
THE EFFECTS OF ENVIRONMENTAL HAZARDS AND REGULATION ON URBAN REDEVELOPMENT

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AND REGULATION ON URBAN REDEVELOPMENT**

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The Department is now actively participating in the Administration's initiative to help communities clean up and sustainably redevelop brownfields. The Department is taking a series of programmatic steps to be responsive to this high priority of concern of State and local elected officials. This includes new Economic Development Initiative funds to specifically address brownfields redevelopment needs, provide technical assistance to State and local governments, and streamline community development regulations to make them more friendly to brownfields redevelopment.

A key part of the Department's efforts is an active brownfields research program. The Office of Policy Development and Research is implementing an aggressive research agenda in support of the Department's programmatic efforts. The purpose of our brownfields research and development program is to better understand how brownfields are impediments to revitalization of America's distressed communities, and to develop ways to overcome and eliminate those impediments.

Our ongoing research is examining a range of issues: how the intertwined issues of environmental risk and neighborhood economic distress affect the redevelopment process; how the Community Development Block Grant program supports local brownfields revitalization efforts; the feasibility of using environmental insurance as a tool to spur economic redevelopment; and innovative approaches for financing brownfields clean up and development activities.

This report, jointly sponsored by HUD and EPA, provides insight into some of the most basic issues confronting brownfields policy: the relative importance of environmental risk versus neighborhood economic distress as deterrents to the neighborhood development. The report addresses the significance of: 1) site contamination as a deterrent to brownfield redevelopment, as compared to other factors retarding reuse; 2) which environmental development cost or uncertainty most deters investments in redevelopment; and 3) which types of State brownfield clean up policies and programs are likely to be conducive to investments and redevelopment. This report sharpens the focus on what the real policy issues are and what are appropriate policy options for addressing these issues.

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Executive Summary

The Effects of Environmental Hazards and Regulation on Urban Redevelopment

In the Fall of 1995, the U.S. Department of Housing and Urban Development, and the U.S. Environmental Protection Agency jointly funded the Urban Institute and its subcontractors -- Northeast-Midwest Institute, University of Louisville, and Northern Kentucky University -- to conduct research on the effect of environmental hazards and regulations on urban redevelopment.

At issue are the thousands of previously developed parcels that are now vacant or underutilized relative to their economic potential. These so-called "brownfields" (as opposed to undeveloped "greenfields") often are suspected of being contaminated by toxic waste. Federal law holds past, current, and prospective property owners liable for cleanup of this waste, but many observers fear that the cost of clean-up, added to other urban development costs, simply makes these properties uneconomic to redevelop. Others believe that the fear of clean-up liability, alone, keeps potential investors away from all brownfields properties, thereby chilling urban renewal prospects.

To help inform policymaking in this area, HUD and EPA sought answers to three major questions: (a) how important a development deterrent are environmental contamination and regulation compared to other, "non-environmental" barriers to investment, (b) which among environmental barriers are most troublesome, (c) what kinds of State and local economic and environmental policies offer most promise to encourage redevelopment on contaminated or potentially contaminated sites?

We approached an answer to these questions with an explicit emphasis on the State and local economic, environmental and policy context. We canvassed the views of developers, property sellers, lenders, public agencies, environmental consultants, and other actors in the redevelopment process for a sample of 48 redevelopment projects in 12 cities in 4 States. These included both failed and successful efforts on sites suspected, but not necessarily known, to be contaminated. (In 22 cases, failure and subsequent success happened on the same site.) For the most part, this research relies on analysis of views expressed by developers -- those who weighed the pros and cons of development most carefully.

Based on evidence from our sample projects, cities, and States, we conclude that (a) environmental issues, while often important, were never the single critical obstacle on failed development deals --- other non-environmental factors (potential demand, extraordinary costs) mattered also, to a degree depending on local circumstances; (b) immediate environmental costs, rather than the fear of liability for future claims, were developers' predominate concern, and (c)

State and local actions to promote brownfield redevelopment appear to have the highest payoff where explicitly linked to efforts to create viable markets and build system capacity to respond to environmental issues.

