

## **BROWNFIELDS REDEVELOPMENT ISSUES AT THE FEDERAL, STATE, AND LOCAL LEVELS\***

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### **ABSTRACT**

The redevelopment of Brownfields has taken off in the 1990s, supported by federal and state incentives, and largely undertaken through local initiatives. Brownfields redevelopment has several associated benefits. These include the revitalization of inner-city neighborhoods, creation of jobs and tax revenues, greater protection of public health and natural resources, renewal and re-use of civil infrastructure, control of urban sprawl and Greenfields protection. While these benefits are numerous, there are also several obstacles associated with Brownfields redevelopment. Redevelopment issues typically embrace a host of legal liability concerns, financial, technical and socioeconomic constraints, uncertainties arising from inadequate site information, and competing redevelopment objectives. Collectively, local, state, and federal efforts seek to address these Brownfields issues and provide both the framework and mechanism for achieving the cleanup and productive re-use of Brownfields sites. While federal and state level programs tend to focus on providing broad incentives (liability, financial, and technical) for Brownfields redevelopment, local level initiatives tend to provide the actual techniques and strategies for Brownfields redevelopment. Local Brownfields programs are increasingly the practical engine for eradicating existing Brownfields and preventing the formation of future Brownfields. As human,

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technical and financial resources for Brownfields redevelopment are usually limited, local level programs are also responsible for providing creative solutions that maximize limited resources for Brownfields redevelopment. The purpose of this article is to provide an overview of Brownfields redevelopment activity in the United States, define the generic scopes of federal, state, and local level programs, and identify and discuss ways in which the existing Brownfields process could be enhanced.

## BACKGROUND

Brownfields are vacant, abandoned, or under-utilized commercial and industrial sites and facilities where real or perceived environmental contamination is an obstacle to redevelopment. These sites lie somewhere between significantly contaminated sites (Superfund Sites) and pristine Greenfields (unused land parcels or farmlands outside urban borders). An estimated 130,000 to 400,000 such sites exist, according to the U.S. General Accounting Office [1]. Once the might of the U.S. economy, several Brownfields are now found in the older industrial and commercial urban centers of the United States that are now part of declining or depressed neighborhoods. Many of these sites are concentrated in the Northeast and Midwest where much of the economy was historically based on heavy industrial activity. However, they are also common in the South and West and represent a wide variety of past industrial and commercial uses.

Over the last two decades, federal, state, and local environmental regulations, designed to protect public health and natural resources, have unintentionally hampered the redevelopment of contaminated sites. The hazardous waste management era began with the passage of the *Resource Conservation and Recovery Act* (RCRA) of 1976 which clearly differentiated between hazardous and non-hazardous wastes and sought to protect public health and the environment. In 1980, the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA), also known as Superfund, was enacted to facilitate the cleanup of heavily contaminated sites nationwide. Administered by the United States Environmental Protection Agency (USEPA), the Superfund process was designed to establish an inventory of hazardous waste sites nationwide (known as the National Priorities List or NPL), and to transfer the costs of cleaning up these sites to the producers of the waste. Needless to say, the Superfund process quickly orphaned many contaminated sites.

The USEPA rapidly evolved an ardent watchdog role, and demonstrated a strong desire to see the contaminated sites cleaned up at all costs. Where producers of the waste could not be easily located, cleanup costs were indiscriminately passed on to the current users or owners of the site, lenders or any other such individual(s) who could be reasonably linked to these sites. This state of affairs scared off potential property buyers who could wind up exposing

themselves to liability for prohibitively expensive cleanup costs. The Superfund process soon became fraught with litigation and extensive delays.

In 1986, the *Superfund Amendments and Reauthorization Act (SARA)* established a fund, derived from taxes on the chemical manufacturing industry, to provide for cleanup of contaminated sites whose generators could not be determined. However, litigation and the fear of liability kept remediation and redevelopment of the majority of these sites at a standstill. Indeed, the Congressional Budget Office has reported that each site on the National Priority List requires twelve years and thirty million dollars to clean up, with eight of those years and 36 percent of that money going to the litigation process [1]. Moreover, several developers and businesses found the federal Superfund program complicated and unable to provide risk assessments and immunity from further environmental liability once the sites had been cleaned up. Thus, the very Superfund process that was created to eliminate contaminated sites, seemed to result in an indefinite preservation of the contaminated status of a majority of these sites.

As long as these contaminated sites remained unaltered, their obvious health environmental hazards also lingered. In addition, they negatively affected the overall economic and social health of the communities surrounding them, a situation which made the sites even less attractive for redevelopment. As a result, many developers took their businesses to the suburbs, with housing developers and urban commuters following their suit. These contaminated sites have therefore created environmental, economic, and social drawbacks for localities, regions, states, and hence the nation at large. Locally, contaminated sites have contributed to blighted neighborhoods with declining central business districts, stigmatized by decaying and abandoned sites with little potential for attracting business. Regionally, increasing development at urban fringes has resulted in uncontained urban sprawl, with its associated encroachment on virgin Greenfields. In turn, the urban sprawl phenomenon has resulted in associated increases in travel demand and roadway congestion. This widespread increase in urban sprawl has emphasized the advantages of developing Brownfields rather than Greenfields. As Barnette [2] points out:

1. Brownfields are properly zoned and thus well suited for industrial (and commercial) use;
2. The civil infrastructure and utilities necessary for industrial operations are already in place at several Brownfields sites;
3. Brownfields redevelopment preserves the nation's virgin land and natural resources.

Thus, while the cleanup of site contamination seemed to fall squarely on the shoulders of the USEPA in the early 1980s, the late eighties and early nineties have proven rather different. Local entities have come to realize and demonstrate that they have a significant stake in eliminating contaminated sites from their neighborhoods. Without any federal incentives, several municipalities, working

with state level officials, began to develop plans to cleanup and re-use these stigmatized sites, increase their neighborhoods' water and air quality, and revitalize their economic and social climates: portraying yet another classic example where the maintenance of environmental integrity makes social and economic sense. In recent years, these grassroots initiatives have crystallized into a clear federal commitment with supporting initiatives to remove prevailing obstacles, and develop much needed incentives that promote the redevelopment of contaminated sites. The first step in this direction has been the emergence of the expression "*Brownfields*" to replace the previously used term "*Superfund Sites*," a term that simply destroys the market value of any property.

