REMEDIATION AND REDEVELOPMENT OF FORMER INDUSTRIAL SITES

ICURR LITERATURE SUMMARY NO. 4

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BACKGROUND

Many North American cities are now addressing some of the more prominent physical legacies of industrial activity and economic change, such as the existence of vacant industrial buildings and warehouses, contaminated land and abandoned or under-utilised industrial sites in central areas. The remediation and redevelopment of these former industrial sites represents an urban planning issue of considerable significance for local governments. Many former urban industrial sites are already serviced by basic infrastructure and often located in central areas with good access to both services and transit. As a result, former industrial lands often represent an important resource for stimulating local economic development, creating new residential opportunities, revitalising inner-city areas, and reducing suburban sprawl and the loss of agricultural lands.

To realise these opportunities, however, municipalities must overcome financial, regulatory and legal barriers that make the redevelopment of former industrial sites both a challenging and time-consuming process. In addition, redevelopment efforts are often complicated by the fragmented roles and responsibilities at federal, provincial or municipal levels. In the case of contaminated brownfield sites, there are a number of important unresolved issues, particularly regarding approaches to liability and remediation. Not surprisingly, greenfield redevelopment is generally seen as being an easier, cheaper and more predictable alternative to the remediation and redevelopment of former industrial sites.

Increasingly, urban decision-makers recognise the environmental, economic and social benefits linked to successful brownfield redevelopment. Recognition of these benefits has resulted in the formulation and implementation of a range of planning, financial and legal policies to encourage the remediation and redevelopment of brownfield sites. In practice, it appears that the most effective efforts tend to involve a comprehensive policy approach that integrates both remediation and redevelopment strategies, and differentiates between policy responses based on risk assessment of site conditions and uses.

This summary presents a selection of documents that present many of the key opportunities, challenges, issues and policies related to the remediation and redevelopment of former industrial sites. Drawn from Canadian and American experiences, these documents are organised under the following three categories:

- general overview.
- remediation.
- redevelopment.

ORGANISATION

This document pulls together a selection of existing resources on the remediation and redevelopment of former industrial sites available through the ICURR library collection. In selecting publications for inclusion in this document, the following criteria were considered: currency, Canadian content or relevance, and the potential for practical application by municipalities. Entries are presented in chronological order, beginning with the most recent works in each section. While this summary of resources available on the remediation and redevelopment of former industrial sites is wide-ranging, it is by no means exhaustive.

ICURR LITERATURE SUMMARIES

ICURR Literature Summaries are an information service provided by ICURR. The intent of these summaries is to provide an overview of key resources available through ICURR on topics of interest and relevance to Canadian municipalities.

OTHER ICURR LITERATURE SUMMARIES

June 1998 *Alternative Guidelines and Practices for Municipal Planning and Development*
July 1998 *Healthy Cities, Healthy Communities*
July 1998 *Performance Measurement and Program Delivery*

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GENERAL OVERVIEW

National Round Table on the Environment and the Economy. 1998. *State of the Debate on the Environment and the Economy: Greening Canada's Brownfield Sites*. Ottawa: NRTEE. (64 pages, bibliography, ICURR Doc. new, English and French)

Purpose

To identify barriers associated with the clean-up of former industrial sites and propose possible solutions and recommendations to advance the redevelopment of these sites, and to examine the state of information on the environmental condition of these lands and make recommendations for improvement.

Key Definition(s)

Brownfield sites are abandoned or under-used properties where past actions have caused real or suspected environmental contamination. Mostly located in urban areas where existing municipal services are readily available or along transportation corridors, these sites possess good potential for other uses and usually provide economically viable business opportunities (p. 4). An *orphan contaminated site* is one for which no viable responsible party can be located (p. 7).

Summary

This document is part of the NRTEE's series of *State of the Debate* publications. This particular report is the result of extensive consultations with major stakeholders and experts in the field and relevant research on current practices and opinions regarding the redevelopment of brownfield sites. The document also builds on the recent work of the Canadian Council of Ministers of the Environment (CCME). True to its title, this document provides a comprehensive overview of the state of current thinking on the varied issues, barriers and proposals for change related to the redevelopment of brownfield sites.

Key Findings, Conclusions and Recommendations

Across Canada, there are thousands of abandoned contaminated sites, the legacy of a century of industrialisation. These sites pose health and economic threats. Many of these sites have not been identified because of insufficient information as to their environmental condition.

The report supports the 13 principles for a consistent approach to contaminated site liability developed by the CCME in 1993 (see Delcan et al, 1997). The report also underscores the importance of creating the "right" legal framework and insurance products to create a climate that encourages investment, remediation and the productive re-use of former industrial sites by the private sector.

The report presents a summary of the key barriers to redeveloping brownfield sites, along with recommendations to remove or mitigate these barriers (Appendix A). Some of the anticipated benefits of implementing these changes include: the renewal of urban cores, restoration of tax bases, reduction in urban sprawl, alleviation of public health concerns, attraction of investment, development of decontamination techniques with export potential, creation of employment, and the prevention of future contamination.

PART 1: introduction; PART 2: overview of brownfield redevelopment and improving site-specific data on the environmental condition of land; PART 3: benefits of brownfield redevelopment and improving site-specific data on the environmental condition of land; PART 4: a synopsis of background papers; PART 5: results of the NRTEE's national multi-stakeholder consultations; PART 6: suggestions for stakeholders; PART 7: recommendations; PART 8: conclusion.

Platt, Roger. 1998. Recycling Brownfields. *Urban Land*, 57(6):30-35, 96. (7 pages, ICURR Doc. UH 407, English)

Purpose
To demonstrate the importance of recycling urban brownfields and the potential of constructive policies that integrate environmental and economic objectives to contribute to this redevelopment process.