Policy Background

Industrial production produces waste materials, many of which are toxic. In an earlier era of disregard for the effects of these substances on public health, much of this waste was released into the air, poured into drains or waterways, dumped onto the ground, or buried. Federal and State governments now regulate these disposal methods as potentially injurious to the safety of human health and the environment. Unfortunately, many thousands of sites previously and currently used for industrial (and some commercial) purposes remain contaminated. An unknown portion of these sites continue to cause widening pollution of surrounding soil and water supplies, even long after production on those sites has ended.

Almost everyone agrees that the best way to clean up contaminated sites is to bring them back into productive, but non-polluting, uses. Although Federal and State laws require site cleanup or other measures to control contamination, owners of idle property often don't know if their sites are contaminated; even if they do, they have little financial incentive to simply clean up the property without some economic payoff. Redevelopment often involves property sale, mortgage placement, public subsidy provision and other actions that trigger efforts to bring contamination to light and give buyers or sellers an incentive to remove or control it.

Unfortunately, a large percentage of contaminated sites are located in inner city areas that are unattractive to industrial, commercial, and residential redevelopers. This is particularly true of traditionally industrial parts of the country -- the metropolitan Northeast and Midwest, although inner cities in other regions also are affected.) For example, modern industrial processes require large amounts of land, usually difficult to assemble in crowded central cities. But in addition, the cleanup requirements themselves pose an added cost burden on sites that are already uneconomic to begin with. In short, site contamination afflicts those areas of the country least able to spur the redevelopment needed to remove it.

As a result, public policymakers and private developers, bankers, and insurers have sought ways to reduce the deterrent effect of environmental contamination and clean-up requirements. The Federal government (through EPA) initiated a Brownfields Pilot program to encourage State and local economic development and environmental officials to work together with other development actors to get contaminated sites back into productive use. States have enacted their own environmental statutes, which can establish cleanup standards, specify

remediation options, assign responsibility for clean-up costs, provide economic development and site cleanup financing, and certify sites as clean in ways that are different from Federal statutes.

Environmental activists have expressed concern that State policies intended to make environmental clean-ups easier may not adequately protect public health and the environment, either now or in the future. Developers have argued that Federal and State laws are more strict than they need to be, thereby hampering urban redevelopment efforts.

Research Questions

In theory, vacant or underutilized urban lands are a development asset, able to support new investments in industry, commercial facilities, and housing. In practice, these properties often are unattractive compared to suburban, exurban, or rural sites. Many of these disadvantages are well known: outmoded, inefficient, buildings, small parcel sizes that require assembly, obsolescent or deteriorated infrastructure, zoning and other regulatory constraints, security concerns, and others. Many are contaminated, as well, adding further to the comparative unattractiveness of these properties. But by how much? Even if sites were clean, would developers find them attractive? We examine this question in Chapter 3 of this report.

Everyone agrees that clean-up can be expensive, but some developers, bankers, and economic development professionals have argued that cost may not be the biggest redevelopment barrier. The Federal Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980 and most related State legislation require that parties “potentially responsible” for land contamination be held “strictly, and jointly and severally liable” for cleanup. This means that property owners may have to pay to clean-up all of the contamination on a site, even if they only caused a small part of it, or even none at all. Complex and costly legal negotiations can be required in the event that multiple “potentially responsible parties” have contributed to the problem. In some cases, even lenders who have foreclosed on property have been held liable for site cleanup. In view of the considerable uncertainties around potential costs, some developers forego brownfield development altogether, and analysts find that at least some lenders do also. How important is this problem of liability compared to remediation costs as a deterrent to urban land investment? We examine this and related questions in Chapter 4.