### FEDERAL INITIATIVES IN BROWNFIELDS REDEVELOPMENT

In this improving environment for Brownfields redevelopment, a new wave of federal regulations and programs have rapidly evolved to encourage widespread efforts in Brownfields redevelopment. To spearhead nationwide Brownfields redevelopment, the USEPA announced its *Brownfields Economic Redevelopment Initiative* in November 1993. The purpose of the Initiative is to identify contaminated, abandoned inner city properties [3], and promote their cleanup [4]. The Initiative is funded through the Superfund budget and managed by USEPA. A new rule under this Initiative is expected to loosen funds for underground storage tank (UST) upgrades and cleanup, and dramatically reduce lender liability for properties housing USTs [5]. Following this Initiative, the USEPA announced its *Brownfields Action Program* in January 1995 [6]. The main objective of this program is to transfer sites from the Superfund tracking system to state Brownfields inventories, and provide funding incentives for their remediation and productive re-use. Under this program, the federal government has committed to provide funding for local governments to cleanup fifty pilot Brownfields projects by the end of 1996. The projects are funded at up to \$200,000; they will test redevelopment models, direct special efforts toward removing regulatory barriers without sacrificing protectiveness, and facilitate coordinated public and private efforts at the federal, state, and local levels [7, 8]. Approximately 27,000 of the original 40,000 Superfund sites have been transferred from the National Priority List to state Brownfields inventories [1]. In addition, federal legislation has been drafted to reduce and clearly define the levels of liability for both existing and potential owners of contaminated sites [9, 10]. And most recently, the Clinton Administration has proposed a Brownsfields tax incentive plan that will provide over two billion dollars in tax incentives over a seven-year period, specifically targeted to Brownfields pilot sites [11].

In this new and fast improving environment, several state initiatives and local level efforts are underway to develop comprehensive programs with supporting tools for Brownfields remediation and redevelopment. State level initiatives

attempt to create a more favorable framework for Brownfields redevelopment at the local level, with such incentives as risk and liability management, financial support and technical assistance programming. Examples of such state level programs are Minnesota's *Voluntary Investigation and Cleanup Program*, Pennsylvania's *Land Recycling Program* and *Orphan Sites Program*, and Ohio's *Voluntary Action Program*. Local level initiatives take advantage of both state and federal incentives and programs to develop adequate tools for the actual cleanup and redevelopment of these sites. Examples of such local level initiatives are the Duwamish (Washington) initiative to develop a decision-tree model for risk evaluation and remedy selection, and the City of Pittsburgh's pilot project to inventory existing sites with redevelopment potential and use financial incentives to stimulate site redevelopment. Collectively, these initiatives are expected to revitalize inner-city neighborhoods, renew and re-use existing civil infrastructure, create jobs, stimulate tax revenues, ensure greater protection of public health and natural resources, reduce encroachment on virgin Greenfields, and curb urban sprawl. They are also expected to address the major issues in redeveloping Brownfields nationwide.

## **MAJOR ISSUES IN BROWNFIELDS REDEVELOPMENT**

The redevelopment of Brownfields is confronted with a host of issues that largely influence the success of redevelopment efforts. There are five major issues in Brownfields remediation and redevelopment as discussed below.

### **Technical Issues**

Technical issues in Brownfields redevelopment revolve around accurately assessing the type and extent (or absence) of contamination at a site, and deciding on which cleanup standards and procedures must be followed. Typically, developers are concerned about soil and groundwater contamination, water conservation and air quality [4]. These issues are closely related to issues of legal liability. Uncertainty about the exact nature of a site's contamination, and the process through which it may be addressed, is associated with unknown and potentially high costs for remediation. This creates disincentives for parties who are potentially interested in Brownfields redevelopment. In addition, the inability of prospective developers to predict future liability that may result from involvement at Brownfield sites is an obstacle to redevelopment.

### **Liability Issues**

Issues of legal liability are a major controlling factor in Brownfields redevelopment because they largely determine whether or not contaminated sites will be returned to productive use(s). The legal liability framework will promote (or

retard) Brownfields redevelopment as it is simple and straightforward (rather than complex), and able to provide clearly defined types and levels of liability for potential site developers. Where there are few assurances at the federal or state level to protect private parties from future liability, the redevelopment of contaminated sites is simply not a viable option.

### **Financial Issues**

Financial issues are particularly complicated at Brownfields sites primarily due to the following three interrelated factors:

1. Potential risk of legal liability,
2. Uncertainty regarding the ultimate costs of assessment and remediation, and
3. Depressed or declining neighborhoods surrounding Brownfields sites.

The initial investment in site assessments may be prohibitive and, in some cases, may only be justified by the economic gains anticipated from future site redevelopment. However, in depressed areas where several Brownfields exist, there is little economic incentive for the redevelopment of contaminated sites. In addition to this, the remediation costs associated with environmental contamination can be quite high, ranging from thousands of dollars to millions of dollars for particularly hazardous sites. Coupled with the high cleanup costs and economically depressed surroundings of Brownfields, the uncertainties surrounding existing and future liability for site contamination undo the few remaining incentives for investing in Brownfields redevelopment. This combination of factors frequently results in limited fiscal resources for Brownfields redevelopment.

