BROWNFIELD SITE REDEVELOPMENT PLANNING: LIABILITY, RISK ASSESSMENT AND RISK MANAGEMENT -A CITY OF WINNIPEG CASE STUDY

BY

VICTORIA S.A. BROWN

A Practicum

Submitted to the Faculty of Graduate Studies

in Partial Fulfilment of the Requirements for the Degree of

Master of City Planning

Department of City Planning

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MASTER OF CITY PLANNING

Brownfield Site Redevelopment Planning: Liability, Risk Assessment and Risk Management - A City of Winnipeg Case Study

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ABSTRACT

Brownfields are abandoned, idle or under-utilized industrial and commercial lands where redevelopment is complicated by real or perceived contamination. They can perpetuate pockets of decay throughout the urban footprint. Along with negative physical impacts, they pose economic and environmental threats, complicating their management and redevelopment. Canadian municipal planning departments have only recently begun to address a variety of brownfield planning issues. The City of Winnipeg, in particular, wants to better understand the liabilities it faces, as a brownfield site owner. Winnipeg was the subject city for this study of brownfield redevelopment planning issues.

By literature review, interview and survey methods, a policy argument for brownfield redevelopment planning is presented. Environmental, economic and legal liabilities are defined. Lender liability and bank practices are reviewed. Environmental risk assessment and risk management issues are critiqued. Risk-ranking tools applicable to brownfield redevelopment planning are suggested. The review of Manitoba and Winnipeg policies and statutes, as well as reference to several Canadian brownfield cases, frames the program and procedural recommendations designed for the City of Winnipeg.

It was found that increased empirical brownfield site research, particularly addressing environmental land management, is required, given: 1) the lack of public information about brownfield type, quality and quantity, which limits informed-decision-making about urban redevelopment and environmental integrity; 2) poor brownfields awareness among Canadian municipal planning staff and; 3) the recency of government responses to financial sector concerns. Even though the local demand for land drives brownfield redevelopment, land condition can be a defining factor, given legal and economic liability concerns. Brownfield redevelopment incentives may be warranted in depressed development markets or for complicated sites.

The application of environmental planning and sustainable development principles to urban land management is defended. Environmental risk assessment should be instituted as a final step in a comprehensive municipal environmental risk management strategy, which should pro-actively address brownfield management and planning as a key component. Comprehensive municipal risk management programs should include brownfield risk management strategies as a subset, demonstrating due diligence. Such strategies can use existing bank requirements to fulfill basic information needs, but must acknowledge the need for more in-depth site assessments when warranted. A series of checklists and risk management/ site approval flow charts is offered to enhance public decision-making in relation to this issue.

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LIST OF ABBREVIATIONS

CAI	Core Area Initiative (Winnipeg)
CBD	Central Business District
CCME	Canadian Council of the Ministers of the Environment
CEC	Clean Environment Commission (Manitoba)
CMHC	Canada Housing and Mortgage Corporation
CSRA	Contaminated Sites Remediation Act (Manitoba)
ERA	Environmental Risk Assessment
LBIS	Land Based Information System (Winnipeg)
MWCRP	Manitoba-Winnipeg Community Revitalization Program
NAFTA	North American Free Trade Agreement
NPD	North Portage Development (Winnipeg)
NRTEE	National Round Table on the Environment and the Economy
PRP	Potentially Responsible Person
RM	Risk Management
SA	Site Assessment
UST	Underground Storage Tank
WDA	Winnipeg Development Agreement

Glossary of Terms

- **actus reus** - guilty action.

- **anthropocentric** - an ethical position which supports a moral obligation for actions that are human-centered. Costs and benefits are associated with those affecting or benefiting humans (Synonymous with homocentric).

- **brownfields** - abandoned, idle or under-utilized industrial and commercial lands where redevelopment is complicated by real or perceived contamination.

- **civil law** - the legal procedures respecting wrongs between individuals. The burden of proof rests on a balance of probabilities of the actions of a reasonable person.

- **criminal law** - the legal procedures respecting wrong doings that infringe on the public and its well-being, including public law and statutes. The burden of proof rests in proving guilt beyond a reasonable doubt.

- **due diligence** - is the legal principle that guilt is determined based on a balance of probabilities and demonstration of care. Events are evaluated based on the actions of a reasonable person. The expected degree of reasonable behavior escalates as the individual's knowledge of the issue increases and as the person's position to affect the outcome of the issue, or to receive benefit from the issue, increases.

- **environmental risk assessment** (ERA) - defines human and ecological hazards, using probabilistic methods.

- **greenfields** - undeveloped lands, often void of general improvements such as infrastructure or surface development. Greenfields exist in every class of land such as industrial or residential land previously assembled for future development.

- **holocentric** - a value-centered ethic addressing an entity's instrumental, intrinsic and inherent values. A non-anthropocentric position which addresses more than an entity's value to humans.

- **homocentric** - a human-centered ethic, justifying actions based on a moral obligation to humanity. Costs and benefits associated with an initiative are those affecting or benefiting humans (Synonymous with anthropocentric).

- **inherent worth** - is derived by virtue of the entity's existence. Philosophers, theorists and environmentalists have long argued that just because we cannot ascribe an aesthetic or monetary value to a thing does not mean that the thing or entity has no value. In the greater scheme of things, an entity is of, and therefore must have, worth.

- **instrumental value** - rests in the entity's functional or economic value. In other words, how instrumental the item is to your or someone else's (financial) benefit.

- **intrinsic value** - lies in the entity's aesthetic value. Does the entity or thing provide benefit other than for economic or purposeful use? Unique places, whether buildings, parks or geological formations, often provide people with a qualitative rather than quantitative benefit; their presence appeals to a psychological need, hence having an aesthetic value.

- **joint and several liability** - the legal principle that, once found liable, a party can be held financially responsible for remedy, despite having only partially contributed or having been in partnership with the defendant who causes or partially contributed to the problem.

- **leaching** - the dissolving and movement of soil-based contaminants by water (i.e. rain).

- **pathway** - the medium and route that a contaminant takes from its point of origin to another site or medium.

- **polluter-pays principle** - the approach, supported by the CCME and in the Contaminated Site Remediation Act, that believes those who have wholly or in-part contributed to the contamination of a site are legally and financially responsible for the remediation of the environmental damage.

- **risk management** (RM) - is the decision-making process to select a risk controlling strategy. It often includes a combination of risk reduction, risk transfer, risk acceptance, risk management and risk prevention.

- **remediation** - the steps and means taken to remove contaminants from an environmental system such as the water, air or land supply to prevent damage to human or environmental health.

- **revitalization** - the process of bringing an abandoned or under-utilized property back to productive use across a continuum of options ranging from superficial improvements to rebuilding.

- **site assessment** - iterative research defining the likelihood and degree of site contamination, commencing with phase 1-- site characterization, followed by phase 2-- contaminant identification and phase 3-- risk assessment.

- **stare decisis** - known as precedence. It is the body of legal rules derived from the interpretation of precedents, or case-by-case interpretation of rulings.

- **stochastic** - a process that emerges over time, where event probability likelihood depends on the previous steps results.

- **strict liability** - the legal principle that a defendant is responsible for a problem's remedy, ir-regardless of unintentional fault. For example, when leachates escape, the owner/operator is liable despite care taken to prevent such an action. Did the defendant breach a standard of care? This is a determination of guilt issue.

- **sustainable development** - a policy statement or set of principles which combines environmental care-taking with economic and social development. It is often described as, development that meets the needs of the present without compromising the ability of future generations to meet their own needs. However, no definition appears to enjoy universal acceptance.

- **utilitarianism** - a theoretical construct, most often applied to economics and social democracy, that supports the value statement: "the greatest good for the greatest number".

1. INTRODUCTION

1.1 Practicum Context

This practicum comprises research into the issues surrounding municipal brownfield site redevelopment planning, in order to better address the question: *What liability does the City of Winnipeg face as a brownfield site owner and how can site risks be managed?* This is done by reviewing brownfield site management issues and methods in the Canadian municipal context, toward developing a coherent brownfield redevelopment protocol for the City of Winnipeg.

The City of Winnipeg's Strategic Planning Unit, in the Corporate Services Division - the client for this practicum - identified two issues: first, the need for timely information about the nature and extent of civic liability (legal, environmental and economic), to ascertain whether the City has a brownfield ownership problem; second, given the lack of readily available research, the need to determine what other Canadian cities have done regarding brownfield site planning. The need for timely information relates to the national agenda to "harmonize" environmental legislation and the impact of the 1997 Manitoba Contaminated Sites Remediation Act (CSRA).

Because of these development constraints, the issue of poor land condition must be added to the general field of urban decay research. Land condition is emerging as an important factor- as important as location and market value- when determining development viability. Brownfields are a complex land condition issue given their increased susceptibility to legal and economic liability as well as their negative physical and aesthetic impacts.

In terms of a broader historic rationale for brownfield research, Robert Theobald's reference to a culture's failure to act on the consequences of its success (in his Reworking Success: New Communities at the Millennium) aptly describes an anthropological pattern that must be changed. Consider the following quote in terms of the ecological impacts of

industrialization, namely brownfield sites.

> *The historical pattern is clear: cultures rise and fall. They fail to change their success criteria as conditions alter around them.... The collapses have sometimes been ecological. Successful cultures have seen their population grow. This growth has stressed the capacity of the local ecosystems to provide food, and eventually bad weather or bad planning destroyed previously flourishing cultures. This pattern is clearly visible in the anthropological record.* (Theobald; 1997; p.17)

The acknowledgment of brownfield sites in urban areas - old, city centre areas in particular - will likely continue before significant financial and planning reforms are implemented. The need to redevelop and monitor these sites requires the combined use of city planning, public health and environmental management resources. The planner must function as both a catalyst and steward when addressing brownfield site redevelopment. There is an implied professional obligation to pursue the best course of action for existing and future urban dwellers.

1.2 The Problem Context

1.2.1 The Research Context

The general research objectives of this practicum were to:

- investigate three types of liability (economic, environmental and legal) associated with a specific land use issue -- brownfield sites;
- tap related planning literature to discover applicable theory;
- examine practical examples and related precedents;
- explore possible liability-sensitive risk assessment and risk management tools and protocols;
- achieve a synthesis that might better inform Canadian planning practice while providing timely and relevant material on an increasingly important urban development issue.

1.2.2 The Practical Problem

The practical problem focuses on the City of Winnipeg's interests as defined by the City of Winnipeg's Strategic Planning unit: namely:

- the need for research into municipal brownfield site ownership liabilities, to better guide how to manage the sites;
- the need to define the basic history, location and extent of City-owned brownfield sites to better ascertain the extent of the problem in Winnipeg;
- have a better understanding of civic risks in light of Manitoba's CSRA;
- have a better understanding of the mandate and objectives of brownfield management programs at other Canadian cities;
- addressing lender liability;
- identify policy priorities in terms of the City's environment programs and;
- remaining current with environmental law and planning practice.

1.3 Study Approach, Methods and Limitations

An exploratory case study method was used to define municipal brownfield liability and redevelopment planning practice in major Canadian urban areas such as Winnipeg. A mainly qualitative analysis of brownfield redevelopment issues was conducted.

The principal limitations in the case study are as follows:

- brownfield sites are defined as abandoned industrial or commercial land with potential for re-development;
- liability analysis was limited to economic, environmental and legal aspects;
- a focused analysis of Winnipeg and its brownfield history;
- an emphasis on current statutes (rather than a broad historical analysis);
- primary data collection was limited to telephone and e-mail interviews and discussions with pertinent planning staff at select Canadian cities;
- general policy and regulatory alternatives were explored (rather than site-specific physical re-development recommendations);

- the associated literature review was limited to post-1980 material given the rapidly changing legal and financial aspects of brownfield ownership and the newness of the brownfields issue.

1.3.1 Data Collection Tactics

Primary data were gathered through semi-formal telephone interviews, e-mail correspondence and an e-mail survey. Secondary data were acquired from various internet sources as well as government and finance sector publications. Qualitative data were emphasized in line with the exploratory nature of this study.

The following research tactics were employed:

1. informal telephone interviews with planning officials in various Canadian and American cities to access and/or discuss relevant brownfields policy materials (February - March 1996);
2. identification of city-owned brownfields sites, listed in the Manitoba Contaminated Sites Registry (March 1996);
3. review of applicable literature pertaining to brownfield site liability and civic policy from various sources including: the internet; US Environmental Protection Agency district offices; planning, legal and environmental industry literature ; the banking industry; CMHC (re: lender liability); Canadian government publications and documents;
4. participant observation, involvement and discussion with participants at the NRTEE Financial Services Sector session in Calgary (February 1997)[1]
5. e-mail survey of select Canadian planning departments that indicated an environmental planning branch on their internet home page. The Yahoo search engine's Citynet was used as the connecting link to Canadian City governments (March 1997).

Literature review was targeted on the following: 1) land use, sustainable development and urban renewal theories; 2) legal cases; 3) brownfield redevelopment case studies and; 4) applicable statutes. The telephone and e-mail inquiries were not formally scripted but

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[1] As I participated as a stakeholder in these discussions, three issues became clear. First, site condition is only one of several factors influencing brownfield redevelopment, but it can be the "deal-breaker". Second, the local economy drives site remediation work. If the demand for land is low, then the probability of site redevelopment diminishes. Lastly, the banking and legal sectors have driven the brownfield agenda. Since municipalities were not regarded as key stakeholders, brownfield-related urban development and land management issues are not generally addressed. Simply converting brownfields to parkland ignores infrastructure contamination, the civic economy, density and zoning issues. (NRTEE, Feb. 20, 1997; Calgary, Alberta.)

focused on: civic liability and local policies, issues and cases. (See Appendix 4 for an example interview). Using the Canadian Institute of Planners (CIP) Membership Directory, twenty-four (24) initial telephone calls were made to select Canadian Planning departments. Those members identified as environmental planners and managers were targeted as well as those working in capital cities or prominent metropolitan areas, such as Calgary or Kitchener, with an industrial legacy. The initial contact inquired whether that municipality was currently addressing municipal brownfield ownership liability. If so, additional contact names and numbers were requested (February 1997). One follow-up interview, with representatives of those municipalities involved in brownfield policy, bylaw or site redevelopment work, was conducted to clarify issues or to obtain relevant documentation (April 1997).

Exploratory interviews with City of Winnipeg Land and Development Services staff and Administrative Coordinating Group members were conducted intermittently from March 1996 - December 1997. Given a general naiveté about brownfield sites and planning issues the interviews were not scripted: rather the purpose of this research, identification of the client, and a definition of a brownfield site was outlined, followed by questions along the lines of those listed in the letter in Appendix 1.2 or the interview in Appendix 4.

1.3.2 Data Collection Problems and Conclusions

The information gathered from the initial telephone interviews with Canadian and American planning officials proved the most effective means of understanding brownfield redevelopment planning practice. However, it was decided not to use the American material for two reasons. First, and most importantly, Canadian brownfield research and regulatory development is well behind that of the United States. The US has shifted from a strictly regulatory approach, given the disabling effects of its 1980 Comprehensive Environmental Response, Compensation and Liability Act, to a combined regulatory-incentive approach. Brownfield redevelopment incentives, comfort letters and prospective

purchaser agreements are offered in addition to state and federal monitoring and regulation. Canadian governments have only begun to respond to lender liability concerns, while municipal officials are slowly becoming aware of environmental legislation and brownfield site effects. Second, is the difference in land ownership between Canada and the US, which affects liability and responsibility. Canada's fee simple ownership allows for greater government influence over land use (i.e. regulation and expropriation). American cities are hesitant to use their *takings powers* given constitutionally entrenched property rights. Because of this constitutional issue, the United States has delivered significantly more direct influence over brownfields identification, data base development and site redevelopment through federal and state funding programs such as Empowerment Zones and the Environmental Protection Agency's Brownfields programs. This regulatory-incentive approach commenced at the same time as the American economy emerged from its recession, requiring more production capacity and the fast-track re-opening of previously closed industrial facilities. The American materials represented excellent background information on brownfields financing and redevelopment problems, allowing for informed interviews with Canadian planners. However, the US economic climate, regulatory options and institutional responses are different from what can be achieved by comparable Canadian stakeholders , and are therefore not directly applicable to the Canadian context.

The CIP member telephone inquiry yielded very poor results. Approximately, half of the initial telephone contacts were aware of someone in their agency who might address such problems. Of these, Edmonton, Calgary and Toronto were the only cities capable of providing detailed information to the questions or information requests. However, even these cities could not provide information about municipal liability. Instead, available materials addressed site assessment procedures and were in draft format or for discussion purposes only. Because brownfields are a new issue in Canada, public awareness is low, and public information was usually unavailable. The Alberta Association, Canadian Institute of Planners was the best source of verbal and draft written information, with

position papers for its membership in response to the new Alberta Environmental Protection Act and changes to the Planning Act. (See Appendix 4)

The e-mail survey (see Appendix 1.1) yielded the best information regarding Canadian municipal brownfield policy and planning practice. However, the response rate was poor. The survey was sent to fourteen (14) Canadian municipal planning offices in eight (8) provinces. Seven (7) responses were received, two (2) of which indicated the questions would be circulated to seek an appropriate response, yet no further response was received. Of the remaining five (5), none provided complete responses to all questions. Survey results are presented in Chapter 4. The e-mail survey was conducted because of the disappointing response to the telephone inquiry conducted approximately one year earlier. Although better results were received it demonstrated that brownfield site planning still held a limited stature among Canadian planning departments. Whether this is due to an avoidance posture because of brownfield-associated liability or naiveté is not known.

When trying to access quantitative data about Winnipeg brownfield locations and size, it was found that the Manitoba Contaminated Sites Registry only listed contaminated sites under provincial supervision: it is therefore an incomplete brownfields database. Additionally, the City's Land and Development Services staff indicated that no list or map of known or perceived-to-be contaminated sites was maintained. Rather, a map of city-owned properties and operating land-fill sites is mapped as part of the Land Based Information System. The Water, Works and Waste Department maintains maps of former land-fill sites. Finally, the Civic Properties and Legal Departments were extremely reluctant to release any information pertaining to civic brownfield sites or policy. Their concerns related to the liability associated with brownfield labeling. A similar apprehension was demonstrated by the counterparts of these officials in other Canadian metropolitan centers. Consequently, efforts to quantitatively define civic brownfield liability were abandoned.

1.3.2 Analysis Approach and Procedures

A qualitative analysis of brownfield ownership liability, environmental risk assessment and management is presented. Based on the generalizations derived from the research, the City of Winnipeg's brownfield ownership problem is reviewed, culminating in a series of program and policy recommendations.

Using Robson's (1993, p.52) definition of case study method, the empirical analysis targeted the appropriate and necessary elements of brownfield planning policy *(the contemporary phenomenon)* with the City of Winnipeg *(the real life context)* in mind, using a mix of data collection methods. Generalizations regarding brownfield liability and site planning are specifically applied to the City of Winnipeg in light of applicable statutes, municipal policies and interviews with select Land and Development Services staff. Several Canadian brownfield redevelopment precedents are referred to, in support of the generalizations and recommendations. Some empirical evidence, gathered from an informal municipal brownfield survey, is presented in Chapter Four. An inability to test the data's reliability means it offers little more than support to generalizations. However, the lack of response also suggests a poor understanding of brownfield issues within Canadian municipal governments. Finally, the policy development case study of Winnipeg (Chapter 4) observes a three step process: 1) defining the problem; 2) analyzing the problem from the perspective of the City of Winnipeg and; 3) making recommendations to the City.

A policy analysis framework was employed because it supported the exploratory case study approach. Policy analysis is characterized as :

> *a form of applied research carried out to acquire deeper understanding of sociotechnical issues and to bring about better solutions.... (P)olicy analysis searches for feasible courses of action, generating information and marshaling evidence of the benefits and other consequences that would follow their adoption and implementation, in order to help the policy-maker choose the most advantageous action.* (Patton; 1986, p.18)

It was also selected because it parallels the planning process (Friedmann; 1987). Both seek to identify a problem *(brownfield liability)* in order to elicit action *(redevelopment/ remediation)* or policy intervention *(programs, policies and regulations)*; situations are analyzed using policy instruments *(precedence review and risk analysis)* with a view to elaborating appropriate institutional or social reforms. The solutions generated should exhibit futurity, space, resource requirements, implementation procedure and evaluation (process feedback) (Friedmann; 1987). These characteristics are demonstrated in the recommendations made in Chapter Four. Regarding related planning theory, Friedmann's discussion of scientific and rational processes used in policy analysis (1987, p.79) mirrors that of risk assessment, where technical data is used to guide action in the public domain.

Chapter One provides background relevant to the research, and overviews research methods. Chapter Two surveys civic liability and costs associated with brownfield ownership. Chapter Three reviews risk assessment as a decision-making tool. This is followed by a discussion of risk management strategies. Chapter Four recommends brownfield site planning options for the City of Winnipeg. Chapter Five briefly presents a summary of the research, a discussion of implications for planners and city administrators, as well as recommendations for further study. Chapters Two and Three focus on the research problem while Chapter Four addresses the practical problem. Chapter Four is presented as a briefing report to the City, with recommendations developed from the research.

2. BROWNFIELD REDEVELOPMENT AND LIABILITY

2.0 Brownfields Defined

This section defines brownfield sites, identifies what industries are most likely to generate them and where the sites are most likely to exist.

> *A brownfield site is a site or a portion thereof that has actual or perceived contamination and an active potential for redevelopment. To the owner of the contaminated site, clean-up is often necessary to sell the property and return it to productive use. To the public, clean-up of contaminated industrial sites is crucial to reducing economic, environmental and health problems. Unfortunately, many disincentives inherent in existing... policies prevent this. As a result, valuable industrial land remains contaminated, unused, or abandoned, denying communities the direct benefits of jobs and taxes, as well as complementary economic activity.* (Barr Engineering internet site; 1995)

"Contamination is the concentration of a compound (or compounds) in excess of the natural abundance of that compound, that may adversely affect ecological and human health."(Delcan Corp.; 1996, p.5) Specifically, brownfields are contaminated or perceived-to-be contaminated land in developed areas with the potential for redevelopment. Often they are former industrial or commercial sites, but may include institutional sites as well. Their potential for remediation and redevelopment is what makes them distinct from the broad class of contaminated sites.

Knowledge of the existence of brownfields and the problems associated with them has emerged due to several factors including: better understanding of urban ecological systems and past contaminating practices; rising infrastructure construction and maintenance costs, exacerbated by decreasing fiscal resources and; uncertain legal and financial liabilities resulting in increased litigation threats. Decreased public willingness (governmental and citizenry) to pay for clean-up of contaminants generated by for-profit industries has also resulted in regulation requiring those responsible for the contamination to also be responsible for its remediation, under the "polluter pays principle".

Certain industries are more likely to have a brownfields legacy, including:

- coal distillation and wood-preserving industries;
- petroleum refineries, petro-chemical plants, bulk gas storage and gas stations;
- solvent users such as auto body shops, paint and solvent producers/distributors/ users, electronic equipment manufacturers and dry cleaners;
- metals and heavy metals refiners such as smelters and steel mills;
- land fill businesses such as scrap dealers, recyclers, toxic material cleaners and dumps;
- multi-purpose sites housing heavy equipment and/or those requiring raw (contaminating) materials in their operations such as military, airport, ferry terminal and city works sites;
- electric utility transmission corridors, transformer sites and generating stations;
- warehouse districts storing toxins such as pesticides, fertilizers, salts and PCBs, often near transportation hubs.

Brownfields are generally scattered through-out the urban area. In some cases they cluster in industrial areas, due to the nature and extent of production activities. However, some newer service industries are increasingly being identified as potential brownfield generators, such as gas stations and dry cleaners—both are numerous and are often located near residential and recreational land uses.

Databases defining site location, size and degree of contamination are required to quantitatively describe brownfield impact. However, Canadian cities do not necessarily maintain comparable statistics nor use similar classification method. For example, one may catalogue general land use in their geographic information or land mapping system, while in another city a fire department may maintain records of toxic materials stored throughout the city. A province may catalogue land quality through its Environment department while the Land Titles registry catalogues liens, covenants and special orders (clean-up orders) against properties. Also, the information is inconsistent, in varying formats and rarely shared between departments or across jurisdictions. The impetus for most of the current work toward developing adequate brownfield data sets has generally

come from the financial services sector rather than from governments:

> *... the quality of information is being improved by some current practices of the financial services industry, which require, at least, Phase I assessments (review of past uses) of specific sites suspected of being contaminated prior to insuring, lending or investing.* (NRTEE; 1997, p. 4)

From a planning perspective, the brownfield problem rests in their increased presence in the city footprint, along with a poor understanding of their size, location and degree of contamination. Unfortunately, a catch-22 situation emerges as more information about such sites is gathered and analyzed. More information about land condition is beneficial, but it may inhibit bank financing for redevelopment, by exposing liabilities. As well, brownfield sites can become *brownlined* or abandoned, even orphaned, depriving a municipality of tax revenues, perpetuating city centre urban decay and inadvertently promoting increased sprawl through greenfield development.

Finally, redevelopment uncertainty includes potential financial liability coupled with uncertain legislative, planning approval and technical requirements. Developers and lenders are hesitant to enter into projects that may be fraught with protracted bureaucratic, public approval and financial arrangements. Because few standards or case studies have been developed, liability and uncertainty around brownfields are too great, especially given available *greenfield* space and depressed real-estate markets.

2.0.1 City Center Affects

Even though no accurate figures can be given, a growing urban development problem can be anticipated. Assuming the older industrial sites are larger and dirtier than the newer sites, then those located in or near the Central Business District (CBD) would require more extensive and costly remediation. Given the inverse relationship between the cost of remediation and pre-clean-up property value, these CBD-vicinity brownfield sites are potentially the least valuable type of urban property. Taken to a logical extreme these brownfields could generate a "brownline" or "brownbelt" around older industrial

neighbourhoods in central city cores. The practice of brownlining is similar to the insurance and banking industry's red-lining of high crime neighbourhoods. In the brownfields case the liability stems from chemical contamination rather than from a socio-economic condition.

From the city planning perspective, core area decay is perpetuated by neglected or abandoned brownfield sites that have been subjected to tax sale or arson. In most cases, the City's capital liability remains a constant, as site service and infrastructure maintenance costs continue, despite the departure of the tax-paying business and property owners. The business migration, in turn, leads to a cycle of increasing property neglect and abandonment, until the City is required to revitalize the area to retain existing or attract new investments. A classic example of such a scenario was posted on an internet discussion group:

> *We are acquiring several old, urban commercial sites in our redevelopment neighborhoods. Almost every site we are looking at has some type of environmental problem that has been revealed during a Phase 2 environmental site assessment. These problems range from soil contaminated with petroleum products to ground water contamination to some pretty extensive site contamination from former body shops and dry cleaners.*
>
> *The issue we are struggling with is the effect of the environmental clean up on land values. In the past our appraisers subtracted the cost of the clean up from their initial appraisal for our offer to purchase price. However, with the more complicated clean-ups this would make the land literally worthless. Politically, our city council is not happy with that idea. Abandoning the acquisition of the properties is not an option either.* (Ford; 1996)

The result is a surplus of abandoned and (perceived-to-be) contaminated sites awaiting redevelopment. Tracts of railyards with neighboring warehouse districts, light industrial plants, steel foundries and older industrial refuse yards, in or near the city's core, lie idle because of actual and/or perceived contamination.

Further, several factors have combined over the past four decades to frustrate central-city renewal and revitalization of such old industrial areas in Canadian metropolitan areas. The demand for core or central-city real-estate dropped with the introduction of labor-saving

technology, home offices and improved scientific understanding of industry-related contamination (Foot: 1996). This decline was followed by a slow-growth economy and a financial sector leery of real-estate investment given the 1980s equity decline. As a result consistently high commercial real-estate vacancies remained until the late 1990s. At the same time fiscal conservatism practiced by all levels of government and industry meant less venture capital was available for business and real-estate development, and high vacancy rates meant a low demand for renewal projects.

Further facilitating the decline of traditional city centers was the departure of industrial activity with the development of industrial parks during the boom decades (mid-1960s to early 1980s). Placing production close to residential areas, along with well-developed transportation networks, accelerated the departure of core area industries - and related support services - to newer outlying industrial parks. This did remove some commercial traffic from the core, generating time and delivery cost savings for both commuters and producers, by more efficient delivery networks. However, it left fewer residents, workers and consumers for the city center businesses, resulting in a "9 to 5" downtown. To a limited extent, city center decay has been mitigated by infill (re)development of office, residential, shopping center and recreational properties. However, global economics, contamination problems and uncertain legal and economic liabilities, have all stalled the revitalization of remaining known brownfield sites.

This brief synopsis of Canadian urban development patterns illustrates how brownfield sites may become an increasingly prevalent problem in and around city cores. At the time of their initial development the industrial and commercial sites (currently displaying brownfield characteristics) would have been at the city's edge. As cities grew, residential areas were developed adjacent to these industrial and warehouse areas, leaving many of today's brownfield sites located, in or near the city's centre, within a mainly residential ring. As the old industries are further phased out, in the context of the new economy, then

new brownfield situations can be anticipated at many of these locations (Beck, 1992). This was demonstrated in Chicago's and Detroit's core area industrial and manufacturing areas during the economic decline of the 1980s. Brownfields left abandoned have aided in the impact of what has been termed the "doughnut" effect, where city centre areas are decaying while adjacent suburban areas are flourishing.

2.1 Policy Rationale

The increasingly stringent environmental controls implemented by all levels of government (e.g. environmental review processes and decommissioning guidelines) have fostered growing concern over brownfield liability (ecological, fiscal and legal). Economic factors emerge as the leading cause to shifting (off-loading) site remediation and redevelopment responsibility from the government to the land owner or polluter. However, little has been done to acknowledge the broader urban development issues, and long-range environmental concerns, resulting from brownfield identification, related legislation and regulations.

Urban brownfield sites have attracted increasing federal, provincial and municipal government attention as non-governmental environmental organizations promote the clean-up of old industrial brownfields and limits to "greenfield" sprawl development. The Federal and Provincial governments have focused on their regulatory functions, relying on indirect assistance through policy, site identification and consultation work (instead of providing direct brownfield redevelopment assistance). The result has been off-loaded responsibilities to a number of stakeholders. Inadvertently, municipal roles have been largely ignored, as both a brownfield generator and brownfield manager. This lack of municipal involvement in brownfield consultations is supported and perpetuated by the notion that Canadian municipal planners are not aware of nor responding well to local brownfield problems.

Various forms of brownfield redevelopment policy have been developed by all levels of government, including: Federal and Provincial Environment ministries; municipal Planning, Environment and Legal departments; and municipal development commissions and planning initiatives such as the Golden Commission and Waterfront Regeneration Trust which addressed physical management issues in the Toronto area, including the renewal of the Ataritiri site, at the mouth of the Don.

> *"The reuse of contaminated lands was strongly supported by the Golden Commission as a means of utilizing idle urban land, taking advantage of existing infrastructure and preventing urban sprawl, and the Waterfront Regeneration Trust is actively promoting site remediation in a number of locations.* (Rowe; 1996; p. 3)

Federal funding and database development responses include the now defunct, Canadian National Contaminated Sites Remediation Program and the current US EPA Brownfields programs.[2] Additional federal brownfield-related research and policy development includes the National Round Table on the Environment and the Economy's Financial Services Sector consultations and the work of the Canadian Council of the Ministers of the Environment (CCME) whose thirteen (13) principles were adopted in Manitoba's Contaminated Sites Remediation Act. Given a neo-conservative fiscal climate and general economic constraints provincial governments have responded with legislation and regulatory procedures which embrace the "polluter-pays" principle.

The practice of defining statutory obligations or policy statements before a problem is fully defined and understood circumvents the rational approach to policy and scientific analysis. This is the case with current brownfield research. Government legislation and policy have emerged before an adequate knowledge base has developed. The problem is that the perceived negative health and ecological impacts generated by brownfields require an immediate response—problem containment prior to problem analysis. Consequently,

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[2] The US Department of Defense is in the process of decommissioning and remediating some of its military installations, globally. It, therefore, is required to follow US Environment Protection Agency standards. The possibility exists that a US military site may be eligible for US EPA brownfield redevelopment funding.

private and public policy responses have been reactionary, rather than rationally formulated. If a full understanding of the issue is not available, then how can adequate responses be defined and evaluated? Because of the infancy of scientific and policy development surrounding brownfields, an incrementalist approach to redevelopment planning and guidelines implementation is the most logical course of action. Researchers must develop data sets, while policy makers develop and test guidelines, on a variety of site conditions. This approach does have limits as well; there can never be perfect knowledge, nor can the effects of public perception be fully eliminated.

From a municipal perspective a similar attention applies. Municipalities lack information about brownfield site numbers, location and degree of contamination. How can appropriate policies or redevelopment incentives be constructed without adequate knowledge? Before defining a planning response to brownfield site issues, it is essential to determine if there really is a problem, and, if so, its implications—financial, development and health-related. It should be acknowledged that , in all likelihood, the number of contaminated sites (brownfields being a sub-set) is going to increase, as they are informally (if not formally) identified by financial institutions and regulatory agencies.

At all levels of government, an immediate response to the brownfields redevelopment challenge is required, given: 1) their negative health, aesthetic and economic impacts and: 2) the need for better knowledge regarding site conditions, location and related urban development impacts. Empirical research must be undertaken to ensure appropriate public sector responses are formulated. The following section reviews theories applicable to brownfield site redevelopment planning, including land use ethics and sustainable development.

2.2 Theories

This section reviews ethical positions supporting brownfield redevelopment. When designing and managing the urban environment, planning should entail the comprehensive

analysis of social, political, economic, physical and environmental factors. Discussion focuses on the work in Urban Land Use Planning (Kaiser: 1995).

