The Potential of Brownfield Redevelopment To Green the Concrete Jungle

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I. Introduction

"Brownfields are defined by the United States Environmental Protection Agency (EPA) as 'abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.'"[1] Michigan's Governor Jennifer Granholm along with our policy advisor, Emily Fleury, are very interested in implementing a policy that will transform former factories into parks, or transforming inactive industrial sites into green spaces for recreational purposes. Ivy on walls or mosses on freeway bridges or concrete silos are examples. Our job is to research this industrial concept reuse and help determine if it might be applicable to abandoned sites in the State of Michigan.

II. Definition of the Problem

The decline in manufacturing in the United States has caused significant impacts on our central cities and first ring suburbs. It is important to recognize the problem in industrial retention. Industrial retention includes activities that respond to the needs of local businesses, such as infrastructure improvements, safety concerns, technical assistance in modernization, and employment training. These factors strengthen the city by shaping its economic base, rather than responding to the threat of plant re-locations or closings.[2]

Industrial displacement has been widespread in central cities.[3] Beginning in the 1940s, the level of suburban manufacturing growth exceeded that of cities. By the 1960s, both suburban and urban economies were restructuring, with continued growth of high valued-added manufacturing in the suburbs, and decline of manufacturing in the cities, where business services were expanding.[4] By the late 1980s, the location measure of economic concentration for manufacturing in many suburbs was higher than their corresponding central cities.[5] These patterns still exist today. The relocation of many manufacturing plants caused the abandonment of industrial sites in Michigan, which caused a cycle of deterioration in urban centers throughout Michigan.

The reuse of industrial sites for recreational purposes makes sense from

[1] Brownfield Remediation, *Urban revitalization requires local groups to learn to identify brownfield sites and understand the liability and environmental concerns,* Environmental Protection Magazine, By Joe Lorenz and Tom Mignery.

[2] Joan Fitzgerald & Nancy Green Leigh, Economic Revitalization: Cases and Strategies for Cities and Suburbs, 2002

[3] *Id.*

[4] *Id.*

[5] *Id.*

an aesthetic, economic and environmental standpoint. Reusing these sites will create an attractive city, where people will enjoy living, working and spending their free time. It will create a "spill over" effect, which increases the value of the land in its surrounding parameters, thus attracting further economic development. The environment will improve from the cleanup of the contamination related to the site. Redevelopment of industrial sites is a potentially appropriate strategic action for public and private partners to pursue. This may be a particularly appropriate strategy where the private sector has shown limited interest in reusing existing brownfields in highly visible community settings.

III. Decline in Manufacturing in Detroit, Michigan

A. Loss of Manufacturing

The loss of manufacturing in Detroit and massive corporate downsizing from the 1980s to the 1990s had individuals convinced that the nation's manufacturing era had ended. Due to major plant closings, job cuts and the change from blue collar to white collar workers caused a great change in our economy. However, manufacturing still accounts for 15.8 percent of the nation's employment and is still an important component of many urban economies. For example, Detroit's percentage of manufacturing employment in 1990 was 23 percent, 22.1 percent in 1992, 22.4 percent in 1994, 21.8 percent in 1996, 21.0 percent in 1998, and 20.8 percent in 2000. Compared to Los Angeles, 20.2 percent in 1990, 18.8 percent in 1992, 17.3 percent in 1994, 17.0 percent in 1996, 16.8 percent in 1998, and 15.4 percent in 2000.[6] Detroit's manufacturing employment over the last ten years are due in a large part to global corporations such as General Motors, which has a long manufacturing history in Southeastern Michigan. However, even though the manufacturing employment section of the state remains significant, the "retooling" of the industry has resulted in a number of abandoned industrial sites in Michigan.

B. Environmental Impacts

Contamination of brownfield sites present a number of environmental impacts through the hazardous waste remaining within the site. The United States Environment Protection Act ("EPA") defines hazardous waste as "toxic, corrosive, ignitable, or reactive materials."[7] These materials are corrosive to the skin tissue or metals, unstable and can explode or release toxic fumes or have harmful concentrations of one or more toxic materials that can leak out."[8]

Brownfield sites have the potential to pose a threat to public health and safety in two ways. Nearby residents are at risk if the sites have been affected by industrial activities or by the storage or disposal of hazardous waste; these sites usually do not have the appropriate enclosures to keep out trespassers.[9]

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[6] U.S. Department of Labor, Bureau of Labor Statistics (1990-2000a).
[7] *Id.*
[8] *Id.*
[9] *Id.*

Contamination is determined by qualified engineers that assess the site and analyze ecological and human health exposures to determine whether the concentration of chemicals on the site pose concern. Engineering assessments along with zoning restrictions dictate whether a site is suitable for a specific potential use.[10]

Brownfields present financial problems also. Abandoned sites, which become brownfields, fail to bring in any taxable income to the city because of the loss of employee income tax revenues and a decrease in the property value. The site inevitably will cost the owner more to remediate than what the site is worth, which is a deterrent to redevelopment of the site.

The EPA describes three phases within the Environmental Site Assessment ("ESA") conducted by qualified engineer firms, which takes place when an industrial site is purchased and sold. In Phase I, the history of the site is reviewed. This phase identifies the owners of the site for the past 30 years or more. It determines prior uses of the site, as well as the previous uses of the adjacent sites. In addition, the site's regulatory background is investigated, which reveals the type of permits that have been issued for the site.

