July | 2015

Brownfield Redevelopment Inventory

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Executive Summary

Environmentally contaminated land can have an adverse impact on the sustainable development of cities. The redevelopment of underutilized, contaminated sites, known as brownfields, can lead to revitalization and densification of communities. In support of the City of Edmonton's Environmental Strategic Plan, The Way We Green, the Brownfield Redevelopment Grant seeks to promote expedient and productive redevelopment of former refueling sites. As more of these former refueling sites are redeveloped, the Brownfield Redevelopment Grant will have to expand. This research seeks to provide an indication of where the Brownfield Redevelopment Grant could be headed. To do this, an inventory of potential brownfield sites was developed, and the barriers to redevelopment were identified.

To develop an inventory of sites, a method for identification of potential brownfields was established. Land use classifications and legal addresses were used to identify over 7000 properties with available environmental records. A limited systematic review of environmental records was done to identify potential brownfields. This was done for 291 sites as a "proof of concept". From this review, 43 potential brownfields were identified, the majority of which are associated with former refueling sites. Off-site contamination is associated with 24 of these sites.

Based on this review of available reports, three recommendations are given:

1. Refine the method for data acquisition and identification of potential brownfields,
2. Develop a framework for redevelopment properties with off-site contamination,
3. Move towards a site-specific approach of brownfield redevelopment, which considers properties that are not former refueling sites, and areas with limited tax uplift potential.

Please note that the inventory developed as a part of this research contains confidential information and will not be publicly available.

Introduction

Background

Environmentally contaminated land presents a major challenge to cities, and the sustainable redevelopment of impacted land. Substance releases from previous activities, such as industrial, residential, commercial, or agricultural, can remain in the soil and groundwater and have an adverse impact to human and environmental receptors. The term "brownfield" has been given to land parcels where past activities have negatively impacted the environment above acceptable criteria.

The City of Edmonton has the following definition of brownfields:

"A Brownfield is a site that is under-utilized and where past activities on the site may have caused environmental soil and/or groundwater contamination" (Brownfield Redevelopment Grant, 2014).

Strategic Management Goals

The City of Edmonton has set out several strategic management goals, under which the potential redevelopment of brownfields is addressed. Recent initiatives within the last five years are briefly summarized below:

- In 2010, city council approved the Brownfield Redevelopment Strategy, a product of the Contaminated Gas Stations Task Force. This strategy addresses brownfields that are former refueling stations, and promotes effective planning, assessment, remediation/risk management, and redevelopment.
- In 2011, the City of Edmonton's Environmental Strategic Plan, The Way We Green, was approved. This plan promotes the responsible management and return to productive use of brownfields. This will ideally encourage infill on derelict properties over greenfield redevelopment.

- In March 2011, the Brownfield Redevelopment Grant was brought into effect. This program assists the owners of brownfield sites with funding tools to finance the environmental reporting, testing, and remediation and/or exposure control prior to redevelopment. The program continues to be adjusted as necessary with the latest change made in August, 2014 to introduce a Tax Incremental Funding (TIF) model for the Phase III grant.

Brownfield Redevelopment Grant overview

Several brownfields exist within Edmonton, most notably those associated with former refueling stations. These properties can be sitting vacant, or still contain buildings. Many are in areas where redevelopment of these sites can lead to revitalization and densification of communities. It is these former refueling sites that qualify for the Brownfield Redevelopment Grant.

A summary of how the grant functions is as follows:

- Sites formerly used for refueling of gasoline or diesel that are not municipally owned are eligible to apply.
- The historical investigation and environmental testing comprise the first two phases of the grant, and are funded up to 80% of the cost for each.
- Remediation comprises the third phase of the grant, and is typically the most costly step towards the preparation for redevelopment. This step is funded by sum of up to six-year municipal uplift of the proposed development.
- The fourth phase of the grant can be used for the remediation and/or exposure control. Funding can also be applied to the costs associated with an innovative interim use such as renewable energy, or urban agriculture.