2.2.1 Land Use Ethics

Actions directed at maintaining or improving the social, physical, economic and environmental well-being of the city-dwelling public are deemed to be in the public's best interest. Brownfields threaten the public well-being, given their adverse health and ecological impacts. Neglecting brownfields perpetuates continued urban expansion, at the expense of already developed areas, which is neither economically nor environmentally logical. Hence, policies and procedures are required to mitigate brownfield-related threats.

Regarding the link between land quality and human health, physicians speculate that increased incidence of respiratory diseases (asthma and emphysema), cancers and reduced fertility rates have emerged as a "macro" public health issue because of ecosystems contamination.

> *An emerging concern is for the ability of some persistent chemical pollutants in the environment to mimic the biological action of estrogen in the body, possibly affecting sexual development in wildlife as well as raising the question of effects on hormonally mediated cancers, such as breast cancer in humans.* (Graham; 1996; p.21)

A contaminated ecosystem can lead to a corrupted food chain, generating cross-species malformations and/or increased disease incidence; hence the public health basis to environmental policy. Epidemiological research into the effects of contaminants on various populations is beyond the scope of this research, but does warrant recognition. Sound brownfield empirical data can assist epidemiologists with disease cluster research, while epidemiological data may help source potential brownfields.

The traditional means of maintaining public health has been through policy and regulation. "Under a teleological theory... the correct land-use policy or action is the one that generates the greatest quantity of value.... Utilitarianism applies this maximization of

good to a collective societal level. Much of our contemporary land-use policy is explicitly founded on utilitarian ethics." (Beatley; 1994, p.24) In other words, public health or land use policies, such as water quality maintenance and zoning ordinances, are designed to ensure the greatest good for the greatest number. This obligation toward the public well-being is heightened when a public institution owns or assumes responsibility for the problem, i.e. brownfield sites.

> *The* moralistic *political culture... takes a collectivist view in which politics is seen as a 'public activity centered on some notion of the public good and properly devoted to the advancement of the public interest. Good government, then is measured by the degree to which it promotes the public good.... The well-being of the community or collective appears to take precedence over individualism.* (Beatley; 1994, p.21)

Securing the public well-being is clearly articulated in the City of Winnipeg's comprehensive plan. Plan Winnipeg: Toward 2010 (hereafter referred to as Plan Winnipeg) defines the City's commitment to environmental and development issues. Thus, Plan Winnipeg represents the policy foundation for this practicum and benchmarks the City's awareness of environmental issues, including its implied obligation to protect civic and resident well-being. The 1992 Environmental Issues: A City of Winnipeg Status Report articulated a growing environmental-utilitarian ethic (the greatest good for the greatest number with the least impact to the environment/ecosystem). As well Plan Winnipeg states that the City would abide by the principles of 1) Quality Customer Service, 2) Sustainable Development and 3) Healthy Community.

The City's comprehensive plan process (Plan Winnipeg: Toward 2010) and the 1992 environmental issues review sought extensive public participation. It recognized what Kaiser refers to as the *development - environment interaction* (1995, p. 173) in land use planning; namely, that development has both positive and negative impacts on the environment. The positive impacts retain or increase bio-diversity, while the negative impacts displace or damage natural areas and pollute the ecosystem. The essence of an environmentally astute urban land development plan is its comprehensiveness and emphasis

on stewardship, one that balances the capitalist interests (profit) with social interests (ecosystem health).

Kaiser confirms that land development planning has specific information needs, to monitor and analyze development-related impacts on both local and regional eco-systems, making a municipal environmental inventory a necessity. The NRTEE considers a comprehensive understanding of the nature and degree of municipal contamination as essential for effective brownfield sites management.

> *...knowledge is an essential ingredient for effectively managing risk and uncertainties. Sharing specific information about a site reduces the inherent uncertainty in its redevelopment.*
>
> • *Better site-specific data on the environmental condition of land would encourage the preferred uses of various categories of land consistent with municipal plans.*
>
> • *Reliable information will bring more certainty and reduce delays related to land transactions.* (NRTEE; 1997, p. 4-5)

In the interest of information-sharing and long-term, large-scale interpretation, units of analysis and technical definitions must be consistent between municipalities and land management institutions. Kaiser further suggests:

> *In addition to environmental features, it is useful to assemble and maintain an inventory of current environmental policy. If this compilation of existing policy is keyed to environmental inventory and analysis, then it will be possible to assess the adequacy of existing policy to deal with environmental problems. Not only ... identify unmet problems and policy gaps, but reveal conflicts among existing policies.* (1995; p. 176)

Again, the NRTEE recommends the development of such an information base to ensure financial institutions and development companies can navigate the sea of regulatory controls and incentives, enabling City staff, developers and lenders to identify resources and constraints pertaining to land development. An historical land use map, conditions analysis and policy inventory should identify site condition patterns. For example, Toronto's Environmental Protocol office developed an historical land use map, to screen for potential contamination when new development applications are received (DS-Lea Consultants Ltd.;

1993).

> *Pulling this compilation together in an organized format will assist public and private decision-makers in understanding and complying with the intentions of the local land use management strategy. It will also serve as a source book of de jure (formally adopted) and de facto (used in practice) land use policy....* (Kaiser; 1995; p. 200.)

Some uncertainty should be mitigated when using such land use maps to identify probable brownfield sites. However, land use inventories require consistent updating and should cross reference any (dis)incentives the City or other agencies may have concerning specific uses, thereby assisting both the developer and the planner.

> *Ideally, ... decisions will be coordinated with adjacent jurisdictions and with the regional planning agency so land information will be compiled in similar formats suitable for sharing across jurisdictions. Because of the inter-governmental impacts of land use policies and decisions, regional compatibility of land use information is increasingly useful .* (Kaiser; 1995; p. 202)

Regarding definitions and management of risks, the NRTEE has also identified the need for consistent contaminated land information, across all jurisdictions. In Manitoba, given the disproportionate size of the City of Winnipeg relative to the rest of the Province, two options exist:

- the Provincial Environment Department could continue to provide this service across the province, expanding their database to include more than contaminated sites or:
- given the current Land Based Information System (LBIS) initiative, the City of Winnipeg could maintain a site database for the Province, offering fee-for-service to communities outside the City's corporate boundaries.

In conclusion, the ethical basis for brownfield redevelopment policy formation is based on a environmental-utilitarian ethic (holocentrism). In Winnipeg the policy precedence for brownfield redevelopment programming is Plan Winnipeg. But, in order to make informed economic, social and environmental decisions a comprehensive land condition data base is needed. The next section will examine sustainable development principles as they pertain to brownfield (re)development and environmental land management.

2.2.2 Sustainable Development

This section demonstrates that brownfield revitalization is an excellent example of sustainable development practices. First, however, some of the problems common to brownfields and sustainable development, such as a definition and practical understanding, are examined. The definition of sustainable development attributed to Our Common Future is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (see McLeod and Wilkes; 1996, p. 10). Sustainable development seeks to link social and economic development while maintaining environmental integrity, which is articulated in the definition used in Plan Winnipeg: Toward 2010:

> *Sustainable development has been characterized as "...paths of social, economic, and political progress that meet the needs of the present without compromising the ability of future generations to meet their own needs."* (1993; p.15, taken from Manitoba Round Table on the Environment and the Economy, 1990, p.1)

The need for a common definition of sustainable development was also addressed in "What is a 'Sustainable City'?" (Richardson; 1996) He argues that a definition cannot be achieved until an accepted theoretical construct is developed. Unfortunately, a lack of understanding about sustainable development is heightened as spin-off principles, such as urban sustainability or sustainable cities, emerge. Richardson notes the distinction between sustainability as a process to achieve a desired state, and sustainable cities which enact defined practices. Winnipeg has clearly stated its desire to become a sustainable city by employing sustainable development practices in its civic operations, as identified in the Sustainable Development section of Plan Winnipeg. Although Richardson offered no clear definition of sustainable cities or sustainable development, he indicated both concepts incorporate systems analysis and design methods.

A similar definition problem exists for brownfield sites. First, there is the need to distinguish between actual and perceived contamination since each requires a different

management strategy. If a site is *perceived* to be contaminated then the redevelopment strategy should focus on effective communications rather than remediation. Second, there is the focus on brownfield redevelopment principles rather than theory. This practicum argues that brownfield redevelopment *principles* must be supported by a holocentric ethic (environmental-utilitarianism) as applied to urban (re)development and land management theories.

"The World Commission on the Environment and Development said that a healthy economy requires a healthy environment and that a healthy environment requires a healthy economy."(McLeod and Wilkes; 1996, p. 10) With respect to the brownfield issue, economic prosperity is needed to afford the costs of remediation as well as to generate demand for land. For example, the recent development booms and inflationary cycles affecting Vancouver, Calgary and Toronto land values (the healthy economy) have led to greater site remediation plans and more efficient land use (healthy environment).

As McLeod and Wilkes (1996, p. 12) point out, Canadian governments have tried to define sustainable development by itemizing activities under three dimensions of sustainability. The brownfield-specific activities include:

Ecological Dimensions of Sustainability

- *protection of primary resources—air, water, soil*
- *remaining within the carrying capacity of the natural world*
- *rehabilitation of degraded environments*

Economic Dimensions of Sustainability

- *living off the 'interest' of renewable resources instead of the 'capital' of non-renewable resources*
- *reduction/elimination of wasteful consumption*
- *integration of environment and economy in decision-making*
- *reflection of full cost of resources*

Social Dimensions of Sustainability

- *focus on qualitative improvement*
- *those affected by decisions involved in the decision-making process*
- *committed to local and global community*

Brownfield site redevelopment supports the sustainable development principles of remaining within the carrying capacity of the ecosystem through rehabilitation of degraded environments. Land revitalization not only reduces consumption (greenfields), but environmental considerations are integrated into the primarily economics-focused decision-making, land use and planning processes. The attention to quantitative improvements, by living off the 'interest' of renewable resources instead of the 'capital' of non-renewable resources, exemplifies the need to reuse developed lands and infrastructure instead of promoting greenfield development. Finally, sustainable development principles are clearly articulated in Manitoba's Contaminated Sites Remediation Act (CSRA) which ensured that those affected by the Act were involved in its formation. It defines a "polluter-pays principle" (PPP), assigning potentially responsible parties specific obligations for site remediation planning and implementation.

The "Environmental Stewardship" Chapter of Plan Winnipeg clearly states the need to address three components of sustainable development, those being the economy, society and environment:

> *If* Plan Winnipeg *is to respond to the public's increasing concern for the environment, then it must not only adopt preventive measures to reduce damage, it must take positive action where damage has occurred. In this way, sustainable development can be seen as the focus for maintaining the long-term integrity of the environment and ensuring our social and economic well-being.* (City of Winnipeg; 1993)

Although no clear identification of an urban or physical component appears in the above policy statement, it can be construed that the thing being "damaged" is the City of Winnipeg, its lands and the citizenry. Further, the Manitoba government has passed a comprehensive Sustainable Development Act. It has received Royal Assent, but awaits

proclamation.

Brownfield site redevelopment, or the reuse of already developed land, not only follows sustainable development practices but it also reinforces Richardson's point that "...a human dimension has been incorporated in the concept of sustainable urban development...." (1996, p. 34) Therefore, the built environment aspect must be added to the existing economic, social and environmental focus of sustainable development. The built environment, including brownfield sites, is one dimension of the human element. The next section examines urban development and city center revitalization in Canada, with specific reference to brownfield sites.

2.3 Brownfield Redevelopment Issues

What is gained by brownfield site redevelopment and what is required? Brownfield site redevelopment requires revitalization (bringing back to productive use) and remediation (cleaning). A site may be remediated but not redeveloped and vice versa, yet in such cases economic, legal and environmental problems remain. Both physical and economic benefits can be gained by brownfield redevelopment, despite problems such as poor image, reduced value and regulatory constraints which diminish their attractiveness.

> *Brownfields seem to be afflicted with development paralysis caused by a combination of factors: a lack of site-specific information on the environmental condition of land, inappropriate laws, legal uncertainty regarding 'who pays' for the clean-up, scientific and legal uncertainty about appropriate clean-up standards, and the absence of mechanisms to foster the alliances among stakeholders necessary to make progress on the issue.* (NRTEE; 1997, p.3)

Apart from these negative aspects, several benefits can be gained by brownfield redevelopment, including: improved environmental health; revitalized urban areas; reduced urban sprawl with optimized use of existing services; legitimization of the environmental industry (site assessment and redevelopment services); and increased tax and permit revenues.(M.M. Dillon Consulting Ltd.; 1996; p.2-2) These benefits indicate <u>why</u>

brownfield sites should be redeveloped.

Brownfield redevelopment benefits are also delineated in the Delcan-CMHC report (1996) on housing development. By extending housing development opportunities to other development projects, brownfield redevelopment benefits can include:

- cost-effectiveness gained by using existing infra-structure (i.e. water, sewer, telephone, hydro, roads, public transportation services) rather than extending services to greenfield developments;
- redevelopment of large tracts of inner-city land, spawning related renewal projects;
- preventing "orphaned" sites or arson of derelict sites and ensuring the retention of some property revenue;
- development-generated lot levies, permit fees and increased efficiency in the use of existing civic staff and services;
- limiting the need for expanded municipal boundaries or - as is Winnipeg's case - the loss of businesses and residents to neighboring municipalities;
- reduced crime and safety problems gained by increased density and 24 hour (around the clock) use and;
- support to existing businesses in the area, by the redevelopment of vacant and derelict properties.

Despite the above benefits, a lack of understanding about brownfield site characteristics and impacts has inhibited a transparent approach to site remediation. The NRTEE has made some excellent suggestions including:

- a comprehensive and concerted approach on the part of many stakeholders;
- more certainty, clear laws governing liability, unambiguous scientific standards, and a system for accrediting environmental assessors;
- stakeholder understanding of brownfields;
- solutions demonstrating public participation;
- use of a variety of redevelopment initiatives other than reducing or eliminating the contamination;
- more accessible and improved site-specific information on the environmental condition of land to manage the Canadian land base in a more responsible and

> sustainable way. This includes improved quality of and accessibility to site-specific data (land title registries). (NRTEE: 1997, pp. 6-7)

The NRTEE goes further by identifying a series of social, political, economic and physical actions for six (6) stakeholder categories. Several recommendations either affect, or should be acted upon, by municipal authorities. They are charted in Table 1.

2.3.1 Site Redevelopment

What are some of the barriers to brownfield redevelopment? Sites must be remediated under constrained regulatory and financial conditions, sometimes requiring direct and indirect incentives for redevelopment.

Due to the on-going maintenance costs and ecological impacts of greenfield development, there is a trend toward re-urbanization or land use intensification. In Winnipeg alone there have been three tri-partite initiatives to revitalize its city center, including the Core Area 1 and 2 Initiatives as well as the current Winnipeg Development Agreement. Brownfield redevelopment neatly fits into most land use intensification projects, because many of the former industrial or commercial sites can be sub-divided into smaller parcels, for incremental redevelopment.

> *As traditional inner city land uses have changed, ... lands have become abandoned or at least underutilized. Urban planning has recently focused on the revitalization of inner-city lands. In addition, with fewer capital dollars to be spent on transportation infrastructure, the intensification of land use within the urban core has become a motivating factor itself. Opportunities for intensification will naturally fall to underutilized lands and thus brownfields redevelopment has become tied to urban intensification.* (M.M. Dillon Consulting Ltd.; 1996; p. 2-2)

Current intensification and revitalization efforts are moving toward mixed-use initiatives, rather than the traditional single-use residential, commercial or industrial development. For example, in Vancouver, the Pacific Place (former Expo '86) site is undergoing a phased mixed-use redevelopment, with retro-fit of old warehouses to residential properties. This example should be taken in context, given the unusual growth market due to sustained

Table 1: *NRTEE RECOMMENDATIONS PERTINENT TO MUNICIPALITIES*

Agency	General	Affecting Municipalities	Actions By Municipalities
Canadian, Federal, Provincial and Territorial Governments	• Create national guidelines for risk-based assessment. • Develop innovative brownfield redevelopment project financing, e.g. trusts.		• Allow municipalities planning authority and resources for brownfield site monitoring and prevention; • Permit municipal property tax incentives for brownfield remediation; • Allocate municipalities authority over small sites. Complex sites to remain under Provincial/Federal authority; • Work with Provincial authorities on project cost-benefit analysis and development incentives; • With Provincial authorities define redevelopment and monitoring indicators;
All Stakeholders		• Develop and implement standards setting and defined benchmarks, ensuring greater efficiency and data uniformity (evidence of due diligence).	
Municipalities		• Ensure property and casualty insurance products are available for brownfield (re)development projects; • Encourage site-specific redevelopment, beginning with least contaminated areas then rolling revenues accrued from the redeveloped portions onto the more contaminated portions.	• Define clear brownfield re-development policies and guidelines; • Initiate stakeholder involvement; • Integrate land use planning and development approval processes; • Define public consultation protocols using public education programs to reduce unfounded alarm; • Charge real costs to greenfield projects; • Use planning and assessment tools to adjust property conditions in favor of redevelopment, i.e. zoning and density changes; • Identify municipal brownfield policies and incentives;

		• Within a reasonable timeframe, while a site is being remediated, lower property assessments or taxes to encourage redevelopment; • Entrust net municipal revenue increases from the remediated sites to future brownfield projects.
Financial Services Industry/ Industry in General	• Clarify the methodology and use of site-specific risk assessment data in the risk management process.	• Lenders develop financial instruments to fund local or Provincial clean-ups. • Work with ENGOs to define and initiate public involvement in standards setting and site redevelopment; • Access government and industry funds for independent site reviews, environmental risk reduction and brownfield education.
ENGOs	• ENGOs involve other affected stakeholders to define and monitor site-specific risk management techniques, define ERA criteria and develop full-cost accounting methods for brownfield redevelopment.	

(NRTEE; From Brown to Green: Improving the Climate for Brownfield Redevelopment in Canada; 1997. pp. 9-17)

immigration levels. In Edmonton, a portion of the former downtown rail yards, which dissects the city center into a warehousing district to the north and the central business district to the south, was redeveloped as the main Grant McEwan Community College campus. What followed were numerous upgrades to area walk-up apartments, retro-fit of old warehouses to residential properties and strip mall development near the new college complex. Although the Edmonton site was for a single use - education, the mixed-use redevelopments it spawned in its immediate vicinity demonstrate the influence a brownfield redevelopment can have over a larger area. Whether or not a growth economy exists, brownfield redevelopment has proven beneficial to city center revitalization and intensified land use.

If brownfields redevelopment appears, on the surface, to be a win-win scenario (to land owners, planning officials and consumers) then why are so few being redeveloped into productive sites? The MM Dillon Ltd. report, The Financial Services Sector and Brownfield Redevelopment (1996: pp. 3-7) suggests that the following factors must be included in the over-all project feasibility analysis:

- labor characteristics;
- existing transportation resources and industry/area needs;
- financing;
- tax exemptions and incentives;
- market conditions;
- land costs and availability;
- construction costs;
- energy and raw materials;
- regulations and;
- quality of life characteristics.

In discussion, at the Calgary NRTEE sessions, it was generally agreed that site

contamination can be the "deal breaker" for site redevelopment. Therefore, should brownfields consistently fall to the bottom of the "preferred site" lists, then government intervention may be required to improve developer/financier interest - especially if Canadian banks brownline sites based on results of phase 1 site assessments and internal risk assessments conducted prior to loan approval.

The likelihood of brownfield redevelopment is also related to the local economy. If it is strong like Vancouver, Toronto or Calgary and the site is essential to project completion, then remediation costs are another business expense. However, if the local economy is weak, or static like Winnipeg, then brownfield site attractiveness drops as remediation costs increase, relative to the availability of other serviced or greenfield lots. Each brownfield is evaluated as an individual case and not as a class of sites.

The MM Dillon report recommends using incentives to induce redevelopment of complicated sites, or ones in depressed development markets. Both direct and indirect incentives are suggested:

DIRECT INCENTIVES

- *indemnities* to transfer risk from the prospective owner to another party should a particular event occur, including ones that allot retro-active liability for clean-up;
- *escrow or trust accounts* where a portion of the site purchase or proceeds from future revenues are placed in trust for future clean-up costs or as a condition of approving and registering the transfer of ownership, allowing for a viable business, tax revenues and area population;

  CASE : *...land was sold to a trust for one dollar. The American group purchased the industrial installations, and leased the land from the trust. The Government of Quebec assumed liability for any cost related to past environmental problems. The buyer remained responsible for its own potential contamination. The buyer of the industrial installations signed a renewable forty year lease for the land. Also, the buyer created an environmental fund for a maximum of one million dollars US a year. This fund is dedicated to the decontamination of the property. The Government of Quebec, the buyer and the Trust agreed to a protocol to clean up past contamination.*

  As a result of these initiatives, the buyer acquired the plant's industrial installations at a bargain price and financing was readily available as the banks did not incur any environmental risk. A schedule for the

decontamination of the property was established in advance. Three hundred jobs were saved. The operation of the factory generated fiscal benefits, and the appreciation of the land value will accrue to the government. (NRTEE: 1997, p. 13)

- *private insurance* packages against property transfer liability, third party liability, clean-up cost gaps or omissions as a result of consultant recommendations and hazardous materials cleaning;
- *public insurance* packages where private insurance is not available, yet this may be because too few clients exist to provide effective risk coverage and actuarial fitness;
- *shared financing* for remediation and or redevelopment between the land owner and one or more levels of government;
- *government funding* such as grants, loans or site assessment services;
- *tax incentives/holidays* , such as subsidized municipal services or (as Windsor, Ontario does) the quashing of outstanding municipal taxes owed that are directly proportionate to the site clean-up costs.

INDIRECT INCENTIVES

- *site clean-up guidelines* either to background conditions, generic standards per land use (industrial versus residential) or site-specific risk assessment standards to ensure the level of certainty;
- *lender liability agreements* stating regulatory agencies will not hold the financier or trust liable if they maintain a specified interest in the operation of the business or site;
- *prospective purchaser/tenant agreements* where the regulatory agency promises not to sue future site owners or users for previous contamination or future remediation as a consequence of previous remediation efforts or statutory amendments;
- *guidance documents* for a variety of contamination remediation and prevention standards and procedures;
- *comprehensive voluntary programs* including a variety of government incentives such as covenants not to sue, remediation certificates, financial assistance, strategic planning schemes and urban renewal funding together with assistance for new businesses and technical advice.

Finally, more effective brownfield redevelopment and site remediation strategies should be developed per the specific use of the new development, the type and location of the contaminants. Removing Barriers to the Redevelopment of Contaminated Sites for Housing (Delcan Corp.: 1996), consistently refers to the need for a "Risk Assessment/Risk Management" (ERA/RM) approach to brownfield redevelopment. By using an ERA/RM

approach to site remediation, as opposed to generic clean-up criteria, the developer can adjust for the nature and extent of contamination by using differentiated design and land use scenarios. The site-specific approach can save considerable time and money while allowing flexibility not possible with generic guidelines. For example, compare the Pacific Place (Vancouver) and West Don Lands (Ataratiri, Toronto) sites. Pacific Place (a mixed use development) used an ERA/RM approach conducting phased remediation work per the specific lot use. Consequently a spot with subsurface contamination, such as a leaking underground storage tank (UST), may be planned for underground parking, since the lot would likely be rezoned from commercial/industrial to residential. The UST extraction would also serve as part of the excavation for an underground parkade. The underground parkade's ventilation system (to remove car exhaust and gasoline fumes from the enclosed space) could be designed to also vent soil gasses from where the USTs were located, as part of a long-term reclamation plan. Or an open-yard storage compound, requiring only top soil replacement, may be converted into a gravel or asphalt surface for parking, walkways/bike paths or other outdoor sports facilities. At the Pacific Place site, design followed best use and least impact standards. The West Don Lands project, however, required the entire site be remediated to a generic background level, not permitting variable clean-up standards per the new use. Unfortunately, remediation costs are not directly proportionate to the degree of contamination; a limited economy of scale exists in remediation services. So, with the expense of generic clean-up requirements as well as flood management and real estate market constraints, the Ataratiri redevelopment stalled.

In conclusion, unique real-estate market and site conditions can be central to a brownfield site's redevelopment. Coordinating brownfield redevelopment with area-wide or site-specific redevelopment plans and available funding would be a judicious use of time and money. To entice new investors, municipal governments may need to provide brownfield redevelopment incentives, such as tax holidays or grants. Lastly, the application of site - and use-specific remediation requirements will ease redevelopment (rather than

necessitating remediation to standard background levels). This is especially true of large sites and large redevelopment projects. Next, liability associated with brownfields site ownership and financing is discussed. As will be seen, not only is there significant environmental concern regarding brownfield redevelopment, there are also several legal obstacles.

2.4 Liability

2.4.1 General Issues

Brownfield sites can incur both real and lost opportunity costs. In addition, municipalities face unique liabilities given their responsibilities for urban land maintenance, development and revitalization. For example, brownfield costs magnify when contaminants leach into the public infrastructure or water systems, causing area-wide problems. The economic constraints are compounded by legal uncertainties as provincial and municipal governments grapple with a growing land use problem in the midst of responsibility downloading and service rationalization. Consequently, brownfields are generally subject to statutory and regulatory constraints not faced by greenfield or serviced lot developments.

Liability can mean "... a person or thing that is troublesome as an unwelcome responsibility... an obligation, or legally bound...." (Allen, 1990; pp. 681-682) The troublesome nature of brownfield sites is derived from environmental, land use and economic policies. Simply put, owners are unsure of how much liability they do or will bear for site clean-up as new laws and clean-up criteria emerge.

A legal meaning of liability includes precedence and procedure rather than perceived annoyance or duty. It addresses *strict liability* which is:

> *... liability regardless of intents but subject to the defense of due diligence; actus reus (guilty action) must be established (beyond a reasonable doubt); the accused may rely on the defense of due diligence (to be established on a*

balance of probabilities); strict liability is often the standard for public welfare or 'quasi-criminal' offenses. (Greenbaum: 1995: p.10)

Therefore, a defendant (brownfield site owner) is responsible to the courts, the government regulators and other stakeholders to prove beyond a reasonable doubt that they had taken every precaution reasonable (due diligence) to ensure contamination was prevented or managed. The problem in today's changing legislative environment is having to apply existing knowledge to past practices, which were previously subject to less stringent requirements.

The financial liability of brownfield site ownership rests in the economic commitment to redress the environmental problems. This includes costs for:

- site assessments to determine the existence, nature and extent of contamination;
- site decommissioning because of (re)development unsuitability or:
- site remediation to ensure:
  - future development, sale or mortgage and
  - mitigate the problem from spreading to adjoining properties.

As well, the responsible party must bear the financial commitment to develop and implement internal contaminant management policies and procedures, requiring staff time and legal advice.

Once the expected cost of remediation is subtracted from the assessed property value, the brownfield site can become a negligible or a negative asset. The reduced property value can promote site abandonment and subsequent tax foreclosure. In turn, municipal property tax revenues can decline, depending on local assessment procedures. If a site is known or perceived-to-be contaminated, then the likelihood of sale is negligible. Instead, the City may need to waive outstanding taxes or assume site ownership. Because of negative aesthetics and fear of migrating contaminants, neighboring properties may be viewed less favorably, thus reducing redevelopment potential and assessed property values over a larger area.

Related expenses borne by a municipality can include: administrative costs for planning and policy work: legal costs associated with a tax sale: cost recovery for site remediation: and loss of outstanding property taxes. Additionally, new developments may migrate to neighboring rural municipalities as developers and lenders find adequate and "complication-free" land increasingly difficult to find within the urban boundaries. The city then faces lost opportunity costs. to another jurisdiction. The spiral of urban decay is perpetuated as employees and businesses migrate, leaving fewer eyes on the street and reduced density to support public services such as fire, police or transit. Land value, quality of life and labor characteristics are all negatively impacted by brownfields.

Further to the economic liabilities associated with brownfield site ownership, a portfolio holding high-risk assets must either diversify the portfolio or off-load the high-risk assets. By incorporating strict liability (the polluter-pays principle) into the CSRA, the provincial government has off-loaded brownfield risk and abrogated liability. If municipalities inherit high-risk properties, like brownfields, then the banking and bond industries may re-evaluate the city's financial rating/status. The condition of a City's real-estate portfolio may not only affect its real dollar value, but also influence its bond ratings, insurance premiums and short-term loan interest rates. The concept of financial services "brownlining" may be applicable at both the site-specific and municipal levels. The cumulative financial impact of brownfield ownership may not be evident today, but in the long-term municipal brownfields may seriously impact the mill rate, civic functions and municipal operating costs, because of their development (un)suitability. This issue is significant to every Canadian city hosting industrial development.

A brownfield site-owner can face substantial economic and legal liability. Due diligence requires a transparent management plan toward mitigating human and environmental harms. Lost opportunity costs must be acknowledged as a significant brownfield ownership expense. As sites sit idle, re-urbanization and land use intensification strategies

are compromised. Increased long term expenses, due to higher financial service fees, can affect overall municipal operations. Finally, concerning lost opportunity costs, if a site requires remediation, then it may be removed from the market for an indeterminate period. Because governments are public corporations the site remediation costs are paid by the tax payer through higher general mill rates, levies or via public debt and service costs, again increasing municipal expenses.

Next, the law and conflict resolution, the Canadian legal system, lender liability, and the Contaminated Sites Remediation Act are reviewed. Each demonstrates a city's implied or explicit obligation for brownfield redevelopment, and liabilities for failing to redress troublesome sites.

2.4.2 The Law and Conflict Resolution

Most often, liability concerns harm reduction and payment for damages to people and their property. Regarding brownfield sites, the judiciary also examines harms to eco-system and human health. The majority of the liability analysis centers on the work reported in Social Conflict and Environmental Law: Ethics, Economics and Equity, Volume 2 (Greenbaum; 1995).

The idea of *for the public good* is critical to law-making and its interpretation. It is not only the written work, intended to guide the development of a fair and just society: it is also an enforcement process to uphold those rules. Even though legal decisions are commonly based on precedence, new statute and new interpretation of old statutes emerge, making the law dynamic. New interpretation takes into account changing social attitudes and economic climates. Therefore, the application of law varies greatly depending on the jurisdiction, the issue, the individual case and the prevailing social ethic.

Central to the dynamic nature of the law are the concepts of interests and values: "Conflicts of values or principles arise when the parties do not agree on what is valuable,

good or morally right.... Conflicts of interests can also be characterized according to whether the benefits or costs of the disputed activity are concentrated or diffuse." (Greenbaum; 1995; p.2-3) Basically, interests are needs which groups or individuals have, whereas values are shared more broadly by society. Often, conflicts of interests are economic in nature, based on an ascribed instrumental value.

The new Contaminated Sites Remediation Act is a statute rooted in the concern over economic liabilities, while addressing environmental and public health objectives. The value conflicts the Act attempts to resolve are disputes between economic development (past and current) and environmental health (current and future). Yet, the majority of the Act is dedicated to resolving disputes of interest by: identifying contaminated sites; identifying potentially responsible persons; apportioning responsibility; facilitating cost-recovery; and defining offenses and penalties.

The CSRA favors conflict resolution over enforcement. Essentially, this legislation achieves principles 3 and 4 toward resolving a social conflict.[3]

> *Law can (3) transform social conflict. Sometimes substantive conflicts over land use get transformed into disputes over procedure or jurisdiction, or disputes over validity of scientific and technical evidence.... Finally law can (4) resolve social conflict in the sense of settling the dispute, or there can simply be a lack of resolution in the sense that the issue disappears legally.* (Greenbaum; 1995; p.4)

Land use conflicts have historically been about procedure, jurisdiction and data validity/reliability, such as disputes over baseline data or assessment methods. The CSRA attempts to resolve environment and development conflicts, using a polluter-pays principle, in conjunction with joint and several liability, when apportioning remediation costs.

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[3] The first two principles are 1) the law functioning "...to articulate pre-existing social conflict....", and 2) the law functioning "... to create further social conflict... by a sort-of spiral effect. (For example) a zoning ordinance or by-law... articulates conflict between different citizens... (and) may then pit both sets of citizens... against the government in terms of application and enforcement." (Greenbaum; 1995; pp. 3-4)

2.4.3 Canadian Legal Process

Understanding the Canadian judicial system is essential when defining brownfield liability. For example, what is the difference between criminal and civil liability regarding brownfield site ownership? There are five (5) points of law, central to compensation claims and legal liability for environmental harms, which in turn are framed by four (4) case precedents. A municipality's authority over brownfield regulation must be understood since environmental law can fall under all three (3) jurisdictions and branches of government. These issues are elaborated upon in the following review.

In Canada, there are three sources of law corresponding to the three branches of government: judicial (courts); legislative (legislatures) and; executive or administrative (government bureaucracy). Judicial law is also referred to as case or precedent law, legislative law pertains to statutes, and executive law deals with government regulations. Except for Quebec, Canadian law is based on the principle of common law. Judicial decisions are grounded in legal interpretation of statute and precedents (previous legal decisions of a similar nature). This doctrine of precedence is also applied to policy development. For example, by reviewing brownfield planning and redevelopment cases, recommendations can be made to the City of Winnipeg regarding defensible or reasonable brownfield strategies.