Key Definition(s)
The 1980 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) is more commonly known as *Superfund*. While Superfund provides funds for a portion of the clean-up of the most polluted sites listed on the national priority list, CERCLA places responsibility for most clean-up costs on the owner or operator of these sites (p. 32).

Summary
This article reviews both the opportunities and challenges associated with the recycling of brownfields in the United States. With presidential support, the redevelopment of brownfield sites has become a high profile political issue in the United States. The US Conference of Mayors recently made brownfield redevelopment its top legislative priority in Washington, and identified environmental liability issues as the most significant obstacle to the remediation and re-use of former industrial sites. To demonstrate the opportunities associated with the redevelopment of former industrial lands, this article includes a brief case study of the recycling of Collinwood Yards, a 780-acre former industrial site in downtown Cleveland that was recently transformed to a mixed-use redevelopment, combining a manufacturing plant, an inter-modal transit facility and additional industrial and retail space.

Key Findings, Conclusions and Recommendations
In arguing its case for the importance of recycling brownfields, the US Conference of Mayors emphasises the following points: (1) the failure to redevelop urban brownfields represents a significant loss of local tax revenues and economic development opportunities; (2) the difficulty of redeveloping brownfields and its connection to continuing suburban sprawl and loss of agricultural land; and (3) the availability of some public funds at the front end can be leveraged to stimulate private redevelopment projects.

While the intent of the 1980 Superfund was to introduce a “polluter-pays” legislation, the retrospective, joint and several liability imposed by the legislation has resulted in a “buyer-beware” perception that has thwarted market-led redevelopment efforts. As long as owners leave brownfield sites inactive (at least those not listed on the national priority list by the Environmental Protection Agency), they are not required to test or investigate contamination levels. As a result, many owners hold on to potentially marketable properties in order to avoid expensive litigation and liability issues.

At the state level, it appears that an increasing number of urban decision-makers are embracing regulatory incentives to encourage public-private co-operation, rather than litigation, to spearhead redevelopment efforts. State-led voluntary clean-ups based on this approach have resulted in the remediation of thousands of sites in the United States. In some cases, these programs approve clean-ups that involve less costly containment procedures rather than expensive treatment options. These procedures are commonly used in combination with deed restrictions that limit subsequent land uses to minimise human health risks.

The less stringent remediation action undertaken through voluntary clean-ups have been criticised by environmentalists. Even if voluntary in nature, environmentalists argue that the threat of future EPA action (“the gorilla in the closet”) continues to provide the real incentive for such clean-ups. Environmentalists also argue that many owners of seriously polluted sites will pursue such voluntary clean-ups to avoid the more permanent and expensive remedies imposed by a federal enforcement action.

Based on disagreements over the advantages and disadvantages of voluntary clean-ups, it has been proposed that the most seriously contaminated sites should be assigned to federal enforcement, and other sites left to state jurisdiction. The EPA has recently developed criteria for making such a decision. This policy acknowledges that higher-risk sites present different public policy challenges than lower-risk sites.

The issue of "finality" pertaining to liability issues however, continues to be a point of contention. In this respect, proponents of market-led redevelopment support the need for a single sign-off document for both state and federal liability to bolster investment in brownfield redevelopment by the private sector financial community by eliminating uncertainty regarding any future liability issues.

PART 1: introduction; PART 2: defining the issue; PART 3: owner liability under Superfund; PART 4: encouraging brownfields recycling; PART 5: the "finality" issue; PART 6: the path to progress.

Delcan Associates, Golder Associates and McCarthy-Tetrault. 1997. *Urban Brownfields: Case Studies for Sustainable Economic Development*. Ottawa: Canada Mortgage and Housing Corporation. (38 pages, bibliography, ICURR Doc. UG 238, English and French)

Purpose

To assist the Organisation for Economic Development (OECD), the United States Environmental Protection Agency (EPA), and the International City and County Managers Association (ICMA) in their efforts to identify solutions to the barriers involved in redeveloping former industrial sites, and to provide information on the current Canadian situation regarding legal and administrative frameworks, participants in the process, case studies and lessons learned.

Key Definition(s)

Contaminated sites or *brownfields* exist in virtually all settings in Canada, and may range in size from 0.1 ha to over 100 ha and often constitute prime urban development locations (p. 2). *Sustainable communities* emphasise the efficient use of land and resources, reduce consumption of materials and energy and encourage long-term social and ecological health (p. 3-4). *Risk Assessment/Risk Management* is an approach favoured by many practitioners that evaluates the actual human or environmental risk related to specific contaminated sites, taking into consideration the nature of contaminants in relation to the sensitivity of receptors and the exposure pathways (Executive Summary).

Summary

This report provides an overview of the current state of remediation and redevelopment of urban brownfield sites in Canada. It reviews both the administrative and legal framework in which remediation and redevelopment takes place, case studies, lessons learned and the various roles played by key participants in the process. The report situates the redevelopment of brownfield sites within the context of sustainable urban development. As both practice and policy, the redevelopment of former industrial sites emphasises the efficient use of land and resources, reduced consumption of materials and energy, and longer-term social and ecological health. Appendices to the report include a summary of existing enabling legislation at the federal level and in each province/territory, coupled with a review of various provincial/territory guidelines and policies.

Key Findings, Conclusions and Recommendations

To deal with contaminated former industrial sites in Canada, the federal and provincial governments established the National Contaminated Sites Remediation Program (NCRP) under the auspices of the Canadian Council of Ministers of the Environment (CCME) in 1989. While the program was disbanded in 1995, the Canadian Council of Ministers of the Environment (CCME) continues to undertake work in this area. In 1993, the CCME outlined thirteen principles to guide public policy on the remediation and redevelopment of contaminated sites (Appendix B). While these principles are not yet fully enshrined in federal or provincial legislation, they establish a framework to guide future policy and action.