A much more detailed outline of the Brownfield Redevelopment Grant Program can be found online at the City of Edmonton website.

Objectives

The objective of this research is to develop an inventory of potential target brownfields in Edmonton, and determine any potential environmental barriers to their redevelopment. This will provide an indication of the direction the Brownfield Redevelopment Grant Program should take once former refueling sites are exhausted.

In this report, the methodology for the inventory is outlined, major trends in the results are identified, and some recommendations are given.

It should be noted that much of the time allotted to this research was put into a partial inventory. This inventory contains confidential information and will not be publicly available.

Methods

Ideally, the underlying assumption for identifying potential brownfields rests on former land use. This is difficult to use, as former land use is not readily available in city databases, as opposed to land title owners. Being able to access and query data in a way where all the potential brownfields are captured poses a challenge. To achieve this, the major assumption for the development of a site list is that a *potential brownfield will have some type of environmental record*.

The method used to develop the inventory is explained below. Several concessions were made due to a limited time frame for this research. This has taken the form of a “proof of concept”, where the feasibility of the method is tested and demonstrated.

Site List Development

Five steps were taken to develop a site list:

1. Assessment realty tables were joined to land use tables based on land use classification.
2. From this land use classification list, all undeveloped, vacant, and derelict properties that are privately owned were identified.
3. This list was then joined to the tax roll account number to provide spatial data, such as a street address.
4. This spatial data was used to find properties with records in the City of Edmonton's Environmental Site Information Database, and the Alberta Government's Environmental Site Assessment Repository.
5. The final list is comprised of undeveloped, vacant, derelict assessment parcels that are not owned by the city, that have environmental records.

The results of this provided a total list as follows:

Table 1. Potential brownfield site list summary

Land Use Description	Number of Sites
Derelict Commercial	7
Derelict Industrial	2
Derelict Residential	6
Farmland Vacant	183
Farmland Dual Use Vacant	2
Multi-Residential (holding property or derelict)	4
Non-farmland Vacant	68
Outdoor Athletics-Other Vacant	1
Park/Playground - Vacant	5
Park/Playground - Undeveloped	5
Religious - Other vacant	3
Spur Rail Line Right of Way	1
Undeveloped Land	886
Undeveloped Multi-Residential Land	538
Undeveloped Residential Land	5774
TOTAL	7480

The land use descriptions provide an indication how the land is being used. There are some redundancies, such as "Undeveloped Land" and "Undeveloped Residential Land". Additionally, the category of "Non-farmland Vacant" is inclusive of industrial and

commercially zoned areas. This is indicative of the challenges associated with data access and the method development.

It should also be noted that some potential brownfield sites exist that do not have any land use classification. These sites are missed in the method used. To somewhat compensate for this, the 2014 Vacant Land Inventory Report was used. This inventory considers vacant land in the central core and mature neighborhoods. For this study, all commercially zoned vacant lots, not municipally owned, were used (189 records).

Due to limited time for this investigation, several considerations were made:

- Undeveloped land categories were not included for further investigation, due to the sheer number of sites identified.
- Vacant Farmland was not included for further investigation. Many of these sites were given a very cursory review. Of the few vacant farmland sites investigated, none had a risk of environmental contamination and were omitted from the systematic review of environmental records.

Considering all omissions, the site list for review consisted of 291 sites, as listed below in Table 2.

Table 2. Site list summary for systematic environmental record review

Land Use Description	Number of sites
Derelict Commercial	7
Derelict Industrial	2
Derelict Residential	6
Multi-Residential (holding property or derelict)	4
Non-farmland Vacant	68
Outdoor Athletics - Other Vacant	1
Park/Playground - Vacant	5
Park/Playground - Undeveloped	5
Religious - Other vacant	3
Spur Rail Line Right of Way	1
Vacant Land Inventory Commercial Zones	189
TOTAL	291

Identification of Potential Brownfields

The previously described method assumes that any potential brownfields have environmental records. The most common types of environmental records available are summarized as follows from the City of Edmonton Environmental Site Assessment Guidebook, July 2015:

- *Phase I Environmental Site Assessment* – A non-intrusive historical evaluation to determine the likelihood of environmental risk on a property. This involves no testing or laboratory analysis.
- *Phase II Environmental Site Assessment* – An intrusive evaluation of a property through testing and analysis of soil and groundwater. This is done to delineate the extent and nature of any environmental contamination on the site, and is typically conducted if the Phase I ESA identifies previous activities or areas of concern.
- *Phase III Environmental Site Assessment* – This consists of the remediation of a contaminated site. This may involve excavation, soil vapour extraction, multiphase vapour extraction, *in situ* or *ex situ* treatment, risk management or exposure control.
- *Reclamation Certification* – Environmental Protection and Enhancement Act (EPEA) requires certificates for all specified land by Alberta Energy Regulator, which are inclusive of upstream oil and gas activities, coal mines, and oil sands activities. In the context of brownfields in Edmonton, this is typically applied to former wellheads and upstream oil and gas activities.

Available environmental reports *may or may not indicate any potential contamination*; a systematic review of each site and the appropriate environmental records was done.

Results

A review of the available environmental reports for sites in Table 2 resulted in 43 potential brownfield sites:

Table 3. Potential brownfields identified from environmental record review

Land Use Description	Number of sites	**Number of potential brownfields**
Derelict Commercial	7	**3**
Derelict Industrial	2	**2**
Derelict Residential	6	**2**
Multi-Residential (holding property or derelict)	4	**1**
Non-farmland Vacant	68	**10**
Outdoor Athletics-Other Vacant	1	**0**
Park/Playground - Vacant	5	**0**
Park/Playground - Undeveloped	5	**2**
Religious - Other vacant	3	**0**
Spur Rail Line Right of Way	1	**1**
Vacant Land Inventory Commercial Zones	189	**22**
TOTAL	291	**43**

Several land uses and former activities were associated with the possible contamination in each of the identified sites, and are as follows:

- 25 associated with refueling sites and service stations (11 are former refueling/service stations, 14 are adjacent to former or current refueling/service stations)
- 6 associated with rail lines
- 3 associated with drycleaners
- 2 associated with oil and gas activities
- 7 other (meat processing, septic fields, unknown)

It should be noted that not all of the sites listed require extensive remediation, but require some level of environmental work (mainly Phase I and II ESA's).

Based on the report review, two important trends were observed:

1. After sites associated with refueling and service stations, there is no prevalent industrial activity or land use responsible for contamination
2. 24 sites are potentially associated with off-site contamination

These issues are briefly discussed in the next section.

Discussion

Looking Beyond Former Refueling Stations

As it currently stands, Brownfield Redevelopment Grant eligibility criteria states that "a site must have been formerly used for the purposed of gasoline or diesel refueling". The review done in this study identified 11 former refueling/service stations. Looking forward, redevelopment of former refueling sites may be exhausted. For the next round of brownfield redevelopment, there does not seem to be one dominant contaminant type or previous land use. Pending further inventory development and brownfield identification, sites associated with rail lines and drycleaners may provide the best option moving forward. But this is based only on the number of sites in the limited review that was done.

This may present a new challenge, as not all brownfields are ideal for redevelopment and much of the associated contamination originated from the site of interest.

Off-site Contamination

As previously mentioned, 24 of the 43 identified potential brownfields are associated with off-site contamination. In the context of this study, this refers to (1) contamination originated on-site that has migrated off-site, or (2) contamination on the site is due to former activities from an adjacent property.

Off-site contamination can be very complex to deal with. This complexity is reflected in the difficulty associated with liability, and potentially, remediation.

Very broadly, the rationale for environmental liability with regard to contamination falls under the "Polluter Pays Principle", where the original polluter bears the cost of environmental cleanup. This can be simple, where a former land use or activity is clearly

responsible for any substance release or contamination on a site. A relevant example of this is a leaking underground storage tank at a refueling station where the previous owner is easily identified.