In Phase II, samples of soil and water are collected. Potential contaminants are identified, and a formal plan for assessing the property is developed. A timeline is created for investigating the extent of contamination on the site, and a schedule is devised for the final completion of cleanup. Phase II ESAs cost between $20,000 and $200,000, or more.

Phase III is the actual cleanup of the brownfield site. This phase offers three treatment options. First, hazardous substances and contaminated materials are excavated and disposed of in either an on-site or off-site landfill, or some can be burned. Containers, such as barrels or drums, of hazardous waste are removed from the site. Contaminated soil is treated or disposed. Second, containment is used to prevent the contamination of the site from spreading to other locations. To accomplish this the site may need a cap made of asphalt or clay. Third, is treatment. Treatment removes or remediates lingering contaminates so they no longer pose a threat to human or ecological receptors. Waters, including rivers, ponds, or an underground aquifer, are remediated, and the soil may be removed, washed, or incinerated. This may be more expensive, but more efficient.

Although the correction of environmental impacts are costly and very complex, the long term result is beneficial to the community by making healthier land uses; moreover, should not be a deterrent to redevelopment.

C. Social Impacts

Communities that allow brownfield sites to remain inactive lose the tax revenue and employment opportunities generated by thriving operations. For some cities, this can total hundreds of jobs, millions of tax dollars, and hundreds of thousands of dollars in wages that might circulate through the area, bringing still more economic

[10] *Id.*

benefits.[11] Manufacturing jobs pay larger salaries than service sector jobs available to individuals who have graduated from high school only or with less education. The decline of manufacturing jobs increased poverty levels in the city and promoted sustainable development strategies through encouraging reenfield development. Manufacturing jobs were important to our economy because they paid higher wages overall than the service industry. In 2001, the average weekly earning for manufacturing workers was $593.03 compared to $441.94 for service workers. The difference in wages between these two sectors has remained constant since 1990.[12] The number of hours worked and required specialized skills are both important factors when it comes to the differences in wages paid. Since 1988, the average weekly hours worked has grown slightly for manufacturing and fallen slightly in the service sector, which adds to the comparable difference displayed in wages.[13]

Existing streets and roads, water lines, rail spurs, and other infrastructure systems go unused; in jurisdictions with numerous brownfield sites, this means that billions of dollars in prior public and private investment are essentially wasted. Brownfields were strategically placed near waterfronts and downtowns.[14] Their dilapidated structures negatively affect their surrounding sites and discourage revitalization. As manufacturing moves further out, the suburbs will have to turn their attention to industrial retention also. Suburbs are threatened by manufacturers moving overseas for cheaper labor.

It is in the cities best interest to make use of the abandoned sites. Redeveloping brownfields requires solutions designed to attract new business, retain jobs, build a stronger tax base, and make communities attractive places to live and work. The challenge facing community members, developers, and government officials in urban and industrial areas is to design a process to facilitate brownfield redevelopment while ensuring that the interests of all key stakeholders, including local residents, are met and development is sustainable.[15]

IV. Barriers to Redevelopment

A. Liabilities & Stakeholders

A major impediment to the redevelopment of abandoned, potentially contaminated industrial sites is the direct cost of cleanup of hazardous materials and the potential liability associated with environmental contamination. The regulations and legal actions that surround brownfield redevelopment, in many ways may have increased the

[11] www.nemw.org Coming Clean, Framework of Environmental and Economic Development Concerns
[12] U.S. Department of Labor, Bureau of Labor Statistics, 2000.
[13] U.S. Department of Labor, Bureau of Labor Statistics, 2000.
[14] www.nemw.org Coming Clean Framework of Environmental and Economic Development Concerns
[15] A. Donati C. Rossi and C.A. Brebbia, Brownfields Sites II, 2004.

barriers to redevelopment. This has resulted in several federal and state initiating innovative policies to overcome these barriers.[16] There are state programs that offer limited liability relief for innocent owners and purchasers, Letters of No Further Action, Covenants Not to Sue, or Certificates of Completion. These forms are provided by the state to potential liable parties after remediation of the site to state specific standards. The problem with the liability relief is that it does not provided complete exoneration of liability when the property changes hand, which subjects landowners to liability after transfer of title has taken place. "[T]he federal government has been working with the states to create memorandums of agreement (MOAs). "A Superfund Memorandum Agreement (SMOA) or Memorandum of Agreement (MOA) can be negotiated between a state and the EPA, making the state and EPA partners in the redevelopment process." [17]

The legal issues surrounding brownfields are complicated and manifold. Multiple parties, such as past and present owners, can be held liable for any legal liability associated with contamination. However, the government can interject itself to assess and resolve liability. The primary federal law affecting brownfield redevelopment is the Comprehensive Environmental Response, Compensation, and liability Act ("CERCLA" or Superfund). CERCLA is the most significant federal statute guiding public officials and private parties through the process of buying and purchasing properties that with site contamination. The Superfund deals with past dumping of hazardous materials and the toxic legacy of sites that pose grave threats to public health and the environment. CERCLA is perhaps the most influential environmental law affecting whether and how contaminated sites are cleaned and redeveloped. These aspects of the law should be of particular interest to local economic development practitioner.