Statutes that empower government authorities, such as ministries or municipalities, to enact subordinate legislation or regulate activities are referred to as enabling legislation. Section 92 of the Canadian Constitution delegates specific authorities to the Provinces. They are allotted jurisdiction over contaminated sites and their remediation (subsections 5 and 13) respectively, "The Management and Sale of the Public Lands belonging to the Province and of the Timber and Wood Thereon" and "Property and Civil Rights in the Province" (Harvey; 1993; p.31). As well, the Federal government has enabled Provincial authority over environmental matters through such initiatives as the CCME, which developed "13 principles for the purpose of assisting the provinces in their development of

a harmonized approach to site remediation legislation."(Manitoba Minister of Environment; 1995. Cover letter)

Not to be confused with Quebec's civil law system, is the distinction in the common law between civil and criminal law. Here, civil law refers to the legal procedures respecting wrongs between individuals, such as the infringement of one's right to enjoyment of property. Criminal law includes public law and those statutes associated with maintaining the public well-being. Therefore, if a party was found liable under the Contaminated Sites Remediation Act, then it would be considered a criminal matter—a breach of statute law. Suits filed by citizens, such as a land-owner attempting to reclaim remediation costs, are considered a civil matter.

In cases of criminal law the burden of proof rests in proving guilt beyond a reasonable doubt. In civil matters the burden of proof is less stringent, resting on a balance of probabilities that an action would have happened, as would be expected by a reasonable person. "The category of private (civil) law most relevant to environmental cases is that of 'torts' or civil wrongs..."(Greenbaum; 1995; p.14). Therefore, if the City were sued by the Province over a clean-up order then it would be a criminal matter, where it must be proven beyond a reasonable doubt that the City caused or perpetuated the contamination. If the City were sued for devaluing a neighbor's property, who claimed the City was *negligent* in maintaining its site, then it would be a civil matter. In the latter case, the demonstration of probability relates to the City's (lack of) action causing a loss of enjoyment of property.

There are five points of law on which environmental damage compensation can be sought, including[4]:

- *Nuisance* -- The primary question to be answered is whether the activities carried out caused an unreasonable interference of the plaintiff's right to occupy their property without disturbance. An activity's reasonableness is based, in part, on

[4] The 5 points of law and the 4 case precedents were extracted from bank materials to be referred to in greater detail in section 3.2

neighbourhood characteristics, severity of environmental damage, usefulness of the defendant's activities (the social good derived from the harmful activity) and the sensitivity of the plaintiff's use. Remedies include injunctions and/or compensation.

- *Strict liability* – This rule of law is based on the Rylands v Fletcher case. Damages can be recovered where dangerous substances have been brought to the property and pursuant to a non-natural use of the site, the substance escapes and causes damage to others and/or their property. The plaintiff need not have an interest in the land, as the general public can sue for impacts to environmental and human health.

- *Trespass* -- Use of this principle requires that the defendant committed direct and intentional interference with the plaintiff's property. The remedies include injunctions and/or award of damages (compensation). Trespass is not frequently used because of the requirement to prove intentional interference.

- *Negligence* -- The absence of standardized protocols and internal documentation such as policy statements, lender indemnities, warranties and due diligence procedures may be used against a defendant in a negligence case. Negligence can be established when:

  - the defendant has a duty of care to the plaintiff;

  - the defendant failed to exercise a reasonable standard of care and;

  - the plaintiff has suffered damages because of the defendant's breach of that duty of care (malfeasance and beneficence).

- *Deceit* -- This is most often used for environmental problems associated with real property sales, i.e. land transactions. Although no disclosure is required by the sales agent, one must remember caveat emptor (buyer beware). Deceit can be claimed when:

  - false representation is made by the defendant;

  - who intended the representation to be relied upon by the plaintiff, and;

  - in doing so the plaintiff suffered damages.

- *Statutory liability* -- Points to be most concerned about regarding environmental law are:

  - the polluter-pays principle;

  - a polluter is anyone whose actions or omissions cause or contribute to pollution and;

  - corporate officers, directors and employees can be held liable for damages.

The following four legal cases demonstrate precedence in Canadian environmental law.

- *Norwood Case* -- A mortgagee cannot be made subject to a clean-up order unless it has taken steps to take possession or control of the property.

- *Canada Trust v Bulora* -- The Ontario Court of Appeal held that a receiver was obligated to comply with a municipal administrative order issued in the public's interest, despite the interests of the secured creditor (a Fire Marshal's order to demolish houses that were a fire hazard).

- *Panamerican Case*—The Alberta Court of Appeal held that the court appointed receiver (in a bankruptcy case) must act in accordance to the highest standards of the law. The Crown (Alberta Environmental Protection Act) order must be regarded as equal to or higher than credit obligations.

- *Bank of Montreal v Lundrigans*—The Newfoundland Supreme Court granted an order that the Bank need only indemnify a receiver and manager against environmental liability for a property and net proceeds to be realized. The Court's authority rested in its ability to appoint receivers on just terms.

The five legal principles and four cases demonstrate that when a regulatory agency or judge attempts to apportion liability, given due diligence, (s)he will likely query:

- when did the contamination occur—was it a single event or did it occur over a period of time;
- who caused the contamination;
- were reasonable steps taken to prevent the contamination or, on discovery, were steps taken to prevent further contamination and commence clean-up;
- were appropriate authorities notified;
- were standards and practices of the day followed;
- what degree of harm is the contamination presenting to current ecosystem and human health?

These questions apply to civil and criminal matters. The difference between the two is the degree to which a defendant must be proven guilty or liable. In both cases more than one defendant can exist and liability can be apportioned, depending on the degree of culpability. However, the application of joint and several liability allows for one party to be held partially or wholly (financially) responsible, despite being found only in-part responsible. The distinction between responsibility and liability is very fine. Municipalities can be held liable, despite their limited authority to prevent problems like brownfields.

Unquestionably, a municipality's authority to regulate their urban environment is limited:

> *Firstly, there are common law limitations due to the courts' interpretations of potentially useful common law tools and doctrines. Secondly, municipal and local governments are "creatures of statute", limited to exercising the powers expressly or implicitly granted to them in their enabling statute. Finally, they are subordinate governments and as such, cannot infringe upon the powers constitutionally granted to federal or provincial governments.* (Braul: 1994)

Municipal by-laws do not affect Provincial and Federal lands within municipal boundaries, including post offices, airports, Indian reserves, fish habitats, navigable waterways and designated parks.

Despite any expressed or implied authority over environmental management, many Canadian cities have expanded their policy envelopes to include environmental issues. "Toronto's Protection Office... examines proposed remediation plans and contaminated sites and participates in clean-up and remediation of contaminated sites. At present, it functions in an advisory and consultative role to other departments and has no legislative power....A number of Lower Mainland (BC) municipalities have recently established staff positions - such as environmental coordinator or environmental planner—to deal with the environmental aspects of policy and by-laws" (Braul: 1994). Calgary and Edmonton have also added similar positions to their local planning departments. Winnipeg has identified the need for an Environmental Liaison Office to review and recommend on civic policies in keeping with the Environmental Stewardship component of Plan Winnipeg, but to date has failed to operationalize its recommendations. The inclusion of environmental planning in land use decisions and regional planning processes can only be regarded as prudent decision-making, in the best interests of current and future citizens. It demonstrates due diligence.

2.4.4 Lender Liability

> *Barriers to brownfield redevelopment include lack of approval process certainty and finality, uncertainty about liabilities, and the process and costs of*

> *both the legal and technical aspects of redevelopment. This range of uncertainties has meant that the financial services sector is hesitant to finance brownfield redevelopment.* (M.M. Dillon Consulting Ltd.; 1996; p. iii)

Lender liability must be acknowledged as an important factor given changing municipal structures, responsibility, fiscal resources and joint and several liability. Because of government off-loading, municipalities may become owners or managers of land that may be perceived-to-be contaminated, such as old airports or military installations, for example.

In cases where a municipality provides financial assistance to development projects, issues surrounding lender liability must be understood. If a municipality is a loan guarantor, like Canada Housing and Mortgage Corporation, as may be the case in subsidized housing projects, then it may be financially responsible for site remediation costs even though it is not a primary proponent of a project. If a bank is the primary lender and forecloses on the mortgage holder, assuming bankruptcy is declared, then the bank assumes the financial and/or management responsibilities for the property. However, with CMHC, the bank is guaranteed payment of the principle, and is free of encumbrances: CMHC assumes loan and/or property management. If the owner failed to pay mortgage fees or taxes because of contamination and devaluation, then the lender (whether it is a Bank, CMHC or the City) may unwittingly acquire a dirty site - which constitutes a capital "asset" with little or negative value. Liability is further compounded if government-initiated site remediation work is ordered, since the repayment for government-executed site remediation weighs equal to other credit obligations associated with a site or business. As with the Panamerican case the lender becomes a debtor rather than a creditor.

Municipal corporate liability is further compounded by directors' and officers' liability. Despite City of Winnipeg Act clauses waiving municipal officers of liability for damages stemming from their actions as municipal representatives, Council may be liable for acts of omission or commission. Liability of officers, directors and employees requires the City to:

- scrutinize the operations and historical land use of companies where loans are secured by personal guarantees;
- severely limit input regarding lender operations or hold seats on lender Boards;
- ensure a receiver-manager is aware they may be subject to orders stemming from a breach of environmental statute. This is specific to properties acquired by failure to pay taxes.

These three points are especially salient to community economic development initiatives.

The key to mitigating officer/director liability is a transparent due diligence process. However the standard of care and due diligence requirements are increasing as case precedence is further tested and the courts become more conversant in environmental law. A good director/officer due diligence defense requires the director/officer to:

- ensure a pollution prevention system/program is in place and regular inspections, improvements to business practices and compliance with environmental laws is done;
- be aware of industry standards;
- ensure they report back to the Board of Directors about control systems, making them aware of non-compliance issues;
- review compliance reports and seek advice from corporate officers or outside experts;
- actively avoid environmental offenses;
- take immediate action when problems are recognized.

Lender and owner liability must be factored into municipal land assembly or expropriation efforts. Should a property be essential to a project's success then a City's real-estate and legal divisions must ensure it does not assume unnecessary liabilities, including liabilities for site clean-up and/or maintenance.

2.4.5 Manitoba Context - Defining Winnipeg's Liability

The following section discusses Manitoba's requirements under the Contaminated Sites Remediation Act, followed by a review of brownfield planning policies and procedures at select Canadian cities and provinces.

The preamble to the Contaminated Sites Remediation Act reads:

> *WHEREAS it is in the public interest to reform the law respecting responsibility of persons for the remediation of contaminated sites in order to restore such sites to useful purpose or reduce or mitigate the risks of further damage to human health or the environment;*
>
> *AND WHEREAS it is desirable to provide*
>
> *a) a system for identifying and registering contaminated sites...*
>
> *b) a system for determining the appropriate remediative measures ...*
>
> *c) a fair and efficient process for apportioning responsibility...that (uses)*
>
> > *i) ... the "polluter-pays principle"... including factors that would not be relevant in determining civil liability for damages... (and)*
> >
> > *ii) encourages the persons responsible ... to negotiate the apportionment or responsibility among themselves....* (Manitoba Minister of Environment; 1995, p. 5)

There are five (5) key points in the above quote. First, the acknowledgment of "public interest" indicates the Government's responsibility for improved land conditions. Second, is the implied reference to homocentric and holocentric principles (refer to section 2.2.1). The references to human health and "useful purposes" refers to a homocentric ethic, suggesting it is in the public's (human) interest to have productive land. The holocentric ethic is articulated in the statement, "(to) mitigate further damage to... the environment." Third, "a system for identifying and registering contaminated sites... (and) a system for determining appropriate remediative measures" articulates the Government's mandate to regulate these sites. Fourth, the "polluter-pays" principle and the Government's ability to apportion liability makes contaminated sites a matter of public law, in addition to civil or tort law. Finally, the fiscal and physical responsibility for site remediation is to be negotiated between the responsible parties themselves. The Government is addressing conflicts of interest by off-loading legal and financial responsibilities, for remediation, to land owners (the private sector) by using its apportionment and garnishee powers. All this adheres to a sustainable development/holocentric perspective, through an environmental and economic agenda. Because brownfield sites, generally, develop from (profitable)

industrial or commercial activity, the governmental downloading is not so much the abrogation, as the return of responsibility for land quality maintenance to the sector/owner: the ones who did the damage to the site, i.e. the "polluter-pays".

> *The Contaminated Sites Remediation Act, and its accompanying regulation, have been enacted to provide regulatory authority to designate and manage sites that have been exposed to environmental contaminants.... Contaminated sites liability principles agreed to by the Canadian Council of the Ministers of the Environment have been incorporated into the Act. The key principles upon which the Act is based are: polluter pays; fairness; and openness, accessibility and public participation in site remediation.* (Manitoba Environment, internet site)

Regarding conflicts of interests (costs versus benefits), the CSRA proposes to use mediation (when necessary) to allocate responsibility between the potentially responsible parties. Should mediation not work, a system of arbitration is defined where the Clean Environment Commission or the Minister may allocate responsibility to the potentially responsible parties, including the naming of those parties. Should the government assume control of this process there is no guarantee of an equitable apportionment, while the decisions are binding. Finally, all costs associated with naming potentially responsible parties and remediation planning will be transferred to those parties. Should the case be highly publicized, the government may be constrained to remedy a conflict of <u>values</u>, rather than <u>interests</u>.

Regarding environmental policy, Manitoba's is derived from statute, where guidelines and regulations are implemented by Manitoba Environment or delegated authorities. For example, a notice of contamination is registered in the provincial site registry and sent to the Land Titles Office, the property owner, persons with an interest in the site and the municipality[5] in which the site is located. The provincial government manages the data

[5] In Winnipeg, a contamination notice is sent to the City Clerk's Office with the expectation that City staff will contact the City Clerk or Provincial Environment Department for information about a site's condition. Other municipal departments frequently requiring site condition information include: Assessment; Parks and Recreation; Public Works; Transportation; Water and Wastes. Concerning the last two departments, it is a matter of workplace safety, so sewer inspectors and paving crews are aware of potential hazards.

base, dispensing information as requested."[6] In Ontario, on the other hand, "The MOEE[7] Guideline...status as a government document is relatively modest - it is not supported by a regulation, and is not a 'policy' document under the Planning Act or any other legislation."(Rowe: 1996, p. 3) In Manitoba the provincial government has chosen to retain a greater element of control over the municipalities and the private sector concerning contaminated sites designation and investigation, relative to Ontario. In Ontario, "The decision to investigate a site may come from an insurance or lending agency, or from the municipality where redevelopment is proposed on a site (with) a potential for contamination."(Rowe: 1996, p. 3) In Manitoba, the impetus to investigate a site comes from the provincial environment ministry. The Director "may" order a site investigation if (s)he believes the site "may" be contaminated. One possible explanation may be less confidence in Manitoba industries to self-regulate or, with a less active development industry, there is actually less opportunity for non-governmental site identification.

Regarding environmental site assessment processes, a phased approach is becoming a standard requirement of Canadian banks and some cities. The first phase includes an initial site description, history of site use, visual or walk-through assessment of surface conditions, and description of neighboring site uses and conditions. In Manitoba, current and historic facilities details, as well as contaminant and physical site characteristics are described in a Phase 1 environmental site assessment (SA). If there is no indication of contamination, or if there are no exposure pathways (refer to section 3.0.3), then there are no immediate assessed risks to human or ecological health. Therefore, the site does not warrant a contamination designation, but it may be tracked by the Environment Department and registered in the site database. Should concern for potential health risks arise, as a result of any portion of the phase 1 assessment, a phase 2 assessment may be ordered, at

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[6] Manitoba Environment's Manager of Dangerous Goods confirmed that the financial services sector is the largest consumer of site condition information, used in the financing approval process

[7] MOEE means Ontario's Ministry of Environment and Energy

which time a remedial action plan can then be formulated. The phase 2 environmental assessment:

- provides a description of site characteristics such as geological or hydrological formations;
- catalogues land and building conditions;
- conducts soil and water testing to characterize, type and define the degree and extent of contamination.

Should more data be required to assess the extent and impact of the contamination then a phase 3 may be ordered. The phase 1 assessment determines if the site meets the contamination criteria, phase 2 defines site remediation objectives and phase 3 is the risk assessment. In all cases, the site assessment is based on: contaminant source, distribution and concentration; transport mechanisms; exposure pathway; as well as, current and future land uses.

In Edmonton, Phase I environmental site assessments are conducted by the City's planning staff for development, subdivision and re-zoning requests. The City takes a pro-active posture on screening and intervening for subdivision or re-zoning approvals. Contamination review process guidelines define certainty, so developers know when the City will intervene. The Alberta Environmental Protection Act (AEPA) states that the City must ensure "sites are suitable for development". Therefore, the environmental condition of land is regarded as a public health and safety issue.[8] At the same time, great care is taken to ensure privacy rights are maintained and that trespassing laws are not contravened. If an on-site inspection is required, then express permission from the owner/occupier is necessary, otherwise City staff may only conduct a visual site inspection from the property line. Mississauga uses a screening questionnaire as a preliminary Phase I assessment.

[8] Extracted from an interview with Garth Clyburn, City of Edmonton, Principal Planner (see Appendix 4). The City was concerned about leachates since the urban infrastructure can function as a path of least resistance. Is the city responsible for contaminant migration because the duct system facilitated the the movement of leachates? Does the mere recognition of this issue now require civic duedilligence by defining new infrastructre development guidelines? Will the costs of new engineering standards out weigh the benefits gained?

In Manitoba, site remediation work plan approval is at the discretion of the Minister or the Clean Environment Commission. The workplan must identify the responsible parties and their obligations to the site remediation. Different remediation standards may be allocated for different uses.

> *In determining whether to issue a remediation order and the requirements of such an order, the Director shall consider all relevant factors, including*
>
> *(a) the risk to human health or the environment which the site or a contaminant of the site presents or might present;*
>
> *(b) existing and planned uses of the site and of nearby properties;*
>
> *(c) the proximity of the site to*
>
> > *(i) residential and other areas regularly occupied by people, or*
> >
> > *(ii) sensitive or significant areas of the environment, as determined by the director; and*
>
> *(d) the physical characteristics of the site.* (Manitoba Minister of Environment: 1995, p. 23)

A site being returned to active industrial use may not require the same extent of remediation as would be required for a park or residential use. Similarly, proposed uses may vary according to the exposure pathway (sealing a site with pavement for a parking lot could eliminate the threat of dermal contact).

The CSRA also states that municipalities will not be liable for tax losses associated with properties sold or acquired for outstanding taxes. Outstanding government debt is to be paid first, followed by other liens or encumbrances on the property, such as fees owed to the Province for clean-up work.

> *Notwithstanding any other Act, where land that includes all or any part of a contaminated site is held for taxes after the commencement of remediation of the site and there is, at the time of tax sale, a debt due to the government in respect of the site, the proceeds received by the municipality on the sale or, if title to the land vests in the municipality as a result of the tax sale proceeding, from a subsequent lease or disposition of the land, shall be applied*
>
> *firstly, to the payment of any taxes in arrears as of the date of the tax sale and any interest and penalties in respect of these arrears; and*

> *secondly, subject to the terms of any agreement between the municipality and the director entered into in respect of the land, to the payment of all amounts that immediately before the tax sale, were secured by lien and any interest that accrued after the tax sale in respect of those amounts.* (Manitoba Minister of Environment; 1995, p. 34)

Note, this section does not state a municipality will be clear of remediation liabilities if the site is acquired prior to the commencement of remediation work. Nor does it apply to properties acquired by other means such as purchase, expropriation or lease. Therefore, a buyer - or planner - "beware" attitude is appropriate.

Lastly, orders, apportionments or fines made under the Contaminated Sites Remediation Act can be appealed. First, within 14 days a potentially responsible person (PRP) can submit an appeal to the Clean Environment Commission (CEC) which can either rescind, confirm, vary or make a decision/order the Director could have made, within 60 days of hearing the appeal. As well, the CEC may require the appellant to pay for all or a portion of the appeal hearing costs. Appeals to the Minister of the Environment are limited to the portion of remediation a PRP is assigned by the Director. Again the Minister may vary, confirm or deny an appeal, send the decision back to the Director for further consideration or seek advice from the CEC. Finally, CEC decisions can be heard by the Court of Appeal, but only on points of law.

Therefore, given practices in the banking industry Alberta and Ontario as well as liabilities resulting from Manitoba's Contaminated Sites Remediation Act, it is clear that in-house municipal staff should require phase 1 site assessment for civic properties and those sites requiring development approval. Lenders, wary of liability, require prospective borrowers to provide Phase 1 or Phase 2 site assessments as a condition of financing approval. This proves both due diligence and risk management in terms of the Bank's operations. Yet, if the City chooses to tie site environmental assessment to development approval, then it must educate the development community, in order that they understand when and why the City will intervene.

Because of emerging site remediation regulation, more cautious lending, development and information requirements, as well as increased litigation across Canada it is clear that contaminated site registries will require expansion. Municipalities may be burdened with the administrative and financial obligation of updating land registries, and computer land mapping systems, in order that true site condition and use is delineated. Should a city choose to have a geographic information system (GIS) accessible to the public, then computer infrastructure costs will increase accordingly. If an historical land use map approach is selected, one that delineates potential sites, then questions concerning information usage and public access remain unresolved. The ethical question of what is in the best interest of the public should guide the City's approach to site mapping and assessment.

The e-mail survey indicated that municipalities do not map brownfield sites because of liability issues, the primary concern being the inability to guarantee that the information will be restricted to municipal development use (information usage and public access). Generally, the fear was that the consequences of mis-labeling a site would be very costly to the property-owner and the City. Unfortunately, these liability fears also mean that planners, developers and lenders must work with incomplete information, while a significant urban land quality issue is neglected, to the detriment of all parties. It is quite clear that the long-term costs of ignoring brownfield redevelopment (urban decay, sprawl development, lost revenue, aesthetic depreciation and increased operating expenses) can outweigh the short-term costs of redevelopment. There is no doubt that brownfields are a form of "wicked problems". However, the fear of liability is a poor excuse to ignore brownfield issues and not practice due diligence.

2.5 Summary and Conclusions

Chapter Two addressed three brownfield issues—policy, redevelopment and liability. First, the brownfield phenomenon was defined, followed by a synopsis of Canadian urban

development, with brownfields in mind. This led to the hypothesis that industrial districts in the vicinity of city centres and Central Business Districts may house the greatest number of urban brownfield sites. The economic rationale for brownfield policy formation was briefly addressed, focusing on real or lost opportunity costs. The financial services sector was identified as the driving force behind brownfield site research and site assessment work. Land use ethics and sustainable development principles were reviewed. Both provide adequate economic and social rationales for municipal policy development regarding brownfield site redevelopment. Brownfield policy worthiness lies in the homocentric-economic and holocentric-environmental attributes. Finally, it was determined that sustainable development practices referred to in Plan Winnipeg: Toward 2010 could be interpreted to include brownfield site management. The City, therefore, has a clear policy obligation to define and manage domestic brownfield concerns.

The second part of Chapter Two addressed brownfield site redevelopment. The negative economic impacts of brownfields on municipal revenues, property values and urban land management practices were reviewed. There is no doubt that idle/abandoned contaminated commercial and industrial land can have negative health, physical, economic and aesthetic impacts. Brownfield redevelopment can be plagued by a variety of information, legal and financial obstacles. Perceived-to-be contaminated sites require a different redevelopment strategy than sites clearly harboring contaminants. A series of direct and indirect incentives were presented. The local real-estate market conditions appear to be a key factor in brownfield redevelopment. In strong development markets, site revitalization is simply a cost of doing business. In weak real-estate markets, or with problematic sites, some form of government incentive, to remediate, may be required. Being able to match site design details to variable contamination conditions allows for greater flexibility than does a generic standard approach.

Part three focused on liability and municipal authority. Brownlining and its effects on

urban development were discussed. The City as a potential brownfield generator emerged as an issue. Concerning legal liability, the issues of strict liability, due diligence, apportionment and conflict resolution, over conflicts of interests, consistently emerged. This is of concern given a municipality's subordinate status relative to the Provincial and Federal governments, which are actively downloading liability responsibility to lower orders of government. It was identified that a municipality, at times, may be regarded as a joint-venture proponent. Therefore, municipalities must be concerned about lender liability, especially given joint and several liability. Standard banking practices for at-risk sites shed some light on the "inadvertent" promotion of brownlining and land condition "ghettos". Finally, Winnipeg's situation relative to select Canadian cities and to Manitoba's Contaminated Sites Remediation Act was reviewed.

Generally, brownfields present significant negative economic impacts. It is argued that they also pose significant physical threats to urban development by: perpetuating downtown decay; polluting the urban infrastructure; in addition to posing health and ecological problems. A failure to fully understand or act on the cumulative impact of these sites could contravene policy, statutory and land development objectives. But, the question remains, what should be done to confirm a site as a brownfield, and which ones deserve the most attention? This is the focus of the next chapter, which examines brownfield site confirmation from both risk assessment and risk management perspectives.

3. Risk Assessment and Risk Management

3.0 Risk Assessment

Environmental risk assessment (ERA) is the technical process used to define the likelihood of an event and its effects on specific environmental systems. Environmental systems include the air, land and water supplies. Brownfield sites function primarily in the land system given their soil remediation focus. However, they may also be negatively impact water and air supplies.

The following analysis is not a review of risk assessment methodology; rather, the value of the information gained through applied risk assessment is examined. Given unresolved concerns regarding the scientific process, public participation and decision-making processes, it is suggested that environmental risk assessment be used as the final stage in an iterative site assessment process for brownfields research and redevelopment planning - after phase 1 and 2 site assessments have identified information gaps. They are tools to be employed in a broad risk management system.

3.0.1 Definitions and Background

Before assessing the value of environmental risk assessment, a review of related terminology and background on ERA is needed. First, environmental risk statements are judgments about the probability and severity of harm to human and ecological health from exposure to a contaminant. There are three pre-requisites for risk to exist at a contaminated site:

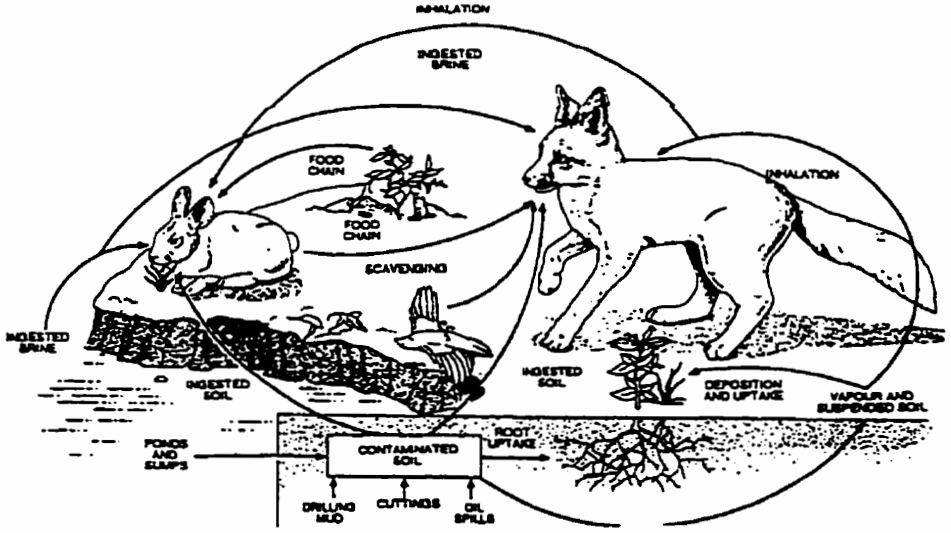
- a source of the *contaminant* must be present at concentrations capable of causing adverse effects,
- a *receptor* must be present, and
- there must be an *exposure pathway* by which the receptor can come into contact with the contaminant (Delcan Corp.; 1996, p. 8).

If any of these criteria do not exist, then the risk is eliminated or reduced. This same principle applies when determining whether to label a site as contaminated. Regarding pathways, the Delcan report defines three common ones, in which human health may be adversely affected:

- *Dermal contact* -- including physical contact with soils, ground water and/or surface water;
- *Inhalation*— including breathing dust or gases from soils and/or water;
- *Ingestion*— by eating, drinking or absorbing plant, animal, dust, soil or water (Delcan Corp.; 1996, p. 9).

The three pre-requisites are independent of each other, as one may exist in the presence or absence of the others. However, cumulatively they can pose risks to human and environmental health. As noted, it is the combination of effects and prerequisites that defines the likelihood of contamination. If no receptor is likely to inhale, ingest or touch a contaminant then risks are negligible. Similarly, if a receptor and/or pathway is present but contaminant concentrations are below established toxicological thresholds, then risk levels are negligible. Even though a site is not classified and does not pose risks, it may remain idle or abandoned, therefore qualifying as a brownfield site, due to perception problems.

Figure 1: Conceptual Model of Exposure Pathways



(CCME. 1996; p. 10. Source: Suter, G.W. II 1993. Ecological Risk Assessment. Ann Arbor, MI: Lewis Publishers)

Because the technical process of risk analysis includes statistical estimation of event likelihood and impact, a data framework to identify gaps in understanding is required. ERAs are dataset interpretations. It is the ranking of the risk assessments and their outcome scenarios that guides the more political decision-making process (risk management). Environmental risk assessments are information tools

> *...attempt(ing)to conduct rigorous risk analyses.... This kind of analysis is information-intensive and technical in nature, leading ultimately to* objective risk estimates. *Several mathematical and scientific techniques are available ..., including fault-trees for estimating probabilities, epidemiological surveys, toxicological experimentation, and systems modeling. Problems for the risk analyst revolve around which technique is appropriate for each occasion, considering both the adequacy of the available data, and the relevance of any results.* (Grima; 1996; p. 5)

An environmental risk assessment is different from an environmental site assessment (SA). An SA quantifies and qualitatively describes social, environmental, economic and physical impacts of a specific development to a site and its surrounding area, such as the effects of a toxic waste treatment facility on the local economy and biota . The ERA attempts to quantify the risks to human health and environmental integrity whether or not a development or remediation plan is proposed, albeit using social, environmental and economic criteria in the analysis. An ERA may be warranted when the lack of data makes a quick assessment of environmental and human health risks difficult. No action is required to validate the need for one. An ERA may be conducted on an abandoned wood treatment plant to determine health and ecological risks, whether the site sits idle or soil treatment plan is implemented.

Much of the current risk assessment research has emerged from the United States. Congress has legislated that when the Federal government is a proponent in a site (re)development then a risk assessment should be conducted, when needed; for example, nuclear power plant or military installation decommissioning.

> *In 1983, NAS (National Academy of Sciences) published a report calling upon the Federal government to make a clearer separation between the*

> *scientific and political phases of risk management. Agencies were asked to distinguish between an objective, quantitative approach to determining risk assessment and a subjective, political approach to developing regulatory controls (management).* (Pollak; 1996; p.28)

> *Even more than ...theoretical and scholarly papers,... the ...driving force behind the increasing interest in 'risk' has been the growing social and political concern over the (mis)management of ... potentially hazardous systems, products, projects and technologies. Many of these 'hazards' are already subject to risk analyses ... and the extension of risk analyses methodologies to more general 'environmental risk assessments' is a natural development in the application of risk theory.* (Grima; 1996; p.1)

The Canadian Environmental Protection Act requires that environmental assessment work be conducted on projects for which the Federal government is a proponent. As well, the CCME has developed "A Framework for Ecological Risk Assessment" (1996) which distinguishes between the scientific, technical process of risk assessment and the decision-making process of risk management. Statutory support for the ERA process is articulated in Manitoba's CSRA:

> *(The) Contaminated Sites Remediation Act (CSRA) defines a site as contaminated if, "having regard to any current, permitted or foreseeable use of a site, that the site is contaminated at a level which poses or may pose a threat to human health or safety or to the environment".... emphasis should be placed on sites that pose risk to human health and the environment. The CSRA embodies the risk-based principle to designate contaminated sites in Manitoba.* (Manitoba Environment; 1997; website)

The need for an ERA depends on a project's size and impact. For example, constructing a new townhouse would not likely require an ERA, whereas the redevelopment of an abattoir or fertilizer plant would. ERA requirements are based on the results of the Phase 1 and 2 site assessments. The Province of Manitoba endorses the site-specific risk assessment process when:

- environmental quality guidelines do not exist for a particular contaminant or the data needed to establish a guideline is lacking;
- the factors such as site condition, receptors and pathways differ from those used in the guidelines (relevance and reliability);
- special ecological concerns prevail (sensitive habitats, threatened species and (p)reserves);

- there are gaps in the data."

The data gathered from an ERA is then used to develop site-specific remediation objectives. The province suggests contaminant fate and transport analyses be conducted along with direct and indirect exposure route assessment. Therefore, the Province supports a risk analysis as part of evidence-based decision-making.

Risk assessment considers the identified risks and associated social, economic and environmental impacts for the development and comparison of a range of management options. Costs and benefits are compared, necessitating that a variety of values and interests be sought and then incorporated into the analysis. This process is akin to earlier definitions of planning and policy analysis. Essentially, risk assessment is a technical or scientific process, while risk management is a policy process.

3.0.2 Environmental Risk Assessment Process

> *The (Federal) government divides risk assessment in four officially designated stages: 1) risk identification (defining the problem statement); 2) dose-response assessment including toxicity studies, epidemiological experiments, morbidity and mortality rates (determining and defining the amounts of the chemicals and likely responses); 3) exposure assessment (how much of x chemical is out there) and; 4) risk characterization. Risk characterization is the result of the likely outcome from a dose at a site to give a measure on human or environmental health.* (Pollak: 1996: p.26)

Dose response research can include methods such as bioassays, which extrapolate animal test data to humans, and epidemiological studies, focusing on human responses to contaminants such as disease or malformation incidents, in a variety of controlled and uncontrolled test situations.