As no single federal agency is responsible for maintaining a comprehensive inventory, it is difficult to estimate the exact number of contaminated sites in Canada. However, it appears that the rate of discovery of new sites exceeds the remediation of existing ones. Contaminated sites exist in both urban and rural areas in Canada. In urban areas, these sites tend to share the following characteristics: vacant buildings, part of a former industrial area, near waterways or a location linked to railways or harbours, close to the

downtown core, and the existence of infrastructure such as roads, water mains, and sewers. Many of these sites represent prime locations for redevelopment for the following reasons:

- *cost effective*: eliminates the infrastructure costs required to develop greenfield sites.
- *economic benefits*: increases municipal revenues through property tax assessment, and in some provinces, development charges and lot levies, and creates other economic spin-offs related to the redevelopment and re-populating of abandoned areas.
- *reurbanisation*: building up under-utilised areas of the existing urban fabric can help to revitalise derelict districts, support existing commercial enterprises and reduce the need for suburban sprawl.

The typical development approvals process in most Canadian municipalities is long and complex. In the case of redeveloping former industrial sites, this process may be further complicated by technical, financial, regulatory and legal issues related to contamination and the remediation process. Often, the technical and regulatory processes related to remediation are separate from the land use approvals process, resulting in greater delays, uncertainties and costs to the project proponent(s).

In most cases, the actual remediation of a contaminated site involves a four-step process:

- *Step 1 - Non-intrusive assessment*: interviews, review of historic activities, expected impacts of adjacent land use and location of potential "hot-spots".
- *Step 2 - Intrusive characterisation*: sub-surface investigation, sampling methodology and reporting.
- *Step 3 - Remediation, design and implementation*: completion of site management plan with description of site contamination, test required to verify remediation technology, regulatory approval requirements, communication plan, construction plan, site safety and other considerations. There are generally four management options for remediation: soil excavation and landfill disposal, in-situ treatment, ex-situ treatment, and in-place management.
- *Step 4 - Verification and compliance monitoring*: verify remediation process and ensure compliance with acceptable standards.

The report identifies 6 kinds of inter-related barriers to the redevelopment of former industrial sites, including: regulatory, technical/scientific, legal/liability, financial, communications and urban planning. With respect to urban planning barriers, the report highlights a number of significant points for municipalities:

- land use policies that encourage a long-term supply of land for new development discourage remediation and redevelopment of contaminated sites.
- a municipal inventory of contaminated sites can assist with land use planning.
- high clean-up costs are likely to encourage the development of higher cost housing.
- municipalities should consider incentives and policies to encourage cost-effective development within already serviced areas such as former industrial districts.

The report also provides a list of twenty-two best practices, along with suggested initiatives for their implementation, aimed at eliminating or mitigating barriers to remediation and redevelopment efforts (Appendix C). The report proposes the adoption of a risk assessment/risk management (RA/RM) approach as the most appropriate policy for facilitating site remediation efforts across Canada.

PART 1: introduction; PART 2: participants, their roles and relationships; PART 3: the Canadian legal and administrative framework for development; PART 4: case studies; PART 5: best practices; PART 6: conclusion.

Pepper, Edith. *Lessons from the Field: Unlocking Economic Potential with an Environmental Key*. 1997. Washington, DC: Northeast-Midwest Institute. (221 pages, ICURR Doc. UG 192, English)

Purpose

To analyse the most effective policies for stimulating brownfield redevelopment efforts, and to understand how certain projects overcame the barriers typically associated with redevelopment.

Key Definition(s)

Brownfields are abandoned or under-utilised, often contaminated, industrial properties (p. 3).

Summary

This study used a case study approach to explore and analyse the most effective ways of encouraging the redevelopment of brownfield sites in the United States. The study presents 20 diverse case studies to derive a series of "lessons learned" from previous experience in redeveloping brownfield sites. These lessons include innovative financing strategies, public-private partnerships and voluntary clean-up programs. Each case study explores key players, project background, the nature of redevelopment efforts, regulatory framework, financing, impacts, lessons learned and presents a contact person for further inquiries.

Key Findings, Conclusions and Recommendations

The redevelopment of brownfields offers an opportunity to address a range of important urban issues, such as inner-city decline, growth management, environmental clean-up, the containment of suburban sprawl and the creation of new employment, housing and municipal revenues while using existing infrastructure. Despite these potential benefits, brownfield redevelopment remains hindered by uncertainties associated with liability, cost, remediation requirements and implementation timelines.

Based on the case studies, the report documents the following "lessons learned" regarding key measures and factors that facilitated brownfield clean-up and re-use:

- *players and institutional capacity*: a pro-active local government or redevelopment authority to provide leadership and act as a catalyst for change, a consolidated brownfield project management team to work with the private sector, strong public-private partnerships to implement projects, and better co-ordination between local, state and federal government entities.
- *community involvement*: strong community participation and support for a project, a good fit between a redevelopment project and a community's vision for itself, and job training and employment prospects for the local community.
- *regulatory and legal issues*: availability of liability relief for both sellers and buyers of brownfield sites, financial incentives and simplified clean-up standards to encourage voluntary clean-up.
- *costs and financing*: piggy-back redevelopment with other public works projects to increase sources of funding, large developers that can manage the financial risks associated with some sites, public sector funds to facilitate the initiation or completion of particular projects, private sector financing and good location, and favourable market conditions that improve financing options, even if site is contaminated.
- *risk management and clean-up*: tailor clean-up standards to end use(s) designated in restrictive covenants, risk management practices that limit (not eliminate) human exposure pathways and environmental harm, innovative remedial technologies employed on-site to reduce clean-up costs.
- *broader policy conclusions*: public funds can leverage additional private investment and bridge financing gaps, brownfield redevelopments in key locations create a domino effect leading to wider revitalisation efforts, clarification of liability and clean-up standards stimulates redevelopment through alleviating uncertainties, and pilot projects help to guide other redevelopment projects and policies.