The initial intent of CERCLA was to promote cleanup of contaminated properties and to provide opportunities for the EPA to recover cleanup costs from all potentially responsible parties. The CERCLA classified potential responsible parties as past and present property owners, lending institutions, and developers even if they did not contribute to the contamination.[18] Due to fear of liability, potential responsible parties do are vigilant of taking title, and financial institutions are disinclined to lend on properties that might have previously been contaminated. The concept of liability applied in CERCLA under its common law meaning of "strict" liability (i.e. not requiring any demonstration of wrong-doing on the part of the polluter, showing evidence of pollution only) was created by lawmakers to offer several advantages to the government as it sought ways to control and reduce discharges of hazardous substances into the

[16] *Id.*
[17] *Id.*
[18] Joan Fitzgerald and Nancy Green Leigh, Economic Revitalization: Cases and Strategies for City and Suburbs, 2002

environment.[19] Bankers and insurers were drafted into the Superfund's liability scheme, receiving protection from liability when companies "*operate according to environmental laws and avoid enforcement and liability expenses.*"[20]

However, there are two exceptions to CERCLA. First, is the "innocent landowners defense," which releases property owners from liability, as long as certain requirements are met. These property owners must not have known or had any reason to know of any contamination present on the site.[21] The second exception, the "secured creditor exception," covers lending institutions. Lending institutions have very limited involvement in the operation of a property. This exception was put in place to accommodate financiers' conventional underwriting and lending practices. The key here is that lending institutions will not be liable if they maintain a security interest in the property *only*. The theory behind this is lenders' participation is encouraged to help further the public interest to address the problem of pollution and clean up site contamination.[22]

Lenders and developers tend to avoid getting involved in projects with companies and properties with environmental risks. "The size and financial resources of the current owner now influence a site's marketability and reuse potential. For example, prospective purchasers may buy an industrial site from a large, thriving corporation that can afford necessary site remediation. Therefore, if the EPA sues for cleanup, the new owner can go after the seller to recover remediation costs, or the EPA can go after them directly.[23] It can be inferred from this that small business owners are challenged when seeking to secure credit. Allocation of responsibility and clean up cost should be clear in the closing agreement.

Michigan has implemented a liability reform. Unlike the federal law, Michigan does not impose liability on a property owner merely because of property ownership. Liability is imposed upon those causing the release of contamination. Liability for remediation is imposed generally only on those who own or operate a facility, which is or was responsible for an activity causing the contamination at the facility.[24]

While significant public policy has been implemented to limit the liability of those reusing an industrial site, the added cost of cleanup and reconstruction are still impediments to reuse. The funding section will examine financial federal and state programs intended to reduce the financial impediment to redevelopment.

B. Federal Financing Initiatives

The U.S. Department of Housing and Urban Development can play a critical role in local economic development by using their resources to support a wide

[19] www.nemw.org Coming Clean, Framework of Environment and Economic Development Concerns
[20] *Id.*
[21] *Id.*
[22] *Id.*
[23] *Id.*
[24] D.S. Card and R.H. Kummler, Hazardous Waste Management Program, Michigan Brownfield Regulatory Review.

variety of financial assistance programs such as loans, loan guarantees, and grants.[25]

Community Development Block Grants (CDBG) provides direct funding for activities that support the reuse of industrial sites. These resources can be used to fund rehabilitation of privately owned buildings and sites, covering specific costs related to labor, materials, construction, renovation, entrepreneurial counseling, preparation of work specifications, loan processing, and site inspections. This grant is "well suited for the 'new generation' of industrial site reuse projects that require a much stronger focus on environmental concerns."[26]

Projects focused on remediating environmental contamination must meet one of the program's national objectives:

- providing benefit to low and moderate income persons;
- aiding in the elimination or prevention of slums or blight; or
- meeting other urgent community needs.

This program was changed to increase the flexibility at the local level to make it more sufficient for problems holding off site reuse activities.

Section 108 Loan Guarantees enables local governments to finance physical and economic development projects too large for front-end financing with single year CDBG grants. Localities issue debentures to cover the cost of such project, pledging their CDBG grants as collateral. Local governments can use their annual CDBG grants to pay off the loan; however some use income generated from the development projects for some or all of the payments. Activities under this loan must meet the same requirements under the CDBG program. These funds have been used for property acquisition, clearance or rehabilitation of obsolete structures, construction of public improvements such as water and sewer facilities, and site improvements. Brownfields are included as a permitted use, specifically for removing hazardous waste and toxic contaminants.[27]

Empowerment Zones (Ezs) and Enterprise Communities (Ecs) are geographic areas targeted to receive special federal treatment and incentives in order that private investment and other economic activity might be attracted to them. Designation brings several benefits to the selected areas, including $100 million in social service grants for each of the urban (Ezs). In addition, these communities can compete for as much as $2.5 billion in new tax incentives to induce investment in the targeted distressed areas. Theses incentives include[28]:

- new tax-exempt facility bonds, available in both Ezs and Ecs, provide business up to $3 million to finance construction of new facilities or expansion of existing ones, and to acquire equipment and machinery;
- employer wage credits for companies located in Ezs of up to $3,000 per year employee; these credits offset the salaries and training costs for

[25] www.nemw.org/cmclean3.htm
[26] *Id.*
[27] *Id.*
[28] *Id.*

employees who both work and live in the zone; and
- a $20,000 increase in permitted Section 179 expensing to allow EZ-based companies to take greater depreciation deductions for equipment in the year it's acquired (bringing the annual total up to $37,500).