An ERA for one site can be used as part of the data base for future ERAs, as process precedence, thus supporting decision-making and data analysis. The only caveat to using previous research and decisions as precedent is one's confidence in the initial research assumptions and methodology. Reliability is a concern in ERA, particularly if historical

data is required to make an accurate estimate of risk. Unfortunately, if previous studies or data collection methods were not reliable, then subsequent ERAs run the risk of compounding the errors. See Appendix 2 for more details on the environmental risk assessment process as proposed by CCME.

3.0.3 What Are The Problems With ERA?

The cost of conducting an ERA is its greatest detractor. Despite providing new information to the decision-making process, the time required to assemble and analyze the data can be significant.

> *Generally, risk analysis is the most time-consuming, costly and technically difficult part of risk management, requiring data collection and analysis in areas where needed data often do not exist and where analyses of these data are more of an art than a science. Because risk analysis often involves probabilities, statistics, and epidemiological data, it may be difficult to convey the results of an analysis to the public and to non-specialists.* (Grima; 1996; p.3)

Equally important are questions of information value. Is the information relevant and useful to the decision-making process? How will the new information be used to frame questions of value, such as, is it worth the risk ?

Questions about the usefulness of environmental risk assessment include, but are not limited to: a) will the technical data improve the decision-making process, and; b) will it result in better decisions? Perhaps yes, if the ERA tools and resulting data are clearly defined, ensuring the decision-makers are making more informed decisions—not just decisions with more information.

> *Some of the reasons why ERAs are often difficult (include) the lack of actuarial experience with such risks, the limited knowledge of ecological relationships, and the prominence often given to particular episodes or events by media...influence(ing) people's perceptions....* (Gregory; 1996; p. 56)

A clearly defined ERA tool requires values to be explicitly articulated in the research design, interpretation and decision-making phases. Beyond economic concerns, social and

environmental values are at the heart of ERA. Value-focused questions asked by the decision-maker can include:

- *given the range of risk that people already face, are additional risks worth taking;*
- *how will (these risks) fit into the overall spectrum of (existing) risks;*
- *regarding the question of equity, who will be saddled with what risks, for how long and for what benefits;*
- *... regarding the question of acceptability, what is an acceptable risk;*
- *and what is an acceptable process for coming to that determination?* (Grima: 1996: p. 4)

The primary constraint to environmental risk assessments rests in its purpose. Because of information gaps and inability to formulate adequate actuarial analyses, additional data is required. This means that extensive and expensive, values-inclusive, research is required. The following sections address other ERA problems, including: policy issues: public participation; understanding probabilities and uncertainties; risk perception and worst-case scenarios. The review here focuses on the need for a clearly-defined communication strategy in relation to environmental risk assessment.

3.0.4 ERA Policy

Concerning policy, environmental risk assessment can:

- aid problem identification at the beginning of the decision-making process and;
- reform policy institutions, opening the way for scientific knowledge to inform and shape policy development.

The problem, however, with scientific knowledge informing policy is that scientific knowledge is developed using debate, peer review and consensus—much like policy—yet when applied to policy formation it is used in an adversarial context where stakeholders grapple with complex problems, having scarce resources to allocate, but multiple constituents to appease.

The adversarial context is further complicated when there is a lack of agreement on which risk characteristics should be valued and how. This can result in a costly paralysis of confidence in clean-up efforts and an alarming loss of confidence in the capabilities of government risk managers (Gregory: 1996; p. 56). Therefore, from a policy perspective, ERA benefits are limited. Variables, social attitudes and diverse resource levels affect research methods and outcomes. This is further compounded as results are perceived/interpreted differently, in turn affecting how a decision is debated or framed. For example, the results of a municipal brownfield redevelopment incentive strategy may vary between locales because of uncontrolled external factors such as the local economy, risk-taking attitudes or statutory obligations.

Despite any methodological commonality between analyses there remains the problems of stochasticity (having to rely on research steps before event likelihood can be assessed) and incomplete or flawed datasets, from which assumptions are drawn. ERA has a great deal to offer in the long-term, as data and decisions are gathered and analyzed. In the short-term however, it should be used as a last step in a comprehensive due diligence process. Environmental risk assessment, although widely-accepted by decision-makers, such as the US Congress, is still in its infancy and must be regarded as such.

3.0.5 Public Participation

> *The most important initial question about the involvement of the public in the debate over various risks is whether or not the complex and sophisticated terminology of much of risk analysis can be easily and correctly translated, or whether another level of frustration is about to be added to the public participation process.... A second question is how public input on issues involving risk is to be handled.* (Grima; 1996; p. 8)

Grima goes further to suggest that public participation is required at two points in the environmental risk assessment process. Firstly, at the beginning to help define and scrutinize the statement and study methodology; having public input into the research

guidelines helps mitigate potentially serious misunderstandings arising from ignorance about the real or perceived nature of the risk. Secondly, the public should be consulted in the post-analysis/options selection stage, to articulate their priorities and concerns. Differences regarding technical analysis must be separated from differences of opinion about the nature of risk and acceptable degrees of risk. The NRTEE recommendation for Environmental Non-Governmental Organization (ENGO) participation in ERA procedures development is one option to ensure legitimate, but controlled, public participation.

As the opening quotation by Grima suggests, officials must be very clear about why public participation is being sought in the ERA process. Adding an ill-informed lay person to a poorly-defined analysis or decision-making process will likely augment mistrust and suspicion, while protracting the processes. Knowing when and how the public should be used in any process must be well-articulated. Over-use can be as destructive as inadequate public consultation, resulting in the appearance of weakness and indecisiveness. Questions to be asked before seeking public consultation in the environmental risk assessment process include:

- why is public input needed;
- how will the public input affect the
    - analysis
    - decision
    - outcome;
- what information or outcome is being sought;
- what is expected of the public's participation;
- at what point will the public be consulted;
- how will the public be consulted and;
- how will the consultation be used and reported back to the public to ensure a perception of legitimacy?

Public participation is essential in an ERA, but the participation level must be clearly defined, as must the reasons for seeking public input.

3.0.6 Probabilities and Uncertainties

> *... risk focuses attention on one of the fundamental issues of making predictions - the question of uncertainty, scientific and societal....* (Grima; 1996; p. 3)

> *... there are several ...kinds of scientific uncertainty. For example:*
> *• There are events of low probability and high consequences (LOPHIC) such as those at Seveso or Bhopal. Mitigative measures for LOPHIC risks tend to be very costly... while the data are limited and subject to various interpretations. In these cases risk assessment... provides a useful organizing framework for conducting rational discourse....*
> *• Another type of uncertainty is where a probability of occurrence and magnitude for both event and consequence are available (e.g. earthquakes, frequency of severe storms...) but prediction in terms of time and place are almost impossible. In such cases risk assessment is useful in order to improve policy. For example, it would be impractical to make every home plane-crash proof but one could use risk data to zone land uses around air fields.* (Grima; 1996; p. 4)

Brownfields represent the former type of uncertainty (LOPHIC). As more data are gathered and analyzed the probability of environmental and human health impacts can be measured, but predicting event timing remains uncertain. Generally, experts are quite certain how, and to what extent, contaminants will leach into the infrastructure, neighboring sites or ecosystems, yet are unsure when or where leaching will occur. Therefore, precautionary measures tend to be implemented to mitigate future harms, through Phase 1 SAs determining site conditions and remediation options. This is similar to the engineering assessment and refit of historic buildings, so they meet regional environmental concerns, such as for flood- or earthquake-proofing.

Returning to the issue of a lack of trust in the scientists and their data, uncertainty regarding scientific processes emerges. Questions regarding the means by which data are gathered and the value of the data in the decision-making process emerges.

> *The privileged status of risk assessment, the scientific component of risk regulation, has been challenged at two levels. The first is epistemological.*

> *Some post-modern critics argue that scientific knowledge has no stronger claims to truth or certainty than other kinds of knowledge, and hence, scientific knowledge should not be privileged. The second level of challenge... denies that regulatory science in general and risk assessment in particular, despite their scientific pretensions, are real science.* (Pollak; 1996; p.28)

The consequence of these challenges, and the responses to them, is a potential for experts to contradict each other, followed by public apprehension. A current example includes the debate concerning global warming and green house gas; whose results are legitimate and what does the scientific knowledge prove? For brownfield sites such debate may apply to soil treatment regimes, as both positive and negative aspects exist for in-situ or off-site treatment.

Blind spots and values frame the public perception of a risk. Consequently, decision-makers must take care how they use ERA data. Generally, a scientific response to a problem is regarded as more credible than a political or institutional response. However, the scientific process can be used for political objectives too. Politicians seeking scientific studies to validate or nullify findings of earlier assessments may use the data for "diversionary reframing" (Freudenburg; 1996; p.51). For example, if public opposition is rooted in a value or blind-spot issue, but decision-makers opt for further studies, then the new data can be manipulated so opposition to research appears to be anti-scientific, rather than an objection to unnecessary additional research. Attention is diverted away from the issues (values) or risks, reframing the debate to one of scientific process and rationality. Diversionary reframing is one of the reasons for public mistrust in the scientific process and rational decision-making. What is the information being used for? Is it to make more informed decisions, or decisions using more information?

Environmental risk assessment attempts to provide scientific authority and rationality to decision-making by eliminating perceived bias from the decision-maker. However, it is only one means by which complex decisions are made. ERA is a young process, awaiting improvements in both method and interpretation. Therefore, it should be used with caution

given uncertainty, cost and public participation issues.

3.0.7 Risk Perception

A central concern regarding the use of ERA is the lack of confidence in the public's understanding of probability and orders of magnitude—which begs the question if there can be meaningful public participation. When the public, or any non-specialist (including decision-makers), does not understand the significance of the quantitative data used in a decision-making process, then the confidence associated with that decision is weak. Thus, the issues of decision reliability and relevance persist. Risk data must be conveyed in clear and understandable terms. Simple communication is the key.

The risk analyst must determine how to present the risk data. There are a variety of options to convey event probability and expected outcome; but which measure is most appropriate? Options include:

- the probability of outcome (i.e. deaths, disease, hazard);
- the probability of worst outcome (numbers, volume or costs) or;
- the most likely outcome.

Clearly, there are many choices regarding the form and content of the risk analysis results, which influence data interpretation and decision-making. Therefore, all stakeholders participating in the decision-making process must clearly understand:

- what is being analyzed;
- to what degree the public faces risk;
- what kind of risk it faces and;
- what costs and benefits will be incurred, in reducing risks?

This stage is extremely important because it is the basis for the risk management strategy, to be discussed later in this chapter.

How information is communicated significantly affects the reaction of a decision-maker. For example, how might a City Councilor decide given the following situation? A two-acre site housing a gas station for twenty years has been idle for the past three years. The local residents' committee considers the site unappealing and unsafe since teenagers congregate there at night. The residents propose community revitalization dollars be used to convert the site to a playground serving area residents and a nearby day care center. The Councilor seeks a recommendation from the Parks and Recreation Department, which in turn commissions an environmental risk assessment from a local engineering firm. The firm determines that the underground storage tanks have been removed, but no soil remediation was conducted. Two reports are written. One is sent to the Parks and Recreation Department. It predicts that after site excavation (to build a play structure) and landscaping (removing contaminated surface soils) there will be a 99.9% likelihood that the site is safe for recreational use. The other report is sent to the Councilor. It states there is a 0.1% or 1 in 1,000 chance a user will become ill from inhaling site soil (dust). The decision the Councilor makes may be significantly different from the administrative staff, simply because of data presentation.

We all judge risk differently. Values, mood, gender, education and social rank all play a part in how one perceives and processes information. Risk assessors must present data in an appropriate format so that decision-makers are able to understand and use the data. This is especially important if stakeholders change throughout the decision-making process, as might be the case with an election or rotating committee membership, or if current decisions are based on previous data and outcomes.

Equally important as risk communication is risk adaptation—how people function with risk. LOPHIC type risks are increasing as society becomes more mechanized. Instead of fearing the technology, people generally learn to cope with the risk and adapt their behaviors to the new technology, while maintaining a static or consistent level of risk.

Improvements to safety or risk reduction are accepted and integrated into an individual's lifestyle, but the rate of incidence does not necessarily decline as people's behavior becomes more risky in response to the new agent. This adaptation to amended risks is referred to as risk homeostasis (Keegan; 1997; p. D5).

> *This idea seems to be easier for ordinary citizens to come to terms with than for policy makers or planners. In presenting individuals as independent risk managers, the concept of risk homeostasis throws a spanner into the works of policy makers who would prefer to control risk-taking by manipulating the environment.... (I)nstead of viewing humans as passive subjects of technical designs or enforcement, we should treat them as active subjects and look for ways to make them want to be safer.* (Keegan; 1997; p. D5)

Regarding options to make the public want to be safer, one might be the provision of inducements or rewards to modify behavior (conditioning). In other words, placing the responsibility for reducing brownfield-related risks with the site owner can have a threefold objective: first, to ensure the polluter pays; second, to limit economic obligations of cash-strapped provincial and municipal governments and; third, to reduce risks. For example, by combining inducements and advertising, through an innovative "Take Pride"[9] program, citizens and developers can be encouraged to create safer sites. If packaged properly, as part of a sustainable development program to reduce habitat fragmentation, a municipality or a provincial Environment Department could strive to adjust owner and developer interest in brownfield remediation/redevelopment.

3.0.8 Worst Case Scenarios

Sometimes it seems the public and media have a perverse pleasure in knowing what is the worst that could happen, in a given situation.

> *The use of worst-case analysis often means that a lot of time and effort is spent on examining highly implausible risks; the use of 'worst-plausible-case' analysis may be a more productive alternative. Another issue is whether non-specialists find mathematical risk analysis useful; (order of magnitude problem) ...?* (Grima; 1996; p. ix)

[9] A civic pride program designed to improve area aesthetic and safety factors through means such as clean-up, facade improvement and streetscaping programs.

A timely example is the use of worst-case scenarios for Manitoba's 1997 Spring Flood management. Worst-case scenarios set a benchmark from which the experts could base their analyses. However, having never been faced with such significant amounts of water, nor having an effective model to project water dynamics, the experts gave their best guess. This influenced both individual and government flood management responses, such as whether to evacuate or where to build dikes. The worst-case scenarios were repeatedly adjusted as new data and prediction methods emerged. The estimated $7 million Brunkhild Dike was not used as predicted. Because of the failure to foresee the flooding of Grande Point, 80% of the residences were lost. The dike building was not in dispute; rather, the magnitude of disaster predicted in the worst-outcome scenario led decision makers to divert scarce resources of man-power, equipment and material, while failing to realize the larger consequence of the dike and altered water flow.

The failure to predict changes resulting from an action is a significant flaw in most scenario exercises. The analyst and decision-maker must be astute at projecting the consequences of their decision. Worst-case scenarios suffer the same perception problem as uncertainty. They may be useful for pin-pointing problem areas; however, when used as the basis for decision-making they may inadvertently misdirect necessary resources at the expense of attention to other equally important factors. The effective use of worst case scenarios is for defining and balancing lost opportunity costs. They should be used as only one tool in the risk analysis process. The decision maker must be able to balance the likelihood of worst-outcome against best use of scarce resources. Are the expenses required to prevent the proposed worst-outcome scenario: i) worth it relative to the likely benefits gained; ii) less than or equal to the lost opportunity costs; and/or iii) feasible?

3.0.9 Conclusion

Although environmental risk assessment (ERA) is congruent with sustainable cities

principles, it is but one step in a larger land use/management policy or decision-making structure. It should not be used as the definitive tool to determine the fate of brownfield site remediation or redevelopment prioritization. Its strength rests in the accounting of unique environmental, economic and socio-political factors associated with specific sites and development alternatives. It can also function as a precedent, upon which an appropriate methodology is built.

A clear strength of ERA is its ability to incorporate public values, emotions and perceptions into a seemingly objective and science-based process. Thus, environmental risk assessment is both art and science. The science aspect rests in the methodology used and statistical (quantified) description of the problem or event. The art aspect lies in the communication and public participation component of the process. As art it aids in closing the gap between the public and the practitioner through public participation, communications and increased direct involvement of those impacted by an event or an ERA decision. It goes beyond economic priorities and questions whether a risk is worth taking, given social values and costs. It tackles the issue of equity in decision making.

The communications aspect of ERA is critical to its effectiveness as a planning tool, because of the multiple objectives it can embrace. For example, when faced with a brownfield site of unknown contamination, a communications plan can be designed, with such goals as: to inform (site assessment); to persuade (site ranking); to validate objective fears; or, to nullify perceived fears. In cases where the brownfield site is fraught with perception-induced problems, then a public relations campaign may prove more effective and efficient than an exhaustive site assessment, or a remediation rather than redevelopment perspective. It is important to distinguish between the significance of communications and multi-stakeholder consultations. As a process in a democratic system, the goal of multi-stakeholder consultation is to activate public participation, a benefit of which is identifying perceived and objective fears, from which the response should be a communications plan.

This strategy assumes the public should not be treated as a passive bystander, but an intelligent constituent, deserving of information and participation.

ERA weaknesses rest in data reliability and validity. Specifically, there remains:

- uncertainty about the data input (and how to output the information);
- a need to define winners and losers (therefore pitting sides against each other) and;
- potential unanimity about the risk but divergent values regarding its management.

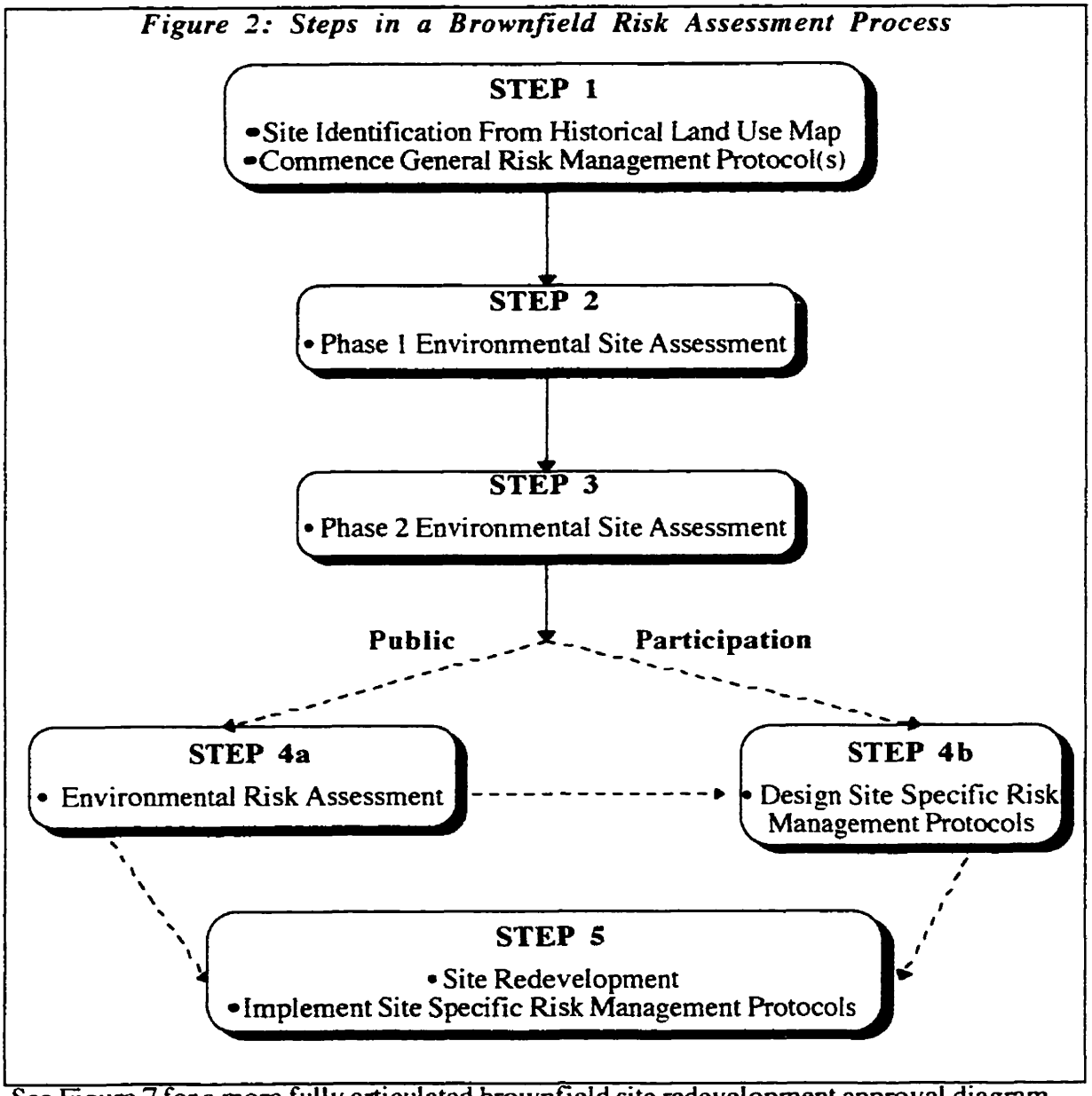
Common methodology, common assumptions and common communication strategies are key components concerning the issues of reliability and validity. Therefore, concise documentation is critical to ensuring previous ERA research can be used as precedence in new research. With respect to using ERA in brownfield redevelopment planning, problems include:

- assumptions and extrapolations made during the scientific research phase using inter-species data, the lack of longitudinal data and/or a comprehensive understanding of multi-factor systems dynamics;
- psychological and cultural reactions to risk, irrespective of the data;
- the costs for technical risk assessment research;
- lack of faith in the decision-makers or in expert interpretations, and
- generic guidelines that may substitute for site-specific research.

Despite the problems associated with this emerging scientific process, environmental risk assessment does have a place in the overall brownfield sites risk analysis process. Its consistent use, within a fully articulated land management and development process, can create datasets for more informed analysis by planners, developers and politicians, regarding short and long-term physical impacts. This information can also be used for actuarial analysis, supporting the quantitative analysis required for new insurance products. A full understanding of a problem's nature and magnitude is required before adequate and appropriate measures can be defined and implemented; otherwise, it is more likely that the

symptoms are being treated rather than the problem. Finally, environmental risk assessment may mitigate perception problems, such as: whether the site is perceived-to-be contaminated; lenders' fear of migrating contaminants; or, public fears of negative health and environmental impacts. Figure 2 outlines a proposed brownfield risk assessment process based on the previous analysis of ERA, site assessment and land use mapping.

Figure 2: Steps in a Brownfield Risk Assessment Process



See Figure 7 for a more fully articulated brownfield site redevelopment approval diagram. (Source: Author)

3.1 Risk Management

> *Risk management is the overall term used to include analysis, evaluation, implementation, and monitoring of a preferred course of action..... including the identification and quantification of risks associated with a proposal/action, the evaluation of alternative strategies and designs that mitigate these risks or their consequences, and a decision and implementation of a preferred course of action. Risk management includes the entire range of methods of coping with risk rationally and systematically.* (Grima; 1996; pp. ix and 3)

Risk management (RM) is applied at both the micro and macro levels of public policy, to individual projects and to a municipality's overall operations. Municipal risk management strategies define policies and procedures to mitigate the City's liability and demonstrate due diligence. The following analysis of risk management will focus on the brownfield site issue, yet risk management is applicable to a variety of municipal operations and/or properties. Therefore, a comprehensive municipal risk management program would have a brownfield risk management strategy as a subset.

First, risk management as a rational process is defined, followed by a lengthy discussion of values in risk management strategy formation. Next, risk-ranking is discussed. Its value in risk management is its attempt to incorporate values into strategy selection. Concerning existing risks, risk reduction and tools for decision-makers are presented. Finally, and briefly, risk management problems are summarized.

3.1.1 A Rational Process

As Grima suggests above, risk management epistemology is rooted in rational-comprehensive analysis as the ideal. As with ERA, risk management relies on scientific data to inform the decision-making process:

> *Policy decisions for environmental protection and risk management must be based on accurate biophysical and socioeconomic information. The importance of developing compliance strategies grounded in ecological and economic principles is even more important today as the linkages between ecosystem health and human health have become evident....* (Energy Spatial Analysis Research Laboratory; 1997)

Further, the RM process is strikingly similar to the stages of ideal-typical decision-making, which is in turn fundamental to rational-comprehensive planning and policy analysis. This is demonstrated in the following list of generic stages in rational-comprehensive planning and risk management (listed in brackets):

- define goals and objectives (problem statement);
- define alternatives to achieving the goals and objectives (research methods);
- predict consequences (risk definition);
- evaluate the consequences (ranking);
- decide on a course of action (options);
- implement the decision, and;
- assess the results, offering feedback/evaluation (Friedmann; 1987, p.78).

Given these similarities, risk management techniques fit in well with prevailing urban planning and financial services sector methods. The data derived from financial and environmental risk assessment can be utilized in the risk management process. However, good risk management strategies require more than scientific data for decision-making. Risk management defines options to deal with the risks, including strategy implementation and evaluation, and therefore it must address value questions before the articulation of a viable risk management strategy.

3.1.2 Values and Risk Management

Risk can be economic, legal or environmental. Risk management attempts to balance a municipality's legal reaction to risks against a risk-taking "open-for-business" stance. However, uncertainty remains central in the risk management process, since it is the uncertainty or risk that is being managed.

Once an ERA has been completed, three common questions remain:

- How safe is the initiative? (A question of facts.)
- Is that safe enough? (A question of values.)
- Has something been overlooked? (A question of blind spots.)

A defined approach to these questions is required. A hypothetical case may include the redevelopment of Winnipeg's Union Stock Yards into a 9 hole golf course. Assume the site will be cleared of all built structures, except for the administration building for a clubhouse, and the parking lot. The remainder of the site will be used as golf greens. An environmental risk assessment might conclude there is a 0.02% chance that a healthy adult will become ill from dermal contact and/or inhalation of dusts associated with the former slaughterhouse activities. In addition, assume there is a 0.05% likelihood of water-table contamination because of chemical reactions between fertilizers, watering and petroleum products embedded in soils at the former docking site. What should the developers, planners and city officials do? Can they be certain of the results? What is the margin of error? Was anything left out in the analyses? Does uncertainty remain concerning ecological or human health risks?

Once uncertainty is identified, how is it managed? Generally, one of three things is done:

- Quantify the risk—i.e. x event will result in y consequence;
- Locate the risk—is the problem the data set (i.e. historical records) or the predictive model or;
- Schedule to reduce the risk—by pledging to improve data sets, tools or conditions by a specific date or measure.

Building on the Union Stock Yard example, the quantified risk and located uncertainty might be described as in Figure 3.

For Risk 1, decision-makers must return to a question of values. Is a 1 in 5000 chance-of-illness safe enough? Will the revenues from golf fees or property/business taxes outweigh the social and economic costs of human illness? Is the scientific data appropriate, for making a value-based decision?

Figure 3:		*Risk and Uncertainty Identification*	
	Affected Units	**Risk Likelihood**	**Locate Uncertainty**
Risk 1	Human Health	• A 0.02% or 1 in 5000 chance of illness. Assuming 10,000 golfers pass by the site then 2 people may become ill.	• How will golf course watering, wind and specific plant types affect the amount of airborne dust? • What is the degree and type of illness anticipated?
Risk 2	Ecological Health	• A .05% or 1 in 2000 chance of water contamination using chemical fertilizers and intensive watering regimes.	• What is the degree of chemical reaction? • What amounts and types of chemicals and watering are needed to generate specific reactions?

Similar to ERA, values play a significant role in environmental risk management, arguably a more significant role given the decision-making function of risk management. Ensuring public participation in the RM process, as with ERA, allows for divergent values to be accommodated into an acceptable course of action. A legitimated decision-making process necessitates a mix of expert and lay input to ensure the public's values are accurately accounted for in the decision.

> *Canadian and American reviews of public involvement in policy development emphasize that public input is only meaningful if it is accompanied by a sharing of powers. This is not to say that elected representatives or their officials should always relinquish all decision-making power to whatever stakeholders happen to have resources to participate in any given process. Rather, it means that there must be a reason why public input is sought and the government must be willing to listen to and respond to public concerns, values and opinions. Properly structured consultations can take the form of a dialogue in which ideas and values can be exchanged and modified. Otherwise, public participation can be a meaningless and frustrating experience for all concerned.* (Moffet; 1997; p. 37)

Using tools familiar to both the public and researchers - helping to ensure consistent results - would seem to be the most logical approach. For example, opinion polls, surveys and focus (Delphi) groups are three consultation tools familiar to municipal officials, planners, researchers and the public. Their results can help decision-makers allocate scarce resources, select options, or design strategies which fit best with public attitudes, social ethics and visions for the city's future development.

Finally, two more questions remain regarding values and the decision-making process:

1. do economic factors rank most prominently? (choosing the most cost-effective option) or;
2. do other values rank more highly? (choosing the most environmentally-sound option)

With respect to the first question, economics represents an integral factor in risk reduction, because economics frames the answer to value questions such as: how much will this cost, relative to the benefits gained?

> *There are several assessment methods (risk-benefit analysis, cost-effectiveness analysis) that attempt to clarify the trade-offs between risks and benefits.... data about the costs (and effectiveness) of risk mitigation across a range of risks would provide the public and decision-makers with a framework to guide decisions about further expenditures on risk mitigation.* (Grima; 1996; p. ix)

There are two common economics-based management strategies. First is mitigation, where (costly) physical measures to reduce the statistical likelihood of ecological or human health injuries are implemented. The second is compensation, where in-kind or monetary payments are made, in lieu of physical remediation and risk reduction.

> *While risk management strategies commonly involve both mitigation to reduce the harmful impacts and compensation to offset the consequences of environmental losses, conventional risk analysis is subject to a bias that unduly favors compensation remedies. The source of the bias is in an assumption that compensation is likely to be more efficient than mitigation remedies because compensation allows injured parties to use an award for whatever they value most. Whereas mitigation restricts the remedy to reducing a specific injury, which may not be the thing of highest value...* (Gregory; 1996; p. 59)

Mitigation favors the injured party while compensation favors the defendant. Mitigation costs can exceed compensation costs. It can be time-consuming and complicated by regulatory assessments. Insurance may not cover either option, especially if the defendant is found negligent or not practicing with due diligence. Finally, compensation begs the question of what to do with the troublesome site? For example, assume gas tanks are ruptured and leak into the groundwater, contaminating a rural hamlet's water supply (well-

water). Also, assume it will take one hundred years for the gasoline to naturally flush from this system. What does the company do and what do the residents accept? Should potable water be supplied until it is safe to use the town's water supply? Should the town be moved? Should the residents accept compensation and assume any consequent responsibilities?

The preferred option depends on one's values. Think of the same situation, but the town's water supply is derived from or flows into a larger system that also serves a metropolitan area. For example, Buffalo Pound Lake supplying the City of Regina, or Shoal Lake supplying the City of Winnipeg. Is the driving philosophy to be the greatest good at the best price (economic utilitarianism) or holocentrism (sustainability)? Values frame the risk management process. Often decisions come down to injury versus dollars. What are we willing to give up to achieve X? How much money is the reduced risk worth? The decision is complicated when the benefits to one group are forsaken to achieve benefits for another group. What does the City value—clean and developable land, a healthy citizenry, cost containment, or development? These questions are salient given a government's onus to protect public health and welfare, but they are also complex that given statistical lives are at risk, and public money is being used.

An effective RM strategy will acknowledge the value basis to decision-making as well as the importance of economic and social indicators, including risk data. For brownfields this means addressing sustainable development principles, holocentric development ethics, local development market conditions, applicable government incentives, pertinent legislation and other liabilities in a comprehensive risk management strategy. But what do developers, decision-makers and the public do when more than one option is available or more than one site requires attention? Risk-ranking is one means of prioritizing options.

3.1.3 Risk-ranking

Even though risk-ranking is an efficient decision-making tool, ultimately enabling the allocation of resources based on the recommendations of technical experts, the actual basis on which the options are ranked involves a series of trade-offs between objective risks and subjective values. Consequently, the ranking or prioritizing of risky options is an inherently subjective process, despite the use of objective and scientific data. Balancing multi-stakeholder participation and site-ranking criteria will allow for private and public values to influence the assessment of scientific-technical data and option selection. Ranking methods include scoring and discussion, or consensus, approaches.

Those who use risk-ranking methods face the problem of having to make tough decisions with limited resources while attempting to accommodate to a variety of stakeholders and policy objectives. As well, they must reconcile risk perception, uncertainty, stakeholder assumptions, lack of available data and value problems into the decision-making process.

> *In a recent Canadian text reviewing environmental risk-based controversies, Leiss and Chociolko...conclude that, since decision-makers will never have all the information they might want, trade-offs must be made based on incomplete information and that, to be effective, such trade-offs should be made "face-to-face" by all stakeholders. Only through face-to-face encounters, they argue, will stakeholders be forced to listen, to confront their own assumptions and seek common ground.* (Moffet; 1997; p. 377)

In practice the NRTEE - Financial Services Sector used this approach. It proved effective in defining the problem, from various stakeholder perspectives, but it was clear that federal resources would permit only cursory discussion of brownfield redevelopment problems[10]. At the municipal level, a standing committee approach to brownfield risk-ranking and redevelopment might be prudent - as long as the standing committee has an appropriate complement of stakeholders, who may or may not change with each assessment.

Given Moffet's observations, above, and NRTEE results, multi-stakeholder involvement is essential given the trade-offs that need to be made. This is especially true when public

[10] This inference is based on what I witnessed in the multi-stakeholder discussions at the Calgary meeting.

funds are required or when public well-being is being compromised. Opposed to a unilateral decision-making process, multi-stakeholder participation can secure greater public "buy-in", for a (re)development, by addressing local concerns and ensuring stakeholders negotiate with each other. Consensus may be harder to achieve, but the results often mean more informed analysis and debate that generates a selection of "best possible" options. This approach allows for a variety of factors to be incorporated into the decision-making process, including social, economic, political, environmental and physical concerns. Finally, multi-stakeholder consultation allows governments to subscribe to sustainable development principles, by ensuring both potentially-responsible and affected parties meet, face-to-face. Although more could be discussed concerning the value of, or process for, multi-stakeholder negotiations, it is beyond the scope of this research. It is value of such consultation that is the issue.