### **Community Concerns**

Brownfields sites hardly exist in isolation. They are often located in the heart of depressed or declining urban communities and may be in close proximity to retail districts and residential areas. Community concerns are fueled by the desire to protect human and environmental health. Existing contaminated properties may pose direct threats to human and environmental health where they are located. For this reason, community groups are usually interested in promoting the cleanup and redevelopment of such sites in their neighborhoods. However, almost without exception, they demand some assurances that the remediation procedure(s) used will protect human health and that of the environment. In several communities as well, certain individuals and private parties may seek an active role in deciding on the future use(s) of specific sites. For these and other reasons, community members have varying degrees of involvement with their neighborhood's Brownfields. Brownfields redevelopment also involves a wide variety of stakeholders including property owners, developers and investors, bankers, environmental and engineering consultants, insurance providers, environmental

organizations, community development organizations, regulators at the local, state, and federal levels, and attorneys.

### **Redevelopment Prospects**

Redevelopment prospects are the issues that determine the marketability of Brownfields once site contamination has been removed and the type and extent of legal liability have been clarified. Redevelopment prospects are crucial because they determine whether there will be demand for the property if the problem of contamination and the potential for liability are removed. These prospects make it clear that concerns about site contamination are only one aspect of the Brownfields remediation and redevelopment process, namely the *remedial* aspect. The other major aspect of Brownfields redevelopment revolves around the important socioeconomic variables that determine the site's marketability once remediation is complete. Brownfields sites, many of which are located in distressed communities, pose problems for redevelopment. In many cases their supporting civil infrastructure is old and obsolete, property access may be limited, and other socioeconomic variables such as crime, high taxes, traffic congestion, low-quality amenities, and racial tensions may be strong obstacles to the redevelopment of these sites. With these existing impediments for Brownfields redevelopment, the development of Greenfields becomes increasingly attractive, contributing to urban sprawl with its associated destruction of farmlands and increase in travel demands.

These five related issues dynamically interact in the actual process of developing Brownfields which is described below.

## **THE GENERIC BROWNFIELDS REDEVELOPMENT PROCESS**

While different Brownfields redevelopment programs may be tailored to suit specific needs and objectives of different localities, most Brownfields programs seem to follow a generic process involving the following four basic steps:

1. Site Identification
2. Site Assessment
3. Site Remediation
4. Site Redevelopment

### **Site Identification**

A number of sites that have been designated as Brownfields possess the stigma of being contaminated rather than any actual site contamination. While the USEPA has estimated about 450,000 Brownfields sites nationwide [12], many of these sites may not be contaminated at all but are merely perceived to be so [1].

Thus, the first step in any Brownfields redevelopment initiative is to identify contaminated Brownfields and develop an inventory of these sites. This stage usually involves a *Phase I* site assessment in which environmental consultants are engaged to provide an analysis of government and other historical records, perform site reconnaissance studies, interview owners, occupants, and others associated with the site, in order to determine if there is evidence of contamination.

The legal liability framework for contaminated sites strongly influences whether or not site identification will be pursued by parties interested in Brownfields redevelopment. Uncertainty over the extent and types of legal liabilities attached to contaminated sites acts as a barrier to site remediation and redevelopment. Legal liabilities must be clearly defined and certified by relevant authorities to provide incentives for site redevelopment. Along the same lines, redevelopment prospects also strongly influence the redevelopment potential of existing sites. Redevelopment prospects may contribute incentives or disincentives to site remediation. Site identification for redevelopment is unlikely to occur in depressed areas with no promise of economic revitalization, and no other public incentives for site redevelopment.

### **Site Assessment**

If the Phase I assessment reveals evidence of contamination, a Phase II level assessment may then be conducted. This includes actual sampling of the soil and groundwater, and results in a determination of the actual type and extent of site contamination. This phase also involves the determination of appropriate cleanup standards, the identification of feasible site remediation technologies for cleaning up the contamination, and an estimation of site remediation costs. Determination of a feasible plan and level of cleanup is based on a host of criteria including toxicity, exposure pathways and associated risk, surrounding land uses, economic considerations, and future land use(s). The decision to proceed with site assessment will involve some levels of legal liability and financial assurances, as well as favorable socioeconomic factors. In cases where a number of sites are to be redeveloped, an attempt may be made to prioritize the redevelopment of sites in an order that makes the best use of usually limited resources.

### **Site Remediation**

Site remediation involves the actual remediation of the site to cleanup levels established in the previous phase. This phase brings into play all the basic five issues relevant to Brownfields redevelopment. Specifically, feasible technical methods and tools, legal liability assurances, financial incentives, community concerns, and promising redevelopment prospects will strongly factor in the decision to remediate the site. The targeted cleanup levels will be largely determined by the acceptable laws for site cleanup in a particular locality, as well as the anticipated future land use(s) of the site.



## Site Redevelopment

With site cleanup accomplished, the site then undergoes redevelopment for some viable socioeconomic use that is compatible with the local land use and transportation plan. As Figure 1 demonstrates, these four stages in the Brownfields redevelopment process dynamically interact with each other and address the five fundamental Brownfields issues discussed in the previous section.

### STATE AND LOCAL LEVEL BROWNFIELDS INITIATIVES

Whereas state (and federal) Brownfields programs tend to be focused on providing a universally conducive (or occasionally enforcement-driven) environment for remediation and redevelopment, public and private entities at the local level tend to constitute the actual mechanisms for the cleanup and redevelopment of Brownfields. State level programs are characteristically strong in their provision of *liability assurances, funding, and technical assistance* incentives for remediation and redevelopment; local level programs, on the other hand, tend to be more focused on the *redevelopment* and *community-related* issues surrounding Brownfields redevelopment. Programs on both levels may make use of strategies for prioritizing the cleanup of sites with higher redevelopment potential.