Applicants are required to explain how they will use these funds to confront economic distress and unemployment.[29]

C. State Financing Initiatives

States have recognized the critical role that financing initiatives play in resolving the brownfield reuse issue. Today, brownfield redevelopment needs are very diverse; states believe the answer is a combination of sources.[30] States have started financing initiatives that focus on brownfield reuse cases. These funds are focused on small to mid-size companies that go through state voluntary cleanup programs. For example, Ohio firms can receive a ten-year state tax abatement for increase in property values, and localities can offer an additional ten-year waiver; Ohio also plans to make low-interest loans available for brownfield uses.[31]

Brownfield sites in urban areas are inherently dangerous investments; the redevelopment almost never produces enough returns to meet or exceed remediation cost. Grants are greatly coveted for sites in urban areas. Grants will assist current owners to remediate their site without losing an enormous investment. Listed below are a "sample of state assisted programs that provide for areas where these sites are typically found:"[32]

- Connecticut's Urban Sites Remediation Action Program was capitalized with $30.5 million in state bond funds for assessment and remediation of sites in distressed municipalities and targeted investment communities.
- Massachusetts's Brownfield Redevelopment Fund has focused $30 million of funds for low-interest loans and grants for site assessment and cleanup in economically distressed areas.
- Ohio's Urban and Rural Initiative Grant Program provides grants to municipalities or nonprofit organization in distressed areas.

Loan programs will put the state in the position of a commercial lender, therefore, lending directly to consumers. However, the state has to be willing to take some risk. On the other hand, the state will have a large security interest in the success of the redevelopment. The state may want to be more involved in the project than a lending institution, which will place more responsibility on the state to ensure stable economic development.

Loan guarantees will allow the state to minimize various risks for financial institutions and for themselves. Loan guarantees are based on the state's pledge to cover most or all of the

[29] *Id.*
[30] *Id.*
[31] *Id.*
[32] Joan Fitzgerald and Nancy Green Leigh, Economic Revitalization: Cases and Strategies for City and Suburbs, 2002.

outstanding balance of a loan made by a private lending institution in the event a borrower defaults. For companies, loan guarantees help increase the availability of capital and often reduce the cost of borrowing. For lenders, they lower the fiduciary risks of lending.[33]

The Michigan's Funding Mechanisms implemented the Environmental Response Division (ERD), which administers MDEQ programs that involve the cleanup and redevelopment of contaminated sites. Funding assistance for brownfield redevelopment is available from a number of state sources including:[34]

- Revitalization Revolving Loan Fund;
- Site Reclamation Grants;
- Site assessment Grants;
- Site Reclamation program;
- Clean Michigan Initiative (CMI);
- Waterfront Redevelopment Grant Program;
- The Cleanup and redevelopment Authorities;
- Single Business Tax Credit;
- Federal Taxpayer Relief Act;
- Coastal Management Program;
- Michigan Transportation Economic Development Fund; and
- Other Sources.

It appears funding can be used for this unique strategy; thus this use is not expressly excluded from the funding policies.

[33] *Id.*

[34] D.S. Card and R.H. Kummler, Hazardous Waste Management Program, Michigan Brownfield Regulatory Review.

V. The Remaining Challenges: Where Industrial Reuse Fails

In spite of numerous public acts limiting the liability of new landowners of previously contaminated industrial sites and the availability of a variety of public financial incentives to differ the cost of rehabilitation, hundreds of abandoned sites continue to depress the economies of older industrial communities in Michigan. According to The Detroit News, "in Detroit metropolitan area alone there is an estimated 3,000 brownfields existing on tens of thousands of acres of land."[35]

Other forces maybe at work that inhibit the redevelopment and reuse of these key industrial sites, but what portrays the greatest impediment to re-use is a "weak" manufacturing market in the U.S.

International competition coupled with a rapidly changing industrial technology has forever changed the nature of the manufacturing enterprises. The potential for Michigan to attract or create the sheer number of private manufacturing or industrial enterprises that might reuse the vast number of abandoned sites seems highly unlikely in today's global economy. This obligates the public to play a greater role when public health and safety is at risk, the environmental, cultural, and historic nature of the site offers unique advantages, redevelopment has the

[35] Brownfield Remediation, *Urban revitalization requires local groups to learn to identify brownfield sites and understand the liability and environmental concerns,* Environmental Protection Magazine, By Joe Lorenz and Tom Mignery.

potential to stimulate further redevelopment in communities, and where the opportunity to leverage unique public and private resources may exist. Given this scenario, what options does a state or locality have to "green" its abandoned industrial jungles. This is particularly critical for these sites that are highly visible and have a depressing effect on the larger community.

In scattered locations across the world, communities are developing a unique and innovative reuse strategy for specific industrial sites. This "greening" of abandoned industrial sites has a number of potential benefits to a broad set of public and private institutions. The following are selected case studies of this innovative strategy of industrial reuse.

VI. Method of Analysis

The Michigan State University Urban Policy Team under took a 15 week analysis of existing green industrial reuse. We identified cases with industrial sites that critically needed redevelopment, while preserving the original structure. Reuse of the industrial site is critical when the nature of the site offers unique advantages. The method of analysis includes examining a group of case studies according to their:

- previous uses,
- size of the parcels,
- character of the new structure,
- surrounding neighborhoods,
- accessibility or ease of access,
- infrastructure,
- number of jobs created from new development,
- nature of the partnerships that initiated redevelopment,
- cost of redevelopment,
- economic impacts,
- implications, and
- sources of information (contact information).

The case studies included are Seattle, Washington, Toronto, Canada, Duisburg, Germany, and Korea. The second step of the method of analysis is to compare what we learn from the case studies to Detroit, Michigan to determine what the characteristics a potential site in Detroit should have to be successful.