CHAPTER 1: introduction; CHAPTER 2: lessons learned; CHAPTER 3: case studies.

REMEDIATION

MacRitchie, Scott. 1996. Quantitative Risk Assessment for Contaminated Sites: A Tool for Intensification, in *A Practitioner's Guide to Urban Intensification*, Janice Emeneau (ed.). Toronto: Canadian Urban Institute, pp. 23-26. (4 pages, bibliography, ICURR Doc. UE 034, English)

Purpose
To present and discuss the quantitative risk assessment method for remediating contaminated industrial sites.

Key Definition(s)
The *generic or absolute approach* to remediation provides a list of the maximum concentrations of contaminants in soils that will not harm human health or the environment , and does not take into consideration site-specific or socio-economic factors (p. 24). The *quantitative risk assessment* (QRA) method determines customised clean-up levels for each site that may maximise clean-up efficiency and minimise costs. Unlike the generic approach, QRA takes into consideration site-specific factors that can greatly influence the risk posed by contaminants (p. 24).

Summary
While not all vacant industrial land is contaminated, redevelopment often requires some form of remediation. Unfortunately, the costs of some remediation methods are so prohibitive that redevelopment efforts are either significantly delayed or indefinitely stalled. This article reviews the use of quantitative risk assessment, a method that forces the integration of the public health, environmental and financial concerns associated with the redevelopment of contaminated sites.

Key Findings, Conclusions and Recommendations
There are limitations associated with quantitative risk assessment. These limitations are linked to the degree of uncertainty and subjective judgement and assumptions used in the QRA process. The question of whose values or assumptions should be used in making decisions is one of the most fundamental concerns raised about QRA. In addition, the importance of public participation in assessing and assigning values to decision-making criteria is increasingly stressed as being crucial to the successful implementation of QRA. One of the anticipated benefits of public involvement in the process is the achievement of a broader consensus on environmental risk and clean-up levels, while increasing the viability of remediation and redevelopment initiatives.

SECTION 1: introduction; SECTION 2: background on quantitative risk assessment; SECTION 3: subjectivity of quantitative risk assessment; SECTION 4: dealing with subjectivity in quantitative risk assessment; SECTION 5: conclusion.

Ford, Glenna, Macdonald, Doug and Mark Winfield. 1994. Who Pays for Past Sins ? Policy Issues Surrounding Contaminated Site Remediation in Canada. *Alternatives*, 20(4): 28-34. (7 pages, bibliography, ICURR Doc. EF 009, English)

Purpose
To discuss national priorities to guide remediation expenditures, to examine standards for remediation efforts, and to explore key issues of liability associated with contaminated site remediation in Canada.

Key Definition(s)
Retrospective liability refers to the imposition of liability on those who were responsible for contamination of sites in the past, even if they are no longer involved with the property or if the pollution occurred prior to the enactment of legislation prohibiting or regulating it (p. 31). *Absolute liability* applies when the polluting activity was: regulated but not in compliance with standards, unregulated, or regulated and in compliance with all requirements but pollution still resulted (p. 32). In the case of *strict liability*, a defence of "due diligence" or "reasonable care" could be used by polluters (p. 32). Under a *joint and several liability* approach, one party may be held responsible for all remediation costs, regardless of their

contribution (p. 32). In *several liability*, legislation attempts to assign liability to individual parties on the basis of their degree of responsibility and the parties may only be liable for their portion (p. 32).

Summary

This articles explores the complexities of developing and enforcing a comprehensive and effective remediation program for contaminated sites in Canada. Probably the most difficult issues are those related to costs and liability. The article explores three key questions related to liability: (1) should liability be retrospective ? (2) on what basis should liability be imposed ? and (3) how should remediation of orphan sites be financed ? The article supports the adoption of retrospective liability as the basis for liability concerning the remediation of contaminated land. The article recommends that the remediation of orphan sites should be financed through options consistent with the principle of polluter pays, not through general tax revenues. Finally, the article underlines the importance of stopping the release of untreated hazardous wastes into the environment.

Key Findings, Conclusions and Recommendations

Contaminated sites in Canada are either waste disposal sites or the site of industrial activities. There are an estimated 10, 000 active and inactive waste disposal sites in Canada, and another 20,000 sites contaminated by underground gasoline storage, industrial operations or accidental spills. Most provinces use the classification system developed by the Canadian Council of Ministers of the Environment to categorise contaminated sites. This process has been criticised for being closed from public view and scrutiny.

There are basically two approaches to remediation: (1) generic standards which must be met in all site clean-ups to ensure consistency, and (2) risk-based which sets standards on a case-by-case basis based on site conditions and future uses. The article recommends that liability for contaminated sites be retrospective in the majority of cases. The article justifies the application of retrospective liability for the following reasons:

- the polluter derived or intended to derive a greater benefit from polluting activities than society as a whole.
- past polluters are morally if not legally responsible for contamination.
- to avoid the public paying for almost all remediation efforts since a great deal of pollution predates pollution laws.

There are a number of possible approaches for dealing with liability issues (Appendix D). In 1993, the CCME endorsed a model that would use joint and several liability as an option of last resort, following efforts to mediate a settlement between responsible parties. Regardless of the liability model adopted by government, there are likely to be a considerable number of sites for which liability cannot be established. Not surprisingly, the financing of remediation efforts at orphan sites will continue to be a significant issue. Consistent with the principle of polluter pays, revenue options to finance orphan sites should include the taxing of particular products such as batteries, solvents and tires.

