents at both the federal and municipal level generally isolate three categories: environmental, economic, and social.²⁹ While arguing that economically-biased ideology has explicit implications with regards to how brownfields are currently developed, we shall look at another aspect, that of *legacy*, in order to address the residual industrial structures that often occupy contaminated sites.

As part of the shifting fiscal relationship between non- and semi-local (federal and provincial) governments and local municipalities, urban centres are facing increasing pressure to attract new streams of revenue. Movement and concentration of capital within the urban fabric is certainly not a novel pattern, but as geographers such as David Harvey and Mark Purcell argue, the pervasiveness of this relationship is reaching an ever-increasing level of saturation.³⁰ "Economic development and competitiveness have become the primary imperative that drives local policy making," writes Purcell. "Local places increasingly engage in... intervention designed to attract investment to the local area."³¹

Accordingly, municipalities have seized upon brownfield redevelopment as an effective method of helping to increase their property tax base. For example, the amalgamated City of Hamilton gained an estimated 1.76 million dollars in annual property tax from the Spencer Creek Village project in Dundas, ON, which consists of 500 residential units and additional commercial space.³² At a provincial and federal level, further revenues

are accrued through additional income tax (jobs created during the remediation and construction process, as well as any subsequent retail or commercial positions), and increased GST and PST (now consolidated into the singular HST in Ontario) from shops or business. When dealing with residential developments, offset savings can be gained by the use of existing municipal infrastructure, including roads and sewer networks, without the need for costly expansion of these services into the suburbs. With this logic in mind, Canadian cities such as Ottawa and Calgary have taken measures to encourage densification by attempting to limit their urban boundaries.³³

The environmental significance of brownfield sites is, in effect, the very basis of their categorical definition. The Ottawa Brownfields CIP states that “environmental benefits [of remediation] can include the removal of threats to the health of residents and workers, the protection of groundwater resources, wetlands and wildlife habitats, and a reduction in urban sprawl.”³⁴ Government documents generally make reference to brownfield redevelopment being contingent upon residential site proposals, citing “reduced urban sprawl pressures on greenfield sites” and “improved air quality and reduced greenhouse gas emissions in urban areas” as environmental benefits.³⁵

In putting idle parts of the city back “to economic use,” in the words of the NRTEE definition, the benefits of redevelopment to society at large are implied to be of a laissez-faire, trickle-down economic bent. Development projects which provide jobs (cashiers at a newly built Shoppers Drug Mart, etc.) can be seen as a measure to bolster local employment and thus social well-being, while additional residential housing stock means “people can live closer to work and recreational facilities.”³⁶ According to Ottawa’s municipal policy, social benefits also include “neighbourhood revitalization, improved safety and security... and an increased sense of community pride.”³⁷ While government literature surrounding brownfield redevelopment contains an inherent bias towards a mix of residential and commercial end-use, recent projects have highlighted the social and economic benefits of adding to municipal green space, or as it might more adequately be defined: green infrastructure. For example, the High Line in New York has successfully turned a derelict stretch of elevated rail track into a vegetated pedestrian walkway through the city, while the Brick Works in Toronto has created

a mixed-use centre, comprising of community facilities and parkland, on the site of a century-old industrial complex nestled against the Don River. Important as issues of housing and urban densification may be, residential uses for brownfields should not necessarily always be seen as the status-quo default. Creating additional greenspace has well-documented social benefits- as Christopher de Sousa notes, "research has found that urban greening improves the social well-being of city residents in a variety of ways- by reducing crime, reducing stress levels, strengthening neighbourhood social ties, helping cope with 'life's demands,' and improving health..."³⁸ Nor are these benefits limited solely to the social sphere. Within the economic realm, the "presence of recreation space and natural space is considered an important factor influencing the location decision of business," helping to attract commercial investment.³⁹

The buildings that occupy brownfields, from mills to factories, often have a longstanding local history within a community. As a result, these industrial spaces contribute to the surrounding urban fabric by providing identifying landmarks like kiln towers, or making up entire districts of a city, such as the Distillery District in Toronto and Vancouver's Granville Island. Therefore, it is necessary to address the topic of *legacy*, and consider the inherent value that extant buildings located on contaminated land bring to an area. In many Canadian cities, industrial structures are an important part of our urban development, and the next stage of their use should be considered carefully. By definition, small-scale commercial or light industrial buildings such as dry-cleaners or former gas stations qualify as brownfields. However, in other cases the remnants of industry are of larger scale and civic/cultural significance. Companies and their respective buildings can become not only main economic drivers, but also integral landmarks which help define the mnemonic city map of urban dwellers.

Although hardly more than a marginalized backdrop for vehicular transition between Gatineau and Ottawa in its current condition, Chaudière Island was once a bustling hub of the lumber and pulp industry. While Ottawa has taken steps to actively repress its industrial history in favour of an alternative civic aesthetic,⁴⁰ similar cultural marriages between city and manufacturing exist elsewhere. It is this connotative relationship that ingrained the steelworks of Dofasco and Stelco into the psyche of Hamilton, which in turn embedded

itself as an urban image into the minds of Ontarians. Indeed, most non-Hamiltonians will make reference to the steel mills when asked about the city; driving along the 403, across Skyway Bridge, and seeing the blast furnaces and ore tankers at work across the waters of Hamilton Harbour. Similarly, the Ford Plant in Detroit produced not only cars, but a cultural image of the city, an icon, projected both at home and internationally.

In the turnover of urban land resulting from the emigration of industry, lies a unique possibility to shape urban development for the next half-century or so, depending on building lifetime expectancies, which will likely increase due to current prevailing attitudes regarding consumption and energy conservation. The question of how to address this inheritance of industrial legacy is a multi-faceted one, oscillating between calls for wholesale demolition and orthodox conservation. Demolition for the sake of expedient redevelopment results in a temporal discontinuity in urban while simultaneously raising questions regarding the sustainable practices of such an approach. Conversely, preserving a frozen and illusory moment in an industrial building's existence can lead to its stagnation and alienation from the urban realm, acting against the constantly changing and dynamic nature of the capitalist process that generated it. Exploring the concept of incremental change through time, we shall seek a middle-ground in answer to this question.

1.4

Remediation and Time

The issue of contaminated land, along with the associated financial and legal risks, continues to be the primary factor discouraging investment in, and redevelopment of, brownfield properties. Most of these sites have a longstanding industrial history, often pre-dating government environmental legislation and private-sector risk management initiatives. While it is not within the scope of this thesis to provide an exhaustive description of possible brownfield contaminants, distinguishing a few general categories is a useful way to provide some

valuable context in this multi-faceted issue. On a typical site, hazards might include volatile and semi-volatile organic compounds (VOCs and SVOCs, respectively), petroleum products, or total petroleum hydrocarbons (TPHs), any number of pesticides and herbicides, polychlorinated biphenols (PCBs) and heavy metals.⁴¹ VOCs are carbon-based chemical compounds with a high vapour pressure, found in substances such as aerosol propellant, fuels including gasoline or kerosene, and dry cleaning solvents, while SVOCs include polycyclic aromatic hydrocarbons (PAHs) produced as a byproduct of fuel combustion.⁴² TPH's can include a variety of fuels, such as heating oil, gasoline and kerosene, as well as the tar component of asphalt, and the widespread legacy of PCBs can be attributed to their former popularity within hydraulic fluids and electrical coolants.⁴³ Finally, heavy metals considered to be of danger to human health include, but are not limited to: arsenic, beryllium, cadmium, chromium, nickel, lead, zinc, mercury and copper. Of these, lead is the most commonly found, as a result of its historic, widespread application in paints and as an additive to gasoline.⁴⁴

At present, there are several techniques for environmental remediation, ranging from outright excavation and export of contaminated soil, to *in situ* techniques which adopt a more localized approach. Established industry practices are generally favoured due to their perceived financial and objective effectiveness in the field, but in some cases the associated displacement or “outsourcing” of site contamination can be questioned from an environmental point of view. Generally speaking, remediation technologies may be broken down into two categories based on whether contaminants are treated *in-* or *ex-situ*. Those representative of a local approach include air-sparging, bioventing, encapsulation, and barrier methods. Air sparging involves the pumping of highly compressed air into polluted groundwater, carrying contaminants upwards with the aid of an extraction fan, while bioventing is a similar concept which instead circulates air to stimulate or increase microbial activity in the natural breakdown of certain compounds.⁴⁵ Barrier methods, like air-sparging, are designed to address groundwater contamination by creating an underground filtering wall, comprised of geotextiles, through which polluted groundwater must pass as part of its natural flow course. Encapsulation, or capping, involves the subterranean containment of contaminated soil on site, usually within a clay or impermeable membrane to avoid exposure to groundwater and human activity.⁴⁶

Remediation which involves the export and/or subsequent treatment of polluted soil off-site includes excavation (commonly referred to as “dig and dump”), incineration, and soil-washing techniques. Of these, excavation is the most disruptive from an ecological perspective; contaminated soil is dug up using heavy construction equipment such as backhoes or bulldozers, and then transported to an approved landfill or storage site. However, recent years within Ontario have seen several instances of contention regarding these dumping sites. In the Township of Scugog, just north of Oshawa, concerns from local residents pressured the municipality to revoke a permit it had issued to a construction company in Port Perry, which had previously allowed the dumping of contaminated fill into abandoned gravel pits.⁴⁷ Toronto itself is home to the largest PCB contaminated dumpsite in the province. Dating from 1988, the Alderwood-area property consists of 22,000 tonnes of toxic soil, covered under a water-resistant membrane.⁴⁸ Presently, no remedial action has been undertaken. Other off-site soil treatment methods include incineration, a process which subjects contaminants to extremely high temperature, transforming them to vapour or destroying their molecular bonds, and soil-washing, which uses scrubs or filters to isolate contaminated sediment within soil, thus reducing the overall quantity to be remediated via other means such as incineration.⁴⁹

While the energy-intensive and highly mechanized techniques listed above are still considered industry-standard for most traditional brownfield redevelopment projects, emerging approaches to remediation are starting to harness the ecological relationships found to exist between microbial colonies, plant life, and contaminants. Bioremediation involves injecting the soil with nutrients to stimulate microbial and fungal growth, or introducing new, specifically-tailored microbial colonies to the site. In turn, these organisms feed on contaminants, such as petroleum products, metabolizing and breaking them down into less harmful by-products.⁵⁰ Recently, the practice of utilizing plants as a remedial tool (referred to as phytoremediation) has been gaining traction as an innovative, cost-effective method in addressing brownfield contamination. Derived from the Greek word *phyton* meaning “plant,” or “that which has grown” in conjunction with the Latin *remedium* meaning “remedy,” the term *phytoremediation* was coined in the early 1990s, and is defined by the United States Environmental Protection Agency as “an emerging technology that uses various plants

to degrade, extract, contain, or immobilize contaminants from soil and water.”⁵¹ This method is perhaps best conceptualized not as a technology *per se*, but rather as an applied understanding of the complex relationships which occur between plant life, microbial cultures, and contaminated soil or groundwater. The way in which plant life affects soil contaminants can occur directly, through the process of phytoextraction, whereby plants or trees uptake heavy metals through their root system and transport it to their tissue or trunk structure, and indirectly through rhizosphere degradation, in which root structures provide favourable conditions for increased microbial activity and consumption.

Phytoextraction describes the ability of certain tree and plant species to absorb contaminants and heavy metals through their root system, at which point it is either stored or transported internally to the tissue or trunk structure. Laboratory and field-testing of this process has revealed certain key species to be capable of accumulating contaminants in excess of their expected toxic level. Known as *hyperaccumulators*, these species can absorb levels of contamination exceeding their expected tolerances for toxicity.⁵² For an overview of these trees and plants, the reader may refer to Appendix A. Following successful extraction, trees and plants may be harvested and disposed of, while in certain extreme cases the embodied metal content can be retrieved through incineration and recycled.⁵³

Rhizosphere degradation is an indirect effect of phytoremediation, where the oxygen provided by root structures provides a hospitable ground for microbial and fungal colonies. Increased presence of these organisms results in a greater ecological consumption of contaminants, particularly petroleum products, and in some tree species, pollutants can be metabolized and broken down within the root structures themselves.⁵⁴ Additionally, increased levels of oxygen in and around the rhizosphere can assist in the natural breakdown of certain compounds. While phytoremediation involves significant cost-savings in comparison to other, more mechanized methods of brownfield remediation, its effectiveness as a technique is ultimately dependent upon the extent and depth of root structures. Accordingly, the United States EPA suggests that “sites with widespread, low to medium level contamination within the root zone [approximately 5 meters] are the best candidates for phytoremediative processes.”⁵⁵

As the Harvard-based landscape architect Niall Kirkwood writes, “a phytoremediation system can be thought of as part of the delivery of a usable site and construction program over the long term (say thirty years), where phytoremediation is ‘embedded’ in evolving [land-use]”⁵⁶ Using the temporally-based approach to site development embodied by this particular method as a point of departure, we shall further explore the architectural implications of a diachronic approach, seeing how design might be conceived as an ever-unfolding process contingent upon its locality in both space and time

Notes:

- ¹ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 1-2
- ² NRTEE *Greening Canada's Brownfield Sites* (Ottawa, Ontario NRTEE, 1998), 14
- ³ Christopher de Sousa *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 2-3
- ⁴ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 9
- ⁵ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008) 10
- ⁶ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 10
- ⁷ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 17
- ⁸ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008) 18
- ⁹ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 18
- ¹⁰ Christopher de Sousa, “Contaminated Sites The Canadian Situation in an International Context” *Journal of Environmental Management* 62, no 2 (2001) 131-154
- ¹¹ John Macfarlane, “Editor’s Note,” *The Walrus*, February 2011, 13
- ¹² Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 15
- ¹³ John Ibbitson, “Five Reasons Ottawa is Turning you Off,” *The Globe and Mail*, March 25, 2011 This trend has seen the Government of Canada shift more power to the provinces with respect to issues such as healthcare and social services The process was highlighted during the mid-1990s, when Jean Chretien’s Liberal government cut transfer payments to the provinces, thus helping to eliminate a crippling federal budget deficit While transfer payments in the past had provided federal support to help establish a relatively uniform level of provincial services across the country, these cuts effectively forced provinces to find new revenue streams and gave them a certain degree of financial autonomy from the federal government This political phenomenon is worth pointing out in order to further explain the relatively minor role of federal government with respect to pursuing initiatives and legislature surrounding brownfield redevelopment, instead choosing to let provinces and municipalities shoulder the cost
- ¹⁴ Government of Canada “History,” Federal Contaminated Sites, [http //www.federalcontaminatedsites.gc.ca/history_historique/index-eng.aspx](http://www.federalcontaminatedsites.gc.ca/history_historique/index-eng.aspx) (accessed August 2010)

- ¹⁵ Government of Canada "History," Federal Contaminated Sites, http://www.federalcontaminatedsites.gc.ca/history_historique/index-eng.aspx (accessed August 2010)
- ¹⁶ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 5
- ¹⁷ Government of Canada "History," Federal Contaminated Sites, http://www.federalcontaminatedsites.gc.ca/history_historique/index-eng.aspx (accessed August 2010)
- ¹⁸ Government of Canada "Federal Contaminated Sites Action Plan," Federal Contaminated Sites, http://www.federalcontaminatedsites.gc.ca/fscap_pascf/index-eng.aspx (accessed October 2010)
- ¹⁹ Government of Canada "History" Federal Contaminated Sites, http://www.federalcontaminatedsites.gc.ca/history_historique/index-eng.aspx (accessed August 2010)
- ²⁰ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 16
- ²¹ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 16-17
- ²² Ontario Ministry of the Environment *Soil, Ground Water and Sediment Standards for Use Under Part XV 1 of the Environmental Protection Act* (Toronto, Ontario Ministry of the Environment, 2011), 1
- ²³ Ontario Ministry of the Environment "Frequently Asked Questions," *Brownfields*, http://www.ene.gov.on.ca/environment/en/subject/brownfields/STDPROD_086237.html#RSC1 (accessed January 2011)
- ²⁴ Ontario Ministry of the Environment "Frequently Asked Questions," *Brownfields* http://www.ene.gov.on.ca/environment/en/subject/brownfields/STDPROD_086237.html#RSC1 (accessed January 2011)
- ²⁵ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 41-43
- ²⁶ City of Hamilton *Environmental Remediation and Site Enhancement*, (Hamilton, ON City of Hamilton 2010), 5
- ²⁷ City of Ottawa, *Brownfields Redevelopment Community Improvement Plan*, (Ottawa, ON City of Ottawa 2010) iii
- ²⁸ City of Ottawa, *Brownfields Redevelopment Community Improvement Plan*, (Ottawa, ON City of Ottawa, 2010), 15 Ottawa currently offers three grant-based incentives. The Environmental Site Assessment Grant program offers financial assistance equivalent to 50% of the cost of an eligible environmental site assessment (Phase II ESA), up to a maximum of \$15 000 per study, two studies per property, and not exceeding \$25,000 per project or property. The Project Feasibility Study Grant program offers up to 50% of the cost of a project feasibility study, up to a maximum of \$5000 and one study per property. Finally the Building Permit Fee Grant program covers up to 30% of the cost of a building permit fee. Also included in the Ottawa CIP are two tax-based programs, offering long-term discounts against property and education property taxes. The Property Tax Assistance program provides a cancellation of the municipal and education property tax of a property for up to 3 years, while the Rehabilitation Grant program offers a 50% reduction in the municipal property tax increase for up to 10 years.
- ²⁹ City of Ottawa, *Brownfields Redevelopment Community Improvement Plan*, (Ottawa, ON City of Ottawa, 2010), 1
- ³⁰ David Harvey, "The Right to the City," *New Left Review* 53 (2008) 23-40
- ³¹ Mark Purcell, "Excavating Lefebvre," *GeoJournal* 58 (2002) 99-108
- ³² NRTEE *Cleaning up the Past, Building the Future* (Ottawa NRTEE, 2003), 3
- ³³ Jeffrey Simpson, "Strike a Blow for Democracy Scrap the OMB," *Globe and Mail*, January 28, 2011. It should be noted here that a decision passed by Ottawa City Council, a democratically-elected body, was overturned following a complaint lodged by a group of developers with the Ontario Municipal Board. The OMB, responsible for land disputes within Ontario, ruled that Ottawa be forced to expand its UB (Urban Boundary) by 850 hectares.

- ³⁴ City of Ottawa, *Brownfields Redevelopment Community Improvement Plan*, (Ottawa, ON City of Ottawa, 2010), 1
- ³⁵ NRTEE *Cleaning up the Past, Building the Future* (Ottawa NRTEE 2003), x
- ³⁶ NRTEE *Cleaning up the Past, Building the Future* (Ottawa NRTEE, 2003) x
- ³⁷ City of Ottawa, *Brownfields Redevelopment Community Improvement Plan*, (Ottawa, ON City of ON, 2010), 1
- ³⁸ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 164
- ³⁹ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam Elsevier, 2008), 165
- ⁴⁰ The legacy of LeBreton Flats is a prime example of mass demolition in order to create a civic aesthetic more "suitable" to the nation's capital city. Originally occupied with workers' housing and light industry, it was expropriated by the federal government and completely razed in the 1960s.
- ⁴¹ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 28
- ⁴² Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 28
- ⁴³ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 29
- ⁴⁴ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 30
- ⁴⁵ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 32
- ⁴⁶ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press 2010), 33
- ⁴⁷ Vanessa Lu, "Fears of Contaminated Soil on Oak Ridges Moraine" *Toronto Star*, February 13 2011
- ⁴⁸ Tyler Hamilton, "Piles of Poison PCBs Remain Across Ontario" *Toronto Star*, May 30 2010
- ⁴⁹ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 33-5
- ⁵⁰ Justin Hollander et al., *Principles of Brownfield Regeneration* (Washington, DC Island Press, 2010), 31
- ⁵¹ Niall Kirkwood et al., *Manufactured Sites Rethinking the Post-Industrial Landscape* (New York NY Spon Press, 2001), 54
- ⁵² Niall Kirkwood et al., *Manufactured Sites Rethinking the Post-Industrial Landscape* (New York, NY Spon Press, 2001), 53-4
- ⁵³ Niall Kirkwood et al., *Manufactured Sites Rethinking the Post-Industrial Landscape* (New York NY Spon Press, 2001), 55.
- ⁵⁴ Ajay Singh et al., *Applied Bioremediation and Phytoremediation* (Berlin Springer-Verlag, 2004), 116
- ⁵⁵ United States Environmental Protection Agency *Introduction to Phytoremediation* (Cincinnati, OH U S EPA, 2000), 7
- ⁵⁶ Niall Kirkwood et al., *Manufactured Sites Rethinking the Post-Industrial Landscape* (New York, NY Spon Press, 2001), 59

2.0 framework

In the highly-influential book *Course on General Linguistics*, Ferdinand de Saussure evokes the chessboard as a metaphor for introducing and describing two types of linguistic analysis: synchronic and diachronic.¹ Derived from Greek, *diachronic* is a union between the prefix *dia-* (passing through, thoroughly, completely) and *khronos* (time), whereas *synchronic* relies on a differing prefix, *syn-* (with, or together). Let us imagine two people playing a game of chess; one affected with anterograde amnesia (the inability to retain short-term memory) and the other being the amnesiac's therapist. Our patient sees the board only from a synchronic point of view; as one particular state at one particular time, due to their impaired mnemonic capacity. According to de Saussure, this is comparable to the synchronic reality of language users, who have interest only in the present condition of speech as spoken, with little regard for its prior iterations.² The therapist, however, has a different outlook. Maintaining a diachronic perspective, he or she sees the board as the totality of its reconfigurations; a process of moves which have led to the current state. As de Saussure argues, "if [we] take a diachronic point of view, [we are] no longer examining the language, but a series of events which modify it."³ It must be noted that while de Saussure's distinction between both methods is a valid one, it is perhaps a bit misleading to say that language itself is no longer being examined in a diachronic analysis. A more accurate description might be to say that language is being examined independent of any one given state; in other words, as a process of constant evolution.

Within the architectural community, *diachronic* was adopted and popularized by Stewart Brand in *How Buildings Learn*, where he argues that "buildings of the past can be studied in terms of how they worked at interacted at one time... or in terms of how they evolved over time."⁴ The representation of time is one of the most contentious issues of architectural representation, and it is perhaps due to this reason, more than any other, that architects have traditionally projected their buildings as being distant from, or outside of the realm of time. As Jeremy Till notes, "[time] presents a force beyond their control, which is why they

either remove themselves from it through false notions of eternity or else attempt to arrange it into a line of 'nows.'"⁵ Certainly, the issue of temporal abstraction has a history within architectural media; at a basic level, the swing-arc of a door signifies time as a micro-condition, while the idea of a structural palimpsest, popularized by Peter Eisenman in the 1980's, relegates static historical intervals to a series of layers at a landscape scale. In the design of the Wexner Centre for the Performing Arts, Eisenman proposed that new construction was simply another layer of the landscape: "Our writing leaves a trace on a palimpsest, whatever the material, and we freeze that."⁶ At the Wexner complex, history has been quite literally flattened into a series of overlapping tectonic myths- the past recalled and reinterpreted through an inherently two-dimensional process which inherently resists any kind of diachronic evolution outside of its highly scripted, artificial sense of stratified time. What I would like to point out here is the inherent dichotomy between the diachronic nature of urbanism and the synchronic state of architectural representation. Since the drawing is arguable still the predominant mode of representation, we would do well here to turn to the words of Robin Evans, who reminds us that "the drawing has intrinsic limitations of reference...There must also be a penumbra of qualities that might only be seen darkly and with great difficulty through it. If judgement is that these qualities in and around the shadow line are more interesting than those laid forth clearly in drawing, then such drawing should be abandoned, and another way of working instituted."⁷

In the context of this thesis, a diachronic understanding becomes a crucial temporal paradigm, linking Gianni Vattimo's ideas revolving around *il pensiero debole* (weak thought) to the architectural project itself. As previously discussed in Part 1.4, the practice of phytoremediation brings with it the prospect of conceiving brownfield remediation as a process of environmental and developmental drift through time, rather than an objective, immediate solution. To further advance this idea of diachronic process, we shall examine Vattimo's parallel of weak thought to the secularization of Christianity, described in his book *Belief*, in conjunction with Ignasi de Solà-Morales' subsequent concept of "weak architecture"⁸ and Jeremy Till's notion of "thick time."⁹ Using this comparison as a basis for establishing a provisional framework for architectural development, we shall propose how this urban re-interpretation through "weakening" might be applied to the diachronic

remediation of urban sites within Ottawa, such as the former Booth Groundwood Pulp Mill located on Chaudière Island, and a selection of brownfield properties found within the vicinity of LeBreton Flats, currently listed as part of the Federal Contaminated Sites Inventory (FCSI).