VII. Case Studies

A. Gas Works Park, Seattle, USA

1. Previous use

This park was former industrial site. The history of the site stretches back to 1906, when the Seattle Gas Company constructed a plant to extract gas from coal. The plant was shut down in 1956 after functioning for fifty years. But as the site was located at the shore of Lake Union, which commanded a fine view of Seattle and marred the landscape of the Seattle with left obsolete, in 1962 the Seattle Parks Department announced plans to purchase the site for 1.3 million dollars and transform it into a public park.

2. Size of the parcels

Gas Works Park with 20.5 acres is situated at the north end of Lake Union in the Seattle.

3. Character of the New Structure

This park was mainly built by making use of former factory structures

without demolition. The original boiler house was transformed into a picnic shelter with tables, fire grills and a mezzanine stage for special events. The former compressor building is now the site of the children's play barn. A pedestrian trail leads up to a hill with a grand view over Seattle. The hill was artificially made from soil from the excavation of a nearby building. This is popular site for kiting and provides visitors with magnificent views the adjacent Seattle Skyline. A sundial is located on the hill. An architectonic feature called the prowl occupies the southern most portion of and provides seating, viewing, and fishing. The pumps have been cleaned and painted with bright colors. An outdoor play area is connected to the play barn. The large refinery towers are surrounded by a fence with signs telling you to keep out which prevents visitors from climbing the more dangerous structures.

4. Surrounding Neighborhoods

This park is situated at the north end of Lake Union in the Seattle with overlooking city of Seattle.

5. Accessibility

Not Available.

6. Infrastructure

Not Available.

7. Number of jobs created from new development

Not available.

8. Nature of the partnerships that initiated redevelopment

This project was wholly driven by the public sector, which is the city and Department of Parks and Recreation.

9. Cost of Redevelopment

The cost of land purchase and park construction is estimated to spend $2,341,000. Of the expense, $1,750,000 was financed by Forward Trust Bond, $591,000 by federal department of Housing and Urban Development.[36]

10. Economic impacts

Not available

11. Implication

This site was a former manufacturing plant of which soil was severely polluted with contaminant that was revealed that any life could live in the site for 50 years, but because of the location, the government decided to buy it for developing with park. First, the Seattle City Authority planned to make it into an arboretum.[37] However, because no life could live with heavy contamination, local government planned the structures would be demolished and the site restored to a conventional, "natural" state, and asked Richard Haag who was a professor of the University of Washington for master plan to develop as a park in 1971. However instead of demolish existing obsolete structures, Richard Haag suggested keeping the old toxic facilities. He proposed the existing structures should be saved, not for historical purpose, but rather for purely aesthetic reasons to provide an interesting visual another for park design. The idea of keeping the old toxic structure drew a great deal of opposition from the local community and environmental officials. The typical public opinion was that the existing structures were nothing, but junk and

[36] Materials from Seattle parks and recreation.
[37] www.historylink.org/essays/output.cfm?file=2899

should be removed. After 24 presentations, the city of Seattle approved the Haag's master plan. It is said that one of reasons of approving this plan from Local government was due to cheap construction expense.

The controversial issue was how to prevent environmental pollution without demolishing the old facilities. In other word, how to find a way to detoxify the soil, which remained contaminated with hydrocarbons from the old industrial process. Richard Haag proposed a bioremediation method. This method is to detoxify the soil on-site by adding oil-degrading enzymes to the soil, as well as organic materials to fertilize the growth of soil microorganisms.[38] When the Gas Works Park opened over 20 years ago, it received much praise as an example of an innovative post industrial revival. It was first conceptualized that the abandoned industrial sites be transformed into public spaces.[39] It has effect on many other countries as well as within America. The park has received local, regional, national and international attention as a prototype for industrial site conversions. Duisburg Nord Park in Germany is one of the more famous in this genre; it is today often referred to as the first of its kind. It is worth to notify that Gas Works Park was designed almost two decades earlier.

But the issue of soil and water contamination is still remained unsolved completely. The park has been closed several times since it first opened due to this reason. Environmental officials are still arguing that the pollutants are washing into the surrounding Lake Union.

The Department of Ecology and the City of Seattle has been investigated soil and underwater periodically.

1965 Gas works park

1999 Gas works park

Artificial kite mound

Remaining structures1

[38] www.washington.edu/research/showcase
[39] www.clr.utorontoca/cgl-bin/virtuallib/clipadd

Remaining structures2

12. Sources of Information

1. www.washington.edu/research/showcase.
2. http://www.cityofseattle.net/parks/parkspaces/GASWORKS.htm.
3. http://www.tpl.org/tier3_cdl.cfm?content_item_id=937&folder_id=729.
4. www.historylink.org.essays/output.cfm?file_id=2899.
5. http://www.lpul.slu.se/projects/pacific/seattleGWP121.htm.

B. Jeongseon Casino Resort in Korea

1. Previous use

This site was former coalmine area.

2. Size of the Parcels

It is located in Baewoonsan, Gohan-up, Jeongseon-Kun, Kangwon-do, which is East Province of Korea. Its total area is 6,611thousand square meters.

3. Character of the New Structures

This project was aimed to provide an international casino resort for both Koreans and foreigners; a family resort with year-round facilities are suited to meet various requirements for people from all walks of life, an eco-friendly resort that visitors can relish the scenic beauty in a remote mountain area, as they relax into the natural surroundings, and a cultural resort that visitors with the opportunity to experience many cultural wonders and enjoy themselves with festivities and special events all day long.[40] By now, only hotel casino is operating. Other facilities are under construction.

4. Surrounding Neighborhoods

This area is secluded area surrounded by many mountains.