As traditional promoters of local area economic development, State governments have been particularly active in legislating ways to assign liability, programs to encourage “voluntary” cleanups, and financing programs to subsidize brownfield investment. How effective are these initiatives as stimulants to redevelopment? Do developers rely on State assurances as safeguards against future costs to remediate properties they have developed already? How well do

developers respond to the offer of economic development assistance through subsidies for capital investments? We examine this question in Chapter 5.

Study Methodology

Given the state of knowledge of these issues, we viewed this study as exploratory, not warranting expensive data collection covering a large number of redevelopment properties for the purposes of statistical model building. Rather, we adopted an approach designed to get the most analytical payoff from data collection in a small number of projects, urban areas and States:

- We selected four States from three types of State policy “profile:” (1) States that offered property developers some form of assurance that if they cleaned their property to the State’s standard, they would not be subject to further State action (Oregon), (2) States that offered this assurance, *and* offered financial assistance to help cover costs of site contamination assessments or cleanup (Pennsylvania and Minnesota) and (3) States that offered neither assurances nor money (Virginia).
- We then chose a large, medium, and small urban area in each of the four States, using population size as a rough proxy for capital availability and relative “sophistication” of the local development community. We also strove for a mix of cities with declining, or stable or increasing manufacturing employment, as a proxy for the brownfields availability and demand.
- We selected four projects from each urban area; two completed projects and two failed development attempts. (“Failed” projects were those in which a developer took steps to begin project development -- e.g., negotiate a property purchase -- but did not subsequently place the project into service.) Where possible, we selected completed and terminated project attempts *on the same site* to control for potentially large differences in location that may distort comparisons of projects on different sites. We also sought a mix of project dollar values, sources of financing (public or private), and end uses (industrial, commercial, or residential).

For each project, we interviewed developers lenders, public officials, site assessors, lawyers, and others. In our discussions, we asked about “obstacles” and “facilitators” to redevelopment, and asked them to comment on the relative importance of a number of environmental and non-environmental concerns that may have affected their project. The remainder of this summary reports the results of these conversations.

Environmental versus Non-Environmental Factors

Based on our research, we concluded that non-environmental factors -- the “market” as it reflected redevelopment costs and potential demand -- most often posed the critical constraint on project progress. Obviously, projects that went forward successfully did so despite environmental concerns. But even where projects failed because of environmental problems perceived as “critical” by the prospective developer, we cannot conclude that environmental factors, alone, “killed” these deals. In fact, among our matched pairs of projects, later developers successfully redeveloped sites on which earlier developers had failed. Developers who correctly read their markets and were expert at the development process (including the sources and uses of government subsidy) effectively overcame environmental obstacles. Projects on sites *not* redeveloped later did not fail only because of environmental concerns; problems of costs and potential demand also were critical.

Our goal was not simply to make statements that environmental concerns either did or did not “kill deals.” Almost any local economic developer or realtor can point to sites that might have been redeveloped if Federal and State environmental protections did not exist. Our task was to explore the circumstances under which environmental concerns gained prominence in development decision-making. We found that environmental issues mattered most when:

- *Potential market demand was weak or highly uncertain.*
Our Virginia projects were a case in point: environmental issues caused greater concern in the “downstate” markets -- Richmond and Lynchburg -- where demand for previously-used industrial sites was soft compared to strong demand for urban land in Alexandria, in the Washington, D.C. metropolitan area.
- *Developers and/or lenders responded inappropriately to environmental issues.*
We found several examples of developers who lacked the expertise needed to effectively undertake complex deals. In addition, several developers who feared huge environmental cleanup bills attempted to evade detection by surreptitious removal of contaminants. These developers fundamentally misperceived their potential liability for cleanup or exaggerated its cost, largely because they had little experience with environmental rules (beyond the “horror stories” that circulate among those active in the field). Similarly, we encountered cases of lenders that refused to lend on projects without State assurances, even though the projects did not require them under State law.
- *The land cost differential between greenfield and brownfield was low (usually because of greenfield proximity).*

Our research showed that developers with brownfield sites in close proximity to undeveloped sites found environmental contamination a more significant obstacle than developers in more urbanized areas. The easy option of greenfield development (even with additional infrastructure costs) meant that marginal environmental costs mattered more in the decisional calculus.