Once a municipality determines whether a multi-stakeholder approach will be used, who will be invited, the operative format and ranking criteria must be defined. John Moffet has concisely summarized what good risk-ranking exercises must address:

> *... priority-setting exercises should confront the uncertainty and judgment... by identifying and taking into account four different considerations: scientific evidence about relative risks to the environment and human health, including evidence about the distribution of those risks and about the uncertainty associated with the scientific estimates of those risks; non-scientific factors influencing public perceptions of risk, such as dread, voluntariness, etc.; the estimated cost to reduce each risk being assessed; and the administrative feasibility and political viability of taking action to reduce each risk.* (Moffet; 1997; p. 362)

Given the subjectivity of ranking, coupled with the need for rationality through scientific analysis, brownfield remediation ranking criteria might include:

- degree of contamination - affects the type of remediation program and subsequent costs (time and money). If there is no or very little contamination then the abandonment may be due to a perception problem or a poor development market, both of which require different revitalization strategies;
- type of contamination - affects the remediation costs and influences public reaction to, or resale of, the site;

- demand for land - pertains to the local development market;
- proposed land use - concerns to the remediation/redevelopment strategy, where recreational or residential uses would require more stringent remediation than commercial or industrial sites, while uses that remain the same may not require remediation. The after-remediation tax and revenue potential must be articulated, since a site remediated to green space will not generate direct tax revenues, yet its resale value may increase while having a positively affect on neighboring sites;
- lot size - benefits are gained through economies of scale, degree of impact and time required for remediation. It also affects the site's anticipated municipal revenues;
- anticipated type, number and age of users -- this demographic factor is most closely linked to the risk assessment process, since epidemiological and toxicology studies will help predict the likelihood of environmental and human health risks;
- need for public assistance -- is both economic and perception-based. Will the municipality incur risk by: a) supporting the initiative; b) providing tax breaks or; c) assisting with the public consultation process?

The CCME's National Classification System for Contaminated Sites (Appendix 2) suggests assessing the degree and type of contamination as well as the age, type and number of users. It outlines a contaminant documentation and assessment process. As shown in Table 2, it is recommended that economic and urban aesthetic factors, not already defined in the CCME remediation process, be added. Assuming: a) each category is ranked on a 10 point scale where 1 is the lowest ranking; and b) the proponent has conducted a Phase I SA, then a hypothetical ranking matrix might resemble Table 2.

Considering the hypothetical examples in Table 2, Lot A would be the preferred site for remediation/redevelopment approval. This is due to the high need for seniors housing, the complementary fit within the existing neighbourhood, increased municipal revenue and no public funding required, despite the degree of contamination. Clearly, this example illustrates that the extent of contamination is not the sole factor regarding brownfield redevelopment, but it certainly plays a significant role. Therefore, a graduated remediation action plan addressing degree of contamination, demand for land, land use and lot size is recommended. This strategy accounts for both costs and benefits associated with human and/or environmental impacts as well as local land economics.

Table 2 ***Brownfield Redevelopment Ranking Matrix***

Criteria	Lot A	/10	Lot B	/10
Description	Convert a 2 story, corner lot, 35 yr. old brick building that used to house a dry cleaner on the main floor and tailor shop on the second floor into a multi-unit Seniors' Residence. The existing 12 space parking lot will be maintained.		Develop a vacant river front property that used to house a scrap yard into a small strip mall with a weekend farmer's market. 50% will be green space. Surface parking will need to be built.	
1. Degree of contamination	• Medium • Contaminants are concentrated over 20% of the site to varying depths of 25 cm-2 meters. No ground water contamination.	4	• Low • Contaminants are dispersed though- out the site, totaling 8/10 of an acre to a depth of 1 meter. No ground water contamination.	7
2. Type of contamination	• Sludgy materials. Compound types unknown. • A monitoring program may be required. • No soil remediation plan presented.	2	• Mostly petroleum products from cars. Some lead paint and PCBs from cooling systems and household materials. • Soil remediation to be managed a) by excavating to build sub-floor for the mall or b) locating paved parking over top.	7
3. Demand for land	• Medium	6	• Extremely low	1
4. Proposed land use	• Currently zoned commercial • Proposed multi-unit residential use	7	• Remain zoned as commercial	5
5. Lot size	• 0.5 acre	3	• 4 acres	6
6. Anticipated type, number, and age of users	• 28 senior citizens and 7 full-time staff.	4	• Human, pet and urban wildlife users. • Varying ages from infant to seniors for all user groups. • Expected to serve 3000 customers weekly with 10 full-time staff and 40 weekend staff.	6
7. Need for public assistance	• None	10	• WDA money for landscaping and river bank development as well as a land tax freeze for 3 years.	2
8. Other	• High demand for seniors housing. • Good fit with neighbourhood. • Little exterior renovation needed, existing set-backs and structures maintained. • Will provide more users to the public library, bus service and local stores within 4 blocks.	5	• Potential to extend river walk/bike path. • Complementary fit with fruit and vegetable business across the street. • Area potentially a MWCRP area, potentially facilitating additional revitalization projects. • Close to downtown.	4
Rating		41		38

3.1.4 Risk Reduction

After expressing applicable values, by using multi-stakeholder consultations for example, two problems persist when planning to reduce risk: first, the conflict of values vs. conflict of interests debate and; second, hidden agendas. For example, by mandating services through regulation, the government supports a site remediation industry which facilitates employment and collects revenues through taxes and fees. Although actual risks may be very small, perceived risk may be enough to rationalize extensive and costly measures.

Charting costs and benefits may help. Using the example in Figure 4, projects benefiting from statutory intervention would automatically require an ERA as part of their risk management plan. Projects consistently requiring indirect incentives may only require special administrative attention, to monitor for problems, such as sites not classified as contaminated but never-the-less tracked by the Province.

Figure 4: Cost - Benefit Valuation

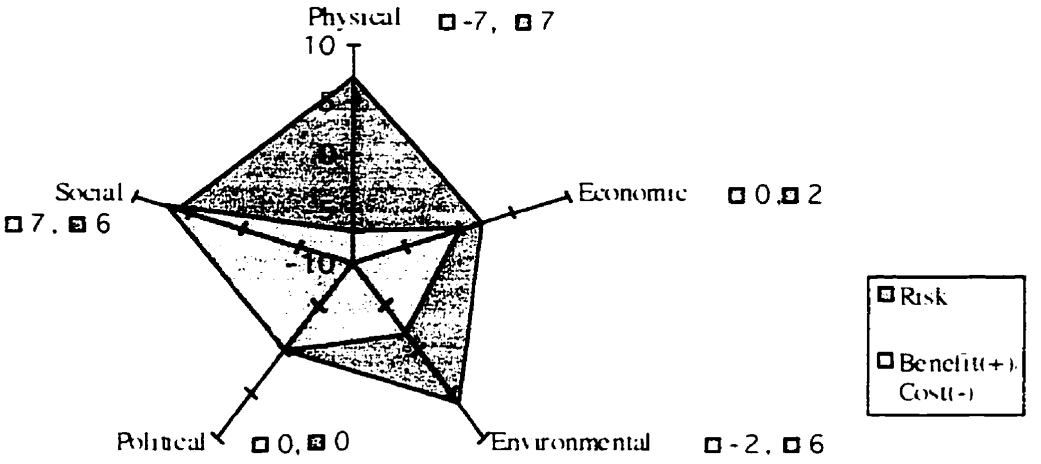
Costs→ **Benefits↓**	(0) Do Nothing	(1) Indirect Incentives	(2) Direct Incentives	(3) Both Incentives	(4) Statutory Remediation	Total
Economic	■	■	■			2
Social	■	■				1
Physical	■	■				1
Political	■					0
Environmental	■	■	■	■		3
						7/20

Area graphs are a visual aid toward selecting the most appropriate brownfield development option (Figure 5). They allow a variety of factors to be compared at once. The values ascribed to the benefits/costs and the risks are derived from cost-benefit valuation (Figure 4), site ranking (Table 2) and risk-uncertainty identification (Figure 3) results. The greater the area covered on the graph's political, social, economic, physical and environmental factors indicates greater benefit from (brownfield) redevelopment. Different

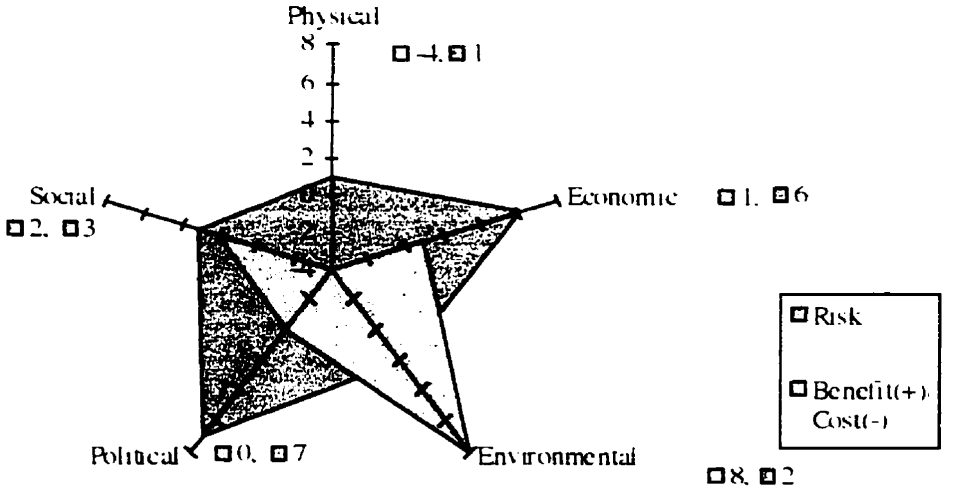
brownfield redevelopment strategies should generate different graphic representations, such as the hypothetical examples presented in Figure 5, namely: a) do nothing; b) statutory remediation; and, c) development with incentives.

Figure 5: Risk Benefit Comparison Graphs

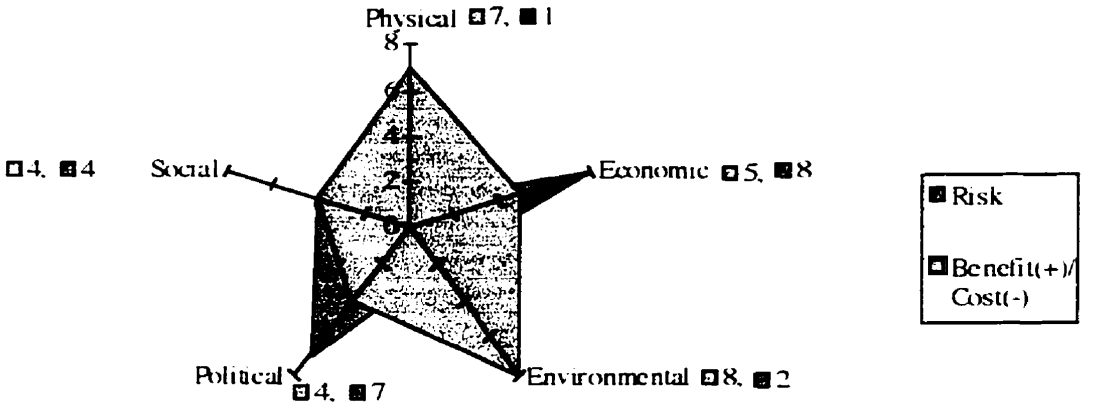
5.a. Risk Benefit Comparison of: <u>Do Nothing Strategy</u>



5.b. Risk-Benefit Comparison of: <u>Statutory Remediation</u>



5.c. Risk-Benefit Comparison of:
Redevelopment with Direct Incentives



These risk-benefit comparisons should be used in conjunction with the results from the brownfield development checklist (Table 3) presented on pages 86-89. The proposed Brownfield Redevelopment Checklist is designed to assist with the identification of site risks, uncertainties, information gaps and overlaps. The checklist does this by asking a series of questions about site risks. Part A focuses on agencies and municipal departments having an interest in, or responsibility for, site redevelopment. Part B questions the values and benefits to be gained by site remediation. Patterns should emerge, to help decision makers articulate risks and strategies for managing those risks.

A comprehensive risk management strategy must acknowledge environmental, social, physical, economic and political factors in brownfield sites redevelopment. A multi-faceted approach to decision-making means an often complex process, yet such a thoroughgoing analysis invariably outweighs the additional time and expense required, while demonstrating due diligence. A brownfield risk management process should focus on "the big picture" and on "the long-term". Clearly, a city must plan for changing legislation (political), downloaded responsibilities (economic/financial), increasing fear and liability (social), shifting planning paradigms (environmental) as well as changing land use and management patterns (physical).

Table 3	*Municipal Brownfield Development Checklist* *PART 1 -- Contacts for Site Information*	
Consult With	About (this and neighboring sites)	Yes, No, Not Applicable
	City Contacts	
Assessment Department	• Whether there are outstanding taxes owed and why? • Whether there has been a re-assessment request due to contamination.	

Economic Development/
Business Liaison Department
	• What development incentives are available for:
	  • brownfields;
	  • the proposed business;
	  • the area.	

Fire Department	• What chemicals are stored on-site? • What compliance notices have been issued? • Has arson occurred on-site in the past 10 years (if so why)?	

Legal Department	• An opinion regarding:
	  • general liability issues;
	  • statutory concerns;
	  • joint-venture concerns.
	• An indemnity clause and waiver in development approval or expropriation agreements.	

Parks and Recreation Department	• Whether the property is needed for green space or habitat corridor development.	

Land and Development Services and Area Planner	• Emerging brownbelt problems in the area.
	• Land use designation and impacts to zoning bylaws.
	• Bylaws, master, area and regional plans indicating civic policies for:
	  • sustainable development;
	  • environmental land management;
	  • differentiated development approval per land condition or specific uses.
	• Area redevelopment plans.
	• Historical land use and building data.
	• Results of site research (i.e. Phase 1 and 2 SAs).	

Public Health/ Workers' Compensation Dept.	• Workplace injuries or condition indicating contamination. • Historical data from area air and water quality tests.	
Real-Estate Department	• Attempts to sell the property, and reasons for any problems.	
Works and Operations Department	• Area problems of contaminants leaching into the infrastructure and duct systems. • Whether the site is designated for future infrastructure work.	
Provincial Contacts		
Environment Department	• Whether the site is classified as contaminated. • Any site condition reports. • Any remediation work done to the site.	
Land Titles Office	• Any covenants, liens or special designations to the property title indicating past or present contamination?	
Other Agencies/Contacts		
Electric Company	• Problems of contaminant leaching in the duct systems.	
Water Company	• Problems of contaminant leaching in the duct systems.	
Telephone Company	• Problems of contaminant leaching in the duct systems.	
Cable Television Companies	• Problems of contaminant leaching in the duct systems.	
Proponent's Bank	• The Bank's risk assessment report.	
Proponent's Consultants	• The consultant's SA report.	
Insurance Carriers	• Types of insurance held and claims made reflecting possible contamination.	
Neighboring Site Employees and area residents	• General observations regarding site use and condition. • Historical background information.	

Municipal Brownfield Development Checklist ***PART 2 - General Site Project Queries***	**Explanation** **(Pros and Cons, Costs and Benefits)**
Social (Values)	

• If the site is not identified as contaminated is there a perception problem? If so why?
• From the City's perspective is the proposed redevelopment safe enough?
• Is the risk worth taking?
• Is public consultation required:
  • as part of a communications strategy;
  • to identify perceived risks;
  • to identify public values given land use and existing site conditions? (If so define)	

Blind Spots	

• Was anything missed:
  • with respect to data;
  • regarding public concerns;
  • overriding provincial legislation?
• Were the risks adequately:
  • quantified;
  • located; *[Figure 2 results]*
  • scheduled for reduction?
• Is more information required to make a decision? (Does uncertainty remain?)	

Economic	

• Are municipal incentives required for site remediation or to attract tenants. If so:
  • what kind;
  • for how long; *[Figure 3 results]*
  • of what value;
  • at what opportunity costs.
• What economic constraints and benefits will the City experience as a result of the redevelopment?
• What are the short-term and long-term gains relative to the short and long-term costs? *[Figures 4 and 5 results]*
• Has the City lost any revenues because the site is considered a brownfield? (define)	

• With respect to legal costs:
  • what is the likelihood of losing a law suit pertaining to this site;
  • should the City lose what are the likely costs (perceived and actual) relative to mitigation or compensation;
  • how can the value of potential damages be reduced?	

Environmental	

• What are the risks to human and ecological health:
  • if the site remains underutilized;
  • if the site becomes/remains idle;
  • if the site is redeveloped?
• What remediation strategy is suggested?
• Will site conditions improve or remain the same?
• How does the development conform to municipal sustainable development policies?	

Physical	

• Will the proposed development likely create a future brownfield site?
• What are the results of the visual site inspection?
• How will this site affect land use concerns such as:
  • unified zoning;
  • brownlining;
  • urban revitalization?
• What are the anticipated impacts if the site a) remains as is, or b) is redeveloped?	

Political	
• Is there more than one development proposed for the site? • What are the site risk-rankings? *[Table 2 results]* • Does another jurisdiction have an interest in, or over-riding authority over, the site? (Describe)	

(Source: Author.)

3.1.5 Problems With Risk Management

> *In brief, the risk concept is useful in pointing out both the limits of science (scientific uncertainty) and the limits of public consensus. Like other techniques of policy analysis in the past (e.g. site assessment, cost-benefit analysis, locational analysis) risk management is largely an analytical tool and could be used by different interests to further their interests. Risk management is not expected to resolve value questions but to clarify the implications of alternative decisions for value groups.* (Grima: 1996: p.2)
>
> *Of particular interest is the gap between objective risks and perceived risks.... We also need more focused research into the way that the public values (and) evaluates its own concerns, lifestyles and other elements of its well-being....* (Grima: 1996: p. ix)

Consequently, risk perception must be acknowledge by decision-makers and in risk management protocols. A clear articulation of the difference between perceived risk and objective risk will help frame the risk management strategy. For example, a Phase 1 SA may indicate contaminants are likely to exist on a site. If contaminants are identified, then an assessment and management of objective risk to human and environmental health is required. However, if no contaminants are found then the strategy must be adjusted to manage perceived risks, requiring a public relations rather than remediative focus. An ERA defines objective risks, while public perception defines perceived risks.

In addition to identifying actual and perceived risks, a RM strategy must be accessible to those it seeks to influence. Effective risk communication is integral to a competent risk management strategy. The communication strategy's objectives must be clear and consistent. For example, is the target group being persuaded, dissuaded or informed? A well-developed communication strategy must be precise and consistent so the message sender and the message receiver are addressing the same issues, and reading the same content into the message. Rules of conduct between the City, the health authority and the Province must be defined—who intervenes, and when?[11] Organizational and fiscal resources must be identified and allocated.

[11] Based on a telephone interview with Garth Clyburn, City of Edmonton, Principal Planner.

> *... (because of) the extent to which public perceptions are based on heterogeneous and subjective criteria that differ from the criteria relied upon in scientific risk assessments, risk communications may not always be an adequate response by itself, and additional efforts may be required to account for divergent but valid public perceptions of risk. Ultimately, each priority-setting decision will also have to account for considerations about relative costs, political viability and administrative feasibility for reducing each risk.* (Moffet: 1997: p. 373)

Applying RM techniques to brownfield sites is generally constrained by three issues. First, brownfields entail more than material losses - as long-term ecological and human health damages are not necessarily easily identified nor quantified. Second, there are few insurance products available for brownfield redevelopment, thus inhibiting a proactive response. Finally, an implied warranty is often assumed if the site is void of regulatory encumbrances - i.e. not identified on the Provincial registry. This may not be the case, therefore a "buyer-beware" stance must be adhered to. Indemnities remain important to brownfield agreements, and disclaimers should be included in brownfield site development approval agreements. Despite implicit brownfield risks and uncertainties, RM aids the developer, financial institution, municipal authorities and the general public to organize and understand relevant data, so the most feasible site management option can be selected. The preferred option, ideally, will be the one that balances economic concerns with social or environmental values, while addressing perceived and objective risks, by using tools such as risk-ranking, multi-stakeholder consultations and cost-benefit/risk-benefit valuations.

When reflecting on a) - the liabilities associated with brownfield ownership, b) - the environmental risk assessment process and c) - the mandatory risk management strategising, it may appear that brownfield site redevelopment is simply too costly and time-consuming, yet there are options. For example, one means of reducing developer obligations would be for agencies to share site information or require similar documentation from the proponent(s); such as a municipality and area financial institutions using the same phase 1 SA to determine project constraints and feasibility. One bank's risk management practices are reviewed next.

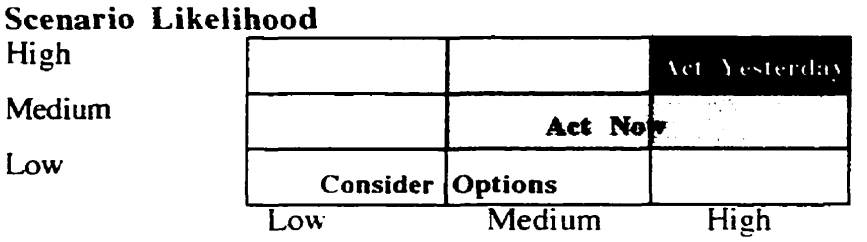
3.2 A Bank's Perspective

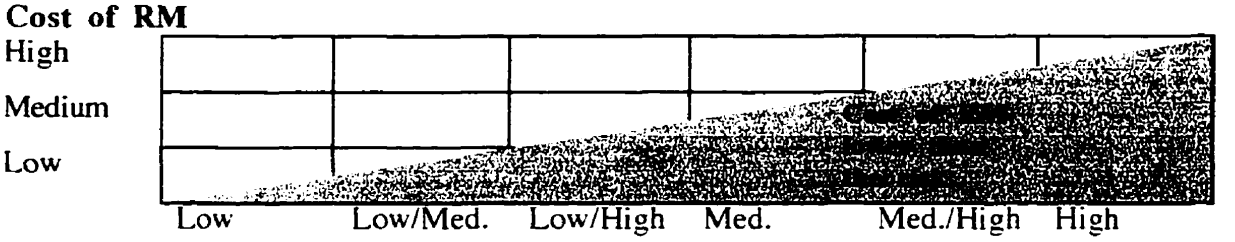
The following material was gathered from bank manager and loan officer training documents and outlines issues regarding contaminated land and the risk management process used to ensure proper due diligence, in order to contain fiscal liabilities. Because of proprietary rights the materials were loaned for review only, and for use in the strictest of confidence. Therefore, no reference is made to the source; it is the substance that is important. The bank for which the material applies will be referred to as *XX Bank*. It is one of the major Canadian banks. It provides a model for municipalities. There is an efficiency logic to having lenders and municipal planning departments require similar documentation and procedural assessment for brownfield sites. Since common information is required, the applicant can fulfill two organizational requirements efficiently.

To *XX Bank* risk has two components: a) the probability or likelihood of unwanted consequences, and b) the magnitude of each consequence. There are chronic and acute risks. Chronic risks are those relating to long-term exposure to a pollutant. Acute risks are episodic events or short-term exposures. Both are measured in economic terms. Liabilities are measured as losses - loss of lives, compensation and remediation costs, business interruption, property loss/devaluation, loss of reputation, and damage to natural resources. Therefore, given *XX Bank's* definition of risk and the economic focus, risk management is a process of altering conditions, events or actions to reduce the likelihood of an unwanted consequence, or to lessen its magnitude (including financial impact). A six-step risk management process is recommended, which mirrors the ideal-typical policy analysis and rational planning processes:

1. identify the hazard;
2. define consequence scenarios;
3. estimate the magnitude of consequences;
4. estimate the likelihood of scenario occurrence;
5. assess risk and;
6. assess risk management options.

Hazard identification methods include interviews, inspections and documents review. The resulting expressions of magnitude are both quantitative (dollars or lives) and qualitative (high or low). Magnitude value is derived using historical data, vendor estimates, expert opinions, and standards as described in the professional literature. First, risk likelihood is defined, followed by the comparison of cost and likelihood.





Using these assessment tools is analogous to the previous discussion about risk analysis and risk-ranking tools (see sections 3.1.2 - 3.1.4). *XX Bank's* preferred risk management options include:

- implement management systems such as training, monitoring, maintenance, waste reduction and protective programs to reduce event likelihood;
- transfer risk through indemnification and insurance;
- accept risk by operating "as is", assuming increased operating costs and/or property devaluation;
- reduce and eliminate risks through cost measures such as capital improvements, off-loading (asset reduction) and/or change of process or materials.

Any combination of the above four management options can be applied to a municipal brownfield site management program. A site-specific strategy permits the City to

investigate and pursue the best option to a variety of stakeholders. Not only does the City need to manage risk for any brownfield property it owns, but RM should be applied to privately-held brownfied sites and their redevelopment, as banks do when a company is seeking a loan.

XX Bank requires loan recipients to describe their environmental management system, asking:

1. General
   - what environmental policies does the company/facility have;
   - how recent are they and what do they cover;
   - who is the authorizing officer;
2. Organizational
   - is there an environment department? If no, which officer has this portfolio?
   - how high in the organizational hierarchy is environmental information reported? Is it consistent with industry standards and practices?
   - who obtains permits, reports to government authorities, tracks new legislation to be incorporated into company policy, and conducts/reports on environmental monitoring functions?
3. Staffing
   - are there any staff dedicated to environmental matters? Are they dedicated to the corporation or to the facility? Is staffing in accordance with industry practice, type and degree of contamination?
4. Compliance Assurance
   - is there an environmental audit program? How often is there an operational review?
   - is there an information-tracking system?
   - are there unique programs or requirements of this facility or corporation?
   - are the company's policies pro-active or reactive?
   - are any formal risk management/reduction programs in operation?
   - are there public out-reach and in-house training programs?
5. Emergency preparation

- is there a plan? Has it been used? Are there drills? What kinds of emergencies are anticipated?

6. Incident Reporting and Investigation

   - are there formal policies and guidelines regarding what must be reported and acted upon, defining what is for internal or external reporting?

7. Financial Commitment

   - are there dedicated environmental operating and capital budgets?
   - are any up-grades planned?

8. Accountability

   - what is the organizational culture regarding environmental management (reluctant or pro-active)?

The bank requires that it be informed of violations to environmental laws or regulations as well as any enactments against the borrower. It recommends indemnities be acquired from the property/business owners, to absolve *XX Bank* of liability in the event of foreclosure. It requires that collateral, other than the property, be used to secure the loan (which underlies the notion of brownlining). *XX Bank* recommends property assessments be adjusted to reflect environmental problems and real market value, especially when the property is part of the collateral package. It conducts a systematic analysis of a client's operations and risk identification for loan approval at perceived-to-be-contaminated sites.

Clearly, *XX Bank* has taken steps to define an internal system for detecting and managing brownfield sites which includes educating middle and senior managers about brownfield site issues and assessment processes. The Bank is practicing good due diligence in order to ensure as little liability as possible accrues to it for site remediation. Banks could do more than provide a template for brownfield site risk assessment and liability identification. For example, they could support a pro-redevelopment posture by:

- funding scholarships and research for brownfields research;
- conducting public education to assist in issue awareness;
- providing seed money, such as trust funds and grants, or development incentives;

- offering pro-bono services to NGOs (professional associations and special interest groups) establishing redevelopment trusts or reserve funds for existing and future brownfield site remediation.

By including banks as an active partner in brownfield redevelopment, municipalities can develop a long-term perspective on brownfield site planning. By generating private and NGO sector reserve and trust accounts, cities can enable consistent and comprehensive brownfield redevelopment in good and poor economic climates. It is also in the banks' interests to ensure their clients and assets remain viable.

3.3 Summary and Conclusions

Chapter Three has reviewed environmental risk assessment and risk management. First, ERA is the rational-technical process to determine the extent of environmental and human health risks stemming from a contaminated site. ERAs are the final stage in a comprehensive site assessment process. Their benefits rest in filling information gaps, enabling informed decision-making and scenarios analysis. RM is the policy process used to reduce organizational risks given financial and legal liabilities. It should demonstrate due diligence and should manage, reduce, transfer or eliminate the risks.

Despite the obvious benefits of both ERAs and RM, they suffer similar problems. First, and foremost, is the need to incorporate values into the research and decision-making processes. Second is the need to ensure meaningful public participation in both processes, given the technical nature of the information and processes. One means of redressing conflicts of instrumental value (economic versus health benefits) is by explicitly incorporating values into the analysis and decision-making phases and using analytic tools such as the brownfields redevelopment checklist, risk-ranking and risk-benefit comparisons. Risk prioritization can be a valuable step in articulating a risk management process, because it ascribes social and economic values to human and ecological risks, as well as demonstrating organizational due diligence. A good communication plan is required

to mitigate perceived and objective fears, as well as promote greater understanding and effective participation. Multi-stakeholder consultations can help with both the risk prioritization and communication components.

The chapter concluded with a review of banking industry requirements (standard practice) to assess lender/site risks. The risk management section, along with banking practices, frames the following chapter's recommendations, made to the City of Winnipeg, concerning brownfield site management and development approval.

4. CASE STUDY: TOWARDS A CITY OF WINNIPEG BROWNFIELD REDEVELOPMENT POLICY

4.0 Background to the Recommendations

The following synopsis of issues pertaining to brownfield redevelopment attempts to address: *what liability does the City of Winnipeg face as a brownfield site owner and how can site risks be managed?* The issues include: municipal authority, urban design, incentive programs, partnerships, municipal policy and development approval

4.0.1 The City's Position

The City's actual economic liability could not be established because formidable constraints prevented the accumulation of quantitative data about City brownfield site condition, location and size. Specifically:

- the Manitoba Contaminated Sites Registry lists contaminated sites under provincial review only. In some cases it could not identify known City of Winnipeg properties because sites had been transferred from one owner to another due to sale, easement or foreclosure or the sites were owned by multiple parties - only one owner is listed. Mainly petroleum contaminated sites are listed in addition to the Domtar and Union Stock Yard sites. This database does not list abandoned properties suspected of contamination and is therefore an incomplete brownfields database;
- the City's Civic Properties and Legal Departments were extremely reluctant to release any information pertaining to civic brownfield sites or policy. Their concern rests in liability associated with brownfield labeling. This apprehension is demonstrated at other Canadian metropolitan centers.

The City of Winnipeg has the authority to address urban brownfield redevelopment planning, and to pursue civic brownfield management strategies through the powers delegated to it in the City of Winnipeg Act (See Appendix 4). It has an implied obligation to act on the brownfield problem because of Plan Winnipeg statements (see Figure 6 on p. 98). The City has the authority to regulate and control nuisance through bylaws, as outlined in its incorporating act. This includes the ability to regulate noise and water pollution, noxious odors, dumping, derelict buildings and lands. The City is also

permitted to order a prohibition and clean-up of noxious sites. Should a land-owner not comply with civic regulations, the City has the authority to enter the property and complete the required clean-up, billing the property owner for costs (much like the Province's authority to remediate contaminated sites). Along with legislative control, by-law making and enforcement, the City has the authority to plan for lands within its boundaries, through its incorporating act. This enables land use controls such as official plans, zoning regulations, development controls, growth and land management policies. The official plan does not require civic departments or Council to undertake any actions or initiatives proposed, but it does require future policies, by-laws and Council decisions to remain consistent with plan statements and objectives. Therefore, by incorporating Environmental Stewardship into its current plan, the City of Winnipeg has opted to ensure that future actions and initiatives do not contravene the environmental integrity of the City of Winnipeg.

The strongest City of Winnipeg policy defining municipal responsibility for environmental land management reads:

> *If* Plan Winnipeg *is to respond to the public's increasing concern for the environment, then it must not only adopt preventative measures to reduce damage, it must take positive action where damage has occurred.* (City of Winnipeg: 1993: p. 39)

Other applicable Plan Winnipeg: Toward 2010 policies include those in Figure 6. In some cases the City has made explicit efforts to implement the policy. Examples of this include the state of the environment reporting and the civic round table. In other cases, where the policy is a statement of belief rather than a statement of practice, the means for ensuring policy implementation needs to be defined. For example, how will sustainability principles be implemented? What guidelines exist for the developer to follow? As indicated by planners in the Land and Development Services Department, it is likely that environmental factors are included in the decision-making process, but implicitly rather than explicitly. This notion is reinforced by: 1) the lack of environmental criteria in the City's

"Development Agreement Parameters"; and 2) the Vacancy Management Committee's failure to approve the Environmental Liaison Officer position (see # 7, Figure 6).

The statements in Figure 6 mandate City action on brownfield site remediation. However, operational resources, responsible parties, definitions and guidelines must be developed, detailing how the objectives will be achieved. The current lack of defined methods or measures does permit flexible programming but it also amounts to failure a to demonstrate due diligence or standardized decision-making and data collection.

The City has taken appropriate steps regarding the acquisition and disposition of municipal real-estate with internal, procedural policies such as Civic Administrative Policy File Nos. C/FP-1 and C/E-3 (see Appendix 6):

> *For the purpose of identifying risk of liability arising from ownership of land or any interest in land due to the existence or possible existence of air, soil or water contaminants which are or have the potential to be harmful to human health, the City shall, prior to transacting in interests in land, conduct an environmental assessment of such risk where there is a reasonable expectation that such contaminants exist.*. (City of Winnipeg; 1993b)

Further, reference is made to educating and training the Land Surveys and Real-Estate Department staff (see Appendix 6 for full wording) which is a prudent step to ensure appropriate knowledge and procedures are in place, in order to reduce municipal liability. Regarding staff training, on-going measures must be taken so municipal staff involved with property assessment or development are also aware of liability issues. The training must be delivered in accordance with staff turn-over and statute or regulatory change.