5. Accessibility

Because the area was in remote place surrounded by the mountains traffic was very inconvenient.

6. Infrastructure

Not Available

[40] http://www.kangwoncasino.com/

7. Number of Jobs Created from New Development

This project has brought effect of employing about 2,000 residents(50% of total employees).

8. Nature of the Partnerships that Initiated Redevelopment

To drive this project, new corporation (Kangwon Land) was founded by government and private parts. The fund was invested 51% by public sector and 49% by private sector.[41]

9. Cost of Redevelopment

Firstly they invested 17million dollars to build a small casino. They are going to invest additionally one billion dollars to construct infrastructures like road.

10. Economic impacts

This project is also making an effort to foster local businesses by giving them jobs such as janitorial work or road management (estimated to be worth 18.5 million dollars annually). Moreover it supplemented local municipalities' financial needs through payment of local taxes and development fund for closed coalmine areas. From 2000 to 2002, this project gave the local government 20.5 million dollars as tax and invested 57.6 million dollars for the closed coalmine areas.

11. Implications

This project was made to recover the distressed local economy in closed coalmine areas. According to decline of coal consumption and change of coal policy of the government, most of the coalmines in Kangwon-do have closed since 1989.[42] Consequently, the living conditions and social base facilities have deteriorated in those abandoned mine areas. The government has gone over various alternatives to revitalize the depressed local economy. However, because the area was in remote place surrounded by the mountains and traffic was also inconvenient, and to make matter worse, transportation cost was high, it was difficult to induce manufacturing industry. After discreet consideration, at last the government has concluded to develop comprehensive tourism resort complex making best use of location feature. However, because condition of transportation and locality formed with coal industry became fatal weakness in access of the public, it was not expected to be success without differentiation from other resorts. So the area needed new concept to compete with other resorts such as golf resort, ski resort and coast resort. The conclusion the government made was casino resort for domestic as well as foreigners.[43]

At that time because the domestic can not use the casino in Korea, the government enacted the special law pertaining to the development of coal mine areas and made it possible for the domestic to gamble at casinos in these areas.

The factors of success of this project could be classified two aspects. 1) Differences from other resorts and 2) Strong support from various organizations. Above all, the success factor is differentiation of other resorts in spite of bad accessibility. A hotel casino was completely new idea in closed mine area in the Korea. The government vigorously backed this project with enacting a special

[41] http://www.kangwoncasino.com/

[42] http://user.chollian.net/~ism/

[43] http://user.chollian.net/~ism/

legislation. This law enabled the domestic to enter the hotel casino.

This project was driven under strong support from public and private sector and that is crucial success factor of it. But in spite of an outstanding economic accomplishment, a negative recognition over casino still remained an issue to be overcome. So this project is also offering Gambling Clinic center, which designed for the prevention of addictions to gambling and treatment of addicts.

Typical Kangwon Mountainous Topography

Coalmine Area1: Sky is always hazy

Coalmine Area2

Kangwon Land Theme park: Image Cut

12. Sources of Information

1. http://www.kangwoncasino.com/ this site is formal homepage.
2. http://user.chollian.net/~ism/ this site is a think tank for revitalization of closed coal mine areas.

C. Don Valley Brickworks, Toronto, Canada[44]

1. Previous Uses

As an estuary in the Don River where silt would collect, aboriginal communities likely used the Brickworks site for centuries as a source for clay. In more recent history, from 1889 to 1984, the Brickworks was one of Canada's pre-eminent brickyards. Today, the Brickworks represents the evolution of one of Toronto's oldest industrial sites,

[44] EVERGREEN Foundation, Canada <http://www.evergreen.ca>

from a Brownfield to a natural environment park.

The Don Valley Pressed Brickworks Company was established in 1889. The plant produced a wider variety of bricks and kiln fired clay products than any other brick plant in Ontario. The present complex of Brickworks buildings dates back to this period and documents the historical manufacturing process. Toronto's skyline owes much to the Don Valley Brickworks. Many of the city's most prestigious buildings have been made from bricks manufactured at the Brickworks. Hart House, Trinity College, Convocation Hall, Casa Loma, Old City Hall, Queen's Park, Osgoode Hall and Massey Hall - all were made from shale and clay extracted from the quarry and manufactured at the Don Valley Brickworks.

2. *Size of the Parcels*
   - Location: 550 Bayview Avenue, on the west side, just north of the Bloor Street Bridge
   - Site Area: 16.4 hectares / 40.7 acres
   - Zoning: Public Open Space
   - Total Number of Buildings: 15
   - Total Floor Space: Approximately 250,000 square feet

3. *Character of the New Structure*

This site doesn't have any new structures, this site use the previous buildings without demolish these buildings.

4. *Surrounding Neighborhoods*

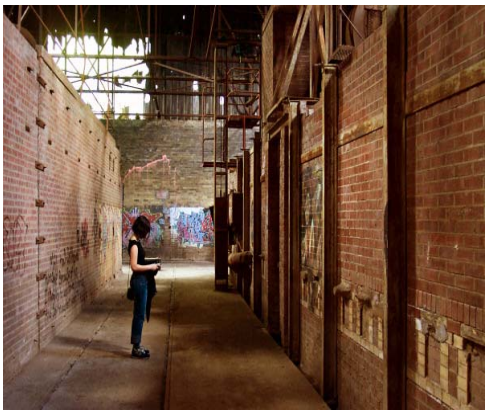
Don Valley Brickworks located in suburban area of city of Toronto. Therefore, the surrounding areas of the Brickworks are only park and river areas.