2.2

Il Pensiero Debole

Gianni Vattimo is perhaps best known for his writings on *il pensiero debole*, or weak ontology, in the 1980s. Born in 1936 in Turin, Italy, Vattimo graduated from the University of Turin in 1959 before studying with Hans-Georg Gadamer at Heidelberg.¹⁰ He currently specializes in hermeneutic (interpretation theory) philosophy at the University of Turin. Apart from his widely-published philosophical works, Vattimo has led an active political life, sitting as an Italian member of the European Parliament between 1999 and 2004.¹¹ Building upon a nihilistic tradition of thought, Vattimo advocates weak ontology as a “‘philosophy of actuality’ that offers an analysis of the sense of existence in [a] technologically oriented postmodern society.”¹²

Weak thought, according to Vattimo, is an extension of the ideas explored by Nietzsche and Heidegger with regards to nihilism. In acknowledging philosophy as being contingent on its historical context, Nietzsche saw nihilism as a defining quality of the Western, euro-centric world during the 19th century as it struggled with the disintegration of universality.¹³ If philosophical inquiry and its subsequent logic were time-dependent and provisional, then by extension, there could be no claim of absolute knowledge or truth. The result of this collapse, for Nietzsche, culminated in the death of God, a foundational concept traditionally placed above all else. With a divine principle no longer acting as an ordering structure of reality, our *Weltanschauung* (literally, world view, or outlook) transforms into a fragmented multiplicity of relative interpretation.¹⁴ Consequently, traditional notions of objective knowledge are lost in the conflict and overlap between various *Weltbilder*

(images of the world). As Luca D'Isanto writes, "the fabulization of the world, of which Nietzsche speaks, becomes understandable [as]... the weakening of the principle of reality in the world of techno-science."¹⁵ Contemporary mass communication is a prevalent example of this conflation of subject and object; our perception of the Iraq invasion, drought in Somalia, and the personality of politicians, is constructed not from any empirical or physical observation, but instead from a plethora of mediated interpretations that flood our eyes and ears. "The images of the world we receive from the media and the human sciences," Vattimo argues, "are not simply different interpretations of a reality that is 'given' regardless, but rather constitute the very objectivity of the world."¹⁶ For Nietzsche, the human subject in the age of nihilism becomes the arbiter of all truth, producing the very reality of the world via a network of technological apparatuses as part of the "will to power," an inherent ambition to reach greater heights of personal and scientific achievement.¹⁷

While Nietzsche distinguishes between a passive and active acceptance of nihilism, Heidegger takes a decidedly pessimistic outlook. In the world of techno-science, he claims, the essence of what it means to be human, our Being, is obscured by the multiplicity of *Weltbilder*, while our bodies are increasingly relegated as yet another image. By viewing the body as an accumulation of quantifiable data, Being is reduced to a synchronic distillation of information, becoming "merely the object of analysis, [an] accumulation of detailed knowledge, thereby losing the distinction between [a] historical being [existing in time,] and objects."¹⁸ Through the act of technological revelation and representation, the human body itself forms part of a *standing reserve*. This capitalist *Weltanschauung*, or worldview, outlined by Heidegger, conceives the natural world as a ready-made commodity lying in wait for industrial use.¹⁹ As William Wood argues, "Heidegger's [notion of the] standing reserve is the coded body, continually open to reterritorialization, continually processed through increasing schemes of complex spatial representation (increasing mapping of the gene, all of our genes."²⁰ Vattimo argues that for Heidegger, "nihilism (the recognition that Being and reality are merely the subject's position, product) heralds the end of metaphysics, namely the thought... that identifies Being with the objectively given, the thing before me."²¹

It is this objective weakening of Being as a concept, within a world which increasingly (and paradoxically) attempts to define the body in greater, and more invasive detail, that Vattimo uses as a basis for his proposal of a “philosophy of actuality [which] aims to interpret the present condition of existence.”²² Pointing out the futility of trying to continuously “update” an objective concept of Being, or simply trading one metaphysic definition with another, Vattimo argues that a hermeneutic philosophy of interpretation entails a “sense [of Being that] discloses itself as a mobile horizon, as the crystallization of a ‘provisional’ understanding.”²³ According to Vattimo, the alienation of self in the age of nihilism that Heidegger warns of may be partially recovered in the sense that we are all common participants in this process. Thus, the modern individual subject has the perception of being immersed in a broader narrative, “as a moment of a process, which can never come to closure, which includes and transcends them.”²⁴ This evolving process of Being is similar to a feedback loop, adjusting to a constant re-contextualization and re-grounding. “In the case of weak ontology,” writes Vattimo, “the long farewell to the strong [metaphysical] structures of Being can only be conceived as an indefinite process of consummation and dissolution of the structures themselves.”²⁵

In the book *Belief*, Vattimo explores his own faith as a Catholic, and how the secularization of the Gospel message might not be viewed as a threat to religious thinking, but rather a continuation of the Christian message, exemplified by the incarnation. Tracing parallels between an objective weakening of Being, proposed by Heidegger, and the Gospel, he argues that a drift towards secularism in the age of modernity is, in effect, the very essence of salvation and Christianity itself.²⁶ “For me,” Vattimo writes, “the primary meaning of this expression [weak thought]... is not the idea of a thinking that is more aware of its own limits, that abandons its claim to global and metaphysical visions, but above all a theory of weakening as the constitutive character of Being in the epoch of the end of metaphysics.”²⁷ As he goes on to explain, this ‘weakening’ as it relates to the Christian message is not one diametrically opposed to the ideas of scripture, but rather involves a contemporary reinterpretation and re-grounding of biblical text.

The God of the Old Testament, in Vattimo’s eyes, is a dominant metaphysical archetype. This iteration of God

functions primarily as a residual holdover of the “natural sacred,” whereby supernatural will was equated with natural disasters such as floods or lightning, and thus understood to be vengeful and fickle. In God’s warning to the Israelites, a litany of curses, including forced cannibalism in times of war, are mentioned as punishment for disobeying divine commandment: “And you shall eat the fruit of your own body, the flesh of your sons and of your daughters, which the Lord your God has given you, in the siege, and in the narrow place, with which your enemies shall distress you.” (Deut. 28:53). It is precisely this concept of God which Jesus comes to undermine, Vattimo argues.²⁸

Through the act of *kenosis*, derived from the Greek term *kenós*, meaning “empty,” Christ serves as divine signifier. Reconciling the nihilistic idea of objective loss, with the forgiving, “weakened” concept of God found within the New Testament, Vattimo argues that “the incarnation... [can] be interpreted as the sign that the non-violent and non-absolute God of the post-metaphysical epoch has as its distinctive trait [a] vocation for weakening...”²⁹ Representing a new image of God who “no longer calls you servants, but friends,”³⁰ Jesus speaks out against this conflation of sacred and violence, as evidenced by several Gospel narratives. In one such passage, a woman is brought before him by a group of Pharisees, who are intent on administering a mandated punishment of stoning. When Christ challenges the group to commence the execution, if they are themselves each without fault, one by one they walk away. “When Jesus had lifted up himself, and saw none but the woman, he said unto her, Woman, where are those thine accusers? hath no man condemned thee? She said, No man, Lord. And Jesus said unto her, Neither do I condemn thee: go, and sin no more” (John 8:10-11). The principle of divine forgiveness embodied here certainly stands in contrast to the implicit thirst for vengeance found in Old Testament text. As Vattimo remarks, “I have the impression... that there are fewer pages in the New Testament regarding ‘justice’ than ‘mercy’; this leads me to my belief that the relation between the two faces of God in fact constitutes a relation between different moments of the history of salvation...”³¹ When Nietzsche speaks about the death of God, he does not necessarily imply the complete negation of the divine, as many would believe, but instead suggests that the concept of a metaphysical, absolute God as a foundation for moral and social order is no longer relevant.

The figure of Christ, in this process of weakening, can be seen not just as a divine signifier, but also as an interpreter of Old Testament scripture. When Vattimo writes that it is possible “to conceive biblical revelation... [not as] an objective truth, but [as] an ongoing salvation,”³² the implicit suggestion is not to view biblical assertions as immutable dogma, but rather as a contextually amorphous script. The only concept guiding a re-interpretation of the Christian message, Vattimo argues, may be found in the very essence of *kenosis* itself. Simultaneously signifying, and revealing, an abolition of “the nexus between violence and sacred,”³³ Jesus personifies a “new and more profound relation of charity established between God and humanity.”³⁴ It is ultimately an increase in charity, and the reciprocal rejection of violence, that informs any contextual re-application of the biblical message. While Christ acts as a divine interpreter, his teachings themselves become part of a larger history of salvation. In spreading the Holy Spirit to his disciples, endowing them with the gift of foreign language, the word of God becomes more inclusive, dispersed, and contextual, in the pattern of secular weakening Vattimo describes. The New Testament describes this event in the Book of Acts: “And suddenly there came a sound from heaven as of a rushing mighty wind, and it filled all the house where they were sitting. And there appeared unto them cloven tongues like as of fire, and it sat upon each of them. And they were all filled with the Holy Ghost, and began to speak with other tongues, as the Spirit gave them utterance” (Acts 2:2-4). Through this new-found ability to communicate in the native language of other cultures, the disciples embody another iteration of divine interpretation, as each one spreads his own account of Jesus’ message.

By conceiving the history of salvation, that is, the reduction of violence and the natural sacred, as a divine revelation unfolding through time, Vattimo hinges his argument upon the term *secularization*. By definition, he states, this “means precisely a relation of provenance from a sacred core from which one has moved away, but which nevertheless remains active even in its ‘fallen’, distorted version, reduced to pure world terms.”³⁵ In thinking of contemporary Western society as the secularized continuation of a Christian heritage, the nihilistic metaphysical crisis spoken of by Nietzsche and Heidegger becomes simply another stage of this temporal and ideological drift. For Vattimo, secularization is framed as a “progressive dissolution of the

natural sacred... [and] the very essence of Christianity.”³⁶ This idea is implicitly linked with the weakening of Being proposed by Heidegger, and as Vattimo writes, “...if we are to stop thinking of Being in metaphysical terms as a necessary structure given once and for all, it must be conceived as an event; this event is the outcome of an initiative, of which I am an ‘effect’, an heir, an addressee.”³⁷ Thus, in the quest to find an ever-contemporary state of meaning, or contextual grounding, the very nature of our humanity and the essence of God reveal themselves as a process, not beholden to the frozen and static shackles of a particular metaphysical condition, but instead in a diachronic state of constant drift and endless re-interpretation.

2.3

Weak Architecture, Thick Time

As an interpreter of Vattimo's *il pensiero debole*, the Spanish architect Ignasi de Solà-Morales sees the “propositions of weak philosophy [as] an interpretation of our contemporary culture’s international, aesthetic situation.” While originally derived from the Greek word *aisthetikos* meaning “sensitive” or “perceptive,” the term *aesthetic* in contemporary use has become synonymous with the establishment and critique of taste, or beauty. This distinction is important to make, because it underscores de Solà-Morales’ conflation between the philosophical and the visual as an inter-changeable point of reference within his work.

Adopting Nietzsche’s (and Vattimo’s) premise that the crisis of modernity has resulted in the “disappearance of any kind of absolute reference that might in some way coordinate, or ‘close,’ the system of our knowledge,”³⁸ de Solà-Morales also speaks of a secondary, contemporary crisis of modernity; the futility of the Enlightenment to supplant metaphysics with rationalism. This “idea that it is possible to discover an absolute reality, within which art, science, and social... praxis can be constructed on the basis of universal rationality”³⁹ is doomed to failure, he argues, precisely in its desire to construct an objective framework. Vattimo mentions this as

well in *Belief*, arguing that the basis of the Enlightenment project, to establish a world as complete fact, is revealed to be an illusion: "De-mythification has finally turned against itself, recognizing that even the elimination of myth is a myth."⁴⁰

The consequence of this loss of metaphysical foundation, for de Solà-Morales, means that architecture cannot rely on any universal application of thought for justification, but rather must constantly re-define its contextual significance. "Contemporary architecture," he argues, "is confronted with the need to build on air, to build in the void. [It is] to be constructed not on the basis of immovable reference, but under the obligation to posit for every step both its goal and its grounding."⁴¹ Again, there are similarities here to Vattimo's suggestion that "nihilism (the recognition that Being and reality are merely the subject's position, product) heralds the end of metaphysics, namely the thought... that identifies Being with the objectively given, the thing before me."⁴² In keeping with Heidegger's warnings of individual alienation and disconnect as a result of this modern condition, de Solà-Morales argues that we might find respite in the world of the visual arts, as the proliferation of scientific and technological *Weltbilder* become increasingly more routine and banal. "In contemporary experience, the aesthetic has, above all, the value of a paradigm. It is precisely through the aesthetic that we recognize the model of our richest, most vivid, most "authentic" experiences in relation to a reality whose outlines are vague and blurred."⁴³ Although not a system of central reference, he suggests that "aesthetic experiences constitute, in some sense, the most solid, the strongest model of- paradoxically indeed-a weak construction of the true or the real."⁴⁴ While never explicit on this point, it would seem that for de Solà-Morales this aesthetic is a primarily ocular experience, where the subject's communion with architecture, art or sculpture becomes the contextual re-grounding upon which provisional legitimacy is based.

Exploring this collapse between subject and object in a 'reality whose outlines are vague and blurred,' de Solà-Morales points to archaeology and language as being models for a thinking no longer bound by closed, or universal systems. Archaeology, which can only arrive at a highly fragmented understanding of a culture based on a collection of excavated objects, "comes into its own as a tool for describing, in almost physical fashion, the superimposed reading(s) of a tectonic reality: of a reality that can no longer be regarded as a

unitary whole but appears instead as the overlapping of different layers.⁴⁵ Similarly, he argues that language follows suit in much the same way: "We can no longer believe that the reality of a signifier responds to the precision of a signifier..."⁴⁶ However, this linguistic comparison is an extremely weak one; Ferdinand de Saussure speaks of the arbitrary relationship between signifier and signified- in essence, a blurred relationship that has always been contextual and fluid.⁴⁷ Equating a philosophical worldview with a visual aesthetic, de Solà-Morales states: "There is no doubt that this way of thinking has a very direct translation in the... production of form, and thus, by inclusion, architectonic form." This idea of temporal juxtaposition, abstracted as different stratified layers, can be linked back again to Eisenman's notion of the palimpsest.

Time as perceived in the modern condition, de Solà-Morales argues, has been subjected to a fracturing. As he explains, "Contemporary time... presents itself as a diffracted explosion in which there is no unique and single time from which we can construct experience. There are, instead, *times*."⁴⁸ Similarly to Vattimo, de Sola-Morales places importance on the *event* as a quality of what he defines as "weak architecture." This definition of event is fleeting and instantaneous, "occurring once and then gone forever."⁴⁹ He writes that "temporality does not present itself as a system but as an aleatory instant that, responding above all to chance, is produced in an unforeseeable place and moment."⁵⁰ However, we must note an apparent paradox here: by choosing to focus on the event as the "fullest form of [temporal] expression"⁵¹ and thus denying time of its diversity, it would seem that de Sola-Morales is simply trading one metaphysical universal for another. Ultimately, to conceive time as a series of disjointed events is to pre-condition any subsequent notion of what "weak architecture" might be.

While de Solà-Morales is vague in terms of giving concrete examples of how weak architecture may manifest itself, his writings imply either an event architecture, in which event and architecture are mutually co-dependent (like that of a spectacle, or traveling carnival) or an architecture open to event, able to accommodate new ideas, people and activities. Along with the event, de Solà-Morales brings two other terms to bear in his circuitous description of weak architecture: decoration and monument. Decoration, as it pertains to weak architecture, is portrayed as "a discrete folding back to a perhaps secondary function...

that projects beyond the hypothetical ground of things.”⁵² By this statement, one might infer the possibility of an architecture which opens up to functions beyond its intent, or designed purpose. It is worth noting that Sola-Morales allies architecture with the visual arts, calling “for the work of art- sculptural or architectonic- [to accept] a certain weakness...”⁵³ The second term, monument, has little to do with the conventional (i.e. classical) definition of the term as utilized by de Solà-Morales, who argues that “[this] notion of monument... is bound up with... the recollection of architecture after it has been seen.”⁵⁴ Rejecting the monument’s claim to eternity, or at the very least to control or limit the effect of time, he focuses instead on the mnemonic significance of the term. For him, weak architecture can evoke a fleeting sense of being, “a window on a more intense reality.”⁵⁵ However, both terms serve to underscore the argument’s overall dependency on an aesthetic and thus visual framework. By associating architecture with sculpture, in the case of decoration, de Solà-Morales negates both the diversity of time (which he himself regards central to weak architecture) and the multitude of other factors upon which architecture is contingent: social, political, environmental, social. To adopt a top-down critique based on the notion that aesthetics are “in some sense... the most solid, the strongest model of... a weak construction of the true or the real”⁵⁶ is to simply toy with the old modernist cliché that form follows function. In redefining monument as a function of memory, one’s experience of architecture becomes nothing more than a frozen synaptic moment, a fragment stowed away in the nest of our sub-consciousness, accessed from time to time as a mirage disassociated from any current or living reality. While the architectural “re-grounding” de Solà-Morales speaks of is valid in terms of how it relates to Vattimo’s conception of a provisional horizon of understanding, the inherent favouritism of the event as a temporal paradigm- through which contextual validity is defined only as a function of individual perception- ultimately denies a broader diachronic understanding.

Jeremy Till is another key figure who, while not directly referencing Vattimo, has been influenced by the philosopher through his readings of de Solà-Morales.⁵⁷ In his book *Architecture Depends*, Till sets out to illustrate the deep schism between architects and the realities that contingency, indeterminacy and time impose on architecture writ large. The notion of the event is again introduced as a way of bringing a temporal

understanding to architecture, but here it is just part of a broader approach. As Till says, “In its *multiplicity*, time presents a diversity that architecture has to accept- the linear, the cyclical, the personal, the instant explosion of the event, the *longue durée*- and, in order to do that, has to relinquish its mythology of stability and strength.”⁵⁸ This relinquishing- a rejection of any claims to monumentality or permanence- is, I would argue, consistent with Vattimo’s description of weak ontology.

Arguing against the emblematic schism between modernity and the past as a perpetual desire for the new, that can exist only as a series of moments before inevitably succumbing to the forces of time, dirt, and decay, Till’s notion of *thick time* encourages us to look at architecture as not just an event, but as a process or exchange. “To be in (thick) time” he argues, “is to be in the world, not a world of static objects but a world of social and temporal exchanges, and if these exchanges are reflected upon in the course of design, it is all the more likely that the resultant buildings will be able to accept the multiplicity of time in the future.”⁵⁹

2.4

Event-Process Architecture

If philosophical inquiry, as posited by Vattimo, is a cultural product and thus specific to a temporal horizon, one might reasonably say that architectural thinking is no different. Or, as we might more accurately state, thinking *through* architecture, since the manifestation of built form is predicated upon a series of thoughts, translated via the various methods of representation we utilize for this purpose. Relying on a diachronic understanding as a temporal paradigm, it becomes possible to draw an implicit relationship between Vattimo’s “theory of weakening”⁶⁰ and the remediation of urban sites, thinking of the resulting architecture not as a “necessary structure given once and for all,”⁶¹ but rather part of a larger process evolving through time.

In establishing this implicit relationship, it is necessary to eschew a literal mapping of one mode of thought (weak ontology) onto another (architectural conception, production) in favour of a more nuanced, metaphorical approach. It can be argued that this is precisely in keeping with Vattimo's call for a philosophy of actuality, one which attempts to create a provisional framework of understanding. Along this vein, I will propose that we explore three main parallels, or themes; the objective dissolution of metaphysical structure and the concept of architecture as a non-discrete entity, the process of secular drift from a sacred core in conjunction with site contamination, and finally, the idea of divine and architectural re-interpretation.

The nihilistic conflation of subject and object in the mass-communication culture of modernity, Vattimo argues, means that one can no longer contemplate Being in universal terms, as an objective given. In citing Heidegger's critique of objectivistic metaphysics, he writes: "Who, and with what tools, could establish by experiment that Being is not the 'product', position, object of the *will to power* [emphasis added]- since she or he would have to establish such a truth via a procedure that is scientifically trustworthy...?"⁶² The futility of this type of objective thinking, then, stems from an inherent disregard of temporal history, in which any notion of reality must be constantly updated in greater and greater detail, to describe an as-is or existing condition. Considering the subjective-objective hybridization Vattimo speaks of, and the subsequent notion of Being not as object, but as event, what might be the implications for architecture, or more specifically, the development and remediation of brownfield sites? The first is that we no longer conceive of a building as an autonomous entity. Holistic design and cradle-to-cradle ideologies are examples of such diachronic thinking; by examining a work of architecture as a network of energy and material flows, the building ceases to be thought of in purely formal, or objective terms, and is defined instead by its relationship within, and in proximity to, a variety of other networks and processes. Thus, a building's sphere of influence (cultural, economic, social, environmental, etc) does not culminate at the property lines, but rather ripple outwards within the surrounding city. If we hearken back to Vattimo's suggestion that the nihilistically-induced alienation of self might be overcome by the realization that the modern individual exists "as a moment of a process, which can never come to closure, which includes and transcends them,"⁶³ is it not unreasonable to suggest

architecture be viewed in much the same way. Accordingly, our buildings become situated as part of a much larger urban process, simultaneously modifying, and being modified.

Vattimo's notion that Being can no longer be thought of in the objective terms of metaphysics, but rather as an *event*, revealing itself through time, heralds a second architectural implication. In looking at the term *event* as used by Vattimo and de Solà-Morales, there is a fundamental difference between that of process, and that of instant. For Vattimo, the reconstitution of Being, and the dissolution of strong metaphysical structure, is an event playing out through time- what we might redefine here for the sake of clarity as an *event-process*. On the other hand, de Solà-Morales' understanding is decidedly more fragmented, relegating the event as a unique phenomenon specific to both place and time. Again, this inherent bias towards the event apparently undermines the very temporal multiplicity which de Solà-Morales champions as a response to the total and absolute concept of classical time. As Jeremy Till points out, "in its *connectedness*, time places architecture in a dynamic continuity, aware of the past, projecting to the future. The here-and-now is seen not as an instant to be satisfied but as part of an 'expanded present,' or of what may be designated 'Thick Time.'"⁶⁴ This is not to say that one must necessarily divorce one from the other; indeed, de Solà-Morales concept of the event can certainly fall within a broader process narrative. While buildings may host a series of events, they still exist within a temporal continuum. For a period of time, we inherit this architectural narrative, and have the opportunity to shape it according to our own needs and desires.

The next parallel I would like to propose is between the practice of phytoremediation, a state of environmental drift, and the process of secularization that Vattimo refers to as the basis of Christianity; once again defined as "the relation of provenance from a sacred core from which one has moved away, but which nevertheless remains active even in its 'fallen', distorted version."⁶⁵ It would seem that in traditional methods of site remediation, there exists an underlying sense of distinction, almost moral, between cleanliness and toxicity. Techniques such as the popular 'dig and dump,' involving the excavation of contaminated topsoil and a subsequent import of clean fill, exhibit a desire to establish a synchronic site condition, removed of industrial trace and stripped of history- a *tabula rasa* upon which new development can build. Similarly, capping methods

which seek to bury and contain contaminants underneath a physical barrier disregard the industrial legacy of site, by literally suppressing it as a hidden stratum. Both might be interpreted as an attempt to apply an objective notion of cleanliness upon a site, a universal, timeless solution for environmental afflictions, borrowing from Vattimo's critique of metaphysical thinking. While not seeking to romanticize the idea of brownfield contamination, we must question the ecological implications of methods which simply serve to displace or offset the issue.