However, this initiative is not applicable throughout the City of Winnipeg. For legal reasons a City must demonstrate that it has made adequate provisions toward implementing its policies. In 1997 the Globe and Mail printed a series of articles concerning the Ontario Department of Environment's legal liability should it fail to provide adequate resources to follow-up on compliance with its external regulations, guidelines and policies. The legal opinions held that if the provincial government had defined explicit environmental perform-

Figure 6: WINNIPEG POLICIES REGARDING ENVIRONMENTAL PRACTICES

1. The City seeks to fully integrate sustainable development considerations within the planning, budgeting and development process.... (p.40)

2. As Winnipeg grows and changes so too must there grow a recognition of the relationship between development and the environment. This recognition must be translated into decisions that are environmentally-responsible.... (p. 40)

3. The City seeks to promote environmentally-responsible decision-making within both the public and private sectors.... (p.41)

4. The City must seek solutions which will serve to ingrain responsible practices over time.... (p.41)

5. The City shall pursue industrial land supply and replacement initiatives that are responsive to demand by:... ii) encouraging the redevelopment of older industrial areas, ... v) promoting cost-effective industrial land management and servicing initiatives. (2D-01).

6. The City shall prepare, implement and periodically review a code of practices to encourage environmentally-responsible methods, applications and procedures in its operations (3B-02)

7. The City shall prepare, implement and periodically review its own environmental impact review and monitoring process... (3B-03)

8. The City shall establish and maintain an environmental liaison office to: i) coordinate, promote and audit environmental initiatives, ii) carry out civic environmental impact reviews as required, iii) prepare, implement and periodically review a sustainable development strategy for the City of Winnipeg, and iv) assist in providing a forum for public debate on urban environmental issues. (3B-04)

9. The City shall establish and maintain a civic round table on the environment to discuss and promote environmental issues and practices. (3B-05)

10. The City shall produce, on a regular basis, a report on environmental issues which include an evaluation of the state of the environment in Winnipeg, an assessment of progress made, and an evaluation of budget implications. (3B-06)

11. The City acknowledges the responsibility of the Province of Manitoba for the reclamation of contaminated sites and shall support programs initiated by the Province for the identification and environmentally-responsible clean-up of such sites for alternative urban uses.

12. The city shall prepare an inventory of natural and environmentally-sensitive lands and shall prepare, implement and periodically review a sensitive lands plan which will designate areas that are natural and environmentally-sensitive and which provide measures for the acquisition, preservation, protection and maintenance of such areas. (3F-01)

(Source: Plan Winnipeg Toward 2010: City of Winnipeg; June 1993)

ance expectations of private-sector operators, then it must secure resources to ensure those expectations are being met (inspection services); otherwise the government is failing to perform. The City of Winnipeg's failure to activate the Environmental Liaison Office demonstrates a disregard for its policy recommendations (re: Plan Winnipeg) as well as industry standards. The Technical Advisory Committee (see #2 in the Civic Administrative

Policy File Nos. C/FP-1 and C/E-3) and Environmental Liaison Office combined could function as internal watchdogs, ensuring policies are being implemented and funded appropriately, while monitoring private sector compliance.

Concerning a comprehensive environmental land management plan in Winnipeg, or any city, local by-laws and regulatory controls need to be developed. When land use is qualified by site condition concerns emerge, given Winnipeg's Unified Zoning Bylaw. First, two (2) classes of land within a specified use may emerge, for example clean commercial land and (perceived-to-be) contaminated commercial land. Second, redevelopment options may be thwarted since contamination designations remain with the site, in the Land Titles Office and on Manitoba Environment's Contaminated Site Registry, until the site is remediated to acceptable background levels. Although the likelihood of a specific use "ghetto" is improbable, overall urban design and comprehensive mixed-use zoning initiatives could be affected. This reinforces the possibility of brownlining, not based on land value, but on land condition. Since monitoring programs can require a long-term commitment, segments of the urban footprint may lie idle or underutilized for extended periods. For example, the North Portage Development (NPD) required a long-term monitoring program and agreement before a former car rental lot could be redeveloped. Also, as a condition of sale, the NPD was required to accept an indemnity, mitigating the vendors from future site remediation liabilities.[12] Unfortunately, Winnipeg's brownfield problems may be further compounded when taking its pre-Unicity development into account. Before 1971, the Winnipeg region consisted of thirteen (13) municipalities. In 1972 they were amalgamated into the City of Winnipeg. Consequently, Winnipeg has numerous patches of industrial land throughout the city. An historical land use map should confirm this hypothesis.

[12] From an informal discussion with Kent Smith, Forks North Portage Partnership. The issuance of indemnities was a practise used by a national bank, as noted in the discussions at the Calgary NRTEE sessions.

A variety of brownfield redevelopment incentives can be employed in Winnipeg. However, these incentives must be a joint effort between the Province and City. The City of Winnipeg does not have the financial resources or, in some cases, the ability to authorize the brownfield redevelopment incentives listed in section 2.3.2. The Province must acknowledge that the Contaminated Sites Remediation Act will have a disproportionate impact on Winnipeg, given development patterns and concentrations of industrial activity in Winnipeg, relative to the rest of the province. Therefore, the Province must acknowledge a possible brownfield development paralysis, due to the CSRA. When required, a Provincial-Municipal approach to brownfield redevelopment incentives provision must be developed, such as what has been accomplished with the Manitoba-Winnipeg Community Revitalization Program. A bi-lateral approach is suggested because of a) the provincial jurisdiction over the Environment, b) the magnitude of some municipal brownfield site remediation projects, and c) the common provincial-municipal need for consistent methodologies regarding site remediation and data management.

Regarding joint-ventures Winnipeg has implemented three tri-lateral public development initiatives in its downtown over the past two decades (WDA, CAI 1 and 2). All three have sought to improve the area through a combination of physical and economic development initiatives. In such partnerships, the Federal and Provincial governments may abrogate liability to the City, if the City is identified as the funding management authority. In such cases the City may be held jointly liable for site remediation, by having had direct input into the management and operation of a project (re: lender liability).

Concerning data management, Winnipeg's Land Base Information System (LBIS) would be an excellent tool to map site conditions. Currently, it maps all city-owned properties and operating land-fill sites, but not the land condition. Some civic departments maintain historical data maps, such as the Water, Works and Waste Department's maps of former land-fill sites. The LBIS could combine maps and datasets from various departments to

identify potential problem spots, as is done in Edmonton. However, public access to site condition information may be regarded as an infringement of privacy or proprietary rights. Clearly, land condition databases need to be developed, as do rules for their use.

With respect to the use of worst outcome scenarios, civic officials must account for the altered conditions as a consequence of actions taken. For example, if the City were to pursue soil remediation measures at the Union Stock Yards site, then it must be prepared to deal with a new set of conditions, which may include:

- the fear of migrating contaminants, affecting business at the neighboring meat processing plant;
- the possible reduced assessment values of this and neighboring sites;
- the need to move contaminated soils through the City (hazardous goods transportation);
- the need to offer site development incentives and;
- the likely need to conduct extensive community relations campaigns.

Finally, regarding brownfield development approval, the Administrative Coordinating Group might consider the five-step brownfield site redevelopment approval process in Figure 7. It is applicable to sites owned by the City or by a private party. It assumes the site is abandoned or idle, thus requiring special administrative attention. The steps are iterative, building upon each other. Step one attempts to ascertain whether the brownfield site suffers from contamination or perception problems, while step five recommends an environmental risk assessment and risk management strategy. The provincial Environment Department's attention or assistance is called for at several points. Regarding brownfield redevelopment, there are common constraints that can inhibit a speedy renewal, namely:

- the local economy and development market;
- geologic features affecting the nature and degree of contaminant transport and fate;
- provincial - municipal relations (degree and scope of municipal authority);

- provincial legislation and regulation as well as;
- site-specific contamination and redevelopment options.

Consequently, the City's development approval authorities (planners, inspectors and the Administrative Coordinating Group) must be aware of the unique brownfield redevelopment issues, because these sites require more than a business-as-usual approach.

4.0.2 Theory and Methods

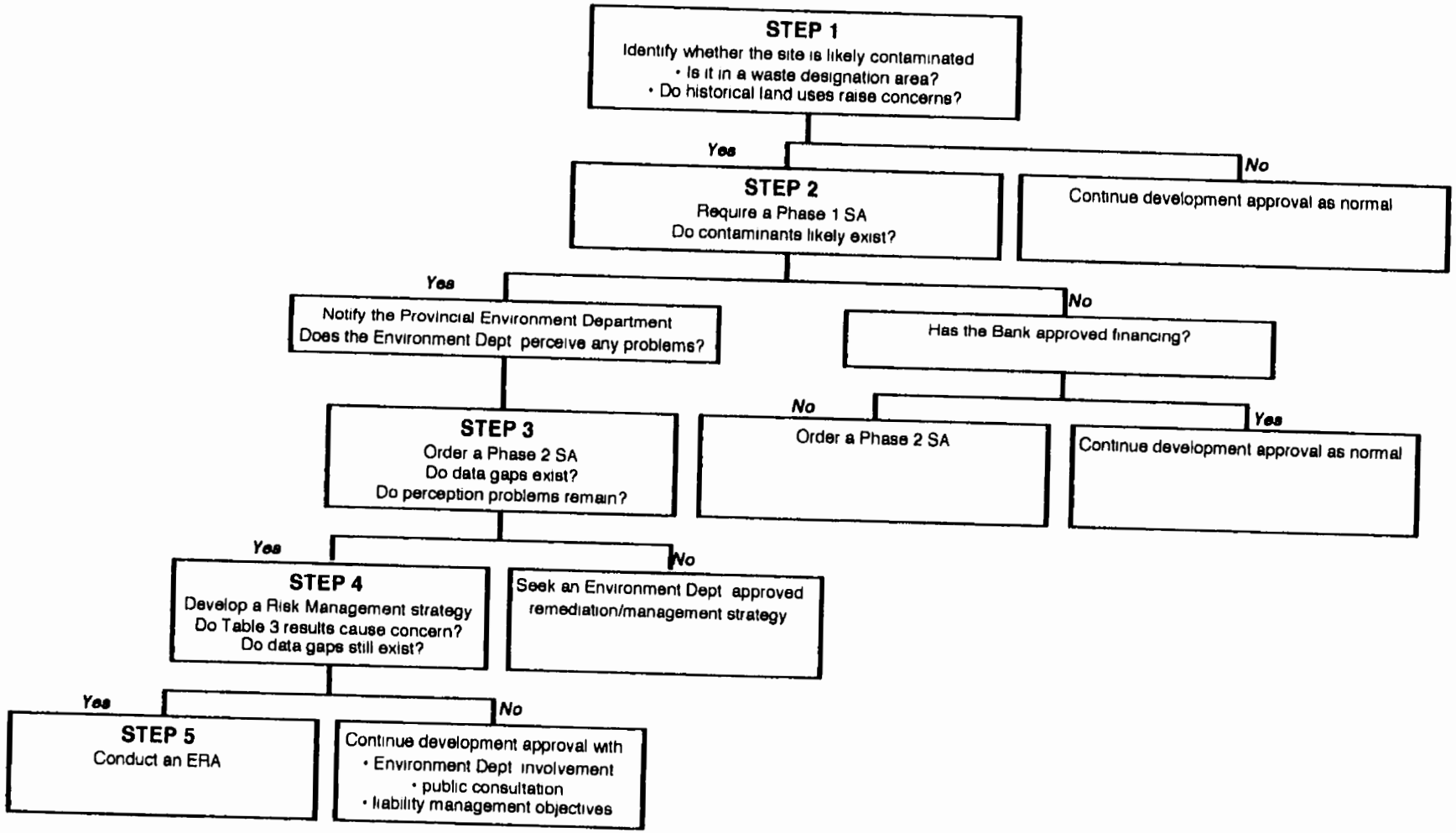
Risk assessment and management align with urban planning methods by attempting to solve existing problems, while serving a vision of the City's future. Risk management uses plausible scenarios to define options (problem solving), while risk assessment quantifies event likelihood (future orientation). Brownfield solutions can include material and design adjustments, new prevention programs, education campaigns and/or changes to institutional structures, such as decision-making guidelines, insurance plans or compensation.

Contemporary urban planning practice is still rooted in the scientific, rational-comprehensive ideal, striving for unbiased and logical decision-making. The steps of ERA/RM parallel the rational comprehensive approach by:

- assessing to what extent the existing contaminants pose a risk:
- making remediation measures and land use recommendations;
- generating site remediation options within acceptable risk levels:
- reviewing and evaluating risks dependent upon land use scenarios.

The use of quantitative data in the decision-making process is widely accepted because the data are deemed impersonal, and not prejudiced by personal biases. Using quantitative data to frame a problem or limit options also limits an un-elected official's influence in the decision-making process, while achieving what Allen McGill calls "procedural objectivity" (Pollak: 1996: p.31-32). However, it has been demonstrated that a good risk

Figure 7: Brownfield Site Redevelopment Approval Flow Chart



(Source: Author.)

management strategy must acknowledge perceived risks and public values, thus engaging qualitative aspects.

One means of ensuring evidence-based decision-making - quantitative or qualitative - is to use guidelines. However, guidelines possess both strengths and weaknesses. They do provide a consistent and accepted baseline to develop remediation plans, or determine human and environmental risks. However, guidelines limit the decision-making process to generalities, not allowing for unique conditions or factors (such as Edmonton's layered zoning as described in Appendix 4, or Ataratiri's contaminant pattern). As well, because environmental remediation science is in its infancy, current regulations and guidelines will likely change from their existing form - fostered by project evaluation data, linking the guidelines used, costs expended and benefits gained. Clearly, no decision-making tool is perfect.

Brownfield sites are a classic wicked planning problem. They require a multi-systems approach to analysis and management. For example, it may be difficult to differentiate between the City as brownfield owner versus brownfield creator or brownfield manager - a reactive posture generated by private sites lying abandoned or polluting the duct and infrastructure systems. In either case, the City is locked into its planning and development approval processes. The failure to support progressive planning and development schemes means a City's liability is not limited to the environmental, legal, social and economic costs, but the physical impacts as well. Economic, environmental and legal systems can not be analyzed in the absence of demographic and design considerations, which address the human element needed in sustainable development practices. Therefore, the City must manage its long-term risk through both prevention and risk reduction programming.

4.0.3 Internet Survey of Possible Precedents

The internet survey results are presented in Table 4 (pp. 109). The survey questions are

listed in Appendix 1. Additional detail on Edmonton's brownfield redevelopment issues is provided in Appendix 4. Even though the survey response rate was poor[13], the information yielded the following results:

- 2 of the 4 cities have conducted brownfield research and developed civic brownfield policies;
- 4 of 5 cities have done some work to catalogue civic-owned brownfield sites;
- 3 cities indicated no increase in orphaned brownfield acquisition, given pre-foreclosure screening and provincial jurisdiction;
- mixed responses were offered concerning contaminant-driven reassessment requests;
- responses to the brownlining and brownbelt queries were not sufficient enough to draw any conclusions;
- 1 city is proposing zoning adjustments as well as using risk management in parkland projects;
- 2 of 3 cities conduct site screening as part of a municipal risk management program;
- 4 of 4 cities use municipal risk management and;
- 2 cities have a database, 1 does not because of accuracy concerns and for another it is a Provincial service. Of the 2 which have a database, 1 has stalled because of privacy concerns.

The poor response rate and the variety of responses may indicate either a:

- general lack of municipal attention to brownfield site redevelopment and management and/or;
- naiveté about brownfield issues and brownfield planning practices.

However, work is being done in data acquisition, ERA protocol and RM strategies. No conclusive responses were offered concerning brownfield impacts such as re-assessments, brownlining or rezoning. Unfortunately, there were too few respondents to form any substantive conclusions or establish firm patterns.

[13] No survey was fully completed. Some questions were answered by all respondents, while others were completed by only two or three respondents, therefore the response rate per question is varied.

Table 4

Canadian Municipal Brownfield Strategy Responses

QUESTION:	CITIES: Edmonton	Calgary	Toronto	Mississauga	Saint John, NB
Q1 *Policy and Research* • Is there evidence on city-owned brownfield sites? • Efforts to identify "catalogue" existing brownfield sites?	Yes		YES - Mentioned in the Harbour Front Revitalization Strategy.	NO	NO
Q2 *Property Acquisition* • Land Increased due to tax foreclosure?	YES - but stalled.	YES	YES - using the Environmental Protocol Office's historical land use maps.	NO Fear of misuse	YES - They are the same as "small sites" in the St. John Industrial Infrastructure Needs and Market Potential Study
	NO-Assessment Dept. conducts pre-foreclosure environmental screening. The City has an option to not pursue the site, incurring tax losses.			NO - Conducts pre-foreclosure environmental audits.	NO - A provincial concern.
Assessment • Has there been re-assessment of brownfield sites?	Yes - owner-driven to reduce taxes.			No Answer Waiting for Assessment Dept. answer.	NO - A provincial service.
Q3 *Long-term Impacts* Is there evidence of: • greylining by banks? • brown belts due to redevelopment unsuitability					NO NO. Sites generally remain for industrial uses.

QUESTION:	CITIES: Edmonton	Calgary	Toronto	Mississauga	Saint John, NB
• new zoning per specific remediation levels or use?				Proposing an H symbol if being rezoned and need remediation.	NO
• Municipal lender liability?				No participation on contaminated sites. Looking at sites subject to RM for parkland use.	Not really - any concerns would be addressed by the Province.
Q4 *ERA* • Are there ERA protocols for known or perceived contaminated sites?	YES - especially with rail and airport lands. Actively screens re-zoning and subdivision requests.			YES - Site screening questionnaire used re re-zonings, sub-divisions and site plans. If contamination is indicated then a Phase I is needed.	NO - if not a strategic site then left as is.
Q5 *Risk Management* • Is there a City brownfield risk management strategy?	Yes - (Reactive)	YES - Contamination issue part of the area structure plans. (Proactive)		Looking at site-specific risk assessments but no policy yet.	NO (But if a City site has potential for contamination then it may be cleared, landscaped and re-zoned to park to deter purchase inquiries.
Q6 *Database* • Is there a municipal database for brownfield management?	YES - Part of the Alberta Environmental Protection Act database. 90% due to gas. Worked on a City database but stalled due to privacy concerns. Fear information could be misused.	YES - includes speculation based on past use.		NO - Can't ensure accuracy. Rely on Region of Peel or Ontario's Ministry of Environment and Energy.	NO - a Provincial concern. Would likely encompass most of St. John due to historical land use patterns. No industry interest in brownfield sites.

In Edmonton, subsurface clean-up guidelines are an issue (see Appendix 4). A variety of sub-classifications exist within the three general land use classifications. For example, a commercial site may also be designated for day care use, in which case the subsurface clean-up standards must meet a residential standard. There have been problems with environmental consultants who only address the broad land use classification, then use the CCME guidelines without consulting the City's specific land use guidelines. Because of the variety of commercial uses in Edmonton the CCME guidelines are not necessarily stringent enough. Planners must look at the range of uses. The City's problem remains: how to ensure private sector consultants and banks are aware of City-specific land use guidelines?

4.1 Recommendations to the City of Winnipeg

Based on the previous discussion of brownfield liability, risk assessment and risk management several recommendations can be made to the City of Winnipeg. Collectively, these recommendations comprise a basic risk management strategy. Some recommendations seek to manage risk through training and mapping; others transfer or accept risk. The recommendations are organized into four categories - tools, strategic planning, technical and organizational - and thirteen topics, and are listed in Table 5.

These recommendations are applicable to the management and redevelopment of civic and privately-owned brownfield sites. They are designed to fit into existing municipal operations, at minimal financial or organizational expense. Therefore, given the City of Winnipeg's:

- ability and authority to regulate the lands within its boundaries,
- duty of care to the public,
- policies that support brownfield site management and redevelopment,

Table 5: ***Recommendations to the City of Winnipeg***

Category:	Topic:	Recommendations:
Technical	Environmental Risk Assessment	• Require ERAs only on highly problematic sites; • Require Phase 1 site assessments for development, re-zoning and variance approvals.
	Code of Operational Practices	• Define a brownfield sites code of operational practices; • Consider using ISO 14001 standards as a base; • Developing an historical land use map.
	Zoning Classification	• Implement a flexible zoning classification and moniker for a) contaminated land and b) land locked into a specific use because of contamination; • Assess brownfield and zoning impacts in light of the Unified Zoning By-law.
	Site Restoration	• Civic brownfields be redeveloped on a site-specific basis (incremental); • Consider a "greening" approach (to improve area aesthetics, or an "as is" strategy); • Have the Administrative Coordinating Group conduct brownfield development reviews, giving it the authority to: a) design and recommend ERAs, risk management plans and public consultations; b) recommend development incentives; • Revise sections 25(a) and 37(ii) of the Development Agreement Parameters; • Add two sections to the Development Agreement Parameters regarding a) remediation work to be done by the developer, and b) define percentages of a site to be brownfield-free.

Category:	Topic:	Recommendations:
Tools	Public Participation	• Require public involvement in ERAs and "as if" management of known city-owned sites.
	Decision-making and Due Diligence	• Participate in guideline-setting exercises; • Use a phased environmental assessment protocol; • Identify applicable brownfield remediation and development guidelines used at the city; • Define municipal brownfield regulatory authority.
	Incentives and Funding	• Use Infrastructure Redevelopment, WDA and other Federal/Provincial funding to improve brownfield-affected areas; • Adjust funding program mandates to encourage community re-investment funds; • Use internship programs to combine remediation research and technical work; • Use public funds as seed money for a private sector remediation industry; • Leverage a municipal bond issue to raise brownfield venture capital.
Strategic Planning	Integrate Brownfield Revitalization into Current Plans and Programs	• Piggy-back brownfield redevelopment onto existing revitalization strategies; • Develop a municipal environmental land management strategy.
	Prevention Strategies	• Ascertain the ability to use municipal records for site assessments; • Review ducts and road construction standards to prevent leachate problems; • Use a "Take Pride" program approach to stimulate private remediation work; • Expand the Safe/Healthy Cities programs to include land condition; • Deliver in-house brownfield and CSRA seminars; • Require indemnification for municipal property acquisition;

Category:	Topic:	Recommendations:
Strategic Planning	Further Study	• Conduct a city-wide brownfield survey, including mapped data; • Determine the impact of brownfield ownership on municipal financial ratings.
	Legal Advice	• Review existing municipal brownfield policies to ensure they are applied; • Ensure contaminant management protocols meet statutory requirements; • Require indemnity clauses on all joint-venture, partnership agreements.
Organizational:	Municipal Real-Estate	• Define the risk measurement tools as well as delineate Technical Advisory Committee composition and duties (Civic Administration Policy Nos. C/FP-1 and C/E-3).
	Environmental Liaison Office	• Fund and empower an Environmental Liaison Office to: a) coordinate environmental planning functions; b) conduct research; c) guide the brownfield public consultations processes; d) assist the Administrative Coordinating Group.

- knowledge of existing brownfield sites,
- and knowledge of standard practices at other Canadian municipalities

then the City of Winnipeg should take reasonable care to:

- prevent (further) brownfield site growth;
- commence remediation (redevelopment) measures and;
- use standard practices (as defined in statutes and as demonstrated by other cities) to mitigate further harms to environmental and human health.

In addition to the following recommendations, those in the "Actions by Municipalities" column of Table 1 (pp. 29-30) should be reviewed and acted upon by the City of Winnipeg.

4.1.1 Environmental Risk Assessment

Environmental risk assessments should only be applied to highly problematic sites. ERAs are costly and time-consuming. As well, their application is predicated on a lack of available information from which to make sound decisions. Risk management however, should be consistently applied to brownfield redevelopment. Because risk management seeks to develop a comprehensive data base, to forecast future trends, it contributes to prudent and diligent urban planning practice.

In the absence of historical land use maps, Phase 1 site assessments should be required of all development permit, variance and re-zoning applications. The Phase 1 site assessment submitted to the developer's lending institution or insurance broker may satisfy City requirements, while limiting the proponent's expenses. The Phase 1 site assessment should determine if contaminants are likely present. If so, the Administrative Coordinating Group should decide whether a more in-depth Phase 2 site assessment is needed, one that defines public health and ecosystem factors. If the site assessment demonstrates no threats then development approval should proceed, as normal (see Figure 6). If the Phase 2

assessment indicates contaminants exist then an ERA should be ordered, to ensure threats to public health are understood and constrained.

The costs associated with requiring site assessments include staff training and administrative expenses. Applying risk management strategies to municipal operations and brownfield redevelopment planning will also require training and administrative expenses.

Operational reviews, procedures, risk transfer and risk reduction strategies will need to be developed. Both processes will likely delay development approvals in Winnipeg, especially for contaminated sites, but by using financial institution-required reports the proponent's reporting requirements could be expedited. The benefits of applying risk management strategies include risk acknowledgment, liability reduction and attention to a poorly understood urban redevelopment issue, by demystifying brownfield site redevelopment.

4.1.2 Public Participation

Although public involvement is essential in the ERA process, it is also needed when the City plans to accept existing risks and manage brownfield sites on an "as is" basis. Public involvement in both the risk assessment and risk management process can:

- reduce some mistrust of the data and decisions, making both more relevant;
- heighten objectivity;
- include public values and;
- ensure results are understood by end-users, thereby increasing their legitimacy and acceptance.

The costs include time and money for education, consultation, review of the public input and reporting back of results and intended actions. By not including a public participation component, or the reporting back of results, the likely result will be eroded Council and administration legitimacy, in the eyes of the general public. Public participation should be

sought when an environmental risk assessment is ordered. Public involvement in methodology-setting, conclusions-development and recommendations-making should also be ensured. Public consultation is critical during the ERA, in order to inform the public of research findings as well as decision-making processes and outcomes.

4.1.3 Integrating Brownfield Revitalization Into Existing Plans and Programs

Through funding programs and by applying planning tools the City can pursue brownfield redevelopment initiatives, by piggy-backing brownfield redevelopment onto existing revitalization strategies, thus satisfying Plan Winnipeg's environmental stewardship agenda while reducing problem sites in the specified areas. Current secondary plans include the Airport and Vicinity Plan as well as Center Plan. Funding programs include the community-directed "Manitoba-Winnipeg Community Revitalization Program" and the tri-lateral Winnipeg Development Agreement, with sub-programs such as 13A, "Buildings Preservation". These programs and plans can facilitate site-specific redevelopment by allocating dollars, introducing incentives and establishing a clear policy rationale.

> *Wherever possible, brownfield cleanup efforts should become part of larger land assembly and land banking strategies, allowing developers, city governments and other involved parties to make more strategic investment decisions. Area-wide redevelopment strategies for neighborhoods, commercial business districts, industrial zones, on the other hand can produce the kind of environment that attracts private investors: a coordinated public sector, a targeted and assured infrastructure investment program, and a local community that supports the development.* (Iannone; 1996; p. 64)

4.1.4 Code of Operational Practices

A brownfield sites code of operational practices is warranted given their multi-faceted and complex nature. For example, first, physical site restoration practices (i.e. CCME and provincial remediation guidelines) might include a waste management and pollution

prevention component, given the transportation or treatment of dangerous (contaminated) materials. Second, site-specific redevelopment plans might include set brownfield ratios, where certain portions of a site may remain as a brownfield given land use and site conditions, or delineate zoning and development constraints appropriate to the nature of the site. Third, public participation and consultation protocols must be established for all phases of brownfield redevelopment. Fourth, the adoption of the ISO 14001 standards enabling the City to promote itself as environmentally-progressive, to meet policy objectives in Plan Winnipeg as well as the other quality improvement objectives being pursued. Finally, inter-governmental or inter-agency communications must be delineated to ensure effective and efficient redevelopment.

Such a code must be used by the City's land service departments, including: Real Estate; Land and Development Services; Fire; Health; Water, Works and Waste as well as; Parks and Recreation. Developers should be made aware of such codes, to ensure efficient implementation and effective industry cooperation. Public relations efforts and consultation initiatives on code development would benefit the City threefold, in terms of:

- public knowledge
- image enhancement
- demonstration of progress on Plan Winnipeg statements.

The costs associated with conducting and implementing an environmental code of practices and/or adopting ISO standards are primarily administrative, since capital requirements can be met in phases. Costs can rise as awareness increases because expectations are heightened. Most of the administrative expense can be assumed by an effective and empowered Environmental Liaison Office. Background research and assessment work can be done in cooperation with environmental or planning graduate studies programs, involving student practicums and internships (university and student employment programs). This allows students access to research data and valued work

placements, while affording the City skilled, inexpensive labor for specific projects.

4.1.5 Zoning Classification

With respect to brownfield site re-zoning, the City would be prudent to identify known abandoned and (perceived-to-be) contaminated land with a new zoning designation, such as the "H" designation used in Toronto. It is intended to be combined with the land use designation. Therefore, an HC classification would indicate commercial land with probability of contamination. This designation must be made removable, once the owner/proponent can supply sufficient proof that the site has been remediated to acceptable levels for that land use classification, such as a Certificate of Compliance (Manitoba Minister of Environment; 1995, p. 23). Since this designation indicates the property's physical condition it may limit future use, should the site be remediated to a specific use level, but not background level. For example, a site limited to industrial use may be indicated with (I), suggesting a closed site or not open to re-zoning.

It would be too complicated and time-consuming to classify every site in the city based on the site's degree of contamination. Should a site be fit for recreation or residential use then no indication of contamination would be required. A problem of re-classifying land, or locking sites into a specific use because of contamination, would be the impact on the City's unified zoning bylaw - affecting development patterns and the availability of uncompromised, developable land.

4.1.6 Site Restoration

In Winnipeg, the local economy (relatively stable population and economic growth) and out-migration of residents to fringe communities, has generated a surplus of vacant/abandoned land and buildings. Given uncertain legislation, inconsistent clean-up standards, emerging decontamination technologies, and a poor development market, an "as

is/do nothing" strategy toward city-owned brownfield site redevelopment is recommended. If the City were to pursue site redevelopment in the absence of a demand for the site , it may set an industry expectation that the will City act as a brownfield broker. If a site is contaminated, causing public health problems, then remediation/redevelopment should be completed, as would be expected for any contaminated site listed in the Provincial Registry. "Greening", as is done in Saint John (re: question 5, Table 4), should be considered when:

- there would be aesthetic improvements to the area;
- greenbelt and habitat corridors could be reconnected, within the city limits;
- a long-term approach to land management can be followed (greatest value versus greatest profit);
- it is the most cost-effective approach, given uncertain health, economic and legal factors.

"Greening" the city center sites may provide an excellent opportunity to develop a more pedestrian and resident-friendly downtown, especially when combined with efforts to promote higher density and mixed-uses in the city center. However, greening too many sites may inadvertently promote greenfield development, at the urban fringe, by reducing the amount of easily developable land within the corporate boundaries. Site-specific analysis and re-development planning is essential, as is the need for a city-wide environmental land management strategy. Site-specific review and redevelopment will ensure flexible usage, and sensitivity to the Unified Zoning Bylaw. It will make the development of mixed use sites easier as portions of the site can be remediated to use requirements, rather than background levels.

With respect to developer- or City-driven brownfield redevelopment proposals, the Administrative Coordinating Group should be charged with the task of brownfield development review and recommendations (see Appendix 6). By assessing the land condition early in the development approval process, both time and money are saved by: a) limiting the amount of unnecessary research for sites suffering perception problems; and,

b) requiring appropriate information from the developer, the City and the Province in order to limit risk and liability. As a result, private and public resources can be re-allocated to effectively address site assessment, management and redevelopment, according to each site's unique conditions. Site review should be requested on an "as-needed" basis. The Administrative Coordinating Group is a development approval committee composed of designated civic officials and has the multi-disciplinary composition required for comprehensive brownfield review. This committee should have the authority to:

- recommend environmental risk assessments;
- recommend site risk management plans;
- define and request public consultation/participation; and
- recommend on the nature and size of development incentives.

Depending on the nature of the recommended environmental assessment, the five-step brownfield development approval process, outlined in Figure 6, could add as little as one week (up to an indeterminate period), depending on the site's environmental assessment results, remediation plans and risk factors.

Concerning the City of Winnipeg's "Development Agreement Parameters" (City of Winnipeg; 1989; p.16) a clause should be added to section 25(a) requiring developers to hold environmental liability and/or environmental remediation insurance (when available). As well, section 37(vii) stating the development agreement may include "other addenda", (City of Winnipeg; 1989; p.24) agreed to by the City and developer, can be interpreted to include such items as environmental assessment reports and/or remediation plans. Two additions may be warranted. First, a section stating: *remediation work (land improvement) should be done on the site by the developer, at no cost to the City, to bring the air, water and soil conditions within specified guidelines per site use, to ensure human and ecological health, and in accordance with the City's interpretation of sustainable development*

principles. Guidelines used should be at the discretion of the Administrative Coordinating Group, but be consistent so the development community can expect uniform treatment.

Finally, a section stating that no more than x% of the site can remain as a brownfield per specific land use, should be developed, and added to brownfield development approval agreements. This will require additional research to define appropriate ratios and legal advice on the impacts, such as easements or caveats attached to the property. However, this may limit the development of brownbelts, by not allowing developers to leave (portions of) problematic sites under-utilized or abandoned.