Don Valley Brickworks and Surrounding Areas

5. *Accessibility*
   - Parking: Approximately 300 cars, 9 buses
   - Transportation and Access: 200 m north of Don Valley Parkway's Bloor Street exit. Car access from the Bayview Extension. Good walking trail access to Rosedale and Moore Park. No public transportation to the site. Nearest subway station is Castle Frank.

6. *Infrastructure*

This site was a brick factory, so most infrastructures already have set up. However, it had cleaned up because of redevelop into the public space.



Inside Building of Don Valley Brickworks

7. *Number of Jobs Created from New Development*

When the Don Valley site had redeveloped, many jobs had created, but the details of the job creations are not provided. Regarding the current operation, Evergreen Foundation is mainly charged in terms of the operation with volunteers. Currently, they didn't offer job opening.

8. *Nature of the Partnerships that Initiated Redevelopment*

This project addresses a range of social and environmental challenges and it will help charitable, non-profit organizations and socially conscious private enterprises working on these issues expand their reach and impact by providing an innovative program and office space at very competitive rates.

Great cities need great places. They need places that inspire, that captivate our imaginations and that build capital - natural and social capital as well as economic. Toronto needs such places. As cities grapple with a range of challenges - poor air and water quality, degraded natural environments, deteriorating public infrastructure - we must also create places that offer solutions. Solutions need the strength of diverse partners, the energy of our collective creativity, and the tremendous potential of volunteers. Toronto needs real, practical solutions that make it a more vibrant, livable city

As public concerns over environmental quality, our increasingly fast-paced lifestyles and the lack of meaningful community life continue to rise, the need for health, environmental and cultural organizations to take a greater collaborative approach to tackling problems becomes more pronounced. Evergreen has recognized the tremendous opportunities for developing an innovative mixed-use program facility modeled on the themes of nature, culture and community for organizations that have a strong experiential focus to their mission delivery. This opportunity is greatly enhanced when located at the Don Valley Brickworks

Because of above reasons, the city of Toronto decided the plan in terms of the Brickworks site, and following organizations help the redevelopment project.

- Toronto and Region Conservation (TRCA)
- Bridgepoint Health
- Gardiner Museum of Ceramic Art
- Jamie Kennedy Kitchens
- Health Knowledge Lab, Centre for Effective Practice, University of Toronto
- Health KnowledgeWorks
- Outward Bound Canada
- ReCreate, ReUse Centre for the Creative Arts
- Toronto District School Board (TDSB)
- YMCA of Greater Toronto

After redevelopment project, the 16.5-hectare land became publicly owned and was designated a Natural and Industrial Heritage Site. The restoration of the Brickworks began in 1995, led by the City of Toronto and the Metropolitan Toronto and Region Conservation Authority. Planting began in 1997 and the site was officially opened as a park in the fall of that year.

9. *Cost of Redevelopment*

The remediation cost of Don Valley project is $80,000, and the capital cost is $5,000,000. About 45% of capital is from the Toronto and Region Conservation (TRCA) and the City of

Toronto provided 5% of the capital. Last 50% of the capital was donated by individuals, and EVER GREEN foundation. Also, some organizations in the community help the redevelopment plan with fund and volunteers. Currently, Ever Green foundation launches a $30million capital campaign.

10. Economic Impacts and Implementation

Regarding the economic impacts, Don Valley Brickworks doesn't pursue economic benefit but improving citizens' welfare. Don Valley Brickworks comprises industrial buildings representing the history of Brickworks, and surrounding park land. Also, Don Valley Brickworks provides following programs.

Evergreen Gardens, a 100,000 sq. ft native plant nursery and market garden. Using urban-sized demonstration gardens, the nursery will teach home gardeners how to create naturalized, pesticide-free gardens, educating them about ecological landscaping and supplying them with the tools and materials to change the way they garden. Plants propagated at Evergreen Gardens will be sold to gardeners along with environmentally appropriate garden supplies.

Evergreen Garden at Brickworks

Restaurant and 'café-on-the-green', will serve organic regional and local produce including food grown in demonstration gardens on-site. Food preparation and the sharing of meals will be treated with respect - as demonstrated in the growing 'slow food' movement. An organic farmers' market will be offered throughout the spring, summer and fall.

Cultural Classes, children's art programs, ceramic classes, and a sculpture garden.

Ceramic Class at Brickworks

Youth leadership programs such as summer camps, an on-site woodworking studios, skills training for youth, the hiring of at-risk youth at Evergreen Gardens; and urban-based leadership programming.

Children's teaching gardens, food growing gardens, heritage, geological and environmental tours, demonstration gardens and a training venue for

teachers, parents and community organizers.

Winter activities, such as outdoor ice-skating and hockey.

Ice-hockey at Brickworks

Health and wellness programming, such as occupational therapy for long-term care patients. Engaging patients in gardening, food growing, ceramics programs and/ or the use of the park setting will go beyond occupational therapy programs at any other Canadian facility.

D. Duisburg North Landscape Park, Germany

The Duisburg North Landscape Park is located in the northern part of Duisburg in Germany. The City of Duisburg has 515,000 inhabitants and lies at the edge of the conurbation on the Rhine and Ruhr - consisting of 17 cities – with more than 5 million inhabitants. For more than 20 years the City of Duisburg has been undergoing profound structural change; more than 120,000 jobs were lost due to the shrinkage of coal industry as well as steel industry. The start of Duisburg North Landscape Park Project was made in 1989 within the context of the 'IBA Emscher Park 1989–1999'. This international building exhibition was held in 1988 led by the state government Land of North Rhine-Westphalia as an attempt to take different path for the development of the region with a legacy of contaminated land and a redundant workforce.[45]

1. Previous Uses

Previously the Duisburg North Landscape Park was a site of iron works including pits as well as a coking plant owned by the company of Thyssen. Industrial use was abandoned in several steps between 1965(coking plant) and 1984(blast-furnace plant).