The Relative Importance of Different Environmental Concerns

We found that anticipated or actual costs to remediate environmental contamination posed the most serious obstacles to redevelopment in our project sample. Although developers frequently cited fears of *liability* for unknown, but potentially large, remediation expenses as a critical obstacle, these concerns were always cited together with issues of actual remediation cost. *Liability concerns were never the sole “critical” environmental obstacle to redevelopment.* Other findings include those tied to the relative importance of other costs and uncertainties, and the effects of project financing and State program participation on redevelopment efforts:

- *Some developers were deterred by high perceived, not actual, contamination costs, particularly in States where brownfield cleanups were not common.*
Some developers who told us that cleanup costs were a “critical” or “important” obstacle to redevelopment at the time they made a decision to invest or not invest in a project, also told us that they had exaggerated these costs, in retrospect. We found this most often in States without extensive experience in environmental cleanups -- Oregon and Virginia.
- *Several factors we expected would deter redevelopment proved not to be significant obstacles compared to other barriers.*
Apparently, developers did not fear that their ability to market property to potential commercial or residential tenants would suffer because of “stigma,” or an unfounded belief that a development on formerly contaminated property would continue to pose a threat to human health. Neither did they deem the cost of initial site condition assessment as a critical or important obstacle. However, we did hear reports that developers avoided some industrial areas because they were stigmatized as “dirty.”
- *Developers sometimes found it hard to borrow money for redevelopment, but these difficulties appeared not to be related to lender fears of cleanup liability.*
Lender fears of liability for site clean-up did not place significant obstacles before developers seeking finance for the properties we sampled. Almost all projects with financing problems also had substantial environmental cost problems (and other cost

problems, as well). Developers tended not to blame their lenders as overly cautious on environmental issues, even though they may have had some incentive to do so, especially on terminated projects..

These findings reinforce those from our discussion of market versus environmental factors. The primacy of cost concerns argues for public priority to subsidize the extraordinary cost of development where broader public purposes are served. (More on this below.) Although State attempts to lower the perceived level of liability risk are important (and are progressing rapidly in a number of States), policymakers should not expect that State assurances, alone, will be sufficient to induce substantial new demands for brownfields properties. Furthermore, the role of lenders as *de facto* monitors of property owner (borrower) compliance with environmental statutes argues for public efforts to build the capacity of lenders to understand and apply environmental statutes to underwriting decisions, and encourage developer borrowing to finance redevelopment.

Brownfield Redevelopment Policies

State and local financial subsidies and legal assurances aided revitalization in a number of our sampled projects. But because financial assistance can be expensive and potential demand is high, State aid cannot be allocated to all projects that meet a “public benefit.” Under what circumstances, then, should government act?

Most policymakers believe that government should act when private markets fail. Fortunately, our background research for this project shows that markets have begun to respond to environmental problems in ways that should spur investment in brownfield properties. First, insurers have developed products that reduce risk to project investors, including coverages for over-runs on cleanup expenses, costs to remediate undiscovered contaminants, liabilities due to incomplete or improper remediation and other risks. Second, lenders in some States and larger urban areas seem to have emerged from a period of skittishness over legal liabilities, and new forms of venture capital for brownfields redevelopment have become available. Third, some developers have become specialists in acquisition and redevelopment of contaminated lands, which allows them to seize opportunities not apparent to those unfamiliar with environmental assessment and remediation practices.

Despite these positive trends, the market cannot offset the additional risks and costs of investment in most cases. Insurance tends to be affordable only for larger projects; lenders retain their traditional conservatism, especially when faced with the risk that contamination will reduce asset value; and developers with special brownfields expertise also tend to focus on larger properties. Therefore, some developments will continue to require public assistance to move forward, and States will continue to play a role in redevelopment decisionmaking.