PART 1: government action to date; PART 2: national priorities; PART 3: remediation standards and approvals, who pays ?; PART 4: should there be retrospective liability ?; PART 5: on what basis should liability be imposed ?; PART 6: who should be potentially liable ?; PART 7: strict versus absolute liability; PART 8: joint and several liability versus several liability; PART 9: financing orphan site remediation; PART 10: conclusion.

REDEVELOPMENT

Urban Development Services. 1998. *Tracking the Kings: A Monitor Statement on the King-Parliament and King-Spadina Reinvestment Initiative*. Toronto: City of Toronto Urban Development Services. (22 pages, ICURR Doc. UI 205, English)

Purpose
To monitor the effects of a new deregulated zoning regime in two downtown districts of Toronto.

Key Definition(s)
The new, *deregulated zoning scheme* for these two downtown areas of Toronto allows for residential, live/work, commercial and light industrial uses and lower parking standards. It also restricts noxious uses, enforces noise standards, and places controls on built form. As such, the new approach focuses more on the re-use and appearance of existing buildings, rather than on numerical density or separation of uses.

Summary
This report tracks the demographic, economic and development impacts of a new planning approach introduced in the King-Parliament and King-Spadina areas of Toronto, two districts bordering the city's downtown financial core. In April 1996, Toronto declared these two central-city areas "reinvestment areas" and relaxed land-use and development controls by permitting "as-of-right" mixed-use development. The new planning and development approach for these districts is designed to stimulate private investment and create new residential opportunities. The city's reinvestment strategy has been heralded for its policy-based planning approach that responds to the evolving needs of a particular area, instead of sticking to standardised land-use controls formulated under a different set of economic and social conditions. The resulting development appears to be contributing to the reurbanisation of former or under-utilised industrial areas of downtown Toronto.

Key Findings, Conclusions and Recommendations
Until the mid-1980s, these districts contained a substantial number of manufacturing jobs and firms. By 1990, a significant number of these firms had relocated to the suburbs or other countries, leaving behind vacant buildings, many of historic value. While land-use controls continued to zone for the separation of industrial and residential uses in these districts, the emergence of an increasing number of live/work units and "clean" new media industries highlighted the lag between the fluidity of economic and social change in parts of the city, and the static nature of conventional land-use planning tools.

Since the introduction of this new approach, both districts have experienced significant development activity. As of September 1997, more than $54 million worth of construction has taken place in the King-Spadina area, and almost $18 million worth of construction has been initiated in the King-Parliament district. In addition, the number of business occupancies and full-time employment are increasing in both districts, while falling in other parts of the city. The introduction of a new, deregulated zoning framework has stimulated investment and redevelopment efforts in these former industrial areas of the downtown core. Both areas are poised for further growth. At the same time, the introduction of built form controls has facilitated the restoration of many older buildings of architectural and historical importance.

SECTION 1: context for monitoring; SECTION 2: development trends; SECTION 3: employment trends; SECTION 4: business profile of King-Spadina; SECTION 5: demographic trends; SECTION 6: resident issues and needs; SECTION 7: prospects for growth.

DeMarco, Christina. 1996. Industrial Lands Strategy: City of Vancouver Draws the Line, in *A Practitioner's Guide to Urban Intensification*, Janice Emeneau (ed.). Toronto: Canadian Urban Institute, pp. 20-23. (4 pages, bibliography, ICURR Doc. UE 034, English)

Purpose
To outline the findings of the City of Vancouver's industrial lands policy review.

Key Definition(s)

Planning by proximity is a policy supported by the City of Vancouver and the Greater Vancouver Regional District (GVRD) that seeks to minimise the demand for movement through the convenient arrangement of land uses (p. 20).

Summary

In Vancouver, about 700 acres of industrial lands were converted to residential use between the mid-1970s to 1990. Before converting additional industrial lands to residential use, the city undertook a review of the function and role of its remaining industrial lands. This article summarises the findings of this review and challenges assumptions about the long-term wisdom of converting under-utilised industrial lands to new residential areas in order to intensify urban land use. The article discusses three key questions of an in industrial lands strategy and discusses how they relate to intensification: (1) is industry using city land efficiently ? (2) does industrial activity enhance access by proximity, and (3) what are the competing demands for other uses and what contribution do they make to intensification ?

Key Findings, Conclusions and Recommendations

To a large extent, work and employment patterns shape a city. The prevalent ownership of private automobiles has removed location barriers for both homes and jobs. In Vancouver, about 1,700 acres or 6% of the City's land area, is zoned industrial and contains 2,000 firms and 46,500 jobs. Vacancy rates are less than 8% in the City of Vancouver. Many of the industrial areas in the city have employment densities as high as 100 workers per acre - densities not likely matched by suburban industrial areas.

The City of Vancouver and the Greater Vancouver Regional District (GVRD) have a policy of "planning by proximity" that seeks to minimise the demand for movement through the convenient arrangement of land uses. In terms of industrial land-use, industry sells 70% of all its goods and services to customers within the city and receives 60% of supplies from other firms within the city. The city-serving nature of industry and the proximity of these functions reduces the need for goods movement and service trips. In addition, about two-thirds of the city's resident blue-collar workers are employed within Vancouver, facilitating the use of public transit, bicycle and walking for journeys to work. In area's such as the city's east side, industrial land-use produces a good jobs-housing match.

Although almost all of the city's industrial land is well suited to residential development, the city has taken measures to retain existing industrial areas and to intensify residential, retail and office development in other areas. These measures include the protection of industrial land for industry and vigilance regarding rezoning requests for industrial areas. Rezoning will only be considered in the context of a city-initiated area plan. While this policy appears to ignore mixed-use zoning trends, the city has adopted these measures to protect industrial land from higher rent uses, preserve city employment and economic activities and to support the goals of urban intensification.