Phytoremediation is, on the other hand, time-dependant in its very nature. Defined by the U.S. Environmental Protection Agency as "an emerging technology that uses various plants to degrade, extract, contain, or immobilize contaminants from soil and water,"⁶⁶ this approach to remediation is, I would argue, analogous to Vattimo's conception of secular drift. By treating contaminants *in-situ* over a period of time, the transformation of site becomes an ecologically-based process. In this light, the industrial legacy of a site is neither denied nor preserved, but instead re-constituted as part of a constantly evolving environmental landscape. The need for continual re-grounding, proposed by de Solà-Morales, is exemplified by the ever changing dynamic between tree/plant and contaminant. Additionally, as Vattimo suggests, the modern subject may take comfort, establishing a sense of historical continuity and individual relation to a larger whole, by the realization they are immersed within a broader and over-arching process of urban stewardship that "includes and transcends them."⁶⁷

The last parallel I would like to discuss here, the idea of divine and architectural interpretation, is one which has implications not only for extant industrial buildings on brownfield sites, but also for the notion of architectural authorship, or origin. In the prevalent culture of celebrity-worship, to which the architectural community is by no means immune, enormous inherent value is associated with a particular name. We need only look to the recent addition of the Royal Ontario Museum in Toronto by Daniel Libeskind as an example of this phenomenon, in which architecture's cultural value is contingent upon the identity of its perceived creator. However, Vattimo's advocacy of a philosophy of actuality and his description of Christ as an interpreter of Old Testament scripture undermines this idea of objective authorship. The weakening of the natural-

sacred, which he sees as the basis of secularization and Christianity, involves a drift from a traditional (and mythical) sacral origin. In much the same way Christ re-interprets scripture, and his disciples interpret his own teachings, Vattimo suggests that we are not creators of our own text in the objective sense, but rather the benefactors of an inherited narrative. We might then view architecture in a similar fashion, not viewing alterations or additions as negative mutilations of an initial condition, but rather as part of a larger process of architectural inheritance. Thus, the understanding of *il pensiero debole* involving a sense [of Being that] discloses itself as a mobile horizon, as the crystallization of a 'provisional' understanding"⁶⁸ entails the modification of architecture as a way of establishing a response for a given time, and its given conditions.

My hope is for the reader to arrive at the proposed architectural project with an understanding of these (provisional) themes, recognizing certain implicit parallels between the design and the ideas discussed here. As Vattimo writes, "if we are to stop thinking of Being in metaphysical terms as a necessary structure given once and for all, it must be conceived as event; this event is the outcome of an initiative, of which I am an 'effect', an heir, an addressee."⁶⁹ In this sense, the remediation of brownfield sites becomes a diachronic process; unfolding in time, establishing a temporal relationship between the contemporary experience of city dwellers and the inheritances of an industrial and environmental legacy.

Perhaps more than any recent British architect, Cedric Price firmly embraced the idea of provisional architecture. While often prone to vitriolic and bombastic affronts against the perceived self-importance of the architectural community (“At the present it is difficult to find good reasons why they should not be ignored totally.”⁷⁰), many of Price’s un-built projects are still prime examples of an architectural approach which promote the forces of time and change unreservedly. The project I would like to discuss here is one known as Potteries Thinkbelt, or PTb in Cedric’s lexicon. PTb was conceived as a mobile series of university facilities based on existing rail corridors covering 100 square miles in North Staffordshire, located in the West Midlands region of England. Conceptual plans were completed in 1966, and although considered by the ministry of education, the scheme was never built.⁷¹

Comprised of several inter-linked networks, including high-density student housing, rail links, faculty areas and motorways, PTb was designed to accommodate upwards of 20,000 students.⁷² Geographically consisting of a rough triangle between the towns of Keele, Pitts Hill and Meir, each vertex served as a transfer point for people to connect with the Thinkbelt. As Price noted, “the PTb bias towards pure and applied science and engineering requires an emphasis on a flexible organization of faculties with easy links to national networks.”⁷³ Industry was seen as a valuable partner in education, and Price viewed education itself as a similar enterprise, urging that “further education and re-education must be viewed as a major industrial undertaking and not as a service run by gentleman for the few.”⁷⁴

For Price, architecture is essentially a physical manifestation of cultural thought, and as such, relevant only insofar as the ideas which spawned it continued to be. When patterns of thought changed, it was necessary for architecture to change as well, lest it hold back this evolutionary process. Similarly to Vattimo’s description of weak thought as offering a provisional, temporally-based understanding, the Potteries Thinkbelt project was designed as a contingent system, shifting as needed. “[This] is what I am talking about in the

Thinkbelt,” Price said “It’s the capacity for activities to change as a result of thoughts changing And the resulting architecture can last as long as these thoughts are current”⁷⁵ Instead of straight-jacketing program by constraining it within a pre-determined architectural framework, Potteries Thinkbelt suggested that both could change simultaneously according to want or need The proposal was vehemently anti-plan, that is to say, against any prescribed stasis or immutable initial architectural arrangement It is perhaps this refusal to commit to any fixed state, for any prolonged period of time, which lent the project to a surfeit of diagrammatic and tabular representation (see Fig 2) Operating in almost constant motion and re-configuration, a master-plan of PTb at any one moment of its existence would have been an exercise in futility Like de Saussure’s linguistic chessboard, in which the game of language reveals itself as a process of moves, shifts and eliminations, unknowable by looking at any one image of the board, the amorphous structural arrangement of PTb unfolds through time

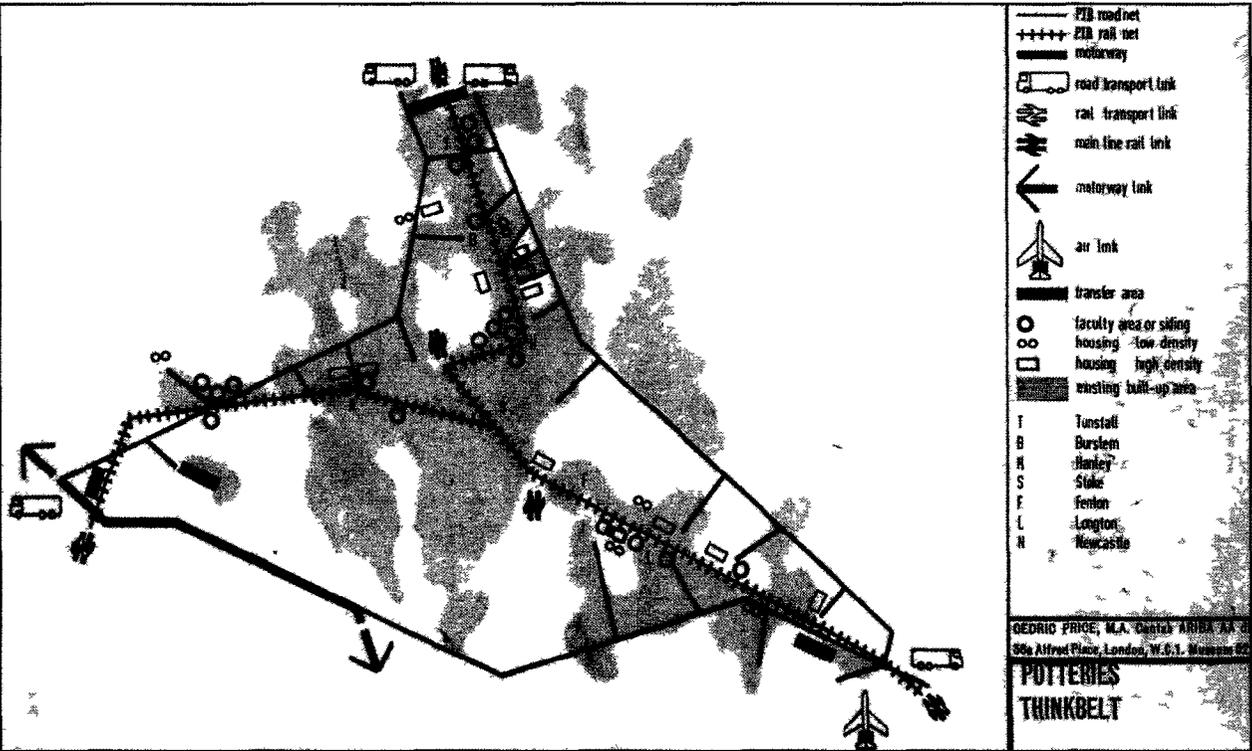


Fig 2

Potteries Thinkbelt Master Diagram c 1966

“This catalogue of 67 structures is presented to the City and to the Citizens of Berlin. One possibility is that all 67 structures can be built over two 30-year periods, the other possibility is that none of the structures [are] built. A third possibility being that some structures are built. The decision lies with the City and Citizens of Berlin.”⁷⁶ So begins *Victims*, a text accompanying John Hedjuk’s proposal for a redevelopment project in Berlin. Along with a multitude of structures, ranging from the bureaucratic (Passport Building, no. 67) to the whimsical (Ferris Wheel Clock, no. 62) the site was intended to be demarcated by a grid of evergreen saplings, maturing over a course of 30 years (see Fig. 3).⁷⁷

Providing a basic kit-of-parts in the form of structures, Hedjuk left the layout and ordering of the project to the people of Berlin (see Fig. 4). *Victims* had no regimented order of construction; the public was to decide where and when each structure was to be built, as well as how they were to connect with each other. In Hedjuk’s words, “the Citizens of Berlin would decide the time sequence for the construction of the elements and their... connective relationship.”⁷⁸

Hedjuk’s project for Berlin not only proposes an architectural indeterminacy, but also reveals a deep sensibility towards the unfolding of time. The more determinant an architecture claims to be, the more fixed, static, and strong- the more it is necessary to freeze time and, with it, undermine any subsequent notion of chance or change. One might suspect that Hedjuk viewed the right of Berliners to exercise autonomy over the (re) building of their city as a crucial component in *Victims*. As a city and a people, Berlin had already been subjected to the viscerally dominant, “permanent” structures of Albert Speer, intended to last with the Nazi Reich they embodied for a thousand years, as well as Communist-era buildings which promoted homogeneity and proletariat sameness. Here was a chance to bring autonomy, through architectural indeterminacy, back to Berlin. As Hedjuk most likely realised, indeterminacy relied not on an ‘instant’ notion of time, a static freezing, but rather a diachronic sense of time “aware of the past, projecting to the future.”⁷⁹ Indeed, he

surmised that “a child of Berlin might be five years of age when construction on the site is commenced and could conceivably be 65 years of age when construction is completed.”⁸⁰ *Victims* establishes an intimate temporal link between building, landscape and people by allowing for the possibility of them growing together simultaneously, informing one another in the process.

Whereas Price’s inclusion of time was very much a time of ideas, to be discarded as soon as they were no longer relevant, Hejduk hints at the possibility of establishing an ecological relationship between architecture and time. In *Victims*, he writes that “the project is conceived as a total growing vision. The trees at first are lower than the structures, then throughout the years, in some cases, the trees transcend the heights of the structures.”⁸¹ Keeping in line with Vattimo’s suggestion that “we stop thinking... [of] a necessary structure given once and for all,”⁸² Hejduk leaves the structuring of his proposal to the citizens of Berlin. “The site plan herein presented in *one* possibility for the total completion,” he writes. “The arrangement of the structures is only a suggestion. The concept of another structural ordering is open.”

In Berlin, Hejduk was dealing with a different kind of contamination, the contamination of war, and the scars that it had left on the land. The way in which the architecture was conceived ultimately depended on a diachronic approach, unfolding incrementally and open to chance by admitting time as an explicit design component. In creating a project which was to last and grow during the lifetime of a Berliner, *Victims* established a temporal relationship between inhabitant and architecture, allowing for a democratic dialogue between citizen and city.

While consistent with Vattimo’s proposal that Being be thought of in terms of an event, not an objective given, the flexibility inherent in Hejduk’s design also speaks to the topic of architectural inheritance and authorship. By allowing the citizens of Berlin to act as collaborators in the design, *Victims* actively dispels the notion of a singular author or creator. In this act of architectural participation, Berliners could become unified as actors, immersed in the larger process of urban re-building (or to use Vattimo’s parlance, re-interpretation). The project makes no claim at a false sense of universalism, and it is primarily for this reason that we might view it as an exemplary architectural interpretation of “weakening.”

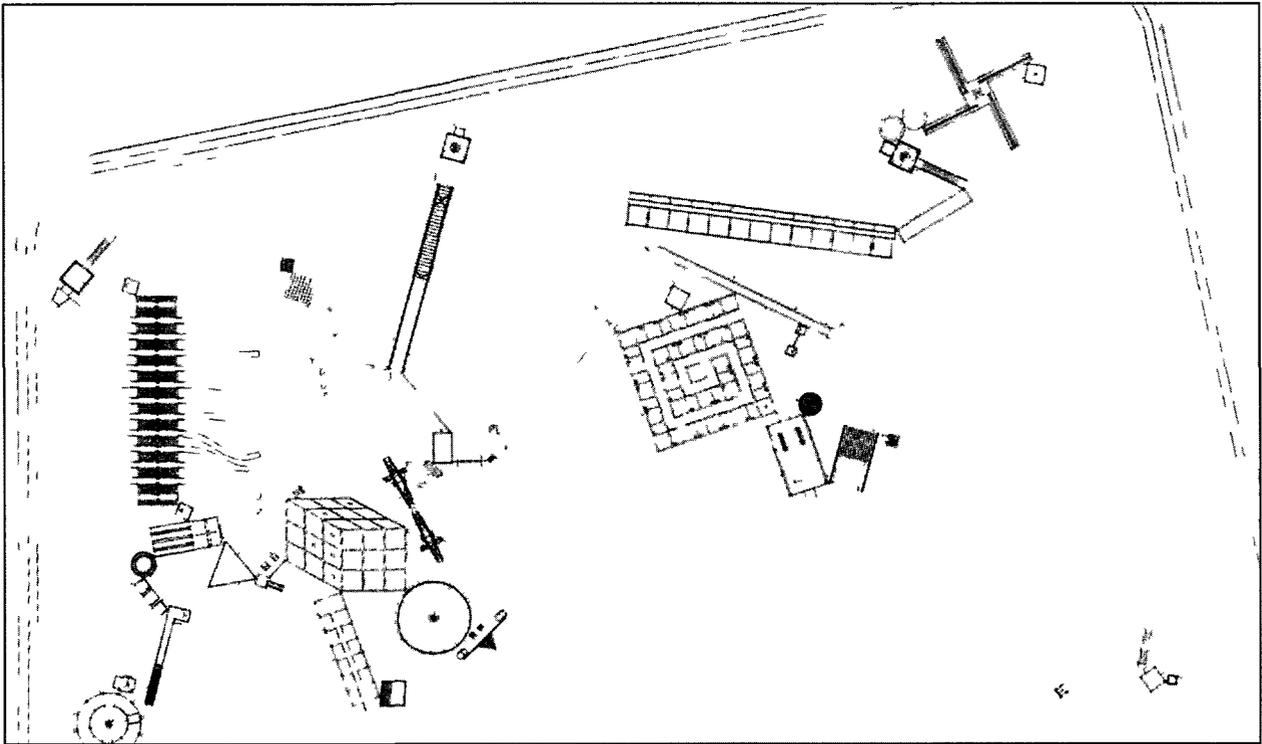


Fig. 3

Victims, Partial Site Plan, 1986

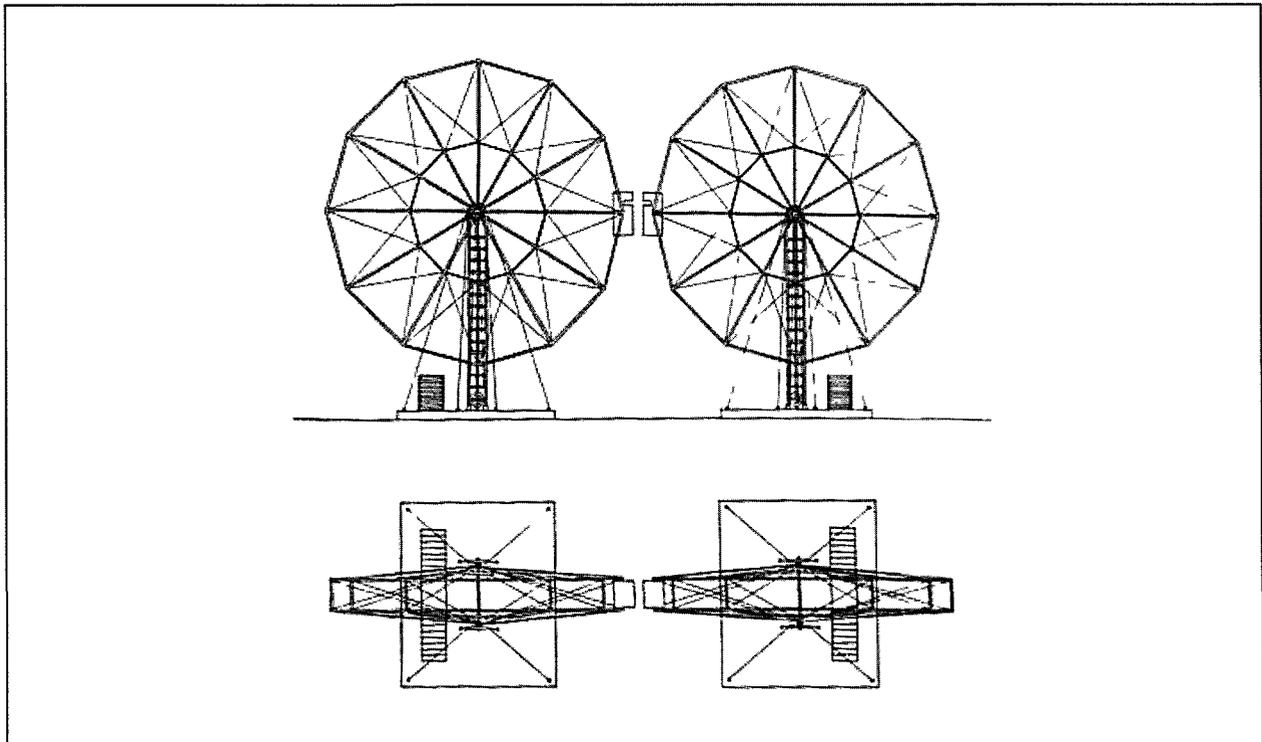


Fig 4

Victims, Ferris Wheel Clock, 1986

The writer Stewart Brand tells of an anecdote- passed onto him by the anthropologist Gregory Bateson- regarding the dining hall of New College in Oxford, England. The room in question is quite large, as required by function, and relies on heavy oak timbers, roughly two feet square and forty-five feet long, to clear its interior span (see Fig. 5).⁸³ Being the oldest surviving college hall in the area, it was completed in 1386 by the master mason William Wynford, under supervision of Bishop William of Wykeham.⁸⁴ Like many other prominent buildings dating from the Late Middle Ages, the dining hall was subjected to whims of architectural fashion during the Victorian era, and renovated in the Gothic Revivalist style by the prolific architect Sir George Gilbert Scott in 1865.⁸⁵

The impetus for this renovation had been the discovery that several of the massive oaken beams had become infested with beetles, and as a matter of course were deemed to be no longer structurally sound. As timber of such dimension was quite rare in England at the time, replacing them posed a significant problem.⁸⁶ During a meeting of the College Council, it was suggested by one of the Junior Fellows that oak of sufficient maturity might be found on one of the properties included as part of the College's endowment, located some miles away from the Hall itself. Desperate to find some kind of resolution to their conundrum, the Council invited in the College Forester who, although responsible for managing the College's disparate plots of land, had only intermittent contact with the College proper. When asked, he revealed "that when the College was founded, a grove of oaks had been planted to replace the beams in the dining hall... This plan had been passed down from one Forester to the next for five hundred years."⁸⁷

It is, as Brand notes, a nice story. Nice indeed, but ultimately fictitious. In truth, Sir Scott used structural oak cut from trees not more than 150 years old, according to a New College Warden's Report circulated in 2002, and the roof renovation actually took place seven years earlier in 1858.⁸⁸ However, to criticize the story simply for a lack of factual accuracy would be to miss its broader conceptual importance as a precedent.

Indeed, the notion of stewardship it imparts is one well worth examining in the context of this thesis. As Vattimo points out, the blurring between subject and object in contemporary society is anathema to any kind of objectively-based notion of Being. While this dissolution may be thought of in metaphysical terms, it also applies to the concept of buildings as being not just discrete entities, but rather components of a larger series of inter-laced networks and process (environment, social etc). It is for this reason that the anecdote of New College is so interesting; it explicitly acknowledges the dining hall as being part of, and defined by, the natural process of tree growth and its subsequent transformation into nominal lumber. This particular ecological 'twinning' between building and raw material is made abundantly clear, thus revealing the building not as an autonomous structure, but rather the product of, and contingent upon, a wider ecological process.



Fig. 5

New College Dining Hall, 2007

Notes

- ¹ Ferdinand de Saussure et al , *Course in General Linguistics* (New York, NY McGraw-Hill, 1966), 88.
- ² Ferdinand de Saussure et al , *Course in General Linguistics* (New York, NY McGraw-Hill, 1966), 88
- ³ Ferdinand de Saussure et al , *Course in General Linguistics* (New York, NY McGraw-Hill, 1966), 89
- ⁴ Stewart Brand, *How Buildings Learn* (New York, NY Penguin, 1995), 210
- ⁵ Jeremy Till, *Architecture Depends* (Cambridge, MA MIT Press, 2009), 94
- ⁶ Michael K Hays, *Architecture Theory since 1968* (Cambridge, MA MIT Press, 2000), 727
- ⁷ Robin Evans, *Translation From Drawing to Building and Other Essays* (London, UK AA Press, 1997), 159
- ⁸ Ignasi de Solà-Morales, *Differences* (Cambridge, MA MIT Press, 1997), 57
- ⁹ Jeremy Till, *Architecture Depends* (Cambridge, MA MIT Press, 2009), 95
- ¹⁰ "Gianni Vattimo," *Wikipedia*, http://en.wikipedia.org/wiki/Gianni_Vattimo (accessed February 2, 2010)
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- ¹² Gianni Vattimo, *Belief* (Stanford, CA Stanford University Press, 1999), 4.
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- ¹⁷ Gianni Vattimo, *Belief* (Stanford, CA Stanford University Press, 1999), 30
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- ¹⁹ William Wood, "(Virtual) Myths," *Critical Sociology* 30 (2004) 513-538
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- ⁴⁶ Ferdinand de Saussure et al , *Course in General Linguistics* (New York, NY McGraw-Hill, 1966), 68-73
- ⁴⁷ Ignasi de Sola-Morales, *Differences* (Cambridge, MA MIT Press, 1997), 66
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- ⁵³ Ignasi de Sola-Morales, *Differences* (Cambridge, MA MIT Press, 1997), 70
- ⁵⁴ Ignasi de Solà-Morales, *Differences* (Cambridge, MA MIT Press, 1997), 71
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- ⁶¹ Gianni Vattimo, *Belief* (Stanford, CA Stanford University Press, 1999), 92

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- ⁶³ Gianni Vattimo, *Belief* (Stanford, CA Stanford University Press, 1999), 8
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- ⁶⁵ Gianni Vattimo, *Belief* (Stanford, CA Stanford University Press, 1999), 22
- ⁶⁶ United States Environmental Protection Agency *Introduction to Phytoremediation* (Cincinnati, OH EPA, 2000), 2
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- ⁷⁰ Kester Rattenbury and Samantha Hardingham *Cedric Price Potteries Thinkbelt* (London, UK Routledge, 2007), 36
- ⁷¹ Kester Rattenbury and Samantha Hardingham *Cedric Price Potteries Thinkbelt* (London, UK Routledge, 2007), 7
- ⁷² Kester Rattenbury and Samantha Hardingham *Cedric Price Potteries Thinkbelt* (London, UK Routledge, 2007), 37
- ⁷³ Kester Rattenbury and Samantha Hardingham *Cedric Price Potteries Thinkbelt* (London, UK Routledge, 2007), 37
- ⁷⁴ Kester Rattenbury and Samantha Hardingham *Cedric Price Potteries Thinkbelt* (London UK Routledge, 2007), 37
- ⁷⁵ Kester Rattenbury and Samantha Hardingham *Cedric Price Potteries Thinkbelt* (London, UK Routledge, 2007), 119
- ⁷⁶ John Hejduk, *Victims* (London, UK AA Press, 1986), 1
- ⁷⁷ John Hejduk, *Victims* (London, UK AA Press, 1986), 1-2
- ⁷⁸ John Hejduk, *Victims* (London UK AA Press 1986), 1
- ⁷⁹ Jeremy Till, *Architecture Depends* (Cambridge, MA MIT Press, 2009), 95
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- ⁸² Gianni Vattimo, *Belief* (Stanford, CA Stanford University Press, 1999), 92
- ⁸³ Stewart Brand, *How Buildings Learn* (New York, NY Penguin, 1995), 130
- ⁸⁴ Stewart Brand, *How Buildings Learn* (New York NY Penguin, 1995), 131
- ⁸⁵ Stewart Brand, *How Buildings Learn* (New York, NY Penguin, 1995), 131
- ⁸⁶ The British Navy relied on the vast timber resources of Canada, notably in Halifax, to fuel its shipbuilding enterprises and sea power dominance. Old-growth trees were particularly prized for their size, which made them ideal for mast-making purposes.
- ⁸⁷ Stewart Brand, *How Buildings Learn* (New York, NY Penguin, 1995) 131
- ⁸⁸ "The Warden's Report " *New College News* 19, November 2002

3.0 context

Situated amidst the eddies of the Ottawa River, Chaudière is the largest of a family of islands scattered around this vicinity, whose other members include Victoria, Albert, Amelia, and Coffin. Deriving its name from the falls it helps create, which the early French voyageurs likened to a *chaudière*, or giant kettle, the island provided a valuable portage route to circumvent the raging 15 metre drop of rushing water. The Chaudière also held significance for the local Algonquin tribe, who regarded it as a place of military importance, due to its vulnerability to attack.¹ European presence became more and more frequent from the early 1600's onward, as French and British explorers pushed inexorably westwards in a drive to find navigable waterways into the interior, some in search of the ever-elusive transcontinental passage that might lead to the Pacific Ocean, and vast trade potential. Figures such as Samuel de Champlain, Jean de Brebeuf, as well as the intrepid Welsh explorer Sir Alexander Mackenzie all visited and remarked upon the natural power of Chaudière Falls.²

The potential of the falls for hydropower was quickly recognized and, by 1802, Philemon Wright had harnessed the current to power the first of several saw and grist mills on Chaudière Island, effectively setting in motion a century of rapid industrial expansion.³ The driving force behind the development of Chaudière was a burgeoning Canadian timber economy, and in the 1820's the first bridge across the Ottawa River was designed by Colonel John By, in order to access timber reserves in Quebec for construction of the Rideau Canal (see Fig. 6).⁴ The original wooden bridge was replaced in the 1840's by a steel-cable suspension structure, called Union Bridge, due to an ever-increasing volume of traffic through this vital transportation artery. At the time, it was one of the longest suspension span bridges in North America (see Fig. 7).