### State Level Programs

There are several ongoing state efforts to clarify cleanup standards and processes, define and clarify the levels of legal liability involved in Brownfields cleanup, and offer financial incentives to promote their cleanup and redevelopment. These initiatives may also make available some level of technical assistance through government oversight. Because NPL (National Priority List) sites

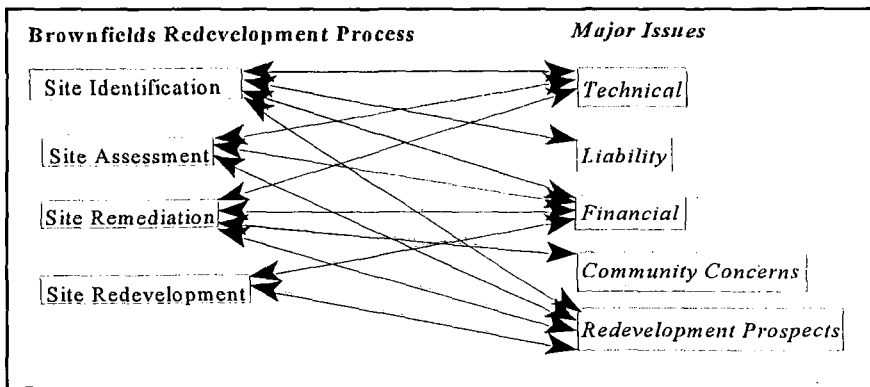


Figure 1. Significant relationships in the Brownfields redevelopment process.

(under federal action) are far outnumbered by non-NPL sites (under state action), much of the "Brownfields" activities have historically taken place at the state level. From the initiation of *Superfund* and related environmental laws, states have addressed non-NPL sites in their jurisdiction through any number and combination of the following three most common approaches: 1) State Superfund Programs, 2) Property Transfer Laws, and 3) State Voluntary Programs [13].

### *State Superfund Programs [13]*

Some states still address Brownfields sites through state Superfund programs. Such Superfund programs are an offshoot of the federal Superfund program, and are operated through *enforcement-driven* activities. In many cases they were created to address sites not considered hazardous enough to be placed on the NPL. Approximately forty-five states operate their own Superfund programs in the United States.

While few generalizations may be made about state Superfund procedures, many operate like the federal Superfund program in which the site identification and cleanup process is driven by enforcement activities. Cleanup standards are largely determined by USEPA guidelines. As of 1993, thirty-four of these states reported the use of USEPA guidelines for deciding on cleanup standards, and forty-two states employed risk assessment techniques to set standards and determine goals (with many relying on EPA risk assessment guidance for direction). Many of these programs also attempt to prioritize sites for remediation; sites which pose higher risks for human health and the environment tend to receive high priority. In today's emerging Brownfields scenario however, site prioritization may be more related to the redevelopment potential of existing sites, since Brownfields are generally low priority sites from an environmental point of view: i.e., Brownfields tend to lie somewhere between highly contaminated Superfund sites and pristine Greenfields.

With respect to legal liability, most states consider a wide range of stakeholders as responsible parties at non-NPL sites. As of 1993, thirty-two states applied *strict, and joint, and several liability* to responsible parties, four allowed *proportional liability* and fourteen had no established standards for determining liability.

On the subject of funding site cleanups, these Superfund programs authorize the state to bring enforcement actions against responsible parties associated with hazardous wastes; the funds raised through enforcement actions go toward site cleanup and to supplement other program activities. In addition, the states have access to state and federal funds designated by law to support cleanup activities.

With regard to community concerns, about 50 percent of these programs have provisions for some level of public participation in the process. This normally takes the form of public meetings with the opportunity for review and comment on remediation proposals.

It is worth noting that these Superfund programs do not have a predetermined agenda with respect to site redevelopment, after site identification and

remediation have been accomplished. Moreover, the prioritization of sites for remediation is solely based on the health and environmental risks posed by the contaminated sites, which is one major difference between Superfund programs and innovative Voluntary Cleanup Programs, as is seen later.

### *Property Transfer Laws [13]*

Property transfer provisions exist in states as laws, regulations or policies that make the transfer, ownership or control of real property contingent on one or more of the following: *discovery, identification, investigation, cleanup, or disclosure* of the existence of hazardous waste contamination. Property Transfer Laws are an indirect method for identifying and initiating site cleanup activities. While some states simply require full disclosure of the environmental condition of a site, others require a more advanced level of site investigations, and a few states require complete cleanup before a transfer can occur. New Jersey established the first property transfer law in the country in 1983. Known as the *Environmental Cleanup Responsibility Act (ECRA)*, the law required that certain industries intending to close, sell, or transfer operations must investigate and cleanup hazardous waste contamination before a transaction could occur [14]. Other states with comprehensive property transfer laws include Connecticut and Illinois. Property transfer laws are significant because they do not only deal with existing Brownfields, but also attempt to prevent the development of future Brownfields. As of 1994, eighteen states had some form of property transfer requirements [15].

### *Voluntary Cleanup Programs [13]*

In today's evolutionary Brownfields climate, State Voluntary Cleanup Programs (VCPs) are increasingly the preferred alternative, and the fastest growing programs for Brownfields remediation and redevelopment. More and more, they are viewed as a preferred alternative to enforcement-driven Superfund programs which are often characterized as confrontational and demanding of time and other valuable resources. VCPs are innovative. They differ from other programs because they involve site owners or developers voluntarily approaching the state to *cooperatively* work out a process for site remediation and redevelopment. VCPs are in direct contrast to enforcement-driven programs in that they involve cooperative agreements between private and public parties and are more likely to consider future uses in deciding on remediation plans. According to Maldonado, thirty state voluntary cleanup programs had been implemented in the country as of May 1996, five to which the USEPA deferred [1]. Commonly, non-NPL sites with no or low to medium contamination problems enter into VCPs. VCPs usually operate on a fee-for-service basis with the voluntary party responsible for all costs associated with the cleanup.