What role should State and local governments play? Borrowing traditional policy analysis tests for the appropriateness of public action, we argue that State intervention makes sense if it: (a) establishes the basic “rules of the game” that protect public health but allow economic transactions to take place relatively efficiently, (b) “makes markets” by encouraging multiple and near-simultaneous private investments in certain areas or sectors, and (c) acquires and disseminates information more efficiently than private actors find possible. Each of these are discussed in turn.

First, the basic “rule of the games” in this study are State assignment of liability among sellers and buyers and assurances to developers through No Further Action Letters or Covenants Not to Sue that successful cleanup will shield them from future State action. States do, however, reserve the right to “reopen” a case if new contamination is discovered or standards of cleanliness change. Further, Federal EPA retains the right to act regardless of the assurances States provide. Our research shows the importance of clear assignment of liability, protection of buyers from liability for past contamination, and certification of cleanups as meeting State standards. (Recall that we also found that State assurances are unlikely by themselves to move many projects forward.) We conclude that:

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- *Land-use-based cleanup standards (different levels of cleanliness for different land uses) and institutional controls (protection, but not full cleanup) can spur faster, cheaper, redevelopment, but the Federal government must ensure protection of human health and the environment.*

Our research finds that industrial projects appear to be more sensitive to up-front cleanup costs than are other types of projects, and that reduced standards for industrial land can help lower these costs. So can “institutional” or “engineering” controls (e.g., deed restrictions or fencing) that stop short of full clean-up, but prevent exposure of persons and the environment to in-ground contaminants. Both land-use-based standards and institutional controls limit future land uses. The Federal government maintains an interest in ensuring that if State Voluntary Clean-up Programs choose to use these methods, they have the capacity to do so effectively. Particularly important is State capacity to monitor the effectiveness of institutional controls over the long-term.

- *Economic development staff training on environmental standards, remediation technologies, and liability issues is critical to effective links between economic development and environmental protection program implementation.*

Developers regarded development finance and agency help in navigating the regulatory maze as significant facilitators to project success. In effect, development agencies (especially on larger projects) are developers’ point of entry into the environmental policy and legal arena. Especially important are links between State environmental and development agencies responsible for rural and smaller urban areas, where county and local governments are not particularly well staffed.

- *State Voluntary Cleanup Programs promise to help smooth transactions, encourage the flow of credit, and reduce future uncertainties, but they can be counter-productive in some local markets.*

As an indicator of the success of the Pennsylvania and Minnesota voluntary clean-up programs, developers and lenders broadly accept State liability assurances as bona-fide hedges against future clean-up risk (in spite of possible “reopeners” or independent Federal action). In Minnesota, for example, developers want the State’s No Further Action letters even if they don’t need them, just to show lenders that environmental risks are nil. In Oregon however, and especially in the State’s smaller urban areas, lenders demand State assurances as a precondition for lending, but the State cannot process the letters quickly; some deals fall through because of these delays. (Prior to the Oregon law, some lenders would have extended credit for similar projects on the strength of an environmental consultant’s opinion.)

Second, State initiatives to encourage brownfield redevelopment also can include direct financial aid to brownfields developers. Our second test of appropriate public action is whether these policies make sense by making markets -- encouraging multiple investments in certain areas of the State or city (e.g., an industrial port district) or in certain sectors (neighborhood-based retail) -- or removing imminent threats to public health. Findings from our study sites include:

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- *Among study States, the policy with the clearest stimulative effect on the competitiveness of brownfields is Oregon's controls on urban growth.*

As noted, nearby greenfield sites can be a major competitive disadvantage to brownfields. However, as Oregon development reaches the growth limits set in the 1970's, demand for brownfields properties has increased noticeably. These policies are politically difficult to implement and they tend to be sustainable only in very strong markets. Other less intrusive techniques -- transferable development rights, for example -- may be good second-best options. (These limit growth overall, but property owners and prospective developers can buy and sell these rights, allowing "transfer" from one place to another.)