In 1852, the Department of Public Works undertook a thorough survey of the island as a basis for further industrial planning and development (see Fig. 8). New water flumes were added, boosting the hydropower generating capacity of the district. The main road running across the island was re-aligned, in conjunction with the construction of a new, small bridge connecting Chaudière with the Bytown side of the Ottawa River.

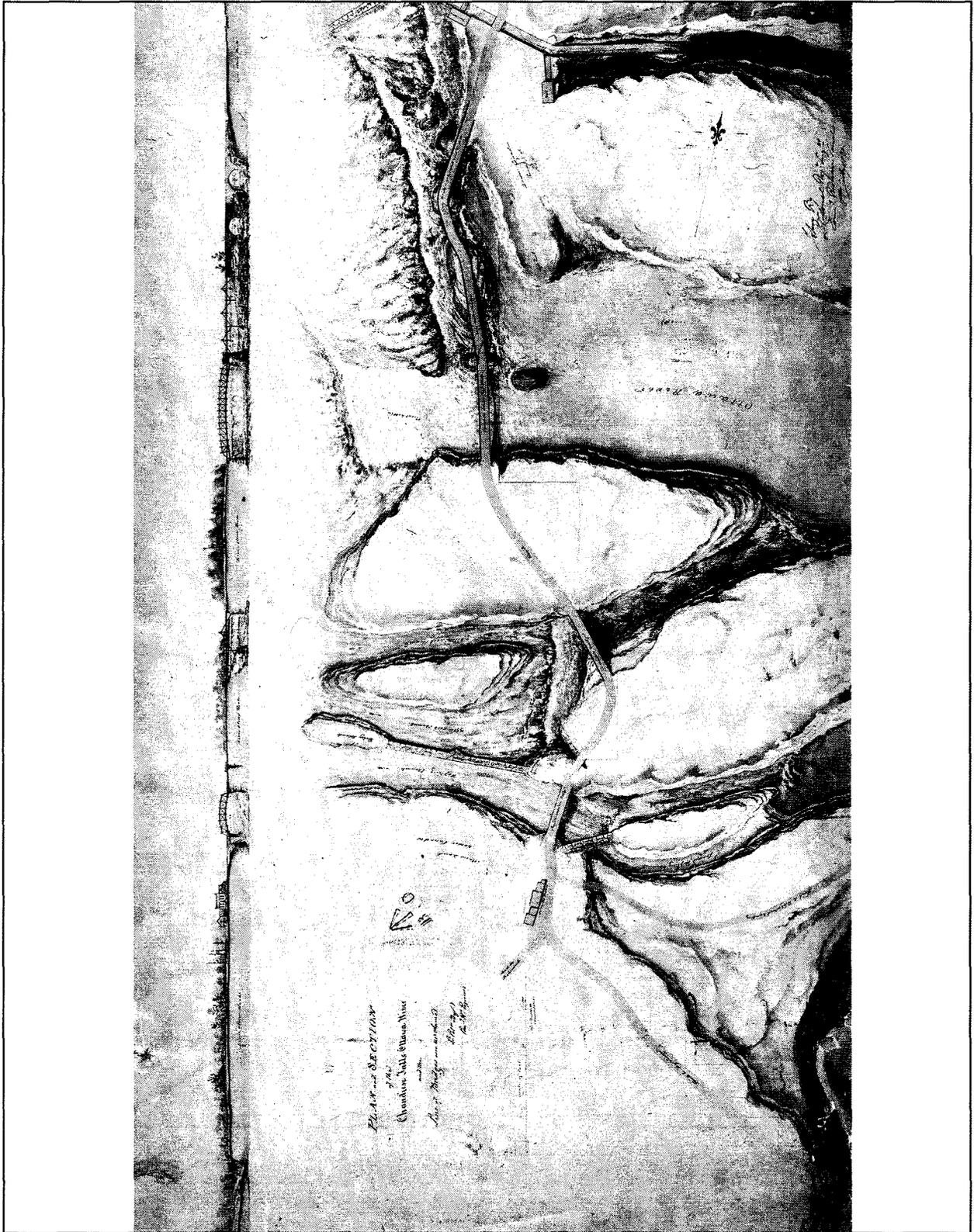


Fig. 6

Chaudière Falls Plan and Section, Col. John By, 1830

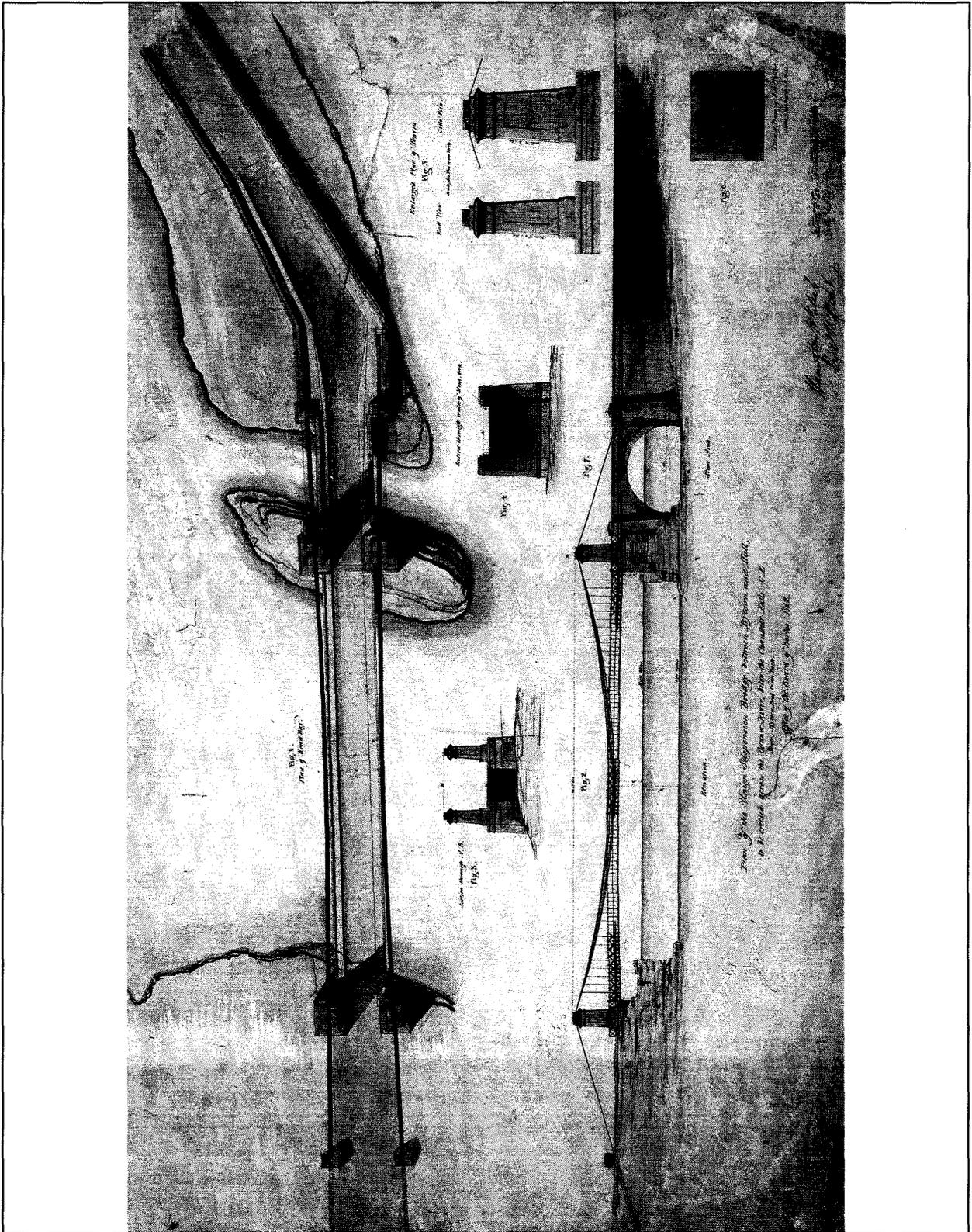


Fig. 7

Union Bridge, Board of Works, 1842

Following the Public Works survey, the federal government initially acted as a landlord for Chaudière island, leasing properties for local mill owners and other businesses. As a result, the next four decades were witness to a process of rapid industrialization, and by 1880 the area was a bustling industrial and commercial hub whose buildings included forges, furniture factories, a brewery, and several warehouses.⁵ The unique hydropower capacity of the island was a boon to industry, allowing landowners to capitalize on their essential monopoly of constant power for mechanical purposes. Prior to the advent of an electrical generating station which dammed the Ottawa River during the 1920's, water was diverted into a series of flumes and channels, while the Chaudière Falls themselves remained as a relatively unbridled torrent (see Fig. 9 and 10).

Residual space on the island and surrounding area was used to air-dry lumber, stacked in closely placed piles which towered up to four or more metres in height (see Fig. 11). However, these provided an easy target for the great Ottawa fire of 1900, which annihilated the district before sweeping on to other parts of the city. Today, virtually all of the existing structures on Chaudière Island date from the early 1900s- a period of expedient and intense industrial rebuilding (see Fig. 12).

While the Chaudière continued to be an industrial centre well into the 20th century, its hydropower potential was no longer of significant value due to the implementation of a long-distance, high-voltage electrical grid.⁶ The post-WW2 era witnessed a slow, steady decline in industrial production, with cheaper foreign labour markets and increased global competition. Gradually buying up property for the past several decades, the sole remaining landowner on the island is Domtar Corporation, a large multi-national pulp and paper manufacturer. Domtar announced its departure from Chaudière in 2007, citing a high Canadian dollar and lowered demand for paper products, while laying off approximately 250 workers in the process.⁷ Currently, the National Capital Commission (NCC) is engaged in on-again, off-again negotiations with Domtar to purchase Chaudière Island for redevelopment purposes.⁸ Past NCC proposals, dating from the mid-1980s, have proposed bringing residential and mix-use functions to the island, in conjunction with the restoration of some industrial structures, similar to the case of Granville Island in Vancouver.⁹



Fig 9

Chaudière Falls, 1880



Fig. 10

Chaudiere Falls with Timber Flotsam, 1880



Fig. 11

Lumber Piling Grounds, 1888

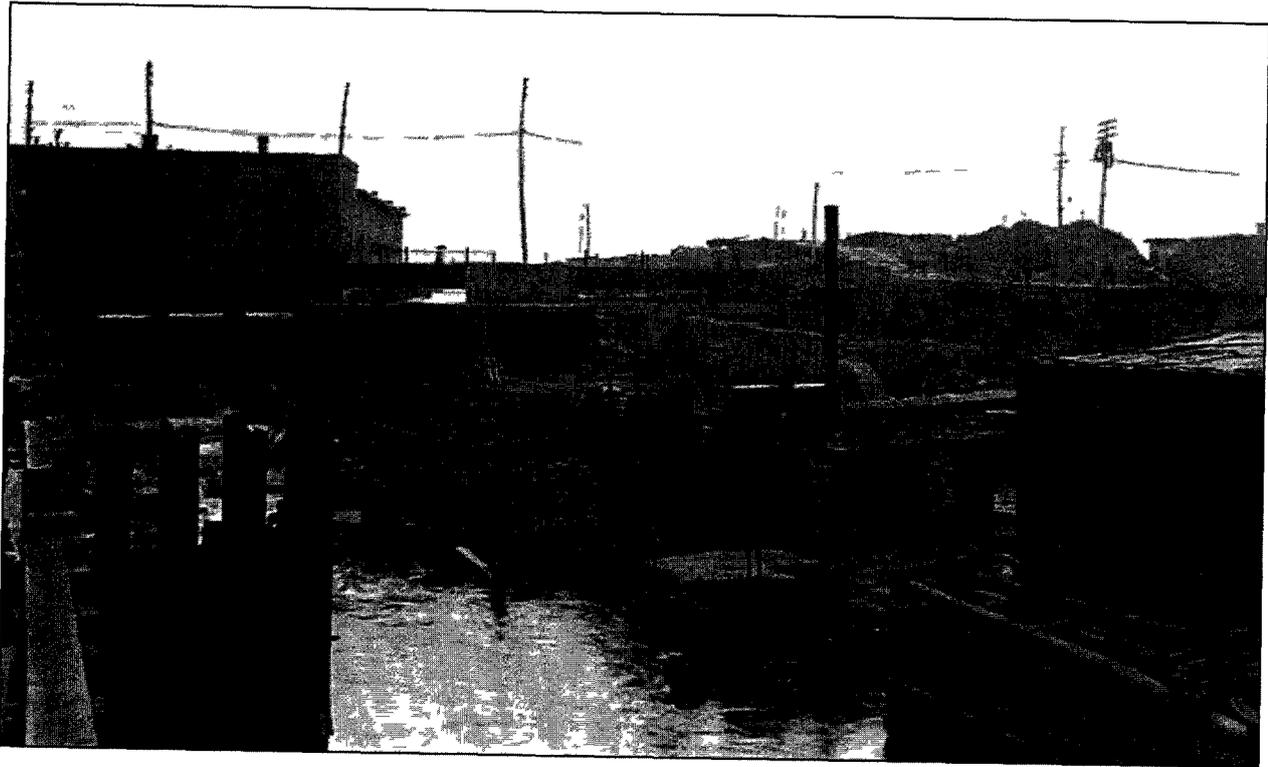


Fig. 12

Buchanan Channel Looking West, 1901

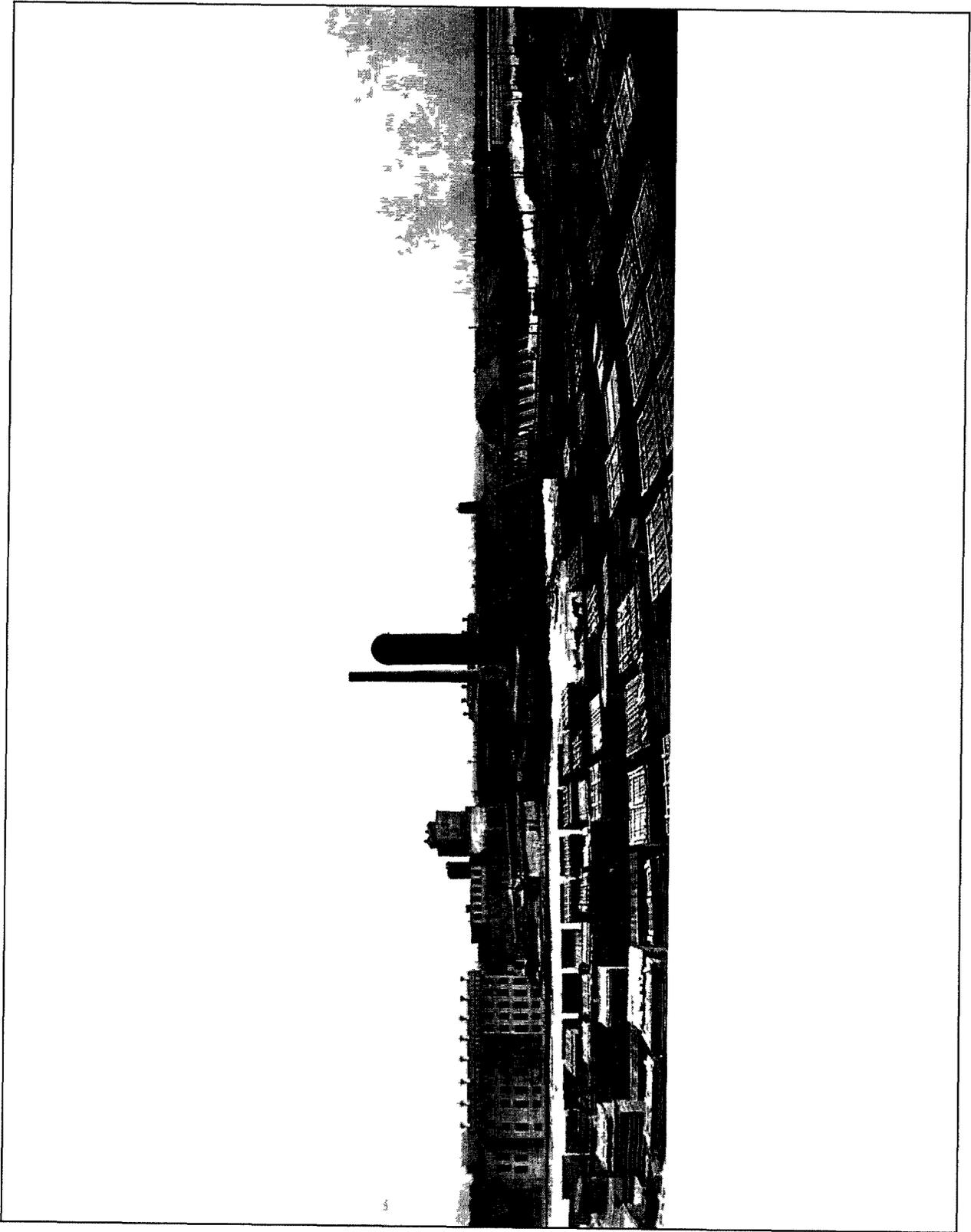


Fig 13

Panoramic View of J R Booth Mills

The Booth Greenwood Pulp Mill, located on the south-eastern side of Chaudière Island, is a somewhat deceptively low-slung brick building which presents a narrow, formal facade to Booth Street while extending back along the shoreline. John Booth was himself one of the largest lumber magnates of the time, and at the height of production his mills had the capacity to produce over one million board feet of lumber in a 10 hour shift.¹⁰ Coming from a poor farming background, Booth quickly utilized his inherent gift for entrepreneurship, and by 1859 he had secured his first large-scale lumber contract- providing timber for the construction of the Canadian Parliament Buildings.¹¹ Owning significant holdings on Chaudière, the Pulp Mill was just one small part of his massive timber empire.

Located on the northern half of Lots H, I and J (see Fig. 8), construction of the Pulp Mill began in the autumn of 1900, following the great Ottawa-wide fire of the same year. Booth started first by building a flume- a narrow, deep channel designed to increase the flow of water for hydropower- which some fellow industrialists on the island claimed was too large, thus producing more power than his lease allowed.¹² Installation of machinery, including turbines and grinders was complete by the end of 1903, and production began the following spring in 1904.

The mill relied on 10 horizontally aligned water turbines for generation purposes which produced upwards of 2400 horsepower, providing excess electricity to the rest of the Booth complex on Chaudière, in addition to powering the pulp grinders themselves.¹³ According to accounts, “the ground wood section of the pulp mill operated with 26 grinders, each with a capacity of seven tons of ground pulp a day, or a total daily production of 182 tons when the mill was operating at full capacity.”¹⁴ The pulping process relied on short log lengths being supplied by the much larger Board Mill to the north. This transfer was accomplished via an underground canal, which floated logs into the basement level of the Pulp Mill where they were subsequently ground down by a series of massive grinders. The grinders themselves (see Fig. 14) were prone to generating a

large amount of heat to friction, resulting in a series of protruding ventilation ports on the southern side of the building, slightly below the foundation level (see Fig. 19).¹ The mill's construction methods are a blend of concrete foundation, heavy timber structure and masonry. Following the devastating fire of 1900, brick was favoured for its fireproof qualities and rapid rate of constructability. Opening onto Booth Street to the west and into the laneway to the north, the uppermost level is of masonry construction, with 4 longitudinal rows of heavy timber columns. Below this is a mezzanine level, from which one can look down into the basement of the mill. The concrete here is supported by a series of steel beams and columns, which replaced the original wood members when E.B. Eddy bought the building in the 1950s.¹⁶ The mill ceased operations in the mid 1960s, and was used to store machinery until its complete closure. Although the building is still technically owned by Domtar Corporation, it has been left abandoned with no substantial plans in place for its future.