State VCPs are favorable because they avoid some of the significant costs and delays associated with enforcement-driven programs. Commonly, they work to overcome many of the obstacles to site cleanup and redevelopment. They usually offer some combination of technical assistance, financial support, and liability assurances to private parties. In addition, they may offer the much needed information management services for valuable information sharing, opportunities for public/private partnerships, and active community involvement in the Brownfields redevelopment process. While many VCPs employ the same cleanup standards that are used under the state Superfund program, others have developed their own specific remediation standards. VCPs provide indirect financial incentives; there is evidence that financial institutions may be more inclined to lend on properties that have gone through voluntary programs than on independently cleaned up sites. From the perspective of governments, states are also interested in promoting VCPs because they typically require fewer government resources, and assure that site cleanups can continue with some level of official oversight despite dwindling funds for enforcement-driven programs.

*Legal liability assurances through VCPs*—VCP legal liability assurances reduce the uncertainty related to legal liability by specifying the parties who would not be held liable at a site, or by defining government interest in the condition of a site. Examples of liability protection offered by some states are letters of “no association” to the contamination (either as innocent or involuntary owner, prospective purchaser, or neighbor to the site); absorption of private liability by the state or a municipality; liability exemption for some public entities such as city or county governments and port authorities; covenants not to sue for any actions related to the site; certificates of completion or partial completion for a cleanup; and letters of “no further action” or “no further interest” in a site. These assurances reduce the likelihood that any enforcement action will be pursued at a future date.

*Funding support through VCPs*—While many state VCPs are operated on a fee-for-service basis, a number of them still offer financial incentives for participation. Funding assistance for initial site assessment, cleanup, or redevelopment is typically disbursed as public grants, loans, or loan guarantees and tax incentives. It is common to offer public financial assistance for Brownfields cleanup activities based on fairly stringent criteria including demonstrated need, the relationship of the volunteer to site contamination (some states will not assist responsible parties), and demonstrated potential of the site for economic development. Table 1 provides a cross-section of Brownfields Funding alternatives.

*Technical support through VCPs*—Technical support is usually made available through public technical oversight for site activities from the initial site assessment through remediation. Technical oversight is a means of ensuring that predetermined remediation standards are being met. This results in more clearly

Table 1. Cross-Section of Funding Sources for Brownfields Redevelopment

Source	Description
Revolving Funds	Source of money providing loans to specified parties. The parties reimburse the fund for the loan amount plus interest, so that the fund is able to maintain the same or increased levels of funding. Revolving funds are typically developed through revenue disbursement from a trust fund.
Trust Funds	Trust funds are special accounts developed to receive and disburse revenues from taxes and/or fees for dedicated purposes. These differ from revolving funds in that they do not maintain the funding capacity through payback of loans, but through new injections of revenue through taxes and/or fees.
Real Estate Investment Trust	Real Estate Investment Trusts (REITs) are funds comprised of revenues from private investors. REITs act as primary investors when purchasing property. Applied to Brownfields, the REIT acts as the owner, thereby shielding investors from liability in excess of the investors' initial monetary input.
Tax Increment Financing	Tax increment financing is created through a local government's assessment of property values. Special assessments are made on properties that are expected to accrue particular benefits from a general improvement, or from an environmental activity, such as a clean up. The incremental difference in tax revenues between the original assessment rate and the new, higher assessed rate is then used to finance the improvement activity.
Tax Incentives	Tax incentives include a wide variety of mechanisms used to encourage redevelopment of Brownfields through the use of public taxation tools. These often take the form of tax credits or tax deferrals. By deferring taxes to be paid on property, income or sales, governments can provide businesses with the needed incentives to create redevelopment opportunities for Brownfields.
State Grants	State grants can provide communities with funding needed for cleanup or redevelopment incentive packages within Brownfields programs. Grants may also be made from state trust funds for the establishment of local revolving funds.

Source: [16]

defined liabilities and/or liability assurances for the site owner after cleanup has been completed.

*Examples of state voluntary cleanup programs*—While several states have ongoing voluntary Brownfields programs [1, 13], the following three examples are selected to illustrate how state programs may successfully provide broad liability assurances, financial incentives, and technical assistance to ease the burden of redeveloping Brownfields. Together these programs demonstrate ways to manage the basic issues in Brownfields redevelopment. It is noteworthy that while these programs may not make direct efforts to link site remediation with redevelopment, the incentives they provide may mitigate some of the largest obstacles to Brownfields redevelopment, and serve as a clear incentive for local entities and individuals to undertake site cleanup for redevelopment.

Minnesota [1, 13]. Begun in 1988, Minnesota's Voluntary Investigation and Cleanup (VIC) program is one of the oldest and most respected in the country. The program is administered by the Minnesota Pollution Control Agency (MPCA), on a fee-for-service basis, and manages about 700 sites. Minnesota's program provides strong liability assurances, financial and technical incentives, as well as higher level public-private partnerships for Brownfields cleanup. Both the state's Department of Trade and Economic Development and the Metropolitan Council offer grants to cities or counties participating in the VIC program. The program also provides an exemplary example of public-private collaboration for Brownfields redevelopment. Fifty percent of a \$100,000 grant by the Ford Foundation and Harvard's Kennedy School of Government has been used in establishing a grant for non-profit organizations. As recipient organizations obtain grants, the money is then matched by local corporations, and a team of attorneys and environmental consultants are engaged to work for the public good. As of June 1995, about 450 companies and local agencies in the Twin Cities area had invested tens of millions of dollars under the VIC program to cleanup about 3,000 contaminated acres [17]. The program also offers ten different types of liability protection from Superfund Laws, through a unique incremental liability protection system, in which liability protection is offered approximately commensurate with the amount of information disclosed by property owners. Finally, MPCA staff offer a high level of technical assistance and oversight for the entire cleanup process. Specifically, they are involved in the approval of cleanup plans, and the certification of completion in the final stage of remediation. The program has proven very successful. As of May 1995, over 100 sites had been cleaned up through the program, and over 300 had obtained closure through a written assurance. The USEPA defers to Minnesota's VIC program.