The costs associated with greening existing city-owned brownfield sites will include real costs associated with prioritization exercises (site identification, assessment, redevelopment strategizing and consultation) as well as site remediation expenses. Lost opportunity costs are applicable to site prioritizing as well as reduced revenues from sites remaining under-utilized/abandoned. The costs associated with adjusting the development approval process have both real (administrative changes) and lost opportunity costs (impacts on the development industry). The benefits of site restoration and adjusted development practices are gained through ecological and aesthetic improvements, and through tax income from land that no longer sits idle. Yet, delays to site development approval may foster fears regarding liability or protracted bureaucratic delays.

4.1.7 Decision-Making and Due Diligence

Regulatory developments and changing banking practices have created a need to assess the environmental effects of development and remediation projects. Therefore, the City of Winnipeg should actively seek opportunities to participate in stakeholder negotiations regarding contaminant guidelines-setting, whether the discussions have a Manitoba or Federal focus. The knowledge gained, in the guidelines-setting and implementation, should be used for: a) developing local bylaws requiring site remediation planning prior to

development approval; and b) application of inspection and monitoring programs to ensure risks to human and ecological health are mitigated. Based on liability and its consequent obligations, a phased environmental assessment protocol should become a component of a general municipal risk management policy and standard due diligence practice. This phased approach may begin by flagging sites which are likely to suffer a brownfield legacy and then require site assessments. An historical land use map is one objective tool to flag probable sites. The effectiveness of this phased assessment and remediation program will need to be evaluated, from both the developer and civic administration perspectives.

Coupled with active participation in guidelines-setting and remediation planning prior to site redevelopment, the City must develop an inventory of applicable development guidelines as well as environmental and land management policies used in municipal environmental land management plans. This is especially important given the increasing number of Federal and Provincial statutes and guidelines affecting land, public health and sustainable development practices. Additional international covenants and guidelines, such as the ISO series, should also be reviewed, and included where applicable. Increasing portions of the urban footprint are being remediated as ecological preserves, in projects such as the proposed Domtar/Fort Whyte bird and prairie grass preserve, thus reinforcing the need for comprehensive land management strategies. The policy and program inventories should help inform new and existing strategies by identifying program and policy gaps, overlaps, resources and principles.

The City must clearly delineate municipal authority and enforcement criteria. It can incorporate soil remediation within its nuisance bylaws and enforcement procedures. Reporting site condition to the Provincial Contaminated Site Registry should be considered as soon into the remediation process as possible to ensure due diligence.

4.1.8 Incentives and Funding

Even though jurisdiction for municipal affairs rests squarely with the provinces, the Federal government should resume concern for urban and regional development. It may be able to exert greater influence through national funding programs such as the Infrastructure Development and Western Economic Diversification funds, regional and municipal grants programs such as the Winnipeg Development Agreement, and through the policies and programs of the Industry, Natural Resources and Health Departments. In particular, the Infrastructure Development Fund could mimic the US "Community Re-Investment Fund" so Federal and matched Provincial/municipal dollars are used for infrastructure improvements to brownfield-affected areas, and for prevention programs to mitigate brownfield-generation or contaminant-leaching. Alternatively, the Human Resources Development Canada internship program should be used to fund skilled entry-level technician and research jobs in urban redevelopment, environmental planning and site remediation.

The leverage of a municipal bond issue where revenues are used for brownfield prevention, public education, and redevelopment incentives should be considered as a source of funding. This municipal bond could be similar to the Manitoba Builder Bonds or the Crocus Fund, with enhanced income tax benefits, relative to private sector registered retirement savings plan investments. Although Provincial approval would be required, it might be an effective means of acquiring more venture capital for brownfield redevelopment projects.

If the City's Administrative Coordinating Group is charged with the responsibility of brownfield redevelopment review then it should have the delegated authority to recommend appropriate direct and indirect incentives, on a per project basis, including the offer of grants and tax incentives, as well as fast-tracked and phased development approval.

4.1.9 Prevention Strategies

Prevention is an effective means of reducing the costs of future problems. Prevention strategies should be incorporated into existing City of Winnipeg waste reduction programs. All prevention efforts must be directed both internally, at City operations, and externally, to the development industry. Therefore, the City should:

- ascertain and define its right (bylaw enactment and program delivery) to enter a property to complete a Phase 1 site assessment using municipal files to determine if contamination may exist (e.g. Fire Department records);
- require indemnification prior to receiving properties as a result of tax sale, foreclosure, trade or expropriation and prior to entering into any joint-venture arrangements;
- review Works and Operations road and duct construction standards to reduce possible leaching and prioritize retrofit of existing hot spots;
- fund a "Take Pride Winnipeg" program providing property owners and developers with both direct and indirect incentives to remediate existing brownfield sites;
- ensure that a voluntary site monitoring, clean-up and disclosure program exists with a 1-800 line for site identification and cataloging, so that appropriate redevelopment strategies can be developed;
- deliver public education programs, including expanding the Safe and Healthy Cities programs to include land management/condition in their mandates; and
- deliver training programs to the planning, legal, real-estate, business liaison and assessment department staff as well as the Lands and Property Committee, regarding brownfield liability and the Contaminated Sites Remediation Act.

Municipal officers and the public must understand brownfield liability in order to prevent the assumption or creation of unnecessary (future) liabilities. Refresher training should be delivered annually, or depending on the pace of regulatory change and problem identification. Public education can be delivered through trade or industry associations as well as general public information campaigns. This should ensure officials are aware of their duty of care, and are equipped to make decisions regarding brownfield redevelopment.

Finally, the City must ensure that appropriately trained staff and expertise is available to

the City to conduct site assessments and other requirements recommended by the Administrative Coordinating Group, or other civic units such as the Legal and Assessment departments. Such expertise may be contracted on an "as required" basis, or incorporated into the staff complement of the Environmental Liaison Office (see 4.1.13).

4.1.10 Recommendations for Further Study

It was clear throughout the analysis that there is a need for further research regarding brownfield redevelopment and environmental land management. The lack of, and inability to easily access, data about site condition prevented an accurate empirical definition of the scope and magnitude of the City's brownfield problem. Therefore, the City of Winnipeg should seek Federal and Provincial funding to conduct a city-wide survey of brownfield sites, to be catalogued on the Land-Based Information System. Research results should be shared with other Canadian municipalities, identifying constraints and successes, with the hope of developing a national data map. As well, research needs to be done on the effects of brownfield site ownership on the corporation's financial status: for example, analyzing the effects of land condition on the City's real-estate portfolio value, bond rating, insurance premiums or short-term loan interest rates.

4.1.11 Legal Advice

Given the new Contaminated Sites Remediation Act the City's Legal Department should conduct a policy review to ensure civic property acquisition and disposal methods are being applied. As well, legal opinion should be given regarding the City's development approval process to ensure the practice of due diligence. All cost-sharing, public-private partnerships, incentive programs and other joint-venture agreements between the City and a second or third party should contain indemnity clauses concerning current and future site conditions and liabilities for remediation.

Contaminant management protocols must be reviewed to ensure they meet industry, statutory and legal precedent standards. This will apply to any civic department using or storing potentially polluting products, such as the Transit, Parks and Recreation, Water, Works and Waste departments.

Finally, legal stature should be given to these recommendations, by amending applicable policies and bylaws, for example, ensuring that the Administrative Coordination group can make recommendations regarding environmental risk assessments, or that the existing Business Liaison Office and new Environmental Liaison Office are empowered to offer incentives to a prospective industrial developer.

4.1.12 Municipal Real-Estate

Should the City enter into any joint venture or long-term lease agreements then it should require liability indemnification for future site remediation responsibilities associated with that property.

If the City must acquire private property through purchase, expropriation or tax foreclosure it should ensure Phase 1, and when necessary, Phase 2 site assessments are conducted. This is in accordance with internal City policy and revisions to sections of The Expropriation Act (Manitoba Minister of Environment: 1995, p. 47). It should take all measures necessary to prevent the acquisition of contaminated sites due to tax foreclosure. The Technical Advisory Committee roles and risk measurement tools mentioned in Civic Administrative Policy File Nos. C/FP-1 and C/E-3 must be clearly delineated, and circulated to all civic personnel involved in the acquisition, disposition or management of civic real-estate.

4.1.13 Environmental Liaison Office

As mentioned throughout these recommendations the City of Winnipeg would benefit by

funding and empowering an Environmental Liaison Office. Not only is it industry-standard for civic administrations to house an environmental unit within the planning departments (i.e. Toronto, Edmonton, Calgary, Vancouver, Hamilton) it is also a definitive measure toward demonstrating due diligence in risk management. In addition to the objectives stated in Plan Winnipeg (see Figure 5) this office should:

- coordinate environmental planning functions;
- conduct or lead in policy and risk-related research, including the development of policy and land use inventories;
- implement public consultations and communications strategies for site- specific and general brownfield redevelopment initiatives;
- assist the Administrative Coordinating Group concerning brownfield development approval and incentives allocation.

The real cost of developing a new office—including space, personnel and equipment—cannot be neglected at a time of fiscal restraint without consequent service deterioration and liability assumption. It is in the City's best interest to fulfill a long-standing policy obligation, in light of prevailing practices.

4.1.14 Conclusion

The City is faced with an unknown and unfunded liability. How should it deal with this problem? Is it better to know or not know about brownfield sites? What financial strategy should be put in place to ensure remediation is funded? Are reserve accounts the answer? It is evident that the City has a very real brownfield problem, part of which is the lack of means and ability to quantify its economic liability, which hinders effective planning to eliminate or manage brownfield-associated risks (financial and environmental). They are a real (not perceived) problem because ignorance about brownfield site numbers and impact perpetuates a hands-off management approach. It is known that they exist and that they pose legal concerns as well as environmental and financial costs. However, it is not known how large the costs are. By failing to have adequate data about brownfield site

location, number, size and degree of contamination, brownfield planning remains problematic.

The question of whether it is better not to know about these sites, given their variety of liabilities is a moot point, because the banks will know. The City will inadvertently abrogate authority over a land management issue to the financial services sector, which, in fact, is already driving the brownfields agenda. As well, knowledge of these sites will enable more informed and pro-active approaches to their remediation/management. Issues such as inner city redevelopment, urban sprawl, lost tax and development revenues, efficient use of infrastructure, public health and neighborhood safety (abandoned sites) can all be addressed by knowing about brownfield characteristics (location, size, degree of contamination). The City's failure to commence site identification and planner education may be regarded as a lack of due diligence.

With respect to site remediation the question remains; should a site be remediated or left fallow? Promoting an incrementalist approach, relying substantially on voluntary reporting and clean-up measures may be sufficient for the private sector. However, the public sector owes a greater duty of care and therefore must actively seek out, quantify and describe city-owned sites. By including institutional properties the City can begin to build a data base from which informed decisions and thoughtful policy can be made. The City should be pro-active about brownfield redevelopment. It need not be radical, such as assuming unreasonable liabilities, but it can be pre-emptive by acting on the recommendations made here.

What can the City do to manage its liability? What are other cities doing? Despite there being limited precedence from which to form a general standard, concerning municipal brownfield site management, the City certainly should:

- activate its plans for an Environmental Liaison Office where brownfield site planning is part of its mandate;

- practice site prioritization using redevelopment feasibility assessment (site rankings), given limited financial resources and an uncertain number of brownfield sites. The first set to be prioritized should be city-owned sites in order to reduce civic liabilities;
- funds for existing brownfield redevelopment can be established in a variety of forms including municipal bonds such as the Manitoba Builder Bonds, trust accounts - where the profits from one brownfield redevelopment are rolled over to fund future redevelopments, or a reserve account. Funds for the redevelopment of emerging brownfield sites can be secured through trust accounts where a pre-defined sum (i.e. percentage of annual profits) is set aside for future redevelopment by the landowner, as a condition of development approval;
- funds for the quantitative research and data management should be sought from a combined tri-level government - private - not-for-profit sectors initiative where common data can be used to both determine the extent of brownfield influence in Canadian metropolitan areas as well as methods of redevelopment.

Although the City may not be directly liable for existing and future brownfield sites within its boundaries, it is impacted by these sites because of effects on urban safety (abandonment and arson), the infrastructure, growth and land management. The first and most important step will be to educate planners and city politicians about the significance of brownfield liability, the next step will be formulating a municipal brownfield strategy.

5. SUMMARY AND REVIEW

Civic governments face brownfield-related risk and liability when they are a site owner (direct liability) and when privately-owned sites present public health or public property problems (risk). Generally, a municipality can face legal and economic liability regarding four types of land: 1) property they own; 2) infrastructure routes; 3) land acquired by expropriation; and 4) land under joint venture agreement/management. Essentially, a city's liability includes legal, economic and environmental liability.

Legal liability is determined through statute such as Manitoba's Contaminated Sites Remediation Act and policy precedence. The City must ensure due diligence is practiced, including informing Council of pertinent issues and practices to ensure, as Directors of a Corporation, they are not held liable for the actions of their staff. This liability is most directly applicable to city-owned properties, such as land-fills, works yards and purchased property. Through indemnities it may be made to assume liability and risk for land acquired by purchase, expropriation or easement, for example when land is needed for a new thoroughfare or bridge. The new CSRA does exempt the city from liability when a property is acquired because of tax sale.

Economic liability can include:

- clean-up costs for past practices;
- property devaluation;
- lender liability when in a joint-venture agreement (especially given the trend toward the retro-fit of older industrial buildings into social housing or through economic development initiatives such as the Winnipeg Development Agreement);
- lost opportunity costs due to perception problems, where diminished development opportunities de-value neighboring sites, therefore affecting area aesthetics and contributing to long-term neighbourhood deterioration;
- lost tax and permit revenues;
- administrative costs to monitor, map and register the sites;

- protocol, equipment and physical repair to infrastructure, such as duct systems, due to leaching.

Environmental liability is determined through site assessments and environmental risk assessments. Risk assessments address the human/public health issue as well as long-term impacts to the ecosystem, resulting in a need to develop environmental planning paradigms regarding urban development. The long-term and cumulative consequences of a "do nothing" approach toward brownfield site management can include:

- brownlining/brownbelts, inadvertently promoting development on greenfield sites or in neighboring municipalities as well as the associated infrastructure costs for both the new developments and the deterioration of the old infrastructure;
- impacts to the unified zoning by-law, possibly creating brownfield ghettos as future uses are tied to site clean-up measures or fears of legal action because of uncertain legislative and regulatory standards;
- design and technical changes to the infrastructure and duct systems ensuring leachate containment as well as equipment and eco-systems protection.

Using evidence-based decision-making, industry standards and best practices requires a long-term, comprehensive approach to brownfield site management. However, this does not come cheaply: the costs include:

- data requirements and technical systems for informed decision-making, including additional staff;
- training of municipal staff or contracting for site assessments;
- a planning paradigm and practice shift from a strict zoning focus for land use/management to one including an environmental (ecosystems) focus;
- training of municipal architects and planners to encourage site-specific development options that create the best product, at the best cost while maintaining public health;
- adjustments to existing codes and/or design standards;
- public education to mitigate reactionary postures by private sector stakeholders (banks, insurance companies, developers, industry and the general public);
- appropriate development standards for new/re-newed infrastructure to mitigate pathways of least resistance; and

- a possible departure of developers and businesses to other communities/regions with "less stringent" development codes and criteria.

The municipal economy is a key factor in brownfield site redevelopment. Basically, if the local economy is not particularly buoyant, such as Winnipeg's, then there is little interest in brownfield site redevelopment, especially when there are plenty of greenfield sites available within, and just surrounding, the city. In such cases a risk management strategy of containment or greening may prove the most effective given the financial and legal disincentives for redevelopment. In more buoyant local economies, and development markets, such as those in Calgary and Toronto, the cost of site remediation is simply another accepted cost of doing business. In Winnipeg's case, because little development is occurring, a brownfield management strategy should be framed by the principles - to do no harm, and to act in the best interests of the general public.

If brownfield site location mimics the concentric growth patterns of most cities, then they will seriously affect the value and redevelopment costs for city centre properties. A national comparison of mapped data should illustrate brownfield location and size patterns. Thus, a consistent data base is needed, as is a consistent technical definition of brownfield sites to ensure that the same units are being compared. If perception, not contamination, is the problem, then a different redevelopment strategy is appropriate.

To summarize, the answer to <u>why</u> remediate brownfields, is because of economic, health and statutory liabilities while risk management is one method of <u>how</u> to plan brownfield redevelopment. All three levels of government - as well as lenders, developers, property owners and special interest non-governmental organizations constitute <u>who</u> should be involved in brownfield redevelopment planning. Concerning <u>where</u> brownfield redevelopment planning should take place, a local site-by-site (incremental) approach is warranted. Municipal policies are required to legitimate brownfield redevelopment planning measures, while a city-wide land management perspective is also needed.

Although brownfield redevelopment planning programs are required as soon as feasible, the need for accurate and reliable data is greater. Empirical evidence is still needed to adequately define brownfield characteristics and impacts.

5.0 Review of the Practicum Process

This practicum has defined a problem (civic brownfield liability), investigated it and made recommendations to mitigate the problem. A legalistic-bureaucratic argument for addressing urban brownfield redevelopment was presented. It is clear that the existence of brownfield sites and their redevelopment/clean-up is a politically sensitive issue. It is also clear that municipal brownfield policy and programming is in its infancy. Many Canadian cities are unaware that brownfield problems exist. Measures must be taken to ensure the problem is not ignored, including the development of a standardized data base and regular use of practices such as site assessments, risk management and environmental risk assessment.

A brief critique of the practicum research and outcomes is offered below. Some of the initial objectives were achieved, yet some were not. Unfortunately, it was mainly the quantitative research objectives that were not accomplished.

5.0.1 Methods

The open and unconstrained search for relevant information permitted the exploration of a variety of topics related to the key issues of civic liability and brownfield redevelopment planning. This allowed the research objectives to be adjusted after it was determined that the empirical evidence was unavailable or unattainable. Consequently, attention was re-focused toward evaluating a planning tool (environmental risk assessment) and decision-making paradigm (risk management) appropriate to brownfield redevelopment planning. A policy analysis framework provided structure to a search that may have taken a variety of

alternate routes.

5.0.2 Data Collection

Collecting information for this practicum was difficult for two reasons:

- the information is not published, or
- institutions are reluctant to relinquish materials for fear of litigation.

In either case, the lack of knowledge about brownfields and their impacts makes the demand for and development of pertinent data minimal. The most effective means for obtaining information about civic brownfield management was through informal telephone interviews and internet sources.

The internet survey cannot be regarded as empirical evidence since there were too few respondents to permit validity or reliability testing. However, the limited response speaks volumes about the inadequate brownfield knowledge base in Canadian municipal planning departments.

5.0.3 Case Study

The case study achieved many of its intended objectives however, the following points were not accomplished:

- the City's economic liability could not be ascertained; and
- a basic history, location and extent of City-owned brownfield sites was not possible, therefore leaving undetermined the extent of the problem in Winnipeg.

Partially fulfilled objectives include:

- an inventory of municipal and provincial policies and legislation pertaining to civic-owned brownfield sites; and
- understanding the mandate and objectives of brownfield management programs at other Canadian cities.

Both the unfulfilled and partially fulfilled objectives are worthy of additional attention, and should be considered for further research.

5.0.4 Further Research

Concerning related brownfield research, with a broader perspective than Winnipeg, the following items would benefit from both theoretical and practical research:

- the need for more brownfield redevelopment case-study evidence. Studies that examine the operational aspects of brownfield redevelopment, asking what needs to exist for projects to be successful, what works and why;
- a general survey of the construction and financial sectors to acquire a better indication of what project assessment criteria are used and how;
- an expanded and internally consistent survey of Canadian municipalities, inquiring about brownfield numbers, policies, issues, locations and redevelopment programs/cases to assist planners, developers and Councils toward defining planning and due diligence standards;
- a comparison of Canadian, US and European brownfield redevelopment planning approaches to assess funding levels, government assistance and public participation options, and :
- brownfield data base design, which should include a standard definition, information needs, formats and outputs (maps).

Much of the brownfield research conducted in this practicum was through the internet or with select government publications. Specific sites and publications will be beneficial to future Canadian brownfields related research; they are listed in Appendix 7. The publications, generally, are either technical manuals or guidance documents to assist with site assessment, acquisition or management. Some provide policy background, while the American material addresses the municipal perspective. The internet sites focus on the legal aspects pertaining to brownfield sites.

5.1 Planning Implications

This practicum has argued for:

- multi-jurisdictional management and a multi-sector approach to brownfield site redevelopment, including Federal intervention;
- land condition to be consistently factored into the redevelopment equation, as it impacts both land value and function;
- database development and management to catalogue and monitor sites, supporting both brownfield research and actuarial analysis and;
- a cautionary approach to certain public-private partnerships.

The recommendations in Chapter Four accomplish four of six NRTEE criteria for brownfied redevelopment (see Table 1). Although no empirical evidence could be offered to support these recommendations, a clear policy precedent exists for municipal environmental planning. As well, brownfield impacts on the urban footprint must be considered when planning for redevelopment or when introducing revitalization initiatives such as the WDA, CAI or NPD -- especially in the central business district and vicinity.

The parallels between policy analysis, rational-comprehensive planning, environmental risk assessment and risk management indicates new analysis and decision-making methods can be easily introduced to urban planning, from other disciplines. All methods share a systems or multi-factor approach to the issue being planned for or analyzed.

5.1.1 Planning Practice Issues

The practicum addressed the issues of risk, legal liability, the influence of economics in decision-making and the ethical role of the planner. Although seemingly similar, the roles of the environmental planner and the environmental lawyer are different. Environmental planners must be astute at administrative law. They must be up-to-date on legislation and case precedence affecting municipal affairs (the brownfield problem). The lawyer's objective is to mitigate corporate liability, while the environmental planner's objective is to

mitigate long-term risks to public safety, public health, and the public interest. Collectively the planner focuses on the public well-being, along with maintaining a fit and developable land base. The environmental planner is part scientist by having to understand the ecological principles, public health issues and assessment methods together with being a facilitator and mediator. Environmental planners are not expert lawyers nor risk assessors, however they should be informed enough about legal process and ERA outcomes to make appropriate judgments about their respective influence. Environmental planners are generalist practitioners guided by a holocentric ethic and a macro/long-term perspective.

Concerning risk, are legal risk and environmental risk the same? No. Legal risk stems from a technocratic approach toward planning, an approach which is also legalistic and economics-driven. Issues tend to be regarded as pro or con, guilty or not guilty, costly or affordable; whereas the environmental perspective tends to take a public health and humanistic approach where conflicts tend to be over instrumental rather than economic values. Neither legal liability nor environmental risk should be ignored or revered, as both hold equally significant importance in brownfield redevelopment planning.

Concerning liability, are liability and risk the same? Again, no, because risk can exist without liability, such as a naturally occurring risk or a risk based on perceived fears. Legal risk is rooted in legal liability; environmental risk stems from impacts to organisms and ecosystems. Unfortunately, in the case of brownfield sites, the issue of "looking out for" environmental integrity and environmental risk tends to get lost in an institutionalized planning realm where legal risk and liability tend to overshadow the (humanistic) objective of planning, the big picture. Richardson has stated that "...a human dimension has been incorporated in the concept of sustainable urban development...." (1996, p. 34); that same human element also remains at the core of planning practice, by doing what benefits the public good.

Moving from the broad practice of environmental planning to the specific issue of

brownfield redevelopment, what is the driving goal: is it to stop a destructive pattern, as is suggested by Theobald (see p.2): or, is it something broader, as is suggested by the scientific and rational processes used in policy analysis (Friedmann, 1997, p.9)? The answer depends on one's point-of-view: for the planner the driving force is the public well-being; for the developer/owner the driving force is economics; for the City the driving forces are legal and economic risks. The notion of public well-being is supported by the social-cultural ethic in sustainability policies and principles, despite the legal and economic focus driving the brownfield agenda. Planners clearly have a stewardship role with respect to brownfield site planning and therefore must expand the brownfield debate to address public health, land quality and ecological integrity issues. Only by expanding the scope of analysis beyond strictly legal and economic risks will the decision makers, developers, planners and public realize that the current "do nothing" posture might be the safe corporate thing to do, but not necessarily the most prudent or ethical thing to do. At the same time the banking industry and legal system can do more to empower and fund municipalities, and research facilities, in order to generate ideas and solutions regarding the brownfield redevelopment paralysis problem in urban Canada.

In their capacity as stewards and caretakers, planning professionals have a responsibility/moral obligation to prioritize the brownfield issue on the civic agenda. First, though, planners, in both private and public practice, must be informed about brownfield site redevelopment issues and processes. Not only do planners need to be better informed but, there is also a need for institutional change: change that supports a multi-disciplinary and empowered approach to urban planning. In order to affect the decision-making process, planners must work with non-expert decision-makers. To do so effectively, both qualitative (values) and quantitative research must be utilized. Decision-makers need to understand what risks they are placing upon the corporation, as well as the public. Fear, whether perceived or objective, has driven the brownfield agenda in Canada; a protect your assets or normative approach has been common. Now, there is a need for public

awareness to encourage a de-mystified and pro-active approach to brownfield redevelopment.

5.1.2 Anticipated Use of Research Findings

Both of the practicum's academic and practical intents were achieved. The objectives to inform about municipal brownfield liability, site identification, site assessment and site ranking were accomplished. Yet, as previously noted, greater brownfields awareness is required. Awareness-raising programs can have different objectives for different target groups, such as the following:

- for planners, to increase awareness of brownfield redevelopment issues, by fostering discourse through professional bodies;
- for the public, to become educated about ecological or development impacts - NGOs (including special interest groups) should be activated to do this given their expert capacity to do so;
- for the banks, developers and land owners, to assume liability and responsibility for brownfield site redevelopment as well as understand unique planning and development restrictions/guidelines on brownfield sites;
- for the government, to implement policy in practice, not just rhetoric, given the very real impacts on urban environmental (land) quality and fiscal integrity.

In order to quell fears about living in a toxic city, the municipal government must employ a pro-active and pre-emptive attitude by:

- recognizing brownfields issues;
- promoting the positive measures it has taken to remediate current sites and;
- preventing future sites from emerging.

This report should be useful to urban planning students and planning practitioners. The recommendations for further research identify related research worth pursuing. The most significant information gap confronted was the lack of relevant quantitative data about land type, quality and quantity, which limits informed decision-making regarding urban form and environmental integrity.

The practical research results, in terms of brownfield liabilities identification and program/procedural recommendations, were achieved. Only to a limited extent was civic brownfield policy and statute inventory developed. Plan Winnipeg: Toward 2010 and the Contaminated Site Remediation Act were the focus of the regulatory analysis. To a lesser extent the City of Winnipeg Act and internal documents were also reviewed. It is hoped that the recommendations in Chapter 4, will be particularly useful to the City of Winnipeg's Administrative Coordinating Group and other civic staff involved in property revitalization initiatives.

Although not a formal objective, this practicum has been recursive, each section and chapter building upon the others, in order to generate a cohesive debate and practical recommendations. Chapter Two and to a lesser extent Chapter Three attempt to demonstrate the logic or rationale, and the critical debate, used when formulating public policy. The ethical and economic aspects, as well as the legalistic and pragmatic perspectives, were described, in order to form a rational and thoughtful policy stance for the City of Winnipeg. Clearly, the development of brownfields public policy requires that social, economic, political, physical and environmental issues be addressed. But, more than that, public policy requires that both the corporate and public interests be accounted for, while maintaining public well-being as the central focus. This exercise has demonstrated the complexity and dynamics of policy development. Programs and policies must be reviewed and amended to meet changing social, economic, political, physical and environmental conditions. Policy can not be static; it must be flexible in order to adapt to the changing conditions that it and the external environment generates.

APPENDICES

Appendix 1

1.1 Internet Survey

Dear Planning Professional:

This "general" e-mail is a request for assistance regarding thesis/practicum research. My name is Victoria Brown and I'm about half way through a U of M, MCP practicum addressing brownfield site liability and risk assessment. The client, the City of Winnipeg, is interested in defining its liability when owning a brownfield site. The paper will address legal, environmental and, to limited extent, economic liability. Quantifying the economic liability is difficult given the lack of data about the number of sites and their degree of contamination. My advisor is interested in how the (environmental) risk assessment and risk management processes can be applied to brownfields redevelopment decision-making systems, at the municipal level. Generally, it is making for a long, yet interesting practicum.

SO... now I need your help. Not being very satisfied with the limited information about Canadian brownfield site research, I'd like to request comment from each of you regarding the POLICY and PROCEDURAL changes that have been implemented in your city regarding brownfield site management and redevelopment. At the end of this e-mail a series of questions are listed. However, if you have any printed material that you might think is pertinent to this research would you please be so kind as to send a copy to:

Victoria Brown
#604 585 River Avenue
Winnipeg, Manitoba
R3L 2S9

I have read most of the CCME materials and participated in the Round Table on Brownfield sites. I understand the Golden Commission made reference to brownfield redevelopment as part of Toronto's downtown renewal plans. Duncan Fraser, in Edmonton, has been very helpful with the APA work on Environmental Management Guidelines. Now I'm looking specifically at brownfields in urban settings, preferably city-owned ones.

Barring any lack of protection caused by hackers, the responses you send will BE REGARDED AS CONFIDENTIAL, unless you state otherwise. I am looking for general trends or patterns that Canadian cities are displaying regarding brownfield site redevelopment/management.

The means by which you were selected was rather random. Approximately a year ago, several Canadian and American cities/agencies were contacted by phone, using the CIP Directory as a guide. Hoping that more Canadian work has been done, an internet scan was conducted using the Canadian WWW Central Index, sorted by Cities and by type of service, in conjunction with the Canadian Internet Handbook Directory. If your city page made reference to planning with the environment in mind, then the information was downloaded and a contact was sought, that being you.

Now, those questions. Would you please comment whether or not your city has addressed any of these issues. I'm looking for work in progress as much as completed initiatives. Only brief descriptions are needed given the breadth of the questions:

1. Has your city conducted any research or commenced policy review/implementation regarding:

    - brownfield sites owned and

- identification of existing brownfields?

If so, please describe the work and the types of liability your City identified:

2. Has the city been acquiring more brownfield sites due to tax foreclosure or has there been an impact to the assessment values of brownfield sites, thus affecting tax revenues? If so please describe the impact to the city:

3. Has the research or policy review addressed the long term planning issues surrounding the POTENTIAL brownfield effects of:

   - "brownlining" by banks,
   - "brown-belts" developing due to unsuitability for redevelopment (fear of lawsuits),
   - new zoning designations for land that meets a specific level of remediation and is then locked into a specific use,
   - lender liability - when the City acts as a partner in a project, such as the redevelopment of a warehouse into social housing?
   - If so please describe the City's response to managing these issues:

4. Has your city researched and/or implemented environmental risk assessment protocols for sites known or perceived-to-be contaminated - this may include Phase 1 site assessment for ALL development approvals. If so, please describe what type of risk assessment is conducted, by whom and what is done with the information - how is it used to make planning decisions:

5. Has your city researched and/or implemented a risk management system regarding brownfield sites? If so, what decision-making system is/will be in place? Is this based on a due diligence defense rationale:

6. Has your city/ province addressed the need for database management of brownfield sites, and if so how - for example designation on a land title, or like Calgary's Environmental Site Information Management System?

Thank you, for taking the time to read this lengthy e-mail. I hope you have the opportunity to respond, and I look forward to your comments. Would you please respond to umgraefe@cc.umanitoba.ca by April 30th.

Sincerely,

Victoria Brown
MCP Student
University of Manitoba
Advisor: Dr. Ian Wight (jwight@cc.UManitoba.ca)

* Please refer to 1.5.2 for results.

1.2 Example of Exploratory Interview Questions and Written Request for Input

March 19, 1997

Chris Knoll
Senior Planner
City of Winnipeg - Community Services Department
395 Main Street
Winnipeg, Manitoba
R3B 3E1

Dear Chris:

The following is an extract from a follow-up letter being sent to the National Round Table on the Environment and the Economy, after participating in a Brownfields session approximately a month ago. It provides background on this research. The information concerning the City of Winnipeg follow, at the end of the letter. Thank you, for taking the time to help with this, I appreciate your efforts. First, is a definition of brownfield sites:

> A brownfield site is a site or a portion thereof that has actual or perceived contamination and an active potential for redevelopment. To the owner of the contaminated site, clean-up is often necessary to sell the property and return it to productive use. To the public, clean-up of contaminated industrial sites is crucial to reducing economic, environmental and health problems. Unfortunately, many disincentives inherent in existing... policies prevent this. As a result, valuable industrial land remains contaminated, unused, or abandoned, denying communities the direct benefits of jobs and taxes, as well as complementary economic activity. [14]

"...Being unsure of the future or past Round Table participant composition, I would like to offer some more background on brownfield sites from a municipal perspective. Municipal governments face risk and liability as a consequence of brownfield sites when they are the owner (direct liability) and when sites present problems to the general public (risk). Immediately a municipal government is legally and economically liable for sites they own. Essentially a city's liability includes:

a) legal liability - as determined through Bill 34 in Manitoba and as a result of policy precedence. The city must ensure due diligence is practiced, including informing the Council of pertinent issues and practices to ensure, as Directors of a Corporation, they are not held liable for the actions of their staff. This liability most directly applies to properties owned by the city, say its land fill and works yards or property is has purchased. Through indemnities it can also be made to assume liability and risk for land acquired by purchase, expropriation or easement, for example when land is needed for a new thoroughfare or bridge. The new Act does exempt the city from liability when a property is acquired because of tax sale;

b) economic liability, which can include,
- clean-up costs for past practices on the sites owned by the city,

[14] Barr Engineering; "Brownfield Redevelopment"; Internet Source; created Dec. 4, 1995.