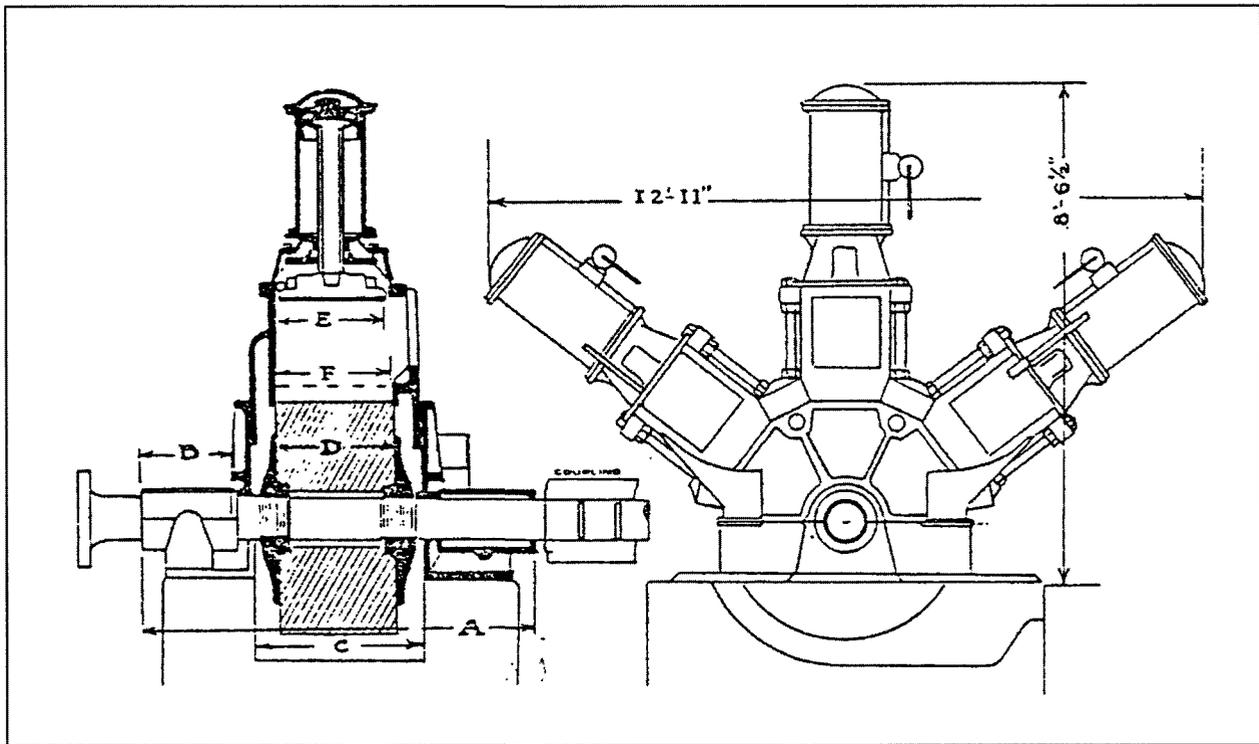


Fig. 14

Pulp Grinder Section and Elevation



Fig 15

Chaudiere Island, 2011



Fig 16

Pulp Mill Looking South-East, 2011

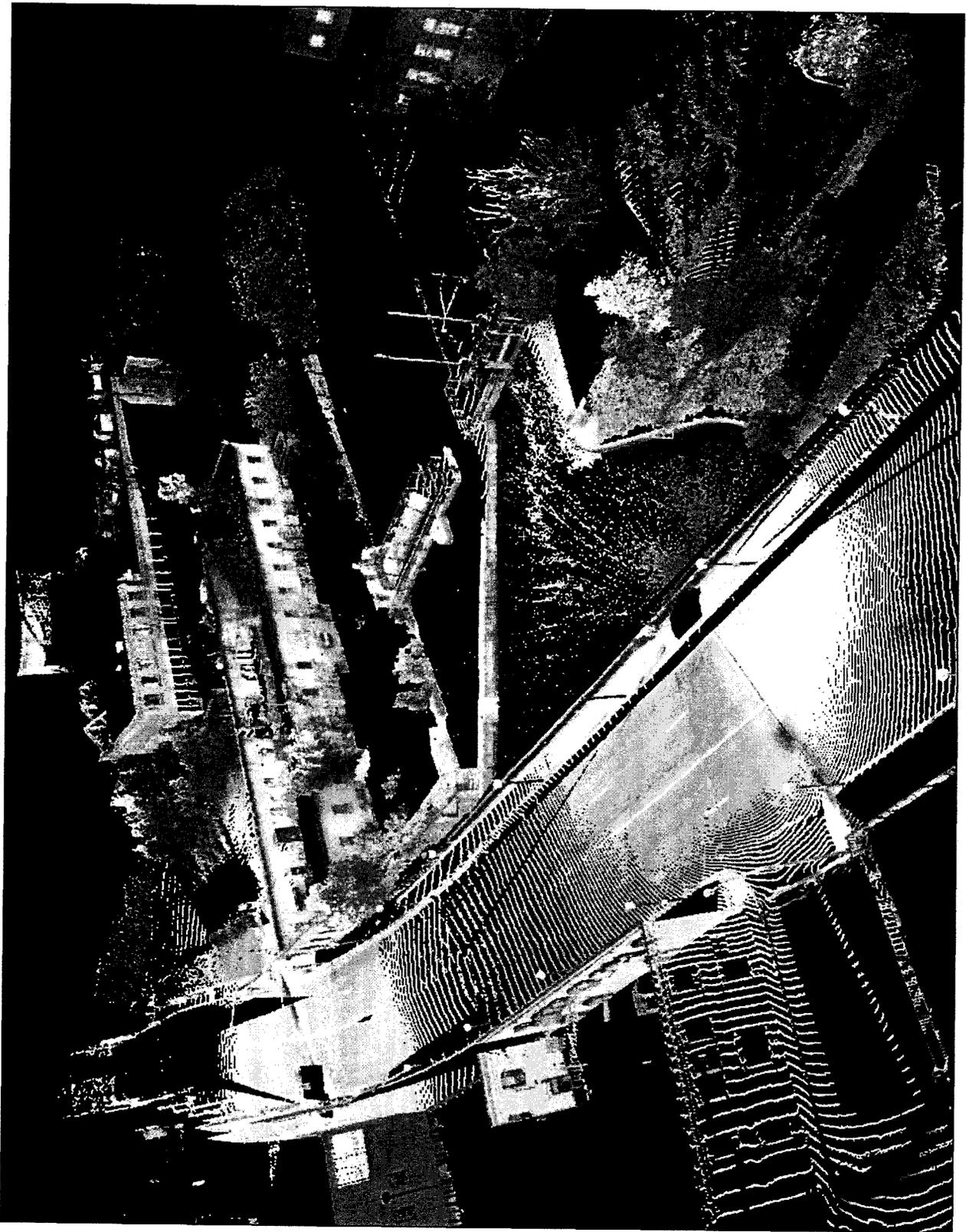


Fig. 17

Booth St. Laser Scan Looking North, 2011



Fig 18

Pulp Mill Laser Scan Looking South-East, 2011



Fig 19

Pulp Mill Laser Scan Looking North, 2011

At present, there are approximately 250 federally-owned contaminated sites within the National Capital Region, ranging in contaminant type, severity and location (see Fig. 1). Within the scope of this thesis, we shall focus on the vicinity of LeBreton Flats; a site with a long-standing industrial history which was completely razed in the 1960's by the federal government. To the east of the site are a number of contaminated "hotspots" (see Fig. 13). The soil depth in this area is relatively shallow due to bedrock conditions, making it an ideal candidate for phytoremediation testing. In addition, the predominant heavy-metal contaminant on site is lead (see Appendix B), which can be accumulated and extracted by hybrid poplar species (see Appendix A). Current development plans include a condominium complex to the north (see Fig. 21) and a major transitway station for the O-Train light-rail tunnel expansion near the corner of Booth and Wellington Street. (see Fig 22).



Fig. 20

Federal Contaminated Site, Lebreton Flats, 2011



Fig. 21

Claridge Homes Condominium Proposal, 2011

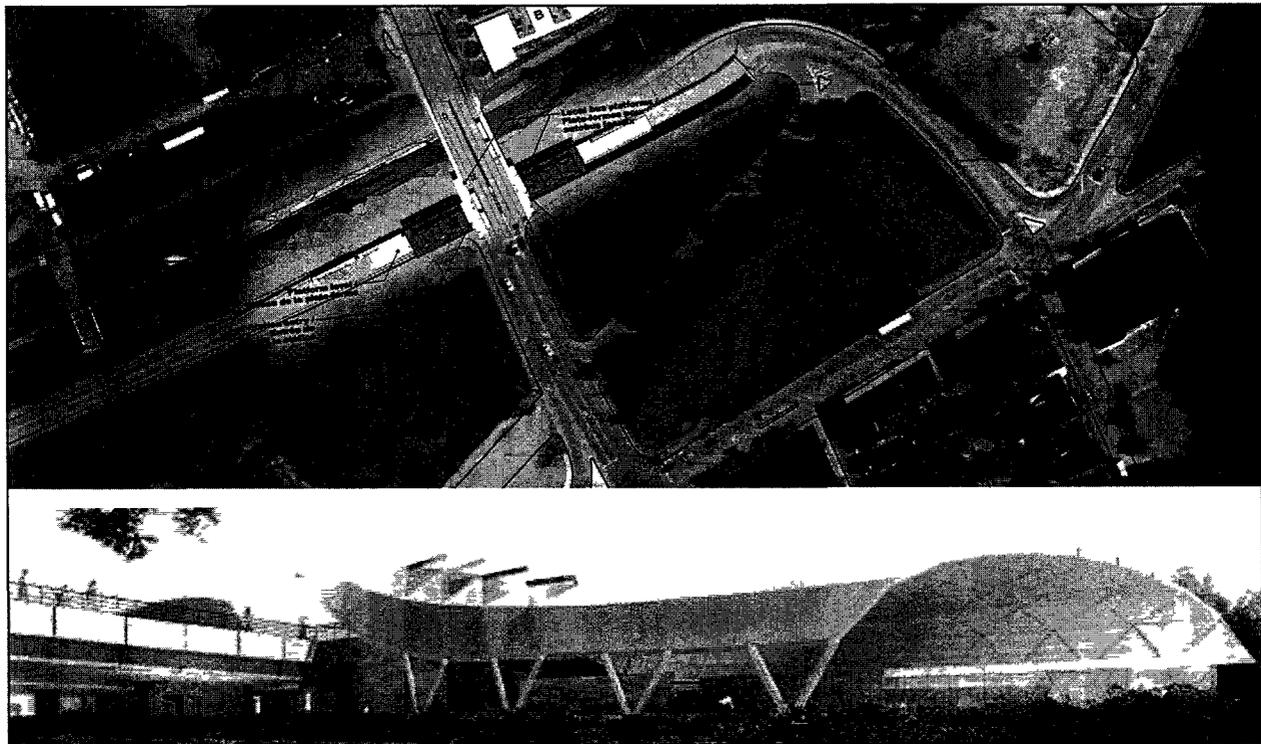


Fig. 22

Lebreton Transitway Station Proposal, 2011

Notes

¹ Ken Desson and Associates *The Industrial Archaeology of the Chaudiere* (Ottawa NCC 1982) 1

² Ken Desson and Associates *The Industrial Archaeology of the Chaudiere* (Ottawa NCC, 1982), 1

³ Ken Desson and Associates *The Industrial Archaeology of the Chaudiere* (Ottawa NCC, 1982) 1

⁴ Ken Desson and Associates *The Industrial Archaeology of the Chaudiere* (Ottawa NCC 1982) 2

⁵ Ken Desson and Associates *The Industrial Archaeology of the Chaudiere* (Ottawa NCC, 1982) 2

⁶ Ken Desson and Associates *The Industrial Archaeology of the Chaudiere* (Ottawa NCC, 1982), 2

⁷ Kelly Egan "Make Domtar's Loss Ottawa's Gain ' *The Ottawa Citizen*, August 15 2007

⁸ Kelly Egan, "Make Domtar's Loss Ottawa's Gain " *The Ottawa Citizen*, August 15, 2007

⁹ Preliminary NCC reports were done in the early to mid 1980s. Local Ottawa architect Barry Padolsky was invited to undertake a preliminary assessment of the Booth Board Mill in 1984, and summer student work documented other portions of the island during this time

¹⁰ C F Coons, *The John R Booth Story* (Toronto Canada Archives 1978) 14

¹¹ C F Coons, *The John R Booth Story* (Toronto Canada Archives, 1978), 12

¹² Hilary Homes, *The J R Booth Greenwood Pulp Mill No 1* (Ottawa, NCC 1983) 24

¹³ Hilary Homes *The J R Booth Greenwood Pulp Mill No 1* (Ottawa NCC 1983) 29

¹⁴ Hilary Homes, *The J R Booth Greenwood Pulp Mill No 1* (Ottawa NCC 1983) 17

¹⁵ Hilary Homes *The J R Booth Greenwood Pulp Mill No 1* (Ottawa NCC 1983) 27

¹⁶ Hilary Homes, *The J R Booth Greenwood Pulp Mill No 1* (Ottawa NCC 1983) 25

4.0 proposal

Recalling Vattimo's suggestion that "if we are to stop thinking of Being in metaphysical terms as a necessary structure given once and for all, it must be conceived as an event,"¹ the thesis project proposes a similar diachronic process of architectural development. Thus, many of the following structures are multi-state; not necessarily constrained to a synchronic function, but adaptable to contextual need, as influenced by Vattimo's call for a weakened, non-universal philosophy and de Solà-Morales' advocacy of perpetual re-grounding.² The project begins with the renovation and conversion of the Booth Greenwood Pulp Mill, located at No. 3 Booth St. on Chaudière Island. For the sake of convenience, we will refer to this structure as B3. Through inheriting a piece of maligned industrial legacy, and partaking in the larger process of urban inheritance discussed in Part 2.4, the thesis attempts to re-ground the mill within the urban fabric, establishing a provisional sense of meaning once again. While B3 once played a vital role in the larger economic, industrial and social networks dependent on the Ottawa pulp and timber trade, we shall seek to connect it once more to the surrounding city as part of a symbiotic blend of technological innovation and environmental remediation.

In keeping with federal policy, such as the Federal Contaminated Sites Action Plan (FSCAP) which claims to be geared towards addressing "the risks that [brownfield] sites pose to human health and the environment [and to support] other socio-economic outcomes, such as [the] training and employment of Canadians and promotion of innovative technologies,"³ the thesis calls for the establishment of a research facility dedicated to the field testing of phytoremediation techniques. Dubbed OCAPS, or the Ottawa Centre for Applied Phytoremediation Studies, this research organization would make its home within the renovated and re-purposed Pulp Mill. As phytoremediation techniques are currently still in their developmental phase, there is generally no significant incentive for private industry to invest money into researching this area. Therefore, OCAPS provides an excellent opportunity for the federal government to advance knowledge of the field while simultaneously remediating its own brownfield inventory.

Once OCAPS is established, a series of federally-owned brownfield sites will be selected as ideal candidates for phytoremediation. The thesis proposes that a portion of LeBreton flats be devoted to this purpose, in part for its proximity to the Centre, but also due to the projected increase in area population as a result of the current Claridge residential development. By selecting contaminated properties which are not heavily polluted by conventional standards, the project turns these spaces into public urban laboratories; park-like spaces which provide a remedial, as well as social, function. As the geographer Christopher de Sousa notes, the distribution of urban green space has well-documented benefits on a variety of levels, ranging from the social to the economic.⁴ Accordingly, plants and trees being studied by OCAPS will be planted close to contaminant “hot spots,” while uncontaminated areas will be planted, where possible, with softwood species native to the Ottawa region, including white spruce, balsam fir, and Canadian red pine in preparation for the next, longer-term stage of urban evolution.

The project also proposes a series of pavilions, to be located in and around the brownfield pilot study area. These structures are provisional, based on community need, but can be activated to work together within a larger architectural process. While allowing for diachronic development, their design is also capable of being modified to support certain events relating to the harvest, cutting and seasoning of lumber. Configured in such a way, a simple bridge transforms into the Water-Blade Pavilion, while park seating turns into the Air Pavilion. Acting in concert, under oversight from OCAPS, these structures evolve into a timber production network over a period of 50 years, based on tree maturity and growth. While able to provide federally and municipally owned buildings of historical significance with a source of locally produced lumber for renovation purposes, the project proposes directing this ecological flow to the construction of a Revelry Pavilion. Possibly located on the easternmost shore of Chaudière Island, it is a structure designed to serve a celebration space for Canada's bicentennial in 2067. While not intended to be viewed as the objective, conclusive end of this urban process (borrowing from Vattimo, we might say it is in perpetual drift, always re-interpreting itself), it is upon this provisional horizon that we cease our architectural gaze.

Once OCAPS is operational, its mandate is one of data gathering and acquisition for federal brownfield sites within the municipal limits of Ottawa. This includes archiving existing information already on public record (for example, Environmental Site Assessments (ESAs) as well as field sampling and analysis for sites requiring further environmental investigation. Data regarding soil type and level of contamination will be collected, as well as the installation of groundwater monitoring stations as deemed necessary. Based on site analysis, brownfields with priority status (due to contamination, or proximity to built-up urban areas) will be selected for phytoremediation development. This process entails determining concentrated areas for remediation, and selecting tree and plant species to deal with specific strands of contaminants. Conceived as a series of open-air urban laboratories, this network of federally-owned contaminated sites will provide ongoing research data as well as additional public-access green space, contingent upon acceptable levels of contamination and risk-assessment evaluation.

The laboratory itself will house a variety of functions relating to phytoremediation. Spaces will be provided for contaminant sampling and analysis, plant tissue analysis and storage, conference spaces, as well as an ongoing public-access library to disseminate information. The top floor of the mill will be devoted to conference spaces, research offices, and a reception area, while a central lightwell and staircase along the south wall will service the subsequent levels. These will be devoted to contaminant analysis and testing, with space provided for sample and specimen preservation. In addition, space will be set aside for the storage or incineration of trees once they have successfully carried out phyto-extraction.

The de-watered flume next to the mill will be converted into a sunken garden, providing the OCAPS staff with a spot to eat lunch, or read. In time, this space will be accessed by the Water-Blade Pavilion, which constitutes a pedestrian link over Buchanan Channel as well as providing views down river and of the sluiceway mechanisms.