Ohio [13, 18]. Contrary to Minnesota's VIC, Ohio's Voluntary Action Program (VAP) is one of the newer ones in the country, and still rapidly evolving. Like several others it was established through legislative reform. Ohio's VAP

came into being when the state passed the "*Real Estate Reuse and Cleanup Law*" in June 1994. Collateral with the recent trend in the Brownfields debate, this law makes an effort to link the re-use potential sites to their priority for cleanup. Administered by the Ohio EPA, the program is valid only for sites that are not on the federal National Priority List (NPL) or regulated by other federal and state environmental laws. It is designed to encourage people to redevelop and re-use land contaminated by hazardous materials or petroleum. Like Minnesota's VIC, Ohio's VAP offers not only liability assurances, but also technical assistance and avenues for public/private partnership. Indeed, there are plans to privatize the entire cleanup process. The amount of cleanup required for a particular piece of property depends on the future and end use of the property. Ohio's VAP provides protection from liability for any volunteer who complies with the applicable program standards. The program also provides lender and fiduciary liability protection for cleanup contractors and local governments. In addition, the program offers financial assistance to program participants through state *low-interest loans* and *tax incentives* that allow volunteers to forgo paying taxes for ten years on any increases in property values resulting from remediation. Participants may also request an additional tax abatement for ten years on real and personal property taxes from their local government. Ohio's program is known for expediting the permit process for sites undergoing voluntary cleanup. As of June 1995, one cleanup had been conducted through the program.

Michigan [18]. Although Michigan's program is also in its infant stages, it is a good example of a state level program that provides more direct links between remediation and redevelopment, a more recent trend in the Brownfields process. Michigan's Brownfields Program came into being with the passage of the *Natural Resources Environmental Protection Act*, in June 1995. The Act is intended to promote the redevelopment and re-use of vacant manufacturing facilities and abandoned industrial sites that have economic development potential, provided that redevelopment or re-use assures the protection of public health and safety, and the welfare of the environment. This program may be different from several others because it relaxes not only liability standards, but also provides for relaxed cleanup standards commensurate with the intended use of the site after cleanup. Cleanup standards for different land use categories depend on algorithms incorporating exposure scenarios that would be in effect during site use. These algorithms assume that exposure to on-site contamination is greatest under residential uses, less under industrial uses and least under various types of specified commercial uses. Legal liability has been relaxed for owners of contaminated sites, and new owners are protected from liability from any pre-existing contamination once they conduct a Baseline Environmental Assessment (BEA). A BEA determines the nature of existing contamination and ensures that new owners are held responsible only for exacerbating any existing contamination or causing new contamination. The program also includes the preparation and submittal of a

Proposed Use Plan (PUP) so that the scope of the BEA is closely tied to the nature of the new business planned on the site.

*Concluding remarks on state voluntary cleanup programs*—The above examples illustrate the fact that state level programs, like federal programs, are support-oriented and set the stage for local level Brownfields activities. They are able to offer broader liability assurances, financial incentives for cleanup and redevelopment, and technical assistance for remediation. State Voluntary Cleanup Programs are usually initiated through reformative laws that clear up the uncertainties related to legal liability, and remove one of the largest obstacles for parties interested in redeveloping Brownfields. In doing so, these programs provide a more favorable environment for local level activities that culminate in the reclamation of Brownfields for more productive and healthful uses. State level programs may also provide the information management services needed for successful management of existing Brownfields in the state. This involves the identification and inventory of existing Brownfields sites, and the maintenance updated information on these sites as redevelopment proceeds. In addition, state level programs may provide risk management and prioritization related to site redevelopment potential, with the objective of stretching limited resources to ensure the continuance of Brownfields redevelopment activities. Clearly, the USEPA still retains a supervisory role over state Brownfields programs to ensure that ultimately, USEPA standards are met during site cleanups. It does this by deferring to programs that are found adequate under USEPA standards for the remediation of contaminated sites. States which achieve this level of independence in their Brownfields activities may effectively speed up their Brownfields cleanup process and attract more interested parties for Brownfields redevelopment. Table 2 provides a feature summary of selected state level Brownfields initiatives showing the different types of liability assurances, financial and technical incentives made available through these programs.

### **Local Level Brownfields Initiatives**

Supported by federal and state incentives and programs, local Brownfields efforts are not only evolved to trigger and support Brownfields cleanup and re-use; they usually serve as the actual mechanisms for accomplishing the cleanup and re-use of individual Brownfields sites. Administered by municipalities (cities and counties), these programs are developed to address the unique needs of different localities. As such, their scopes tend to be varied and their foci revolve specifically around prevailing local needs. However, these programs tend to be similar in the tools and strategies they employ in accomplishing their goals. Specifically, they tend to involve the formulation of Brownfields remediation and redevelopment methodologies, the use of some form of risk-management and site redevelopment potential assessments to identify and rank high priority sites for cleanup and redevelopment, the formation of effective public/private partnerships



Table 2. Overview of State Initiatives for Brownfields Remediation and Redevelopment

State Initiatives/ Programs	Liability Incentives	Financial Incentives	Technical Incentives
Minnesota VIC	No Action Letters Limited No Action Letters Land Recycling Certificates of Completion Offsite Source Determination Letters No Association Determinations	Contamination Cleanup Grants Tax Incentives	Technical Assistance and Oversight for remediation process
Ohio VAP	Covenant not to sue under state law Lender and fiduciary liability protection Liability protection for cleanup contractors and local governments	Low interest loans to help finance site cleanup costs Tax incentives	Certification program for environmental consultants qualified to conduct site investigations
Michigan Brownfields Initiatives	Recent legislation that requires proof of cause for contamination in order to find parties liable Establishment of land-use-based standards for cleanup in eight categories including commercial and industrial	Public grants to cities for initial site assessment and reclamation Financial assessment for areawide site investigation	N/A
New Jersey VCP	N/A	Low interest loans to help finance site cleanup costs	N/A
California VCP	Certificate of Completion No Further Action Letter	N/A	Technical Assistance at any stage from initial site investigation to full site cleanup
Wisconsin Brownfields Initiatives	Wisconsin Spill Law for limited purchaser liability Limited lender liability Cleanup exemption for sites acquired through tax delinquency Protection transferable to successive owners	Clean Up Cost Cap Limited lender liability	N/A

to accomplish the cleanups, and the transfer of this knowledge to potential stakeholders and the general public for use in developing other Brownfields sites. Below, the goals and objectives of six selected local programs are given to illustrate the above mentioned similarities and differences. All of these programs have been initiated through the provision of federal grants by the Brownfields Action Initiative.