2. Size of Parcel

2 million square meters (494 acres, over 200 hectares).

3. Character of the New Structure

The concept of this project, which was proposed by the landscape architecture Prof. Peter Latz, was not to demolish the most important old plants but to integrate them in the new park layout. There are intensively usable open spaces, trend sport areas laid out especially for juveniles, and, natural retreat areas for many rare species of animals and plants. In addition, the buildings in the park were converted for new uses. For example, the old administration building is used as a hotel and blast furnace is converted to open-air theater.

[45] Ingerid Helsing Almaas, Regenerating the Ruhr – IBA Emscher Park project for the regeneration of Germany's Ruhr region, 1999

4. Surrounding Neighborhoods

100,000 people were living in north of Duisburg situated between two densely populated areas of the city.

5. Accessibility

Not Available

6. Infrastructure

Not Available

7. Number of jobs created from new development

Not Available

8. Nature of the Partnerships that initiated redevelopment

Being implemented in the context of International Building Exhibition, Emscher Park 1989–1999, the project was implemented collaborated with IBA (Internationale Bauaustellung), IG Nordpark, Society for industrial Culture and the Parks Department of Duisburg City Council, Thyssen Entsorgungstechnik (a waste treatment technology company).

9. Cost of Redevelopment

DM 100 million (about 58.51 million dollars). The IBA administered no project funds of its own: all its projects made use of existing private and public funding available through regional, national and inter-European subsidy programs.[46]

10. Economic Impact

From economic points of view, it achieved significant cost savings with overall expenditure of DM 100 millions (about 58.51 million dollars), otherwise the potential demolition cost (without remediation of contaminated soils and re-design) alone were estimated at approximately DM 80-100 million. Also, today about 300 persons are working there and the effects on the surrounding area cannot accountable.[47]

11. Implications

Psychological Aspects

Even if there is scientifically well-founded knowledge about contaminated site safeguarding, it is obviously not sufficient to completely overcome the psychologically barrier, the "fear" of potential hazards at a revitalized old location. Also In this case, there was a considerable obstacle to obtaining positive acceptance of revitalization because of the image of the site, which included not only the fear of potential hazard at contaminated sites but also the emotional aspect of the lost jobs.

Legal Aspects

It was hard to identify who was legally responsible for contamination because the actual time of the pollution was not sufficiently clarified due to the ownership changes of the contaminated site. After the enactment of Federal Soil Protection Act as of Jan. 1999, the seller of the site was to be made liable for all contamination of the site to the extent that he knew or had to know about it at the point in time of sale. In addition, there were no generally applicable criteria for the treatment standards for

[46] Ingerid Helsing Almaas, Regenerating the Ruhr – IBA Emscher Park project for the regeneration of Germany's Ruhr region, 1999

[47] Martin Linne, Workshop report, Experience of reactivation measures in the city of Duisburg, National Brownfields Conference 2001 - Chicago

different reuses. This made the actual local marketing difficult.

Flexible Planning

The selected design concept was unusual processes and planning contents not yet often tried out. This courageous decision could be made easier for the city by the contents-related and financial support within the scope of the International Construction Exhibition Emscher Park started in 1989.[48]

Communication and Participation

The experience of the city of Duisburg shows two things: first, great importance to qualify a project idea in advance of a public discussion to the extent that a rational presentation is made possible and second, intense public debates about costs and benefits of the project. This applies in particular, if a financial involvement of the public is linked with the project implementation.[49]

Social/Cultural Impact

Duisburg North presents itself as a successful combination of ecological, open space, sports and leisure aspects. Now, the Duisburg North Landscape Park has developed into one of the most important cultural performance venues.[50]

Other Unique Physical Elements

The night-time illumination of the blast-furnace works designed by Jonathan Park, a lighting designer from London who worked for Pink Floyd, led to an incredibly positive change with regard to the public consciousness of the park. The work of light art also caused an international stir and turned out to be the image highlight of the park

VIII. Recommendations for Michigan

After examining the research and case studies, it seems very plausible to reuse selected abandoned industrial sites for cultural recreational purposes. The state should consider implementing a pilot project funding specifically for the reuse of abandoned industrial sites with cultural and/or historical character. Recreational and cultural use should be the target activity; however, stakeholders should be required to make valid arguments showing whether the recreational use will contribute to further economic investment and public benefit beyond the project.

Keys to the success of this pilot program will be the selection of two to three sites in Michigan that can demonstrate the viability of this re-use concept. Criteria for the selection of these sites should include:

- The potential for private sector redevelopment is low due to site size or cost of cleanup.
- The site has a unique cultural or historical, environmental, or recreational potential.
- The site is highly visible and thus has a depressing affect on the surrounding community/region.
- The site has unique structures that lend themselves to creative reuse.
- The site has the potential, when reused, to stimulate other

[48] Martin Linne, Workshop report, Experience of reactivation measures in the city of Duisburg, National Brownfields Conference 2001 - Chicago
[49] Id.
[50] Id.

development within the adjoining community.

- There are capable and effective public and private organizations to provide leadership and support for the re-use of the site.

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