SECTION 1: introduction; SECTION 2: work as a city shaper; SECTION 3: industrial land: efficient use of city land ?; SECTION 4: enhancing access by proximity, city-serving industry, employment of city residents by industry; SECTION 5: balancing competing demands for industrial land; SECTION 6: protecting industrial areas through zoning; SECTION 7: conclusion.

Page, William and Harvey Rabinowitz. 1994. Potential for Redevelopment of Contaminated Brownfield Sites. *Economic Development Quarterly*, 8(4):353-363 (11 pages, ICURR Doc. EI 067, English)

Purpose

To explore ways that present environmental policies and past industrial practices affect the redevelopment of brownfield sites.

Key Definition(s)

TOADS stands for temporarily obsolete abandoned derelict sites.

Summary

This article presents a succinct overview of the legal, economic and policy factors that influence the redevelopment potential of brownfield sites. Using case studies as concrete examples, the article examines the range of factors that may influence the redevelopment of brownfield sites by both private and public sector intervenants. The article argues for an approach that encourages redevelopment efforts through private sector investment, public sector incentives or a combination of the two depending on the site characteristics. The article also proposes a model with a "redevelopment threshold" based on expected rate of return and risk of contamination to guide the targeting of public resources in the redevelopment process.

Key Findings, Conclusions and Recommendations

There are large numbers of vacant brownfield sites in the United States, especially in urban areas. Federal legislation has attempted to regulate the use and disposal of toxic substances and to clean-up existing contaminated sites based on the principle of "polluter pays". Still, the Office of Technology Assessment estimates that 95% of total toxic emissions may go unreported, while many known sites experience leaks and spills.

The 1980 federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) imposes retrospective, strict and joint and several liability. As a result, liability issues are a major barrier to reinvestment, and some states have passed legislation to protect innocent purchasers of contaminated property. This also has the effect of creating better opportunities to secure financing for private sector redevelopment efforts.

The degree of contamination present at brownfield sites influences redevelopment potential. In general, the potential for redevelopment decreases as the risk of contamination increases. The expected rate of return on a particular investment combined with other factors such as site location, experience in site remediation, access to public funds and the public value associated with the redevelopment of a particular site determines the "redevelopment threshold" for a brownfield site. Poorly located brownfield sites with extensive contamination are likely to remain the most difficult to redevelop.

The large number of vacant and derelict brownfield sites located in urban areas represents a potential environmental and public health hazard, as well as a social and economic opportunity to rebuild the urban fabric using existing infrastructure, create jobs and strengthen inner-city communities. Those sites with the highest potential returns will attract private sector developers, while less favourable sites may require incentives and/or private-public partnerships to stimulate redevelopment activities. The combination of these strategies will allow scarce public resources to be more effectively targeted at mitigating contaminated brownfield sites posing the greatest threat to public health.

PART 1: environmental problems and economic development efforts; PART 2: inspecting for contamination prior to redevelopment; PART 3: redevelopment examples; PART 4: discussion; PART 5: conclusions.

Black, J. Thomas. 1994. Recycling Inactive Urban Industrial Sites, in *ULI on the Future - Urban Growth: Development Prospects and Issues*, Urban Land Institute, Washington, DC (13 pages, ICURR Doc. UH 027, English)

Purpose

To examine and discuss the overall context, barriers and options for restoring productive use to inactive and derelict industrial sites in urban areas.

Key Definition(s)

Innocent purchasers of contaminated lands are those owners who did not contribute to the contamination process (p. 45).

Summary
Many cities that developed during the industrial age had an average of 11% of their total land in industrial use. Today, larger American cities such as Chicago, Detroit, and Philadelphia have hundreds of acres of inactive and derelict industrial land in their old industrial areas. How to restore productive use to these sites is both a challenge and an opportunity for urban planners and municipalities. This article reviews the industrial development of many American cities, presents the rationale for recycling inactive urban industrial sites, and discusses the challenges associated with the contemporary remediation and redevelopment of industrial lands. The article also reviews the criticisms attributed to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, federal legislation intended to kick-start remediation of contaminated lands in the United States and presents a range of successful redevelopment projects implemented in various central city areas of major American cities.

Key Findings, Conclusions and Recommendations
The rationale for recycling inactive industrial sites includes the following:

- create employment opportunities and a stronger tax base through redevelopment of industrial lands.
- reduce the demand for suburban sprawl and investment in new infrastructure by redeveloping under-utilised former industrial lands in central areas.
- provide support for inner-city communities.
- create residential opportunities for middle and upper-income workers in the central business district to reduce commuting and travel demands.
- implement remediation measures that reduce or control the hazards associated with contaminated sites.

Finding successor uses for inactive industrial sites is complicated by the cost, remediation and liability issues associated with toxic contamination, as well as a number of potential obstacles such as the deterioration of private and public infrastructure, the high-incidence of inner-city crime, and poor environmental amenities in American inner-cities. At the policy level, better co-ordination between the environmental remediation process and the re-use and redevelopment process is required. On the other hand, the presence of health care institutions, government offices and educational institutions contribute to the prospects for central city revitalisation efforts. Cities with better public amenities and services are better positioned to take advantage of residential development opportunities. Other factors such as the increasing number of higher-end service jobs and tourism in the central city also contribute to revitalisation prospects.

Former industrial areas immediately adjacent to the central business district are particularly likely to benefit from the confluence of these factors in redevelopment projects. Often these developments are mixed-use in nature, combining office, commercial and residential space and include large tracts of land and not just individual properties. Many of these commercial activities, such as computer support, graphic design, printing and binding services, usually supply businesses in the central business district, but cannot afford the office rents in the district itself.