*Examples of Local Brownfields Pilots [7, 8]*

*Bridgeport, Connecticut*—Bridgeport’s goal is to identify and tackle existing contamination and the environmental obstacles prohibiting redevelopment in the City. Although this City plans to focus on environmental obstacles, it is clear that Brownfields redevelopment obstacles may be as much socioeconomic as environmental. Funding for Bridgeport’s pilot program will be used to accomplish the following objectives:

- Categorize and prioritize site cleanups;
- Develop timeline estimates for cleanup duration and methods, with associated costs;
- Select two to six model sites based on incentives relating to effective property assessment, cleanup, and redevelopment for each model site; and,
- Coordinate with the Housatonic Community and Technical College to offer environmental science courses to students to prepare them to assist in future redevelopment efforts.

*Emeryville, California*—The City of Emeryville’s main goal is to encourage Brownfields redevelopment by building stakeholder confidence in emerging state regulatory policy by using an area-wide, risk management-based approach for environmental cleanup. Planned pilot activities include the following:

- Compiling existing site information, conducting additional assessments and creating a geographic information system model;
- Developing a Mitigation/Risk Management Plan; and,
- Convening a broad-based Community Task Force to serve as a forum for community participation in decision making.

*Houston, Texas*—Houston’s overall goals are to establish a permanent organizational infrastructure for future Brownfields redevelopment, revitalize inner-city properties, and increase jobs. Planned pilot objectives include:

- Identifying candidate sites within the city’s Federal Urban Enhanced Enterprise Community;
- Developing a Land Redevelopment Committee that involves stakeholders in decision making; and,

- Developing a model for the redevelopment process encompassing financial incentives, community outreach, targeted job opportunities, and the new Texas Voluntary Cleanup Program.

*Knoxville, Tennessee*—Knoxville’s goal is to identify potentially responsible parties for contamination, and to develop a cleanup implementation plan that ensures activities which do not aggravate existing environmental threats. Two major planned activities are as follows:

- A feasibility evaluation on the redevelopment of the Center City Business Park which encompasses many acres of abandoned or underutilized commercial and industrial property;
- Investigating sites that are thought to be contaminated and determining the most cost-effective method for remediation.

*Lawrence, Massachusetts*—Lawrence’s overall goal is to provide long-term stability and a safe environment for its downtown industrial, commercial, and residential centers by employing the existing public/private partnerships created to redevelop three significant contaminated sites in the City. The City’s plans include:

- Creating an inventory of Brownfields within the City’s Canal Industrial Corridor;
- Expanding the existing advisory committees to encourage meaningful involvement of stakeholders; and,
- Creating a one-stop guidance manual for Brownfields redevelopment.

*New Orleans, Louisiana*—New Orleans will use pilot funding to develop a Brownfields Management and Monitoring System that encourages redevelopment efforts. Planned activities will do the following:

- Identify the city’s Brownfields;
- Maintain an inventory of sites on a government information system for data analysis;
- Develop criteria for ranking the redevelopment potential of sites; and,
- Sponsor meetings with redevelopment stakeholders to explore remediation funding mechanisms.

While these programs illustrate that Brownfields programs have unique objectives at the local level, it is clear that most of these programs rely on some form of *Information Management* tools, *Risk Management* strategies, *Prioritization* techniques, *Community Outreach*, and *Public/Private Partnerships*, to accomplish their ultimate goal of cleaning up and redeveloping their existing Brownfields.

Table 3. Common Local Level Brownfields Techniques and Strategies

Activity Municipality	Goal	Information Management	Risk Management/ Prioritization Methods	Public/Private Partnerships and Outreach Programs
Duwamish, WA	Developing comprehensive guidelines for contaminated sites	Development of a new Washington Department of Ecology guidance document for contaminated sites	Development of a Decision Tree Methodology as a model for risk evaluation and remedy selection Adaptation of national efforts regarding the risk-based corrective guidance action	Backed by a group of commercial, environmental, and community representatives known as the Duwamish Committee
Phoenixville, PA	Cleanup of abandoned Phoenix Iron and Steel Company Site	Produce a video journal of the project	Determining feasibility of redevelopment	Building a land community consensus on site re-use
Portland, OR	Encourage Cleanup and Redevelopment of specific sites within Enterprise Community and along Willamette River	Developing an Internet-accessible online computer information system to provide data on site assessments, cleanup, and development	N/A	Education and Outreach to involve citizens Crafting partnership agreements with affected neighborhoods
Richmond, VA	Developing a systematic and cost-effective means to inventory and market Brownfields sites	N/A	Evaluating commercial and industrial market re-use options	Creating a program to bring host residential communities into the re-use decision-making process

Rochester, NY	Develop and Initiate Cleanup Mechanism for high priority sites	N/A	Preparation of marketability criteria for Brownfields site selection Selection of four to five priority sites eligible for a revolving loan/grant program	Creation of strategies that will rely on partnerships with current and future site owners, government, regulatory agencies, and development staff
Sacramento, CA	Developing an automated land use permitting process and monitoring system to geographically overlay environmental information onto land use maps	Development of an automated Information System	N/A	Develop a cooperative process among federal, state, and local agencies to involve the community in redevelopment
St. Louis, MO	Developing a transferable model for Brownfields remediation and redevelopment	Transfer knowledge gained from business park efforts to a Brownfields redevelopment model for wide implementation	Selection of Cleanup Criteria and development of risk-based cleanup standards	Form a Citizens Advisory Council to ensure community involvement with the process
Trenton, NJ	Establishing the Brownfields Environmental Solutions for Trenton (BEST)	N/A	Identifying key commercial/ industrial Brownfields sites	Raising public awareness of possible issues at sites in residential areas

Table 3 provides a feature summary of local programs showing their use of the above mentioned strategies and tools for Brownfields redevelopment.