This can be problematic when the owner of any pollution or substance release cannot be identified. If the polluter is insolvent or does not exist, liability is extended such that the cleanup costs are not borne by the public (Omura, 2013). This extended liability can impact a variety of related parties who were neither responsible (i.e. profited), or will gain from the redevelopment.

In Alberta, the legislative basis for off-site contamination is governed by the Environmental Protection and Enhancement Act (EPEA). This act lays out the regulatory requirements related to remediation, specifically Section 129, where an environmental protection order can be given to a person responsible for contaminating a site (EPEA, current as of December 17, 2014).

The EPEA supersedes the Contaminated Sites Policy Framework, which provides policy guidance for management of contaminated sites in Alberta. This document is broad in the provisions for off-site contamination, and maintains that an acceptable solution must be achieved with input from all parties and affected stakeholders.

Given the wide-ranging capacity for dealing with off-site contamination, which includes acceptable solutions from all stakeholders and extending liability, achieving expedient redevelopment of brownfields can be difficult and exceedingly complicated, and this research does not fully address off-site contamination. Looking to the future, there may be a need to adopt a more site-specific approach within the Brownfield Redevelopment Grant.

It should also be noted that there can be fear associated with extending liability, and this could pose a major obstacle for brownfields. The Brownfield Redevelopment Grant helps to alleviate the fear of liability, where environmental cleanup is incentivized up to a point

(the lesser of either 100% of remediation costs or Municipal Tax Uplift over a six year term) and payable only relevant to the qualifying applicant property.

This leads to another challenge, where limited tax uplift might reduce available funding for remediation costs.

Limited Municipal Tax Uplift

For Phase III grants, the current total allotted is up to 100% of the total remediation cost of the Municipal Tax Uplift over a six-year term, whichever is less, per subject property.

Considering this, potential brownfields in areas where substantial remediation is required but is in a location where development is limited, or where future development generates a limited tax uplift, the grant may be of limited utility. This could be due to brownfields being located in an industrial area, areas unattractive to a developer, or sites not large enough for a tower or equivalent development/land use. Again, this points to a need for a site-specific approach.

Recommendations

Based on this research, there are three main recommendations that can be made.

1. Data management and methodology refinement
    - Developing a brownfield inventory within Edmonton is predicated on accessing and acquiring data. These data sources can be difficult to navigate and understand. Institutional knowledge of how City of Edmonton data is stored and queried was needed, but this may not be a sustainable solution moving forward.
    - In this research, over 7000 potential sites were reduced to 291, which then went through a systematic review of environmental records to identify 43 potential target brownfields. Although time consuming, a systematic

review of environmental records may continue to be necessary, notably for land use classified as “undeveloped”.

- It is recommended that a review of land use classification and historical land titles be done, such that a method can be developed for future potential brownfield inventory work or expansion can be done more simply. This may be useful for further refining the list of over 7000 to a smaller, more easily manageable number of sites.

2. Framework for off-site contamination
    - As previously mentioned, off-site contamination has the potential to be very complicated and problematic for brownfield redevelopment. It is recommended that a framework be established within the Brownfield Redevelopment Grant when dealing with off-site contamination.
    - A framework may involve a step-by-step process to ensure that all stakeholders are satisfied with any potential outcomes, such as property redevelopment or exposure control.

3. Site-specific review, eligibility, and funding.
    - As the Brownfield Redevelopment Grant moves forward, it is recommended that eligibility be expanded to a site-specific basis, rather than limiting grant applications only to former refueling sites.
    - A site-specific approach may help in the productive redevelopment of brownfields that are not associated with former refueling sites, and also provide site-specific funding where limited municipal tax uplift is available for remediation activities.

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City of Edmonton Brownfield Redevelopment Grant
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City of Edmonton Environmental Site Assessment Guidebook
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City of Edmonton The Way We Green: Environmental Strategic Plan
http://www.edmonton.ca/city_government/documents/PDF/TheWayWeGreen-approved.pdf

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http://www.elc.ab.ca/Content_Files/Files/Brownfields_AREF.pdf

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