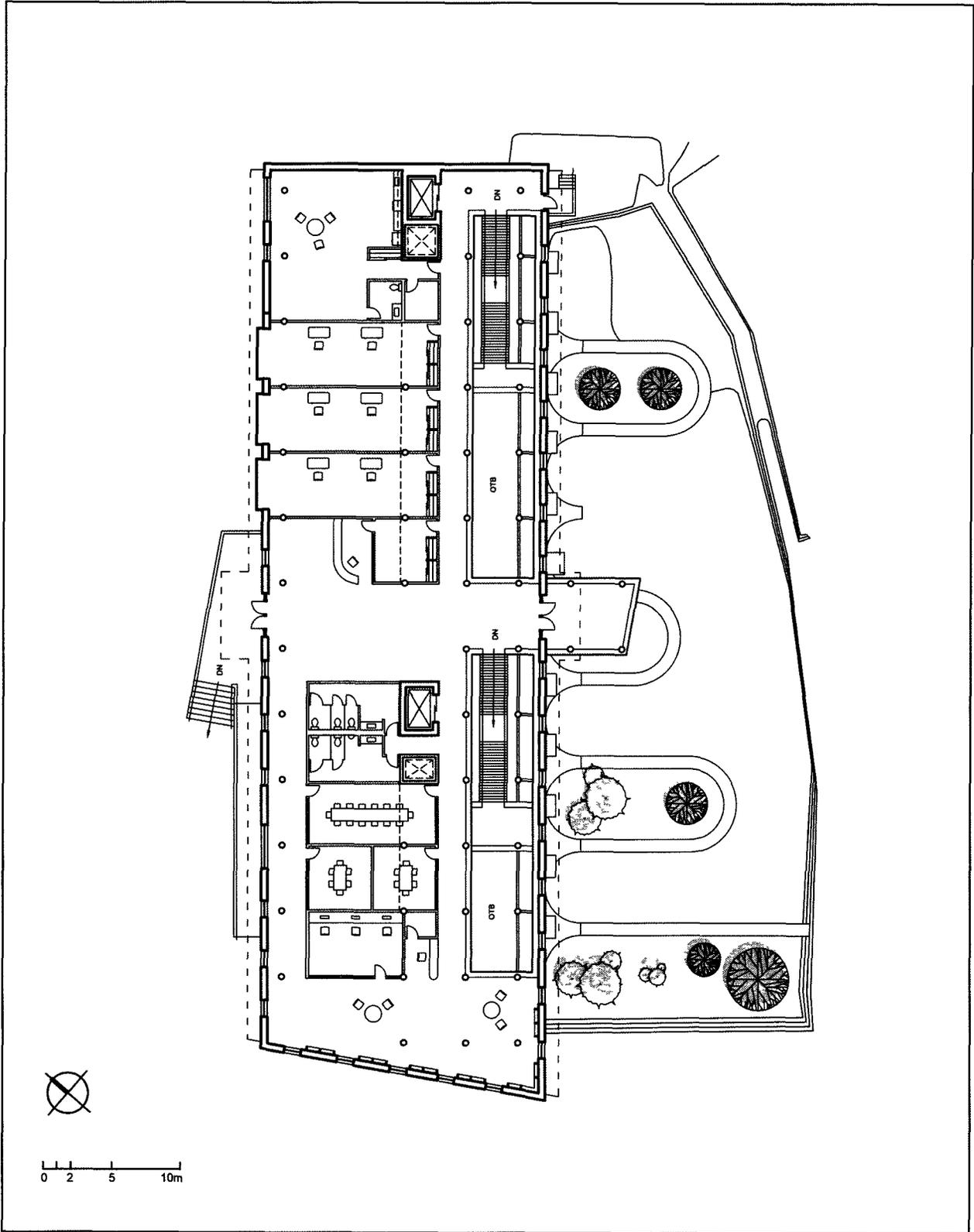


Fig 23

OCAPS Ground Level

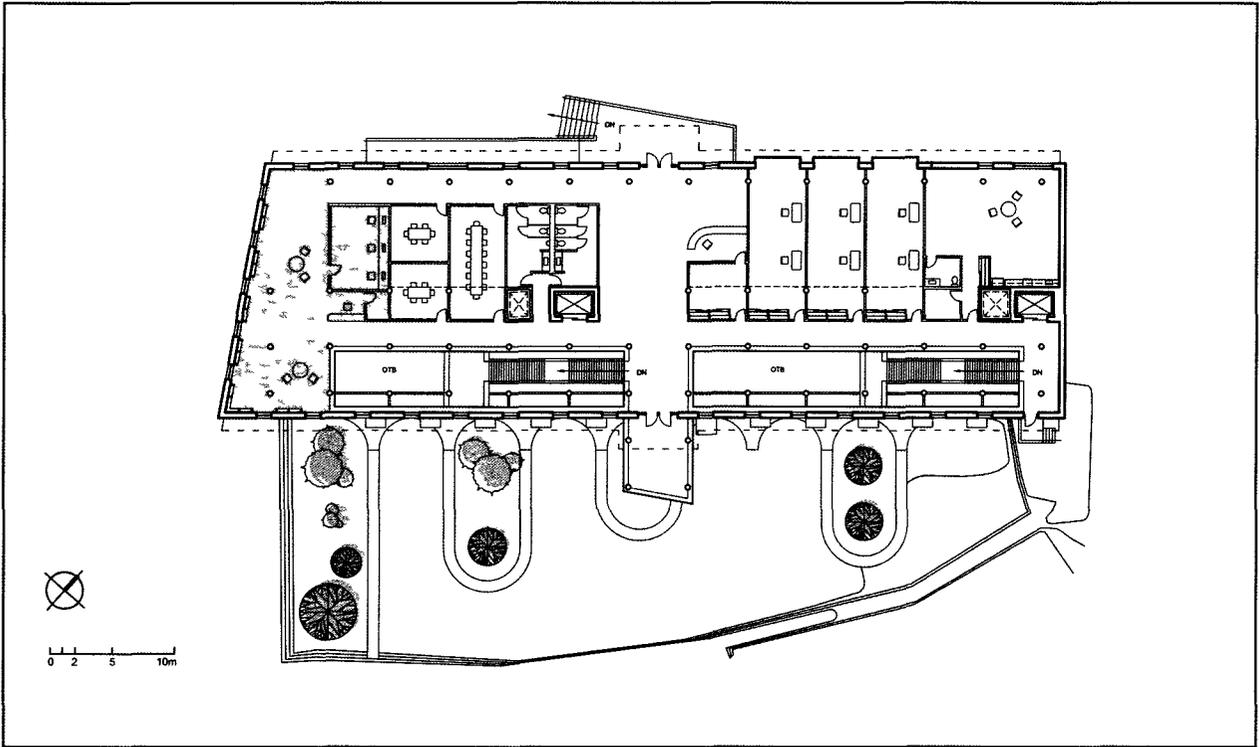


Fig 24

Library and Data Centre

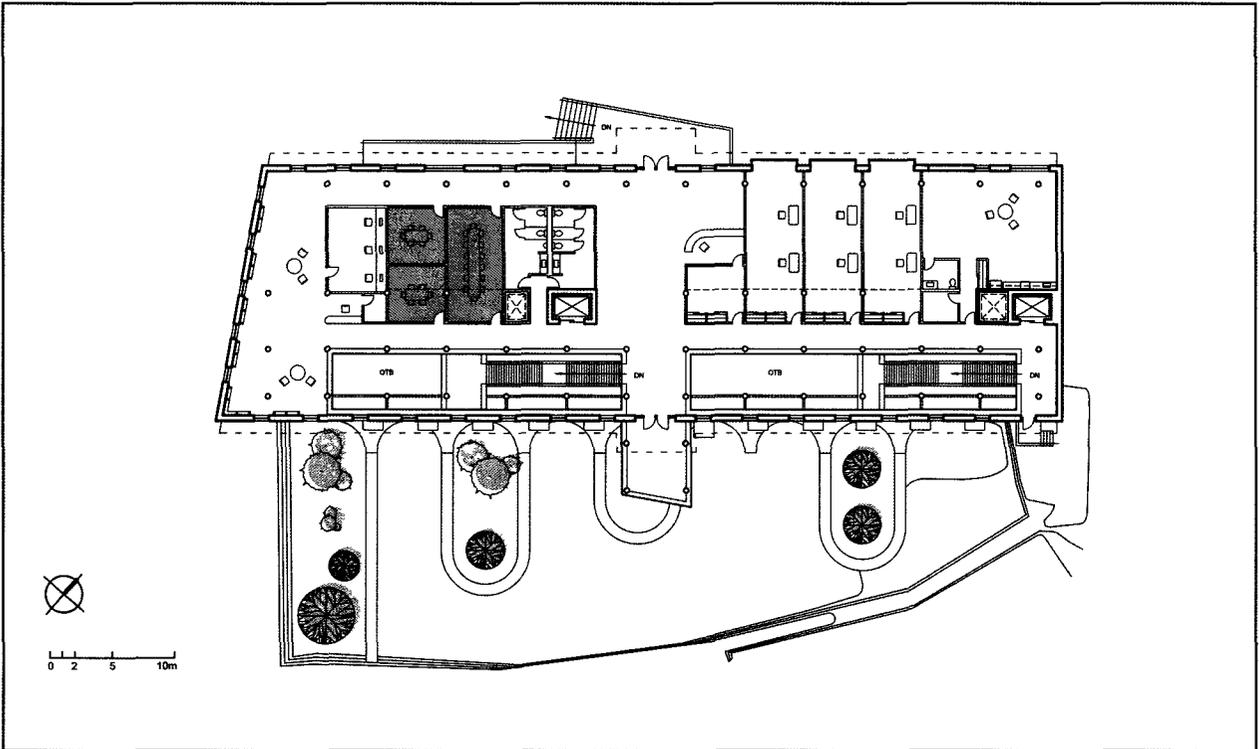


Fig 25

Conference Areas

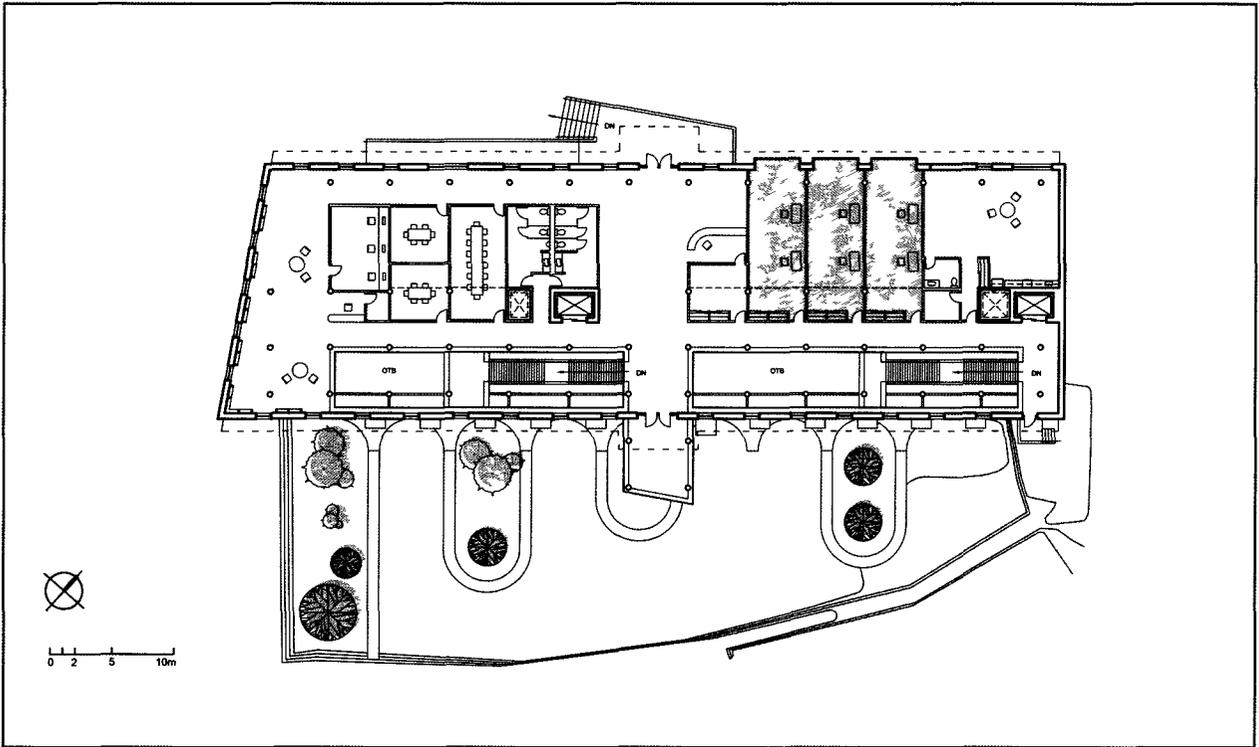


Fig 26

Research Offices

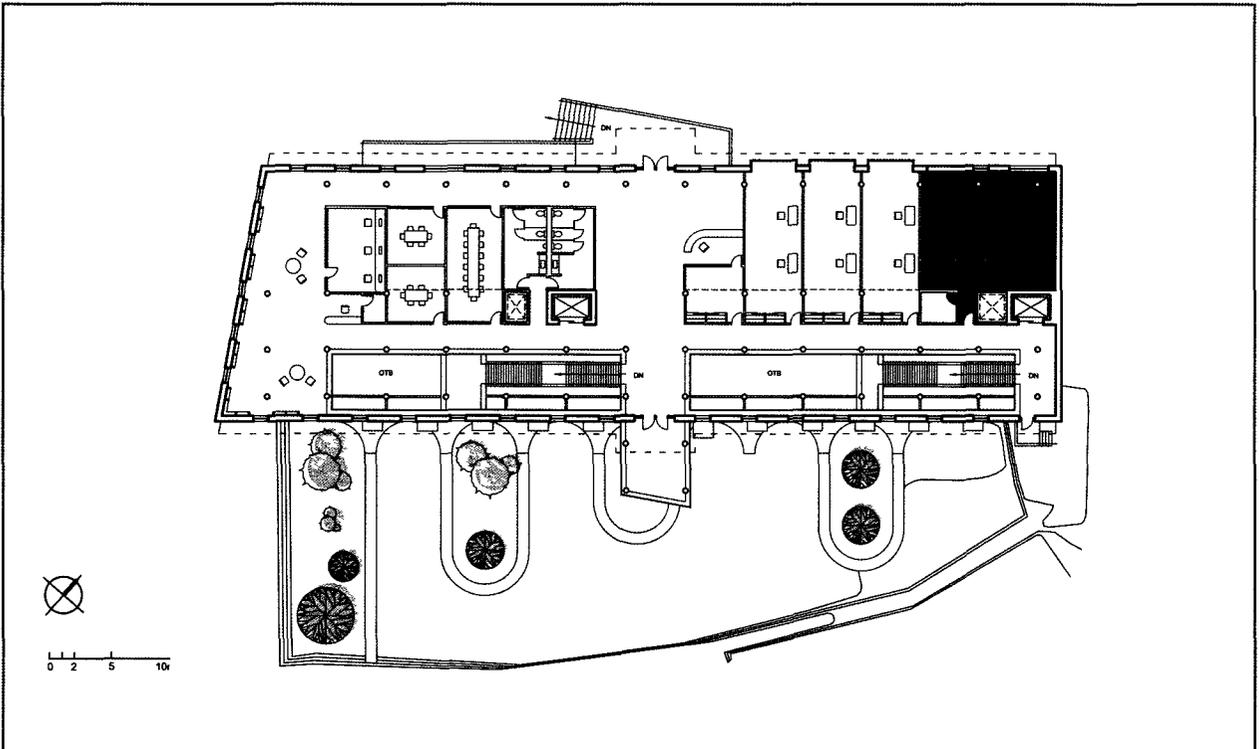


Fig 27

Staff Lounge

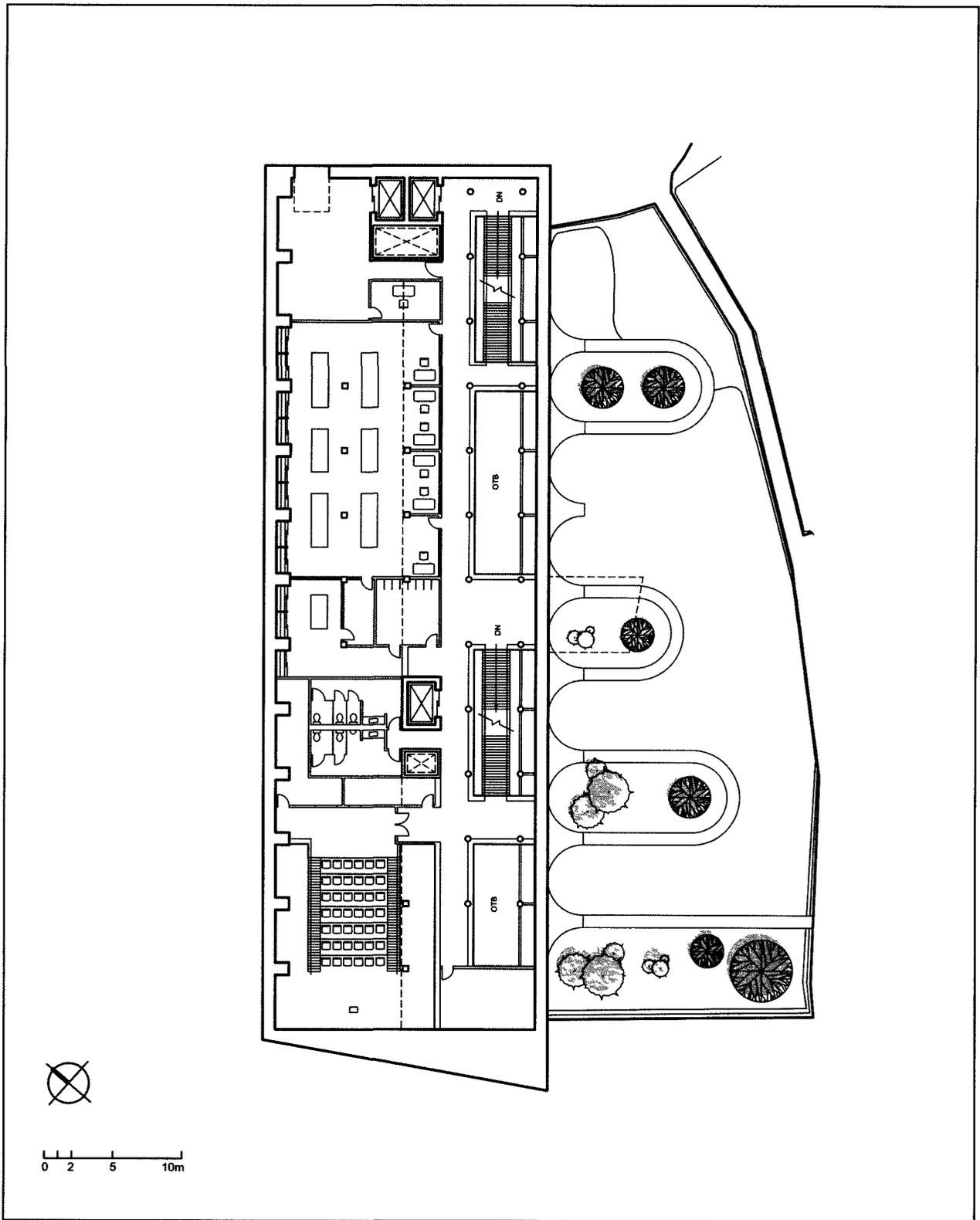


Fig 28

OCAPS Laboratory Level

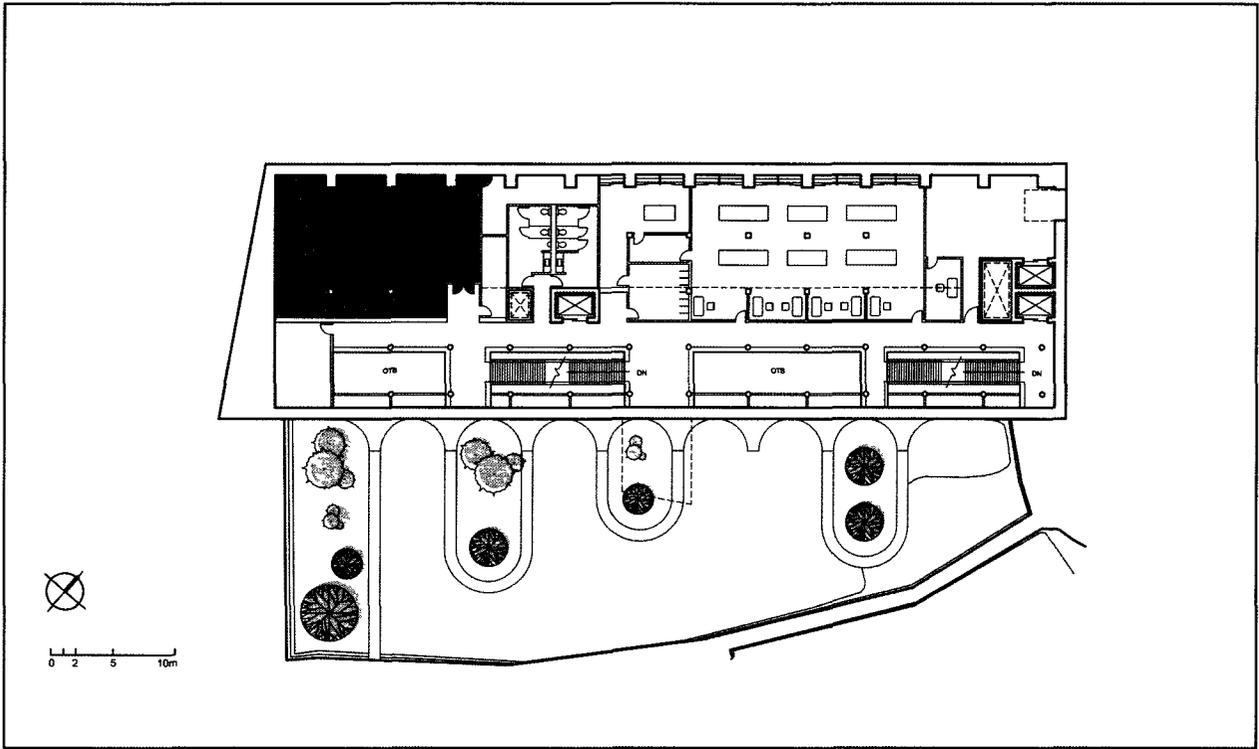


Fig 29

Presentation Space

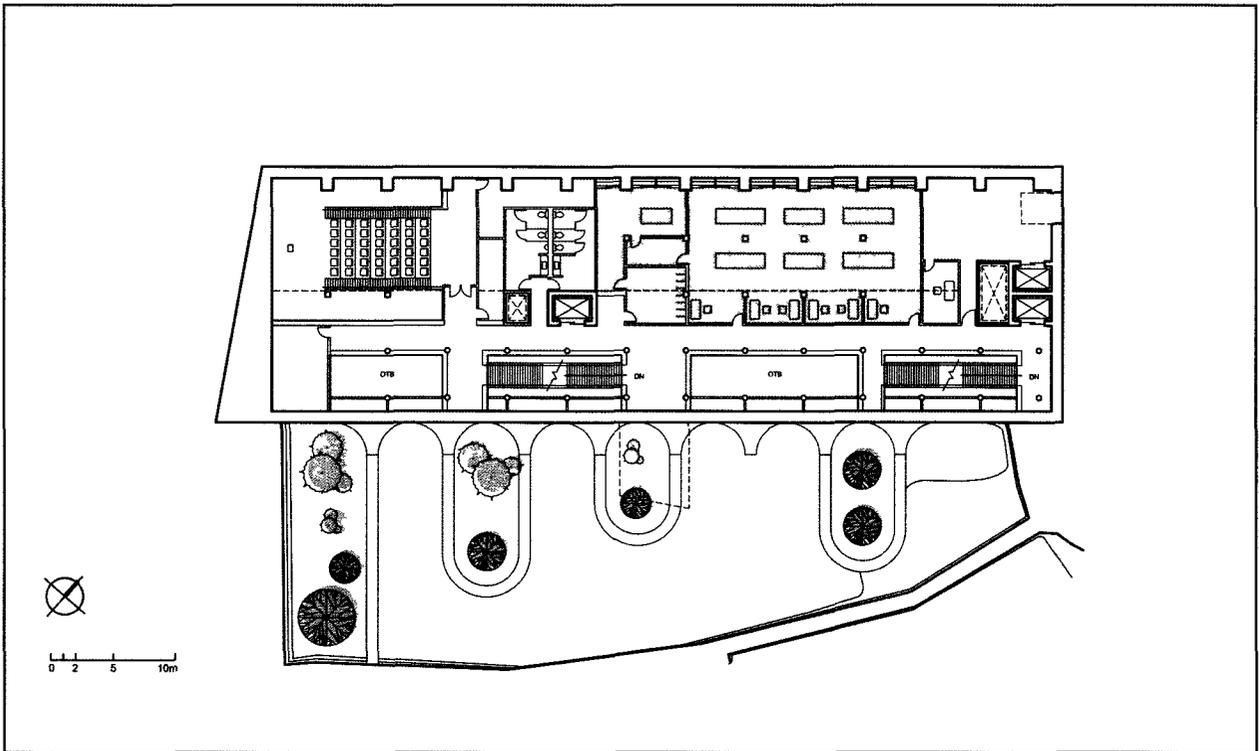


Fig. 30

Soil and Water Analysis Lab

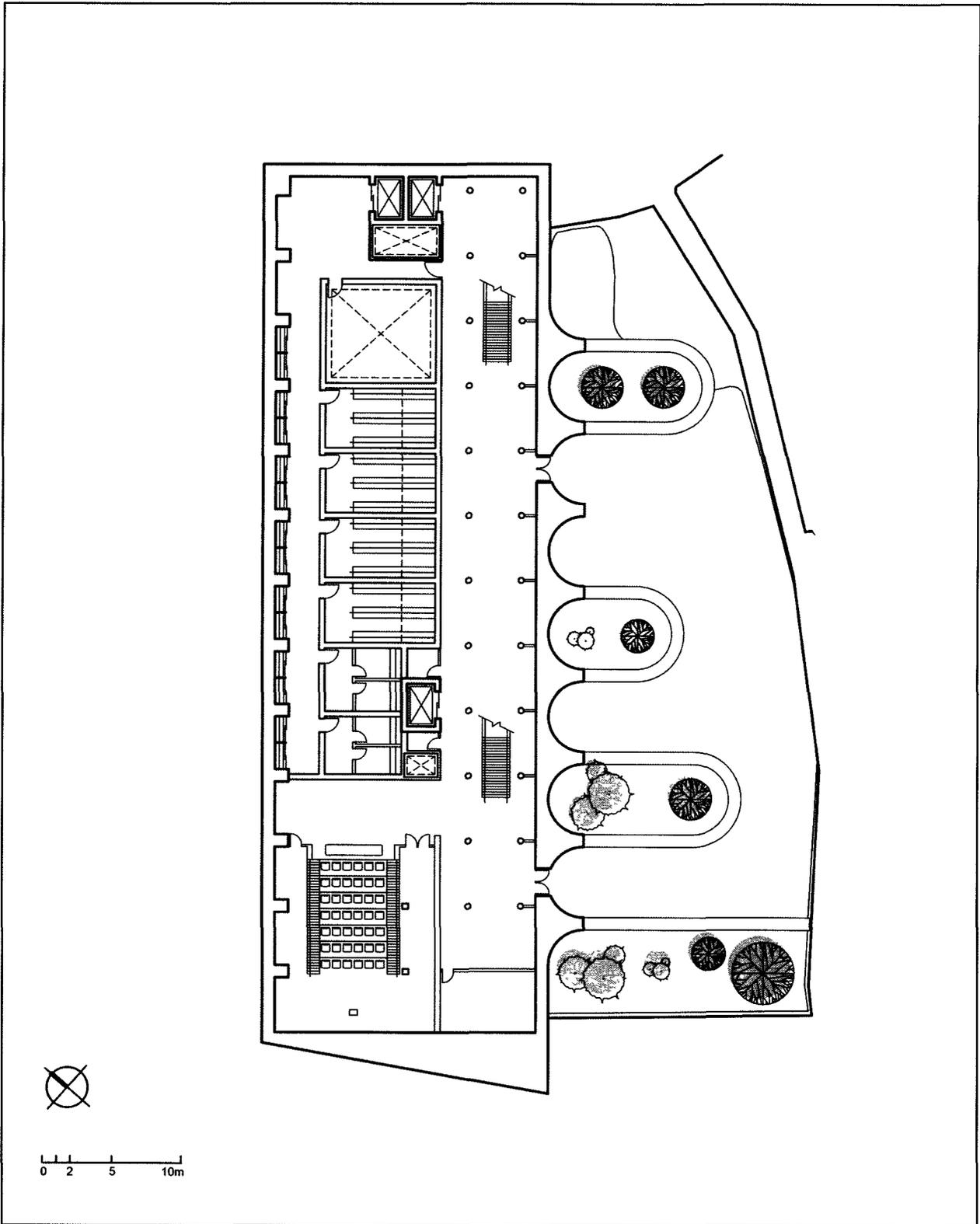


Fig. 31

OCAPS Flume Level

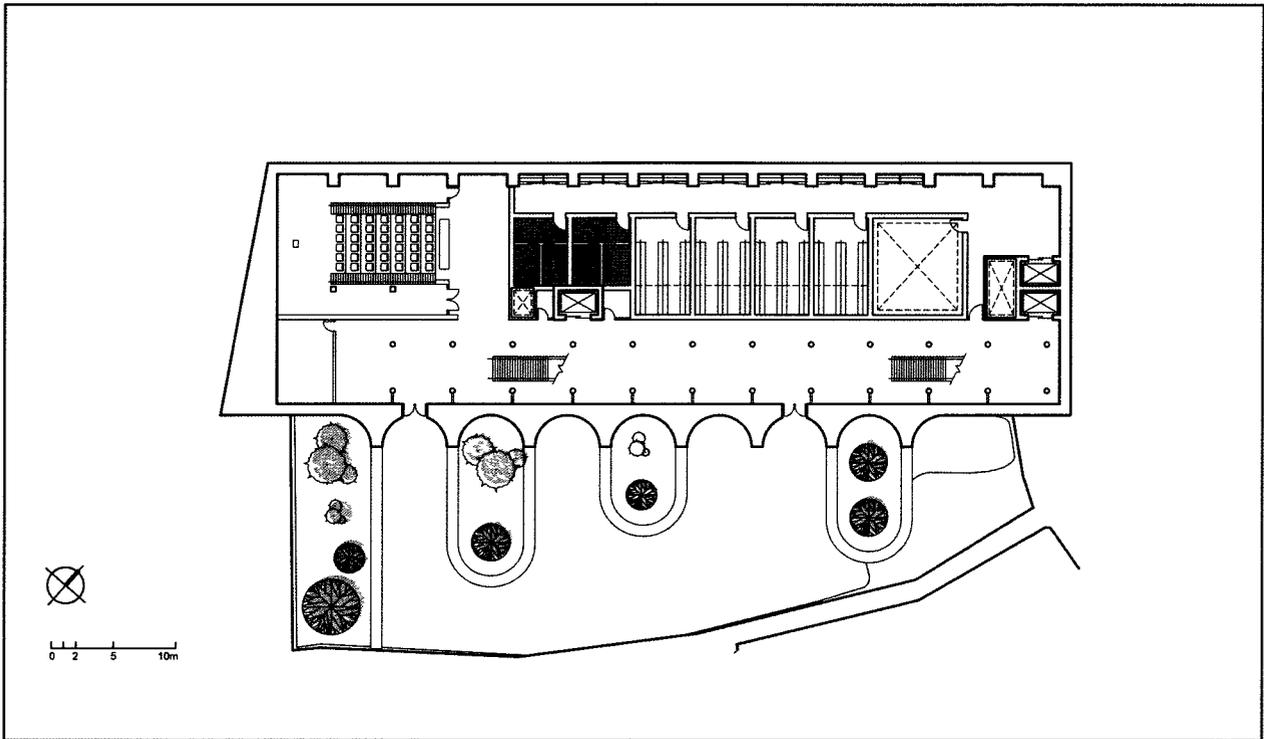


Fig. 32

Freezer Storage

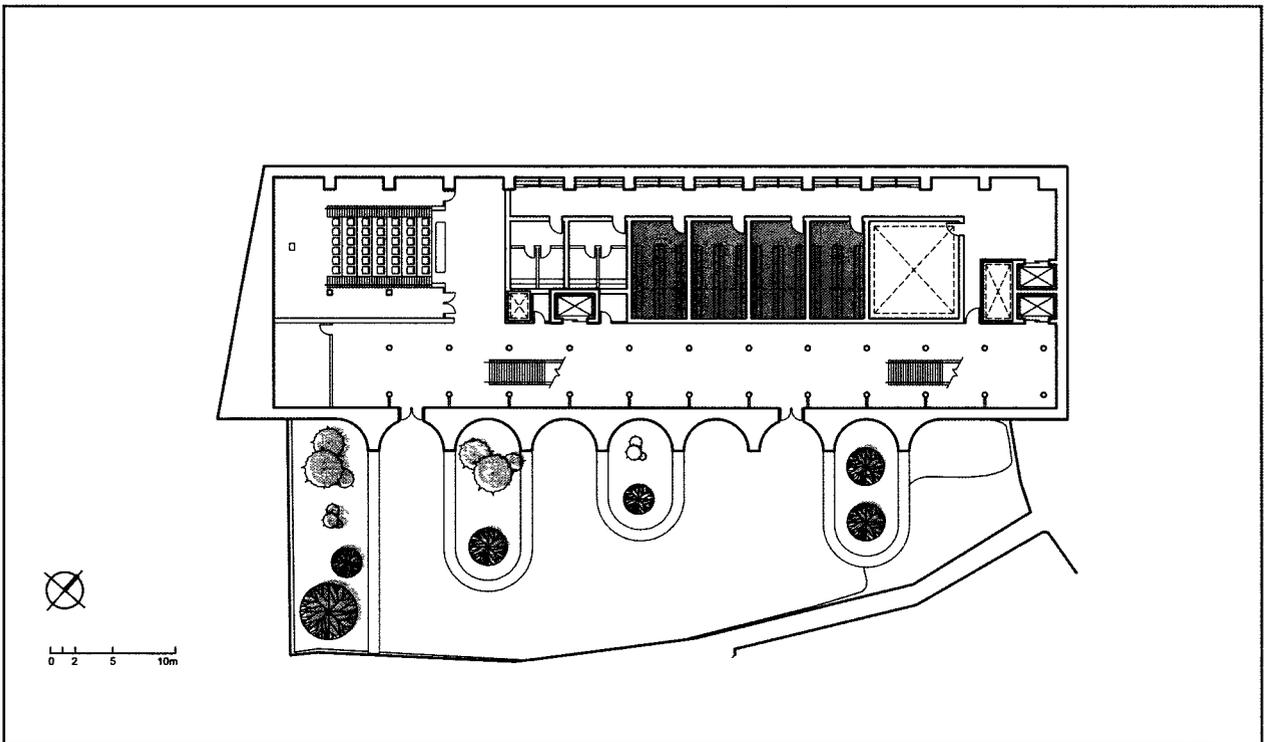


Fig. 33

Field Sample Storage

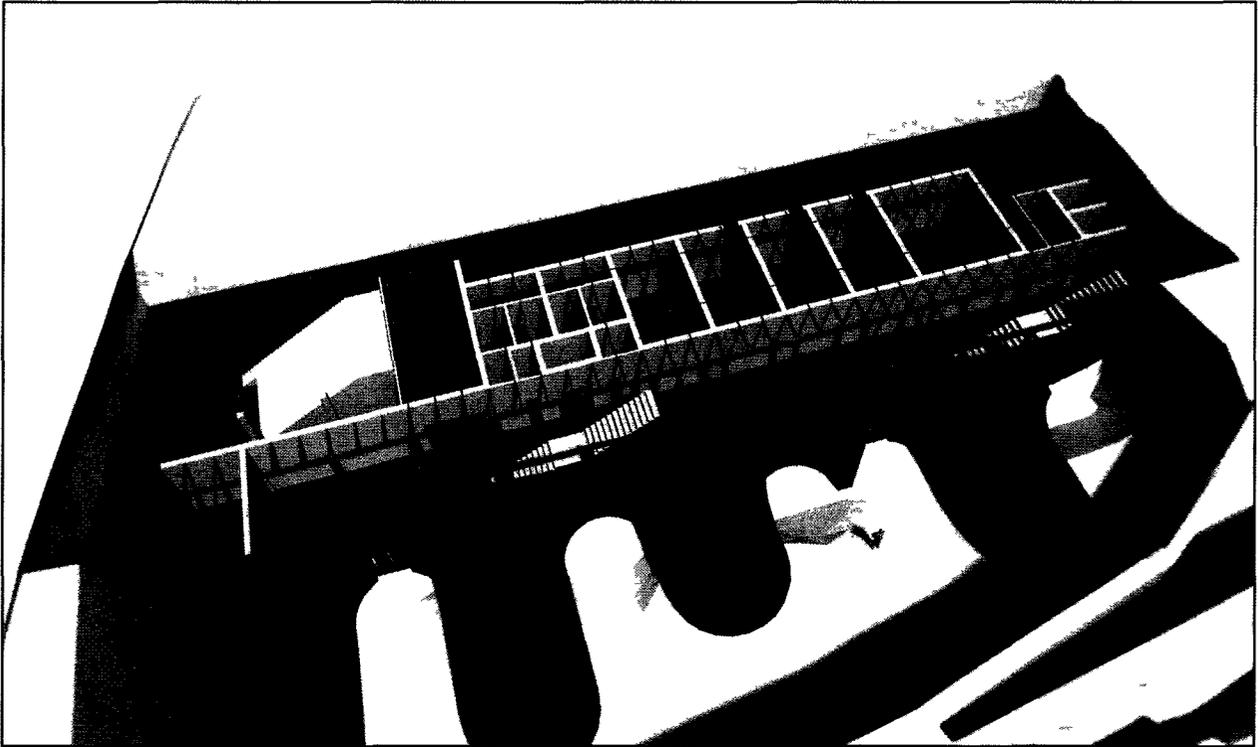


Fig 34

Perspective of Flume Level

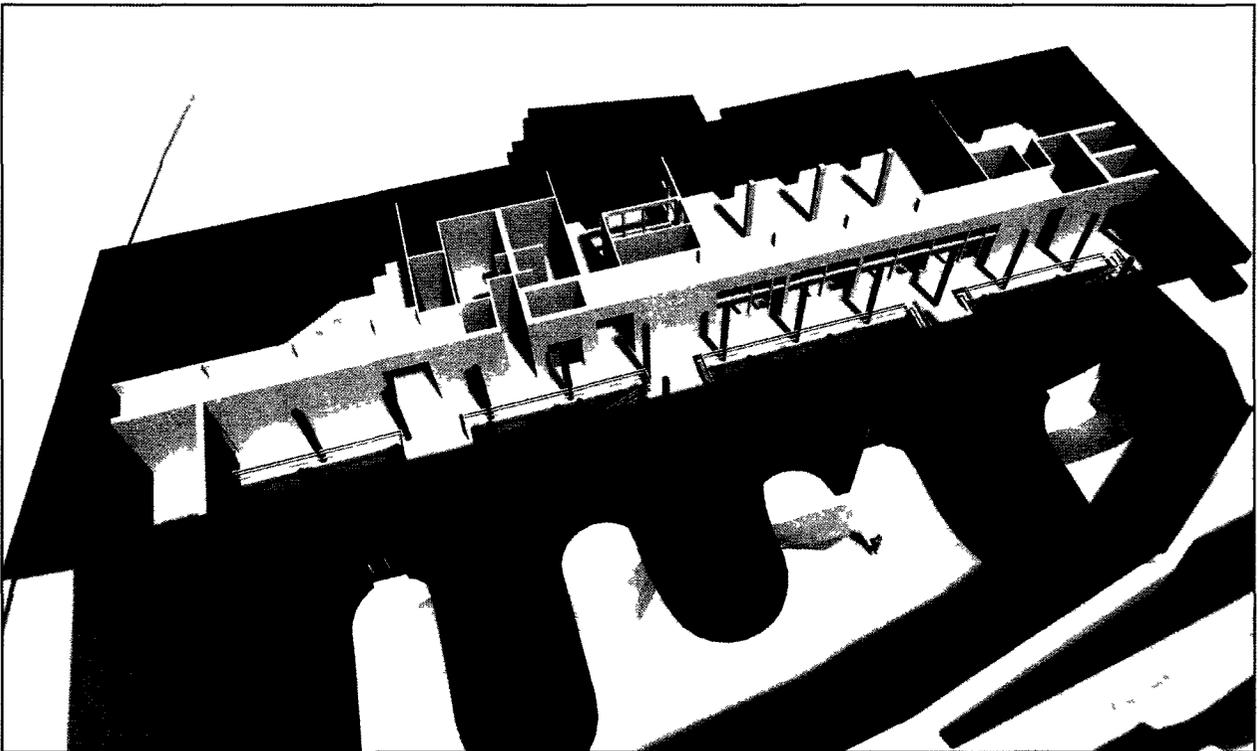


Fig 35

Perspective of Laboratory Level

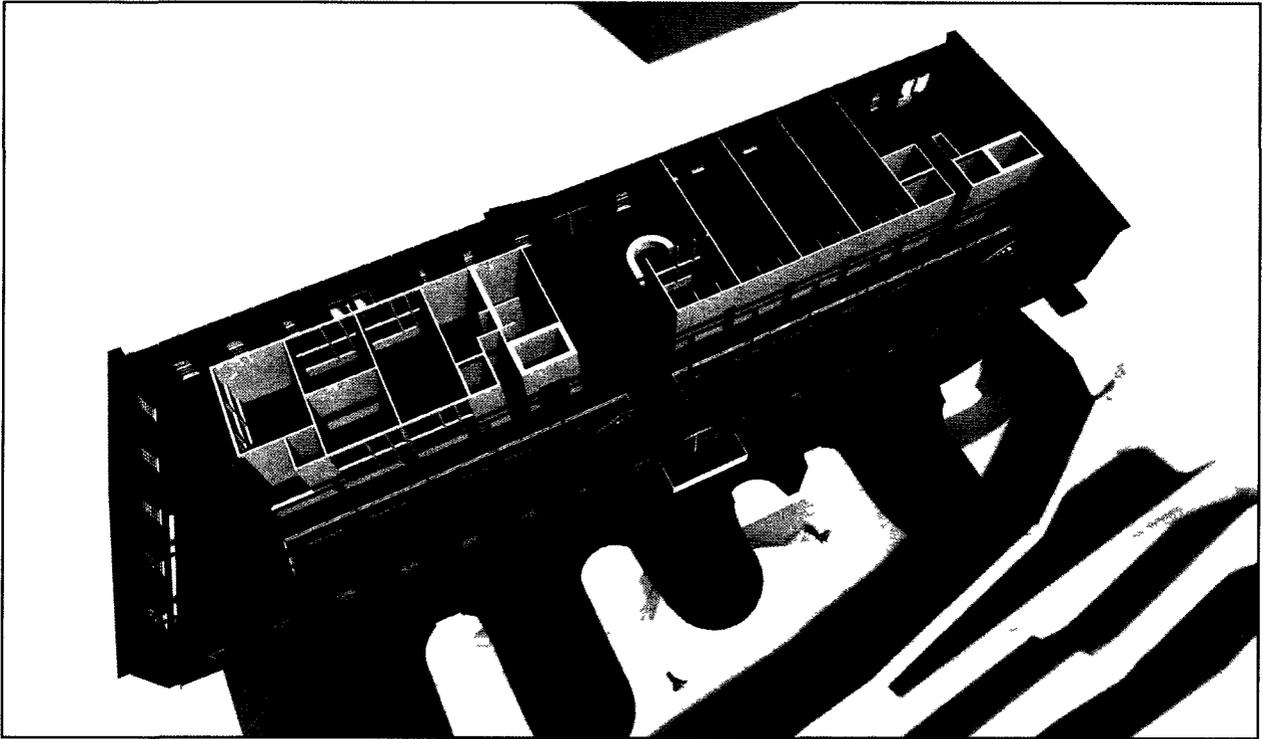


Fig 36

Perspective of Ground Level

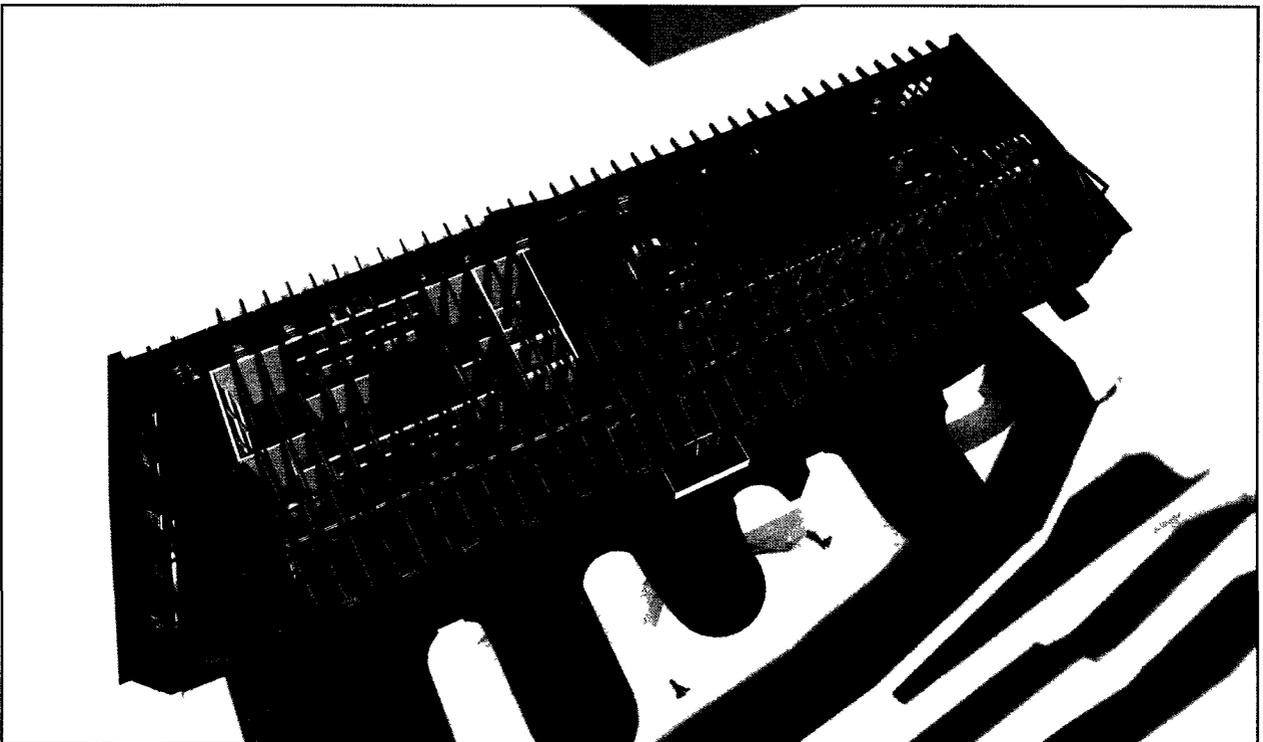
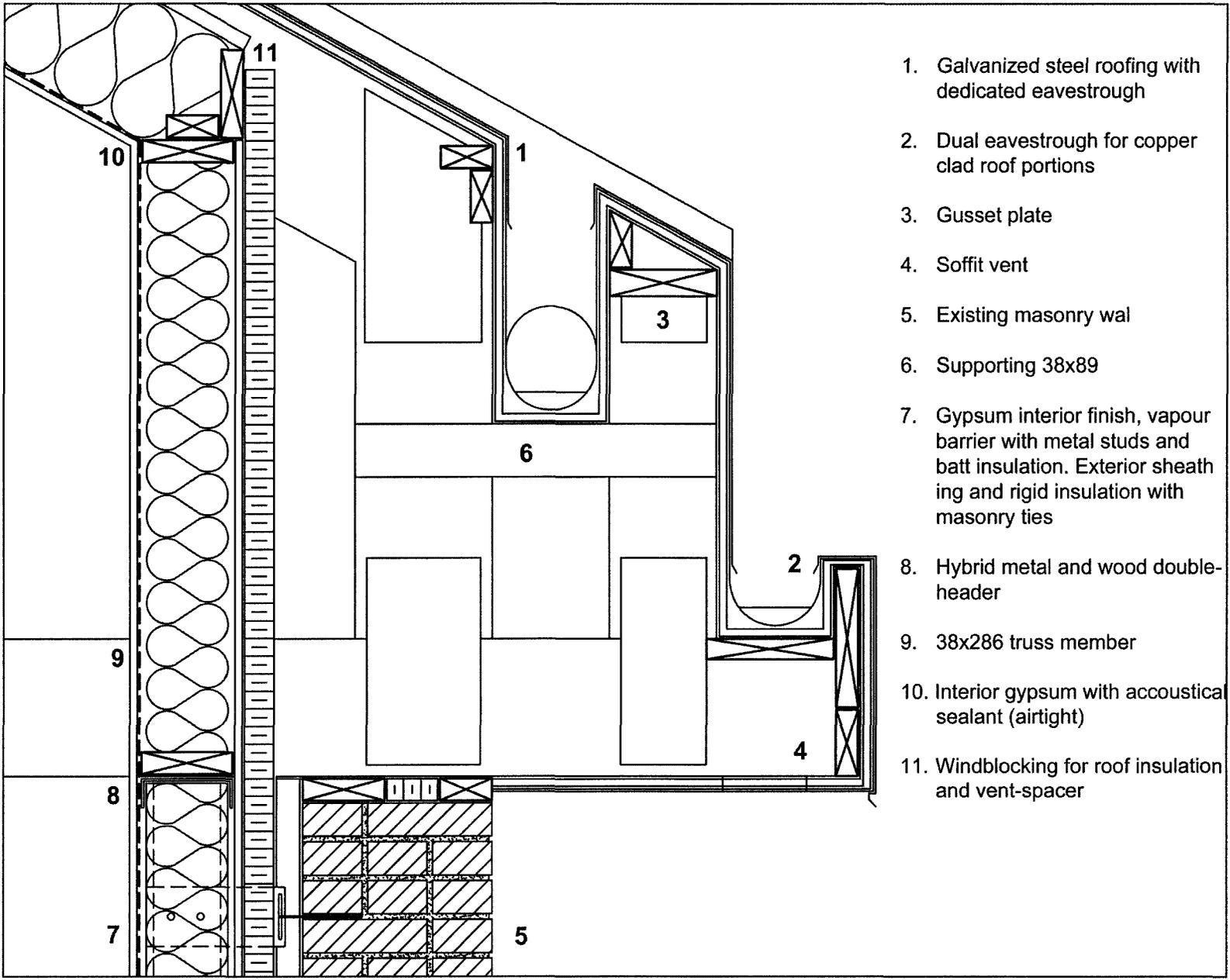


Fig 37

Perspective of Roof Level

Fig. 38

Detail Showing Dual Drainage for Copper-Clad Roof Areas



1. Galvanized steel roofing with dedicated eavestrough
2. Dual eavestrough for copper clad roof portions
3. Gusset plate
4. Soffit vent
5. Existing masonry wal
6. Supporting 38x89
7. Gypsum interior finish, vapour barrier with metal studs and batt insulation. Exterior sheathing and rigid insulation with masonry ties
8. Hybrid metal and wood double-header
9. 38x286 truss member
10. Interior gypsum with acoustical sealant (airtight)
11. Windblocking for roof insulation and vent-spacer

The Dry Pavilion is a multi-state structure; designed initially for shelter or rest, it may be converted over time into a lumber seasoning pile. Consisting of a concrete foundation with optional seats that might also double as stacking piers, this pavilion is a highly adaptable space. As initially proposed, the first Dry Pavilions can be placed as part of an OC Transpo stopover station at the junction of Wellington and Booth. These shelters will be interspersed throughout the phytoremediation and softwood timber plots, offering the suggestion of a variety of programmatic interpretations.