### **NEED FOR RANKING BROWNFIELDS FOR REDEVELOPMENT**

Local Brownfields initiatives are a practical engine for eradicating existing Brownfields and preventing the formation of future Brownfields, although the latter activity has yet to gain importance in the Brownfields debate. Whereas federal and state level programs tend to focus on providing broad incentives (liability, financial, and technical) for Brownfields remediation and redevelopment, local level programs tend to provide actual tools, techniques, and strategies for Brownfields redevelopment. As human, technical, and financial resources for Brownfields redevelopment are usually limited, local level programs are also responsible for providing creative solutions that maximize limited resources for Brownfields redevelopment. To this end, many municipalities seek intelligent strategies for decision making that prioritizes sites for redevelopment. Such strategies will benefit from *repeatable techniques* for identifying the redevelopment potential of sites, and for managing the risks associated with site cleanup and redevelopment. To this end, formal *decision analytic tools* may be useful for developing defensible models to rank Brownfields for redevelopment. Models such as these, combined with an appropriate financing program such as a revolving fund (see Table 1), have the potential to extend limited resources for redeveloping Brownfields sites. Figure 2 demonstrates the proposed redevelopment process.

### **NEED FOR PREVENTING THE FORMATION OF NEW BROWNFIELDS**

Although there are several local efforts to remediate and redevelop Brownfields, few localities have begun to address the ultimate issue of preventing the formation of Brownfields. The West Central Municipal Conference (WCMC) in Illinois is unique for its curative as well as *preventative* goals for Brownfields. It is one of the few municipalities with a well-articulated goal to identify and eliminate the source of its Brownfields. The WCMC program is also funded by the federal Brownfields Action Initiative. It has parallel objectives to cleanup and redevelop existing Brownfields sites as well as eliminate the source of Brownfields. The program objectives are to:

- Establish a Brownfields Prevention Program to identify ongoing industrial activities that pose a risk of creating new Brownfields.
- Create a “Rapid Response Team” to provide timely expertise on Brownfields Redevelopment;

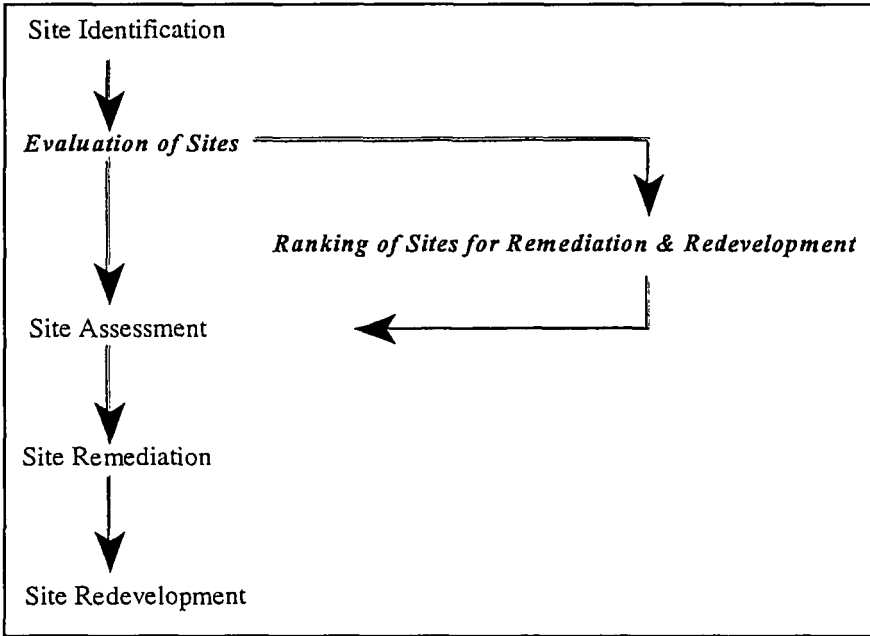


Figure 2. Improved process for Brownfields remediation and redevelopment.

- Support the redevelopment of at least *two* public and *two* private Brownfields lands parcels, and,
- Distribute information about the pilot projects to the public.

### CONCLUDING REMARKS

The redevelopment of Brownfields has been embraced by all levels of government—federal, state, and local—in the 1990s. While the redevelopment process is complex and dynamic, it addresses multiple redevelopment issues. While federal and state level Brownfields initiatives tend to provide broad incentives relating to legal liability assurances, financial, and technical assistance, local level initiatives form the *actual mechanisms* for site cleanup and re-use in several cases. Different localities may have unique needs in redeveloping their Brownfields; nonetheless, they make use of similar tools in achieving their different agendas. Because resources for redevelopment are usually limited, local level initiatives are also faced with the challenge of developing creative solutions to optimize existing resources. Decision models which rank Brownfields on the

basis of their redevelopment potentials may be combined with adequate funding programs to successfully redevelop entire inventories of Brownfields in localities. While the Brownfields redevelopment process seems to be fraught with challenge, the benefits to be derived are several and provide an incentive for localities to actively pursue the development of adequate Brownfields programs. The redevelopment of Brownfields will revitalize inner-city neighborhoods, create jobs, provide tax revenues, provide greater protection of public health and natural resources, provide renewal and re-use of existing civil infrastructure, curb urban sprawl, and increase Greenfields protection.

As a final note, it is worth mentioning that since Brownfields redevelopment is a rapidly growing domain, information may change significantly or become obsolete within short periods of time. Therefore, rather than attempt to provide any exhaustive summary of the ongoing issues and activities related to Brownfields redevelopment, this article provides a strong sense of *general trends* in Brownfields redevelopment.

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