Even though there is an overall net reduction in total industrial uses in most central city areas, there continues to be a market for new and reconfigured industrial sites. For example, large single-firm sites may be subdivided into multi-tenant complexes. While some sites may be converted exclusively to housing, it is important for cities to formulate an overall industrial land policy to preserve and anticipate economic opportunities over the long-term.

Recommendations for facilitating the re-use of industrial lands include the following:

- provide insurance to purchasers and users against future liabilities for remediation or damage for sites passing environmental assessment tests.
- remove liability for “innocent” purchasers of contaminated sites.

- clarify and co-ordinate federal and state roles in site clean-up and liability allocation.
- reduce the time and costs required to implement clean-up efforts.
- increase federal financial assistance for clean-up and redevelopment of sites serving key economic development objectives.
- develop more effective re-use strategies and technical solutions for redevelopment and remediation.

PART 1: introduction; PART 2: the background and extent of the challenge; PART 3: opportunities for redevelopment and re-use; PART 4: obstacles to industrial land recycling; PART 5: facilitating the re-use of inactive urban industrial sites; PART 6: conclusion.

Appendix A

Summary of Key Barriers and Recommendations for Change in Redeveloping Brownfield Sites

BARRIER	RECOMMENDATION FOR CHANGE
Legal Uncertainty • lack of clarity and certainty in many laws relating to environmental liability and clean-up responsibility.	• align environmental laws at the federal, provincial and territorial levels with the 13 principles for contaminated site liability established by the CCME in 1993 in order to harmonise and simplify the decision-making process.
Liability Issues • the application joint and several liability for developers and investors.	• introduce alternative dispute resolution procedures, reduce the practice of litigation, and apply joint and several liability only as a last resort to encourage successful mediation.
Scientific Standards • the absence of clear standards to assess the costs of clean-ups and exposure to liability.	• introduce science-based standards through data gathering protocols, evaluation of current databases, development of new data, re-evaluation of existing data and periodic reviews of information.
Insurance Product Development • lack of environmental insurance products to support brownfield redevelopment.	• encourage a meeting between the Federation of Canadian Municipalities and the Insurance Council of Canada to adapt insurance products that would assist municipal governments to better manage risks associated with brownfield redevelopment.
Orphan Issues • no national funding mechanism for covering clean-up costs for orphan sites and shares.	• CCME should resume work to develop mechanisms for funding the clean-up of orphan sites and shares.
Data on Environmental Condition of Land • existing site-specific data on environmental condition of land are scattered among many databases, lack of consensus on who should collect this information and what data should be included.	• Statistics Canada and NRTEE should convene a meeting to address and resolve current issues of disagreement in this area.
Public Information and Education • no consensus as to what information should be made available to the public or how they should be involved in decision-making.	• establish transparent mechanisms to involve the public in redeveloping brownfield sites and to build public trust.
Leadership by Example • lack of government leadership and an integrated approach to dealing with environmental regulation.	• set a better example through a series of pilot projects, encourage sharing of responsibility between levels of government instead of "passing the buck" through downloading, and develop incentives and best practices to guide future activities.
Government Initiatives and Partnerships • view that redevelopment is a private sector problem and that government role is to regulate, not fully participate, in the process.	• federal government should develop economic incentives to encourage redevelopment, provincial governments should work closely with municipalities and develop partnerships with the private sector to undertake clean-up activities.

Source: National Round Table on the Environment and the Economy. 1998. *State of the Debate on the Environment and the Economy: Greening Canada's Brownfield Sites*, pp. 4-10.

Appendix B

Recommended principles for developing legislation to address liability issues associated with contaminated sites across Canada

Endorsed by the Canadian Council of Ministers of the Environment, 1993

General Principles

1. The principle of "polluter pays" should be paramount in framing contaminated site remediation policy and legislation.

2. In framing contaminated site remediation policy and legislation, member governments should strive to satisfy the principle of fairness.

3. The contaminated site remediation process should enshrine the three concepts of openness, accessibility and participation.

4. The principle of "beneficiary pays" should be supported in contaminated site remediation policy and legislation, based on the view that there should be no unfair enrichment.

5. Government action in establishing contaminated site remediation policy and legislation should be based on the principles of sustainable development, integrating environmental, human health and economic concerns.

Specific Principles

6. A broad net should be cast for determining potentially responsible persons with conditional exemptions enacted for lenders and receivers, receiver managers, and trustees where they have not contributed to the contamination. Lenders should be exempt beyond the outstanding balance of the debt unless the lender had actual involvement in the control or management of the borrower's business. Receivers and trustees should be exempt unless they fail to take reasonable steps to prevent further contamination or to address ongoing environmental concerns at the site.

7. Authority should be provided in legislation to recover public funds expended on the remediation of contaminated sites from the persons responsible for the contamination. Environmental claims should have priority over all other claims or charges on an estate that has entered into receivership or bankruptcy.

8. Processes should facilitate the efficient clean-up of sites and result in the fair allocation of liability. A four staged process deigned to discourage excessive litigation and promote alternative dispute resolution is proposed. Following site designation and the identification of responsible persons, liability should be allocated through voluntary, mediated or directed processes. If these attempts at allocation fail or are not used, joint and several liability should apply.

9. Liability Allocation Factors are suggested for use in cases where there is more than one responsible person. Based primarily on a list of factors in *Alberta's Environmental Protection and Enhancement Act*, the following are among the matters that should be considered in the apportionment of liability:

    - when the contamination took place.
    - who caused the contamination.
    - if reasonable steps were taken to prevent the contamination.
    - if industry standards and practices of the day followed in dealing with the contaminating substance.
    - what steps were taken following knowledge of the contamination.
    - the degree of hazard.

10. A four staged process is designed to discourage excessive litigation and promote alternative dispute resolution is proposed. Provisions should be included to enable government authorities to accept or reject

any particular liability allocation scheme or to have joint and several liability apply to individuals who unscrupulously avoid their obligations.