Situated just south of the former Booth Pulp Mill, the Water-Blade Pavilion is intended to serve initially as a catwalk across Buchanan Channel, a narrow body of water controlled by sluice-gates which separates Chaudière from Victoria Island. Supported by a series of concrete columns, the structure allows a casual passerby to further explore the surrounding complex of lock structures. This access also connects to the Ottawa Centre for Applied Phytoremediation, as well as providing passage to the sunken garden next to the building, located in the now de-watered flume. In time, as the urban laboratory plots in LeBreton Flats and elsewhere start yielding harvestable lumber, the bridge can be re-contextualized as a water-powered sawmill. Utilizing the sluiceway-controlled flow at the western mouth of Buchanan Channel, the Water-Blade Pavilion generates torque power from an undershot style waterwheel. This wheel can be lowered into place as needed, and then removed or dismantled, depending on use.

Notes:

¹ Gianni Vattimo, *Belief* (Stanford, CA: Stanford University Press, 1999), 92.

² Ignasi de Solà-Morales, *Differences* (Cambridge, MA: MIT Press, 1997), 59

³ Government of Canada. "History," *Federal Contaminated Sites*, http://www.federalcontaminatedsites.gc.ca/history_historique/index-eng.aspx. (accessed August 2010)

⁴ Christopher de Sousa, *Brownfields Redevelopment and the Quest for Sustainability* (Amsterdam: Elsevier, 2008), 164.



Fig 39

Project Vicinity with Process Flows



Fig. 40

Contaminant Gradient Map (Blue:Low, Yellow:Medium, Red:High), 2011



Parameter	MDL	CCME	MOE Table 1	MOE Table 3	04-BH10 S2 0.6 - 1.2 30-Aug-04	04-BH11 S1 0.0 - 0.6 30-Aug-04	04-BH11 Duplicate 0.0 - 0.6 30-Aug-04	04-BH12 S1 0.0 - 0.6 30-Aug-04	04-BH14 S2 0.6 - 1.2 31-Aug-04	04-BH15 S2 0.6 - 1.2 31-Aug-04	MW06-30 S3 1.2 - 1.8 31-Jul-06
Sample Depth (mBGS) > Data Sampled >	(µg/g)	(µg/g)	(µg/g)	(µg/g)							
Antimony	1	20	1	13						<1	89
Barium	10	500	210	750	210				190		
Lead	1	140	120	200	260	440	270	360	91	470	650
Zinc	20	200	160	600	120				60	120	

Fig. 41

Contaminant Breakdown



Fig. 42

Typical Phytoremediation and Timber Plots for Non-Uniform Contaminated Site

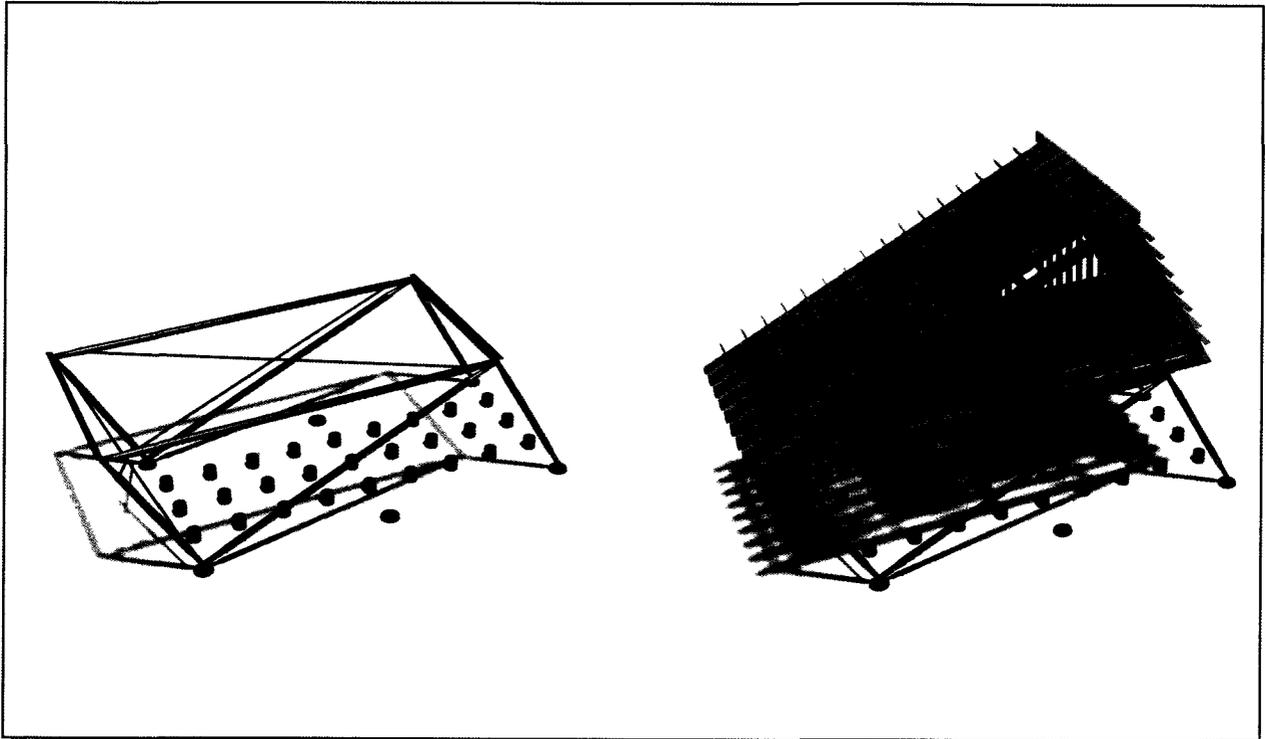


Fig. 43

Dry Pavilion Structure

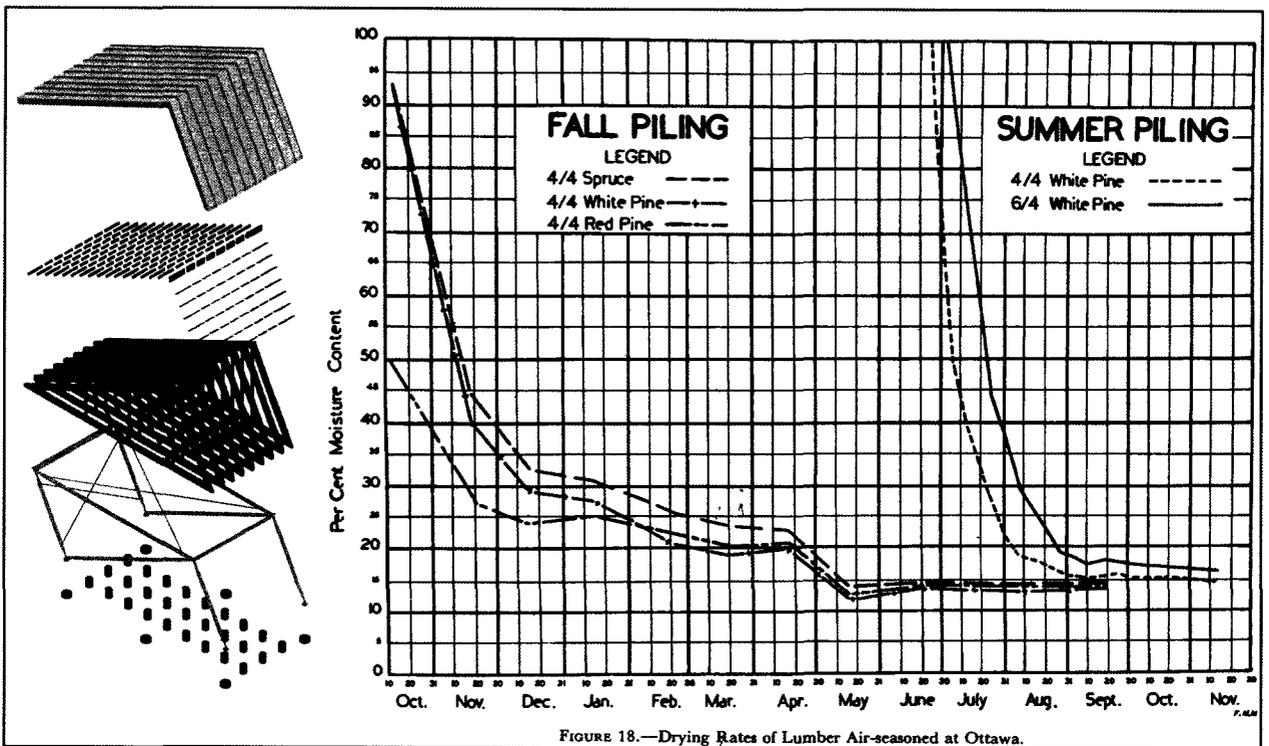


FIGURE 18.—Drying Rates of Lumber Air-seasoned at Ottawa.