- devaluation of property;
- lender liability when in a joint-venture agreement (especially given the recent trend for the retro-fit of older industrial buildings into social housing projects or through such economic development funds like the Winnipeg Development Agreement);
- lost opportunity costs because of site perception thus having poor development opportunities and potential de-valuation of neighboring sites affecting area aesthetics;
- lost tax and permit revenues,
- long-term affects of neighbourhood deterioration,
- administrative costs to monitor, map and register these sites;

c) environmental liability is determined by performing risk assessments of the site using say three scenarios 1) Do nothing, 2) Green It, 3) Develop it. The risk assessment addresses the human/public health issue as well as long term impacts on the ecosystem - environmental planning;

d) urban development. These include the long term and cumulative consequences of a do nothing approach, whether the sites are owned by the City or another agent, and include

- lender liability (City as joint venture partner),
- brownlining/ brownbelts leading to development on greenfield sites or in neighboring municipalities and the associated infrastructure costs for both the new developments and the deterioration of the old infrastructure,
- affects on a unified zoning by-law possibly creating brownfield ghettos as future uses are tied to site clean-up measures or perceptions of future legal action due to uncertain legislative and regulatory environments;
- design and technical changes to the infrastructure and duct systems to ensure leeching is contained to a) mitigate further leeching and b) protect equipment and environmental systems such as riparian corridors.

Part of the problem is the liability (legal & economic) the City has when it owns a brownfield site, but in the long term it also owes a duty of care to the public for the planning and management of these sites because collectively they affect urban land development planning and practice. A municipal government's obligation to address brownfield sites rests in two things, first the reactionary posture it must take as a consequence of new second and third order government legislation, regulation and policy - including downloading, and second its own policy, namely the municipal plan. The obligation is owed to the public for land owned by the City and within the City's boundaries because of public health issues. Although a plan does not require a city to actively do something, city policy and programs cannot contravene its municipal plan.

With respect to the municipal plan, Plan Winning: Toward 2010, makes specific reference to "Environmental Stewardship" as a cornerstone of land management practices within Winnipeg and through City operations. Essentially the City owes a *duty of care* to its electorate/ rate payers and therefore should address contaminated land management because of environmental and public health issues. The same principles are exemplified in sustainable development practices and legislation. By ignoring or

failing to address an issue the City is aware of, it may be accused of a malpractice much like a doctor who fails to act on a patient's health issue (s)he is aware of. The terms malfeasance and beneficence certainly apply. Essentially, to do harm and to do good, respectively, as a public official. Or as the physician's creed suggests, to do no harm and act in the best interests of your patient (client/public). Liability need not be defined simply in legal or economic constructs, but in moral ones too; such as having responsibility or obligation for a troublesome thing.

Best practices, that are in the best interest of the public, leads to the need for a long-term, comprehensive approach to brownfield site management. However, this does not come cheaply, the costs include:

- data requirements for informed decision making, including the costs for technology and staff;
- training of municipal staff or contacting for site Risk Assessments;
- training of municipal architects and planners to encourage site specific development options that create the best product, at the best cost while maintaining public health - i.e. on the most contaminated spots locate an underground parkade because the soil needs to be removed for treatment. This may require variances to existing codes and/or adjustments to design;
- appropriate development standards for new/re-newed infrastructure to ensure they do not facilitate leeching, acting as pathways of least resistance;
- public education to mitigate reactionary postures by private sector stakeholders (banks, developers, industry and the general public);
- a planning paradigm and practice shift from a zoning focus for land use and management to include an environmental (ecosystems) focus;
- a probable departure of developers and businesses to other communities/regions with "less stringent" development codes and criteria, perhaps due to more greenfield space.

These are some of the planning and policy issues that municipalities must face as brownfield sites gain greater awareness and as new legislation, regulations and policies are implemented. The municipal economy is key to the redevelopment component of brownfield management policies. Basically, if the local economy is not active, like Winnipeg, then there is no interest to redevelop the sites, especially when there is plenty of greenfield spots available within and just surrounding the city. In active economies like Vancouver, Calgary and Toronto the cost of site remediation is a cost of doing business. But as the economy changes or is less robust, it must look to at providing incentives to attract development on these sites which may prove difficult as municipal revenues decrease. In Winnipeg's case, because little development is occurring the strategy changes to one of what do we do with the site to *do no harm and act in the best interests of the public.* Who pays, now that a city is cognizant of a problem? The taxpayer.

Further questions regarding municipal liability and brownfield sites need to be researched, including:

- It makes sense to me that brownfield site location would mimic the concentric growth patterns of the cities. If this is true it will seriously affect the value and redevelopment costs, including time, for central business district properties. A national comparison of mapped data may illustrate patterns and extent of brownfield site location. Thus a consistent data base is needed, as is a

consistent technical definition of brownfield site to ensure the same units are being compared. As Joe indicated if perception, not contamination, is the problem then a different strategy and data set are appropriate;

- Can or has a municipality been sued for development approval on a brownfield site, especially when the contaminated location requires further remediation on built-up land, especially with changing clean-up criteria and changing regulatory environments;
- Will there be an effect on municipal bond ratings if the municipality owns significant amounts of brownfield sites;
- If land use is frozen, due to clean-up criteria, will brownfield ghettos emerge and what effect will this have on future zoning practices and development patterns?

It is clear there is a growing brownfield problem across Canada, because municipalities are being forced to react to Provincial and Federal agendas. The brownfields agenda has been influenced by the banking industry and lawyers without rational or comprehensive assessment of the effects of new legislation on other agents, such as cities.

My practicum title is "Municipal Brownfield Site Redevelopment Planning: Liability, Risk Assessment & Risk Management Strategy for the City of Winnipeg". It attempts to answer, one of many research questions surrounding the brownfields issue: *What liabilities does the City of Winnipeg face when it owns a brownfield site and how can development risks be managed?* Essentially, it defines the liability the City faces given:

- Bill 34 and;
- what select other Canadian cities are doing concerning brownfield site management.

The risk assessment and risk management material addresses a series of policy options. The theoretical background addresses law, urban development ethics and sustainable development. Now I need to gather data on Winnipeg, specifically information on:

1) Winnipeg facts - i.e. size, population, growth and issues;

2) Development permit statistics for the past 5 years to determine where development is located and what is being developed - this will help determine an immediate strategy for two selected sites - DOMTAR & Union Stock Yards;

3) Some site information. on DOMTAR & Union Stock Yards i.e. maps and assessment values for the past five years;

4) a development approval protocol to determine if environmental assessments are conducted;

5) a (hopefully mapped) list of city owned - landfill, roads, parks, easements, etc. - properties that are contaminated and/or abandoned;

6) a list of properties acquired by tax sale, for the past five years to see of there is a pattern emerging regarding brownfield sites - which ones can the City re-sell and which ones it can/ will not ;

7) a definition of the property acquisition and disposition process to determine if any considerations are being made about contamination.

Again Chris, thank you for taking the time to help me with these questions. If you do not have the information, would you please suggest an appropriate contact.

Thank you,

Victoria Brown

Appendix 2 - CCME Risk Assessment Guidelines

(Source: CCME: A Framework for Ecological Risk Assessment: General Guidance: 1996. p.p. 5 & 27)

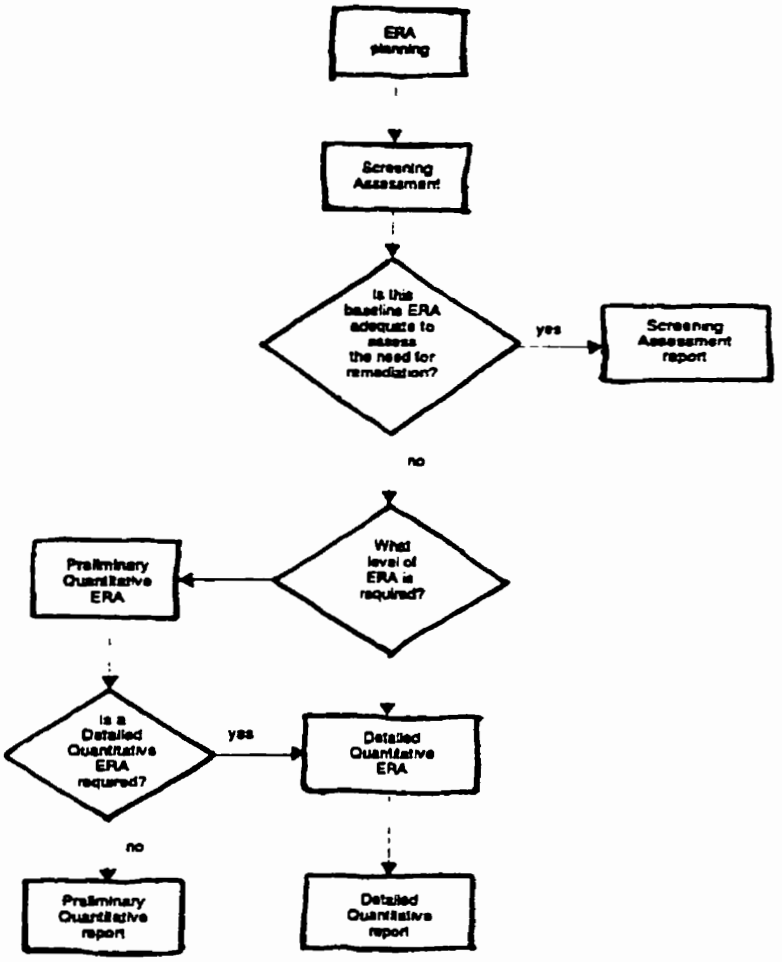


Figure 1. Framework for tiered ERA.

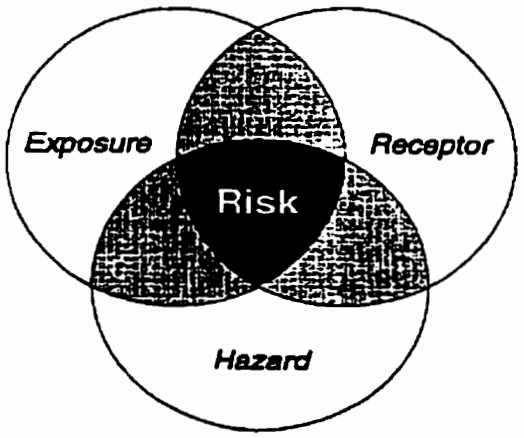


Figure 2. The relationship of the components for ERA. The same relationship exists for each level of ERA.

Table 8. Summary of Tasks Comprising the Components of a Detailed Quantitative ERA

Sources of Information
• detailed quantitative methods • field investigations, monitoring data, and detailed computer models • models to predict exposure, hazard, and risk for remediation alternatives as well as for existing conditions for multiple exposure pathways/chemicals
Receptor Characterization — **See CCME 1996b, Appendix B**
Detailed study • analyze community structure in depth • improve accuracy and precision of quantitative information collected in the Preliminary Quantitative ERA • measure ecosystem functions in the field • assess successional trajectory following remediation
Exposure Assessment — **See CCME 1996b, Appendix C**
Selection of target chemicals • revise or confirm from Preliminary Quantitative ERA; if necessary, use advanced quantitative fate models incorporating most important pathways of individual chemicals and mixtures
Contaminant release/transport and fate • combine detailed models with direct measurement (site-specific monitoring data) • apply site-specific complex models (e.g., GEMS, EXAMS) • explore long-distance transport and long-term persistence
Exposure pathway analysis • integrate exposure from several pathways • confirm pathways through direct measurement • conduct advanced quantitative fate models incorporating most important pathways of individual chemicals and mixtures
Aquatic and/or terrestrial exposure • integrate detailed exposure models with transport and fate models • make quantitative estimates of exposure from different pathways • evaluate food-web models, if appropriate
Uncertainty analysis • provide estimates of uncertainty for exposure • use Monte Carlo simulations, sensitivity analysis, calibration with monitoring data where adequate data distributions exist
Hazard Assessment — **See CCME 1996b, Appendix D**
• re-evaluate measurement and assessment endpoints • use sophisticated hazard assessment methods (e.g., mesocosms, microcosms, QSARS, field experiments, growth, reproduction tests with indigenous species, community/ecosystem assessment) • establish extrapolation relationships, if necessary, to reduce uncertainty • assess mixtures and multiple exposure pathways, as applicable • develop well-documented exposure-response relationships for samples collected at the site • evaluate exposure-response relationships for survival, growth, and reproduction of all VECs • evaluate exposure-response relationships for population(s), community and/or ecosystem • estimate uncertainty
Risk Characterization — **See CCME 1996b, Appendix E**
• use population, community, and ecosystem models; in rare instances, use quotient methods • provide probability of several effect magnitudes • estimate uncertainty and sensitivity • indicate major sources of uncertainty for any predictions; provide a monitoring program to verify and evaluate these predictions • make quantitative estimates of ecological risk

Appendix 3 - City Of Winnipeg Act Sections Relating To Brownfield Sites

Figure 8:

PART 6 - ACQUIRING AND DISPOSING OF LAND

- 158 (2) - City may dispose of excess land
- 159 (2) - Power to redevelop
- 159 (3) - Power to acquire lands for assembly

PART 7 - ASSESSMENT

- 176(1) - Change of assessment rate due to land value
- 182(1) - Premises occupied for part of the year

PART 11 - BUILDINGS, WORKS AND SERVICES

- 393 - Acquisition of Buildings
- 394(3) - Acquisition of stocks by the City

PART 13 - HEALTH and SANITATION

- 433(1) - General Power to make regulations
- 433 (2) f - Content of Regulations
- 437.1(2) - Unsanitary Buildings

PART 15 - BUILDING STANDARDS

- 472 (1) - Permit to Construct, Demolish or Occupy a Building
- 473 (1) - Powers of Council Respecting Buildings
- 480 (1) - Dangerous Buildings
- 483 (1) - Fixing a Period of Time for Repair
- 493.1 - Liability of City for Negligence

PART 20 - PLANNING AND DEVELOPMENT

- 576 (2) Content of Plan Winnipeg
  - a) sustainable use of land and other resources
  - b) sustainable development
  - c) physical, social, economic, fiscal and environmental conditions and trends within the City
  - e) provision of services and facilities with respect to
    - i) public health
    - iv) control and abatement of pollution and activities detrimental to the environment
  - g) revitalization of commercial and industrial areas
  - j) provision and coordination of programs respecting economic, social and physical environment and health, welfare and safety of people

- 581(2) Provincial Interest in Planning and Development
  - a) protection and management of the environment
  - b) sustainable economic growth
    - c) supply, efficient use and conservation of resources
    - f) fiscal well-being of the City

Appendix 4 - Interview with an Environmental Planner

April 23, '97 Telephone Conversation with Garth Clyburn
City of Edmonton - Principal Planner

• There has been more press coverage of the brownfield problem in Calgary, relative to Edmonton. The problems in Calgary are more serious in their downtown core with large post-industrial use sites. Because the soil is sandy the leaching problem is greater in Calgary, as opposed to Edmonton with a clay base, and the contaminants in the downtown sites are leaching into the Bow River. Calgary's politicians and administrators are more aware of brownfield issues than are Edmonton's.

• FROM AN EDMONTON PLANNING and DEVELOPMENT APPROVAL PERSPECTIVE
- The ownership issue has shifted to the Asset Management division.
- Contaminants are leaching onto public rights of way which is an Engineering and Transportation Department issue.
- The City has liability due to:
    a) migration onto private property
    b) worker health
    c) infrastructure decay (utility corridors)

A coordinated multi-stakeholder response is being sought to manage the leaching problem.

• Edmonton has acquired 270 industrial/commercial properties from tax foreclosure.

• Changes to the Municipalities Act made sure that the City is NOT liable for remediation of contaminants on sites acquired due to tax arrears. However, the sites cannot be ignored because of due diligence and potential civil suits for failure to manage the problem.

• DIDSBURY CASE - The Town refused to take a property from its receiver. The receiver was suing the Town to assume the site as part of the tax arrears foreclosure process. The receiver lost the court battle, however the town did incur legal fees as a result. As well the receiver won on a clause stating the Town would have to assume the tax arrears for the site. By testing the right of way to determine if leaching was occurring (if yes, then contaminants were present), the Town opened up the issue simply by practicing due diligence. IF A MUNICIPALITY IS GOING TO PRACTICE DUE DILIGENCE THEN IT MUST HAVE THE BUDGET TO BACK UP AND ACT ON ITS FINDINGS, NOT TO DO SO IS A FORM OF NEGLIGENCE. This site is creating a split in the town as the previous owners are prominent businessmen, yet the site is creating a doughnut effect in the middle of the downtown.

• In Edmonton, the practice is to assume contamination until proven otherwise - especially on former rail and airport lands.

• Calgary has the issue of contamination in their area structure plans.

• Edmonton has a database from Alberta Environmental Protection. 90% of the identified sites are due to gas leaks and are known sites. Calgary's database is bigger, with speculative sites based on past history. They will intervene on various types of permit requests. There is nothing in the EPHA stating the city must maintain such a database. Edmonton is more reactive to the issues, relative to Calgary which is being more pro-active.

• Edmonton is pro-active on screening and intervening on re-zoning requests or subdivision approvals. Guidelines to frame the contamination review process are essential in order to frame a certainty so developers know when the City will intervene. The Act states the City must ensure "sites are suitable for development" thus the environmental condition of land is regardedas a public health and safety issue.

• Edmonton has a "Right to Information by-law" whereas Calgary does not.

•The Planning Act is now part of the Municipalities Act. The City is able to intervene on bylaws through case law and statute precedence. It is open to each municipality to define how they want to act regarding contaminated sites. Some towns approach this from an economic perspective while others approach it from an environmental perspective, not to mention differing land use patterns in the various municipalities. Therefore, lack of consistency makes it difficult for developers.

•Regarding data, there was 3-3.5 years of work completed to interface the City and Provincial land data bases. However, the freedom of information and the right to privacy issues created problems. The Provincial Land Registry information was easily accessible, however there has been a 180° turn in the issue. Alberta Environmental Protection Act cannot provide commentary until the freedom of information right to privacy case has been settled. The city is in a catch 22 regarding data and mapping: they need the information to make decisions but are either not allowed access to the required information or able to release it. Even though the city is not dealing with potential or suspect sites a protocol in needed because a shadow is being cast on suspected brownfield areas.

• The BC experiment may work well if there is a strong Provincial push/support.

• The Safety Code Act: The City planning department was using information from the Fire Department's database, until the City lawyers said no, due to a right to privacy.

• Safety Code Act and the Privacy Act are in conflict. One will have to be amended and appeals will be the only means of ratifying the issue of a right to privacy Vs a public's right to information.

•Clean-ups are driven by:

1. need to sell the property - economics
2. need to gain planning approval - municipal (planning) policy

•Last year the Assets Management Department commenced screening on sites that come up for auction due to tax arrears. They complete a preliminary assessment. If they feel more screening is required, permission to enter the property is gained. It was recommended that 2-3 sites not be acquired due to contamination concerns. The City can try to go after other assets in the province. THE CITY HAS AN OPTION TO GO AFTER A SITE OR NOT AND THEN INCUR THE TAX LOSSES.

•If Provincial funds are created for site clean-up it will most probably be for USTs and focus on rural, Mom and Pop gas stations. The municipalities should get special dispensation from these funds for orphaned sites.

•For a development/subdivision approval or re-zoning application the Land and Housing Department conducts:

1. a preliminary screening (60% of a standard Phase I Assessment). It is a property line inspection, so not to violate trespass laws. Because of the number of sites to be reviewed, the City can not check too deeply into site history. If there are further questions then,
2. a complete Phase 1 assessment is conducted.
3. if further questions arise, due to the data, then subsequent Phase 2 and 3 assessments are conducted.

Items 1 and 2 are conducted by City staff; item 3 is contracted out.

•In the case of an expropriation the same process is used. Older excess lands from transportation corridors are proving the most difficult City property to sell due to contamination problems.

•There is a trend for people to challenge their assessments due to contamination. Generally their properties are being reassessed at lower values. Despite this admission the City cannot force the owner to remediate until the owner seeks a permit from the City. The City has two disclaimers on the development approval applications, as a consequence of this. This trend reinforces the issue of buyer beware.

• There have been a couple of out-of-court settlements for Tellus for damages to their lines from leaching contaminants. Property owners are opting for this rather than court battles.

• Subsurface clean-up guidelines are an issue. There are three general land use classifications in the City: a) residential, b) commercial and c) industrial. However, there are a variety of sub-classifications within each category, for example a commercial zone may be designated for day care use in which case the sub-surface clean-up standards must meet a residential standard. There has been a problem with environmental consultants who only look at the broad land use classification and then use the CCME guidelines, not consulting the City-specific land use guidelines. Therefore, because of the variety of commercial uses in the City the CCME guidelines are not necessarily stringent enough. Consultants are not looking at a range of uses relative to the current use. The PROBLEM is how to get the message out to the private sector consultants and the Banks.

• The City uses the Canadian Standards Association guidelines for Phase I assessments. The City staff provide information to land owners on what is required in a Phase I and what to look for regarding their sites.

• The Environmental group at the Planning Department was set up in 1992. They see the City dividing the brownfields management into three areas:

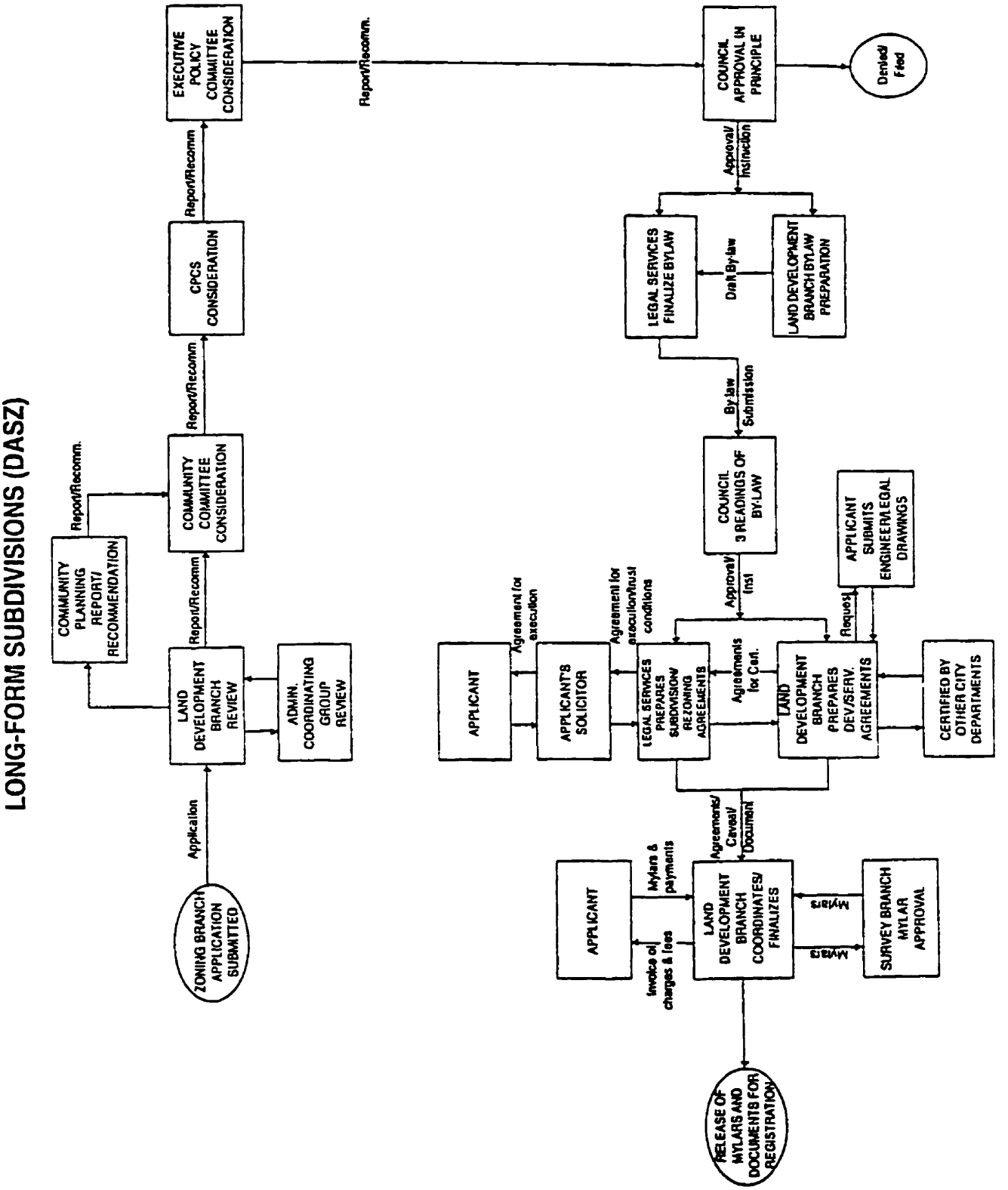
1. the planning and approval process
2. migrating contaminants and rights of way
3. city-owned lands

• The Environmental Planning group as well as the brownfields issue is evolving. Certainty is a problem because of constant information, technology and regulatory changes. There is an uneven playing field since not all municipalities have the same resources.

• A municipality must decide before-hand how far it is prepared to go with the results of gathered information or research. There is no room for changing minds due to political shifts or uncertainty regarding policy. The City must commit and decide how much staff to allocate to the matter. Rules of conduct between the City, the Health authority and the Province must be ratified - who intervenes and when?

Appendix 5 - City of Winnipeg's Long-Form Subdivision Approval Process Flow Diagram

(Source: City of Winnipeg, Land and Development Services Department. 1998.)



Appendix 6 - Civic Administration Policy: Environmental Liability

January 7th, 1993 Cont'd

93/17

From the Commissioner of
Finance and Administration,
File Nos. C/FP-1 & C/E-3

Submitting a report from the Director of Land Surveys and Real Estate Department, dated November 20th, 1992, regarding a proposed environmental issue policy and procedures.

The Director recommends that the following recommended policy statement be approved:

A. "For the purpose of identifying risk of liability arising from ownership of land or any interest in land due to the existence of possible existance of air, soil or water contaminants which are or have the potential to be harmful to human health, the City shall, prior to transacting in interests in land, conduct an environmental assessment of such risk where there is a reasonable expectation that such contaminants exist."

The Director also recommends approval of certain steps in order to implement the above policy.

Moved by Mr. Carroll,
That the above policy statement be approved;

That the following be approved in order to implement the above policy:

1. The Director of Land Surveys and Real Estate, on behalf of the originating department shall conduct Phase I environmental audits.

2. The originating department shall be responsible, in consultation with the Technical Advisory Committee, to retain consulting environmental experts to carry out Phase II environmental audits and Phase III remediation.

3 That funding in the amount of $10,000 be provided to education and training of staff from the Land Surveys and Real Estate Department and the originating departments in order that the staff shall be familiar with the requirements of Phase I environmental audits.

4. If any of the above studies indicate a need for remedial action, the originating department shall be responsible for coordinating same.

5 A Technical Advisory Committee shall be established with a mandate to review and make recommendations to the originating department with regard to environmental audits.

6. The City Solicitor shall include in all future leases, purchase and sale agreements, and any other agreements respecting interests in land, terms and conditions which shall indemnify the City from all future claims and "Orders to Remediate", to the extent possible.

7. The results of Phase II environmental audits shall be reported to the Province of Manitoba and/or the Government of Canada.

8. The Technical Advisory Committee shall investigate cost-sharing of remediation of contaminated sites with other levels of government, and determine programs, policies and ability to participate.

9. All future planning requiring land acquisition shall take into account need (or possible need) for environmental audits in order that proper budgets and timelines are prepared.

10. If and when the position of Environmental Coordinator is filled, said position shall be responsible for the administration of all matters relating to environmental issues.

Carried.

Appendix 7 - Suggested Readings

To assist with future research, the following internet sites and publications are worthy of review. They are in addition to the items listed in the Bibliography. Each of the internet sites provides links to other related sites; they include:

Name	Address
US EPA - OSPS Brownfield Page	http://www.epa.gov/brownfields/
The TRIANGLE Resources Home Page	http://tritsoc.soc.titech.ac.jp:80/tritsoc/higuchi-lab/han
Environmental Professional's Home Page	http://www.clay.net
NRTEE - English Home Page	http://www.nrtee-trnee.ca/english/index.htm
Canadian Environmental Law Association	http://www.web.net/cela
Canadian Institute for Environmental Law and Policy	http://www.web.net/~ciclap/index.htm
Major Industrial Accidents Council of Canada	http://www.marcc.ca

Suggested readings include:

- Canadian Council for the Ministers of the Environment. National Contaminated Sites Remediation Program. Winnipeg, Canada:
  - "A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines". 1996;
  - "Guidance Manual for Developing Site-Specific Soil Quality Remediation Objectives for Contaminated Sites in Canada". 1996;
  - "National Classification System for Contaminated Sites". 1992.
- City of Chicago. "Final Report and Action Plan". Brownfields Forum: Recycling Land for Chicago's Future. Chicago, USA: 1995.
- Larson, M. and Harley, M. "The Urban Environment and Economic Development: Brownfield Strategies for Midwestern Cities". Minnesota Environmental Initiative. Minneapolis, USA: no date.
- National Round Table on the Environment and the Economy. State of the Debate: Greening Canada's Brownfield Sites. Ottawa, Canada: 1998.
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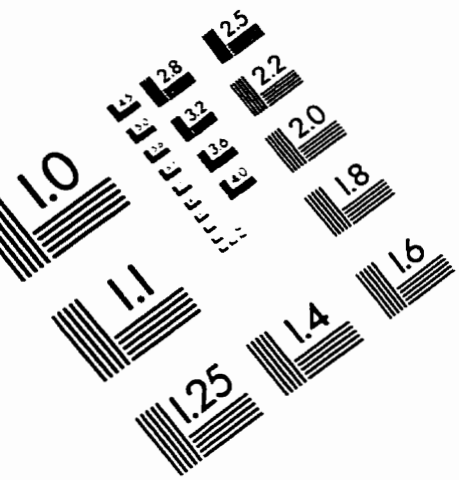

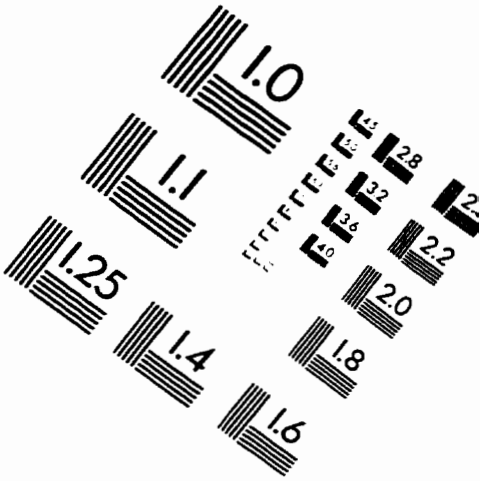

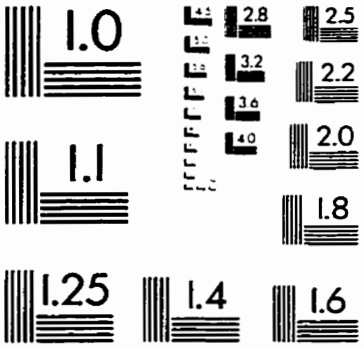

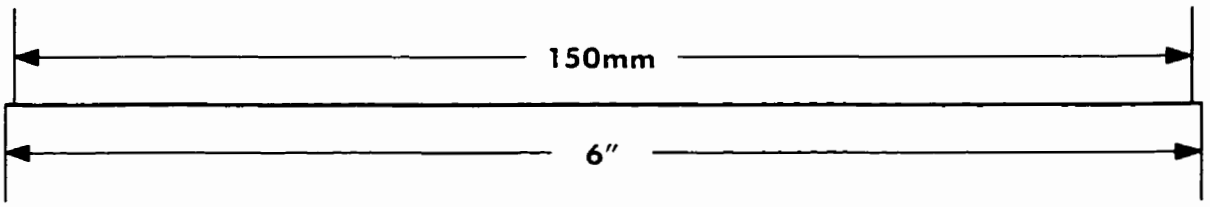

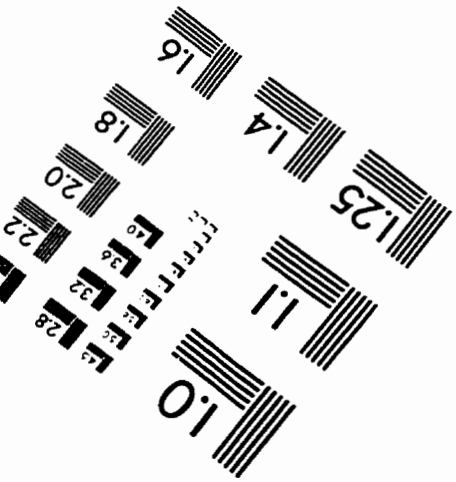

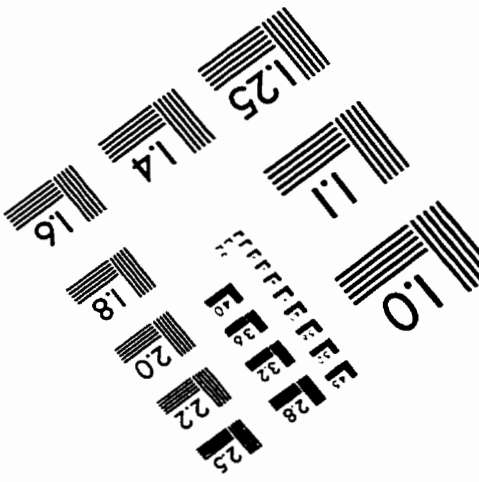

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