11. Governments should retain the discretion to designate contaminated sites and should involve the public in such site designation. For the purposes of better predictability, governments should clarify their policies regarding site designation. Such policies should be based on risk to human health and the extent of environmental risk.

12. Certificates of compliance should be issued to responsible persons who complete the clean-up of a contaminated site to the satisfaction of the regulatory authority. The certificates should expressly state that they are based on the condition of the site at the date of issuance and that the remediation undertaken met the standards of the day, thereby leaving open the possibility that the responsible person may be liable for future clean-up.

13. Benchmarks for the remediation of contaminated sites should be developed with public input. The use of benchmarks will allow remediation plans or orders to be tailored on a site-specific basis.

Source: Delcan et al, 1997: 9-10.

Appendix C

Best practices for removing barriers to the redevelopment of contaminated sites and suggested initiatives for implementation

BEST PRACTICE	SUGGESTED INITIATIVES FOR IMPLEMENTATION
1. Adopt the principle of user pay for site review to allow fast tracking of approvals.	• review the acceptance of user pay in the provincial political climate; establish the personnel qualifications to complete the review; assess the benefits of user pay versus a regulatory agency commitment to fast tracking.
2. Develop exposure pathway and depth restricted numerical clean-up criteria.	• implement generic risk based criteria, research mechanisms that facilitate the communication of exposure pathway factors to future landowners.
3. Allow the use of "future clauses".	• harmonise the terminology for inclusion in future clauses between jurisdictions; research procedure(s) which adequately protect the public from remnant contamination at a property and which reduces future liability to investors and users of a property with remnant contamination.
4. Make provisions for contaminated soil relocation.	• research the re-use of contaminated soils in less sensitive sites; research the regulatory requirements to re-use contaminated soil; find solutions to residual liability issues.
5. Improve regulatory sign-off mechanisms.	• consider the implementation of regulatory endorsement of completion of site remediation.
6. Ensure a consistent approval process.	• harmonise approval processes and requirements between jurisdictions; determine where regulations or guidelines allow for ambiguity or not; develop clear and universal policies and regulations where practical; improve regulator education and communication between offices.
7. Pursue integration of land use planning with other approvals.	• reform provincial legislation and regulations to ensure that an integrated approvals process is possible; revise Official Plans to include policies that enable special planning processes on contaminated sites.
8. Consider the application of wide area designations.	• identify mechanisms by which wide area remediation could be achieved; research the potential for cumulative impacts of contaminants.
9. Require the registration or certification of qualified practitioners in site investigations/remediation.	• establish consistent credentials to ensure consistent site redevelopment; support the development of a registry for qualified practitioners.
10. Development and encourage the use of risk assessment/risk management methods.	• develop generic criteria related to exposure pathways for site screening purposes; implement risk assessment/risk management as an acceptable approach in new legislation, policies, and guidelines across Canada.
11. Encourage a statistical evaluation of soil and water quality data.	• pressure regulatory authorities to accept statistical assessments.
12. Pursue research on toxicological data and environmental effects.	• encourage research on toxicological data and ecosystem impacts.
13. Improve support for the development of new remedial technologies.	• support the development of remedial technologies by government programs and resources and private sector environmental firms.
14. Encourage the use of "limited liability agreements".	• research the extent to which liability allocation processes have succeeded in avoiding the application of extended and joint and several liability; recognise the use of limited liability agreements in legislation where desired.
15. Foster inter-governmental	• encourage all levels of government to collaborate and pool

collaboration to provide financing, incentives and public/private joint venture opportunities.	resources; consider the social and environmental costs of not redeveloping vacant lands; explore the use of incentives (e.g. no development charges) to foster the redevelopment efforts.
16. Promote awareness and innovation of new environmental insurance products.	• increase awareness and use of environmental insurance products; encourage insurance companies to develop other innovative and flexible products.
17. Encourage the use of, or require, contaminated site profiles.	• develop a standardised site profile template; encourage preliminary site screening in transactions and applications.
18. Require registries or databases of known contaminated sites.	• require municipalities to maintain a registry of known contamination sites in new legislation or policies; consider putting site-specific investigations on the public record; research how registries of contaminated sites may contribute to due diligence property transactions.
19. Encourage municipalities to prepare contaminant risk mapping.	• encourage or require municipalities to maintain mapping of potentially contaminated sites through provincial land use planning policy.
20. Pursue alternative methods of notices on title of contamination issue.	• pursue more positive methods of communicating remediation efforts and risks to potential buyers, along with better public education.
21. Develop information tools to help educate all participants in the process.	• explore methods to include the public in decision-making and activities regarding contaminated site remediation; examine the appropriateness of public consultation processes for site remediation (such as those currently required under the Canadian Environmental Assessment Act); publish more explanatory material in plain language to facilitate public education efforts.
22. Promote awareness of contaminated site development success stories.	• promote significant advances and success stories as well as economic, environmental, community health and sustainability benefits.

Source: Compiled from Delcan et al, 1997: 28-35.

Appendix D

Advantages and Disadvantages of Various Approaches to Liability

LIABILITY APPROACH	ADVANTAGES	DISADVANTAGES
Absolute Liability	• limits complexities involved in imposing liability for past events. • limits extent of public costs.	• may produce unfair results in cases where a past owner did not contribute to contamination.
Strict Liability	• recognises distinction between unknowing and purposeful contamination of land.	• will result in more cases in which public authorities will be unable to impose remediation costs on responsible parties.
Joint and Several Liability	• limits complexities involved in imposing remediation costs.	• may result in one party being responsible for remediation costs, regardless of contribution.
Several Liability	• produces potentially fairer settlement for responsible parties.	• difficult to allocate responsibility for past events precisely among group of parties.

Source: Ford et al, p. 32.

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