Fig. 44

Typical Air-Drying Rates for Ottawa

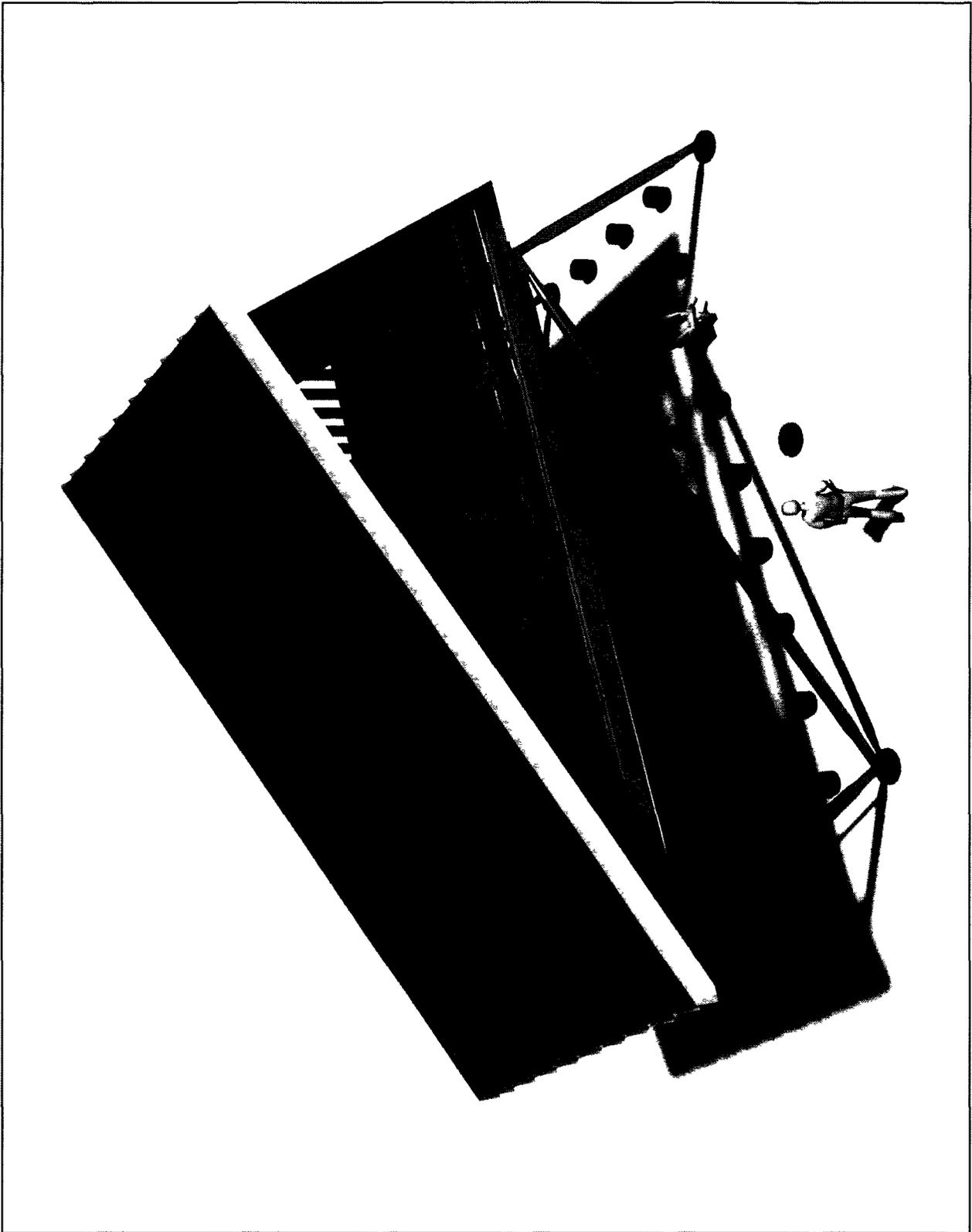


Fig 45

Dry Pavilion as Transitway Shelter

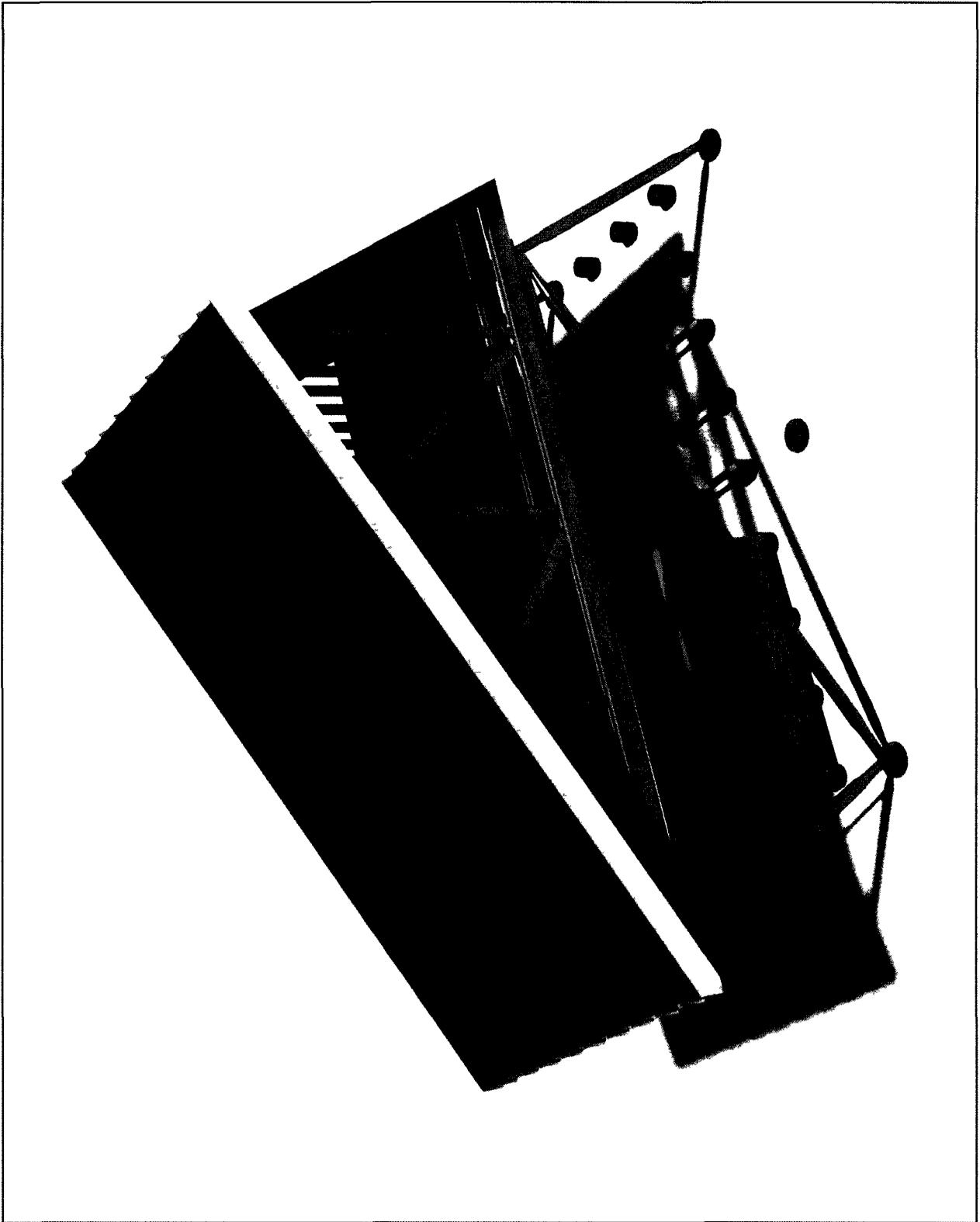


Fig. 46

Dry Pavilion as Lumber Piling Facility

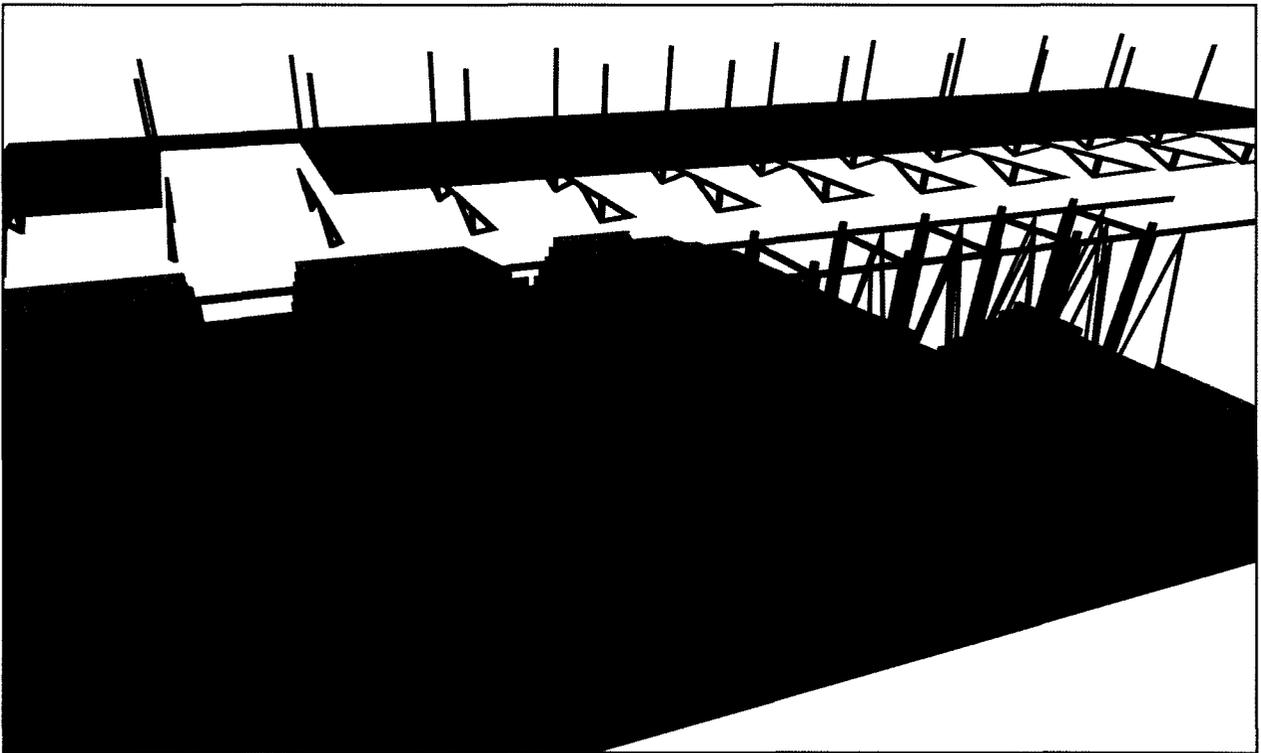
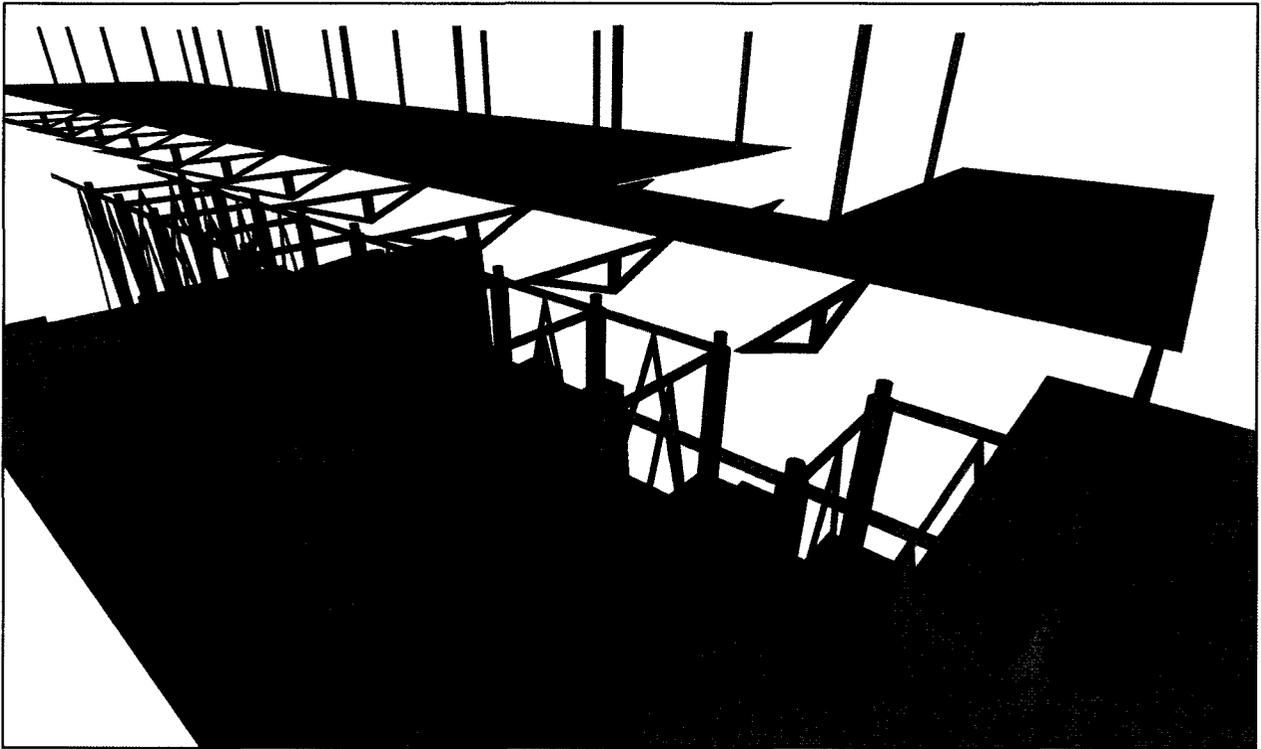


Fig 47

The Water-Blade Pavilion

Epilogue – The Pavilion of Revelry

The Pavilion of Revelry is proposed as a celebration space for Canada's bicentennial in 2067. Constructed almost entirely of locally-grown lumber from the network of federal brownfield sites, it is the production of a half-century of urban stewardship. The Pavilion currently exists as nothing more than an idea, simply another possible event in the process of brownfield remediation as outlined within this thesis. It has neither specifications, nor form, keeping with Vattimo's suggestion that we adopt a "sense [of Being that] discloses itself as a mobile horizon, as the crystallization of a 'provisional' understanding."¹ Yet it is intimately connected with the surrounding city through the narrative of which it is part. While the architects are unknown- and will inevitably be designing for their time and conditions- the Pavilion will be grounded within an inclusive and transcendental process of development. In the spirit of architectural inheritance and re-interpretation, the materials generated by the brownfield network will help inform the next stage of this diachronic process.

Beyond the confines of wire fencing surrounding windswept lots, beneath the mounds of rubble piled up in front of abandoned buildings, and around the now-silent industrial machines descending into rust-drenched obsolescence lies a crucial choice. It is a decision often quietly decided upon by property developers or city planners, but ultimately it is the choice of what kind of city we desire. What differentiates brownfields from other types of development is in essence the very hallmark of their identity: their disuse, abandonment, and environmental contamination. The urban process of re-making and the imprints that our generation leaves in time and space will ripple onwards and outwards, in directions both foreseen and unpredictable. As architects and citizens of the city, we inherit this process of redevelopment, and for a brief moment have the potential to shape and re-interpret it through our structures, interventions, and dreams.

Notes:

¹ Gianni Vattimo, *Belief* (Stanford, CA: Stanford University Press, 1999), 6.

Table 3-4. Phytoremediation Overview

Mechanism	Process Goal	Media	Contaminants	Plants	Status
Phytoextraction	Contaminant extraction and capture	Soil, sediment, sludge	Metals: Ag, Cd, Co, Cr, Cu, Hg, Mn, Ni, Ni, Pb, Zn; Radionuclides: ⁶⁰ Br, ¹³⁷ Cs, ²³⁹ Pu, ²⁴¹ Am	Indian mustard, pennywort, alfalfa sunflowers, hybrid poplar	Laboratory, pilot and field applications
Rhizofiltration	Contaminant extraction and capture	Groundwater, surface water	Metals, radionuclides	Sunflowers, Indian mustard, water hyacinth	Laboratory and pilot-scale
Phytostabilization	Contaminant containment	Soil, sediment, sludge	As, Cd, Cr, Cu, Hg, Pb, Zn	Indian mustard, hybrid poplar, grasses	Field application
Rhizodegradation	Contaminant destruction	Soil, sediment, sludge, groundwater, groundwter, surface water	Organic compounds (TPH, PAHs, pesticides chlorinated solvents, PCBs)	Red mulberry, grasses, hybrid poplar, cotton, rice	Field application
Phytodegradation	Contaminant destruction	Soil, sediment, sludge, groundwater, surface water	Organic compounds, chlorinated solvents, phenols, herbicides, insecticides	Algae, azoreosol, hybrid poplar, black willow, halimolobos	Field demonstration
Phytovolatilization	Contaminant extraction from media and release to air	Groundwater, soil, sediment, sludge	Chlorinated solvents, some inorganics (Se, Hg and As)	Poplar, alfalfa, black locust, Indian mustard	Laboratory and field application
Hydraulic control (pump and treat)	Contaminant degradation or containment	Groundwater, surface water	Water-soluble organic and inorganic	Hybrid poplar, cottonwood, willow	Field demonstration
Vegetative cover (evapotranspiration cover)	Contaminant containment, erosion control	Soil, sludge, sediments	Organic and inorganic compounds	Poplar, grasses	Field application
Riparian corridors (non-point source control)	Contaminant destruction	Surface water, groundwater	Water-soluble organic and inorganic	Poplar	Field application

- Radionuclides: ⁶⁰Br, ¹³⁷Cs, ²³⁹Pu, ²⁴¹Am, ²⁴⁴Am

- Normetals: B

- Organics: The accumulation of organics and subsequent removal of biomass generally has not been examined as a remedial strategy.

3.1.5.2 Contaminant Concentrations

Contaminated soil concentrations used in research studies or found in field investigations are given below. These are total metal concentrations; the mobile or available concentrations would be less.

- 1,250 mg/kg As (Pierzynski et al. 1994).
- 9.4 mg/kg Cd (Pierzynski et al. 1994).
- 11 mg/kg Cd (Pierzynski and Schwab 1992).
- 13.6 mg/kg Cd (*Thlaspi caerulescens*) (Baker et al. 1995).

- 2000 mg/kg Cd was used in studies of Cd uptake in vegetables (Azadpour and Matthews, 1999).

- 110 mg/kg Pb (Pierzynski and Schwab 1992).

- 825 mg/kg Pb (Nanda Kumar et al. 1995).

- 40 mg/kg Se (Bartuska et al. 1997b).

- 444 mg/kg Zn (*Thlaspi caerulescens*) (Baker et al. 1995).

- 1,165 mg/kg Zn was suspected to have phytotoxic effects (Pierzynski and Schwab 1992).

Nanda Kumar et al. (1995) reported that the following concentrations were not phytotoxic to *Brassica juncea* when added to soil mixtures:

2 mg/L Cd ²⁺	100 mg/L Ni ²⁺
50 mg/L Cr ⁶⁺	500 mg/L Pb ²⁺
3.5 mg/L Cr ³⁺	100 mg/L Zn ²⁺
10 mg/L Cu ²⁺	

Table B.1 - Subsurface Soil Analytical Results - Marine

Parameter	MFL	CSDE (ppb/l)	MDE (ppb/l)		04-SH10	04-SH11	04-SH12	04-SH14	04-SH15
			Table 1	Table 3					
Sample Depth (meters) >					0.0 - 1.2	0.0 - 0.6	0.0 - 0.6	0.0 - 1.2	0.0 - 1.2
Date Sampled >					30-Aug-04	30-Aug-04	30-Aug-04	30-Aug-04	31-Aug-04
Antimony	1	25	17	15	5	5	5	5	6
Arsenic	1	15	2-3	150	2-5			150	
Barium	10	500	2-3	1.3	<0.5		<0.5	<0.5	<0.5
Beryllium	0.5	4	1.2	1.3	<0.5		<0.5	<0.5	<0.5
Boron (Anhydrous)	1	NV	NV	1.5	<1		<1	<1	<1
Calcium	0.5	10	1	12	0.5	0.5	0.5	0.5	0.5
Chromium	250	NV	NV	NV	85,000	74,000	47,000	100,000	145,000
Copper	5	54	71	79	30	35	35	35	35
Lead	0.4	0.4	2.5	8	<0.4	<0.4	<0.4	8.8	<0.4
Manganese	5	50	21	40	10	15	15	15	15
Nickel	5	55	55	225	50	50	25	25	25
Vanadium	5	NV	NV	NV	83,000	29,000	24,000	24,000	25,000
Iron	200	NV	NV	NV	245	415	570	380	410
Lead	1	143	125	300	13,000	11,000	11,000	5,200	12,500
Mercury	0.1	6.8	0.23	15				0.2	0.2
Molybdenum	1	15	2.5	45	2	1	<1	<1	1
Nickel	5	50	43	190	30	25	25	25	25
Selenium	1	3	1.8	15	<1	<1	<1	<1	<1
Silver	0.3	20	0.42	25	<0.3	<0.3	<0.3	<0.3	<0.3
Sodium	250	NV	NV	NV	600	1,200	1,200	800	1,500
Thallium	1	1	2.5	4.1	<1	<1	<1	<1	<1
Tin	5	50	NV	NV	15	10	6	<5	<5
Zinc	10	120	51	200	50	50	50	50	50
Zinc	20	300	150	500	125				125

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