- *We found no strong economic rationale for restricting subsidies only to cover site remediation costs, versus other costs that make redevelopment unprofitable.*

Our research found that remediation costs were an obstacle to redevelopment, but that other factors also deterred investment (e.g., high land or infrastructure costs). Any type of above-normal cost can sink desirable deals; experienced project developers tend to roll environmental costs into projections of overall costs and revenues, then evaluate the result just as a developer on a clean site would do. Unless public health or the environment face imminent threat (as they do on Federal Superfund sites) there is no economic rationale to earmark funds for remediation, only. Such earmarking limits the flexibility needed by agency staff to tailor subsidies to developers' financial need.

- *We found multiple examples of subsidies that failed to pass basic tests of efficiency, either because developers received more than they needed to make projects work, or the projects themselves produced little public payoff.*

Economic developers underwrite industrial, commercial, and market-rate housing projects to offset extraordinary costs or absorb the risk of shortfalls in demand. We studied several projects in which public subsidies produced meager returns of public benefit, either because they would have happened anyway, or the projects proved unmarketable no matter how much subsidy was invested. State and county subsidies for greenfield development were particularly inappropriate, as they subsidized investments that probably would have been made anyway. These subsidies aggravate the competitive disadvantage of potentially marketable central city sites.

Our third policy criterion is the public agency role in accumulating and disseminating data to support investor decisionmaking. State and local efforts to educate the redevelopment industry on environmental standards, remediation technologies, and legal liabilities are a good example of this. Our findings argue for more strenuous efforts in this area:

- *Efforts to bolster networks among developers, lenders, and economic and environmental agency staff can encourage critical flows of information among parties to redevelopment.*

In a number of cities, local partnerships formed to combat barriers to redevelopment of urban land have stimulated new “systems” in which information flows have eased tremendously. For example, the Chicago Brownfields Forum (not part of our study) brought together the full range of local stakeholders to review environmental deterrents to investment and recommend concrete steps for public and private action. In turn, participants in the Forum served as links to others in their industries not directly involved.

- *We found less “sophisticated” systems in need of considerable technical help; the role of lenders as de facto agents of environmental program enforcement argues for strengthening their capacity to apply environmental requirements.*

State governments should take the lead role in guiding environmentally-sound redevelopment efforts in less urbanized areas of their States. Pennsylvania’s regional administrative structure takes an active, and apparently successful, role in areas without substantial in-place capacity. Lenders have much at risk in brownfields redevelopment and can be unnecessarily conservative in areas where environmental requirements are not well understood. Technical education programs designed for (and aggressively marketed to) smaller lenders promises considerable payoff in credit availability.

We did not intend to research program or policy issues tied to specific Federal initiatives, but we believe our research has implications for Federal policy. (Because our emphasis was on State programs and not Federal agency enforcement, as such, we do not comment on recent amendments to CERCLA that cover lender liability or other issues.) Based on our findings, we suggest that:

- *In view of various pressures on States to relax environmental cleanup and enforcement statutes, there is a clear need to maintain a Federal “floor” that allows States to innovate without fearing future Federal interference.*

We found that land-use-based cleanup standards and institutional controls can lead to cheaper and swifter cleanups for cases where some contamination is left in-place, compared to cleanups that require more aggressive remediation techniques. But some respondents feared (although one hoped) that a State’s ability to monitor the effectiveness of these remediation approaches could suffer under if State budgets shrink; e.g., in a future economic downturn. Inter-State economic competition also may produce pressures to reduce standards; e.g., neighboring States competing for similar types of investment may “ratchet-down” standards in an attempt to make industrial development comparatively more attractive. We argue that consistent monitoring of State remediation decisions and local capacity to maintain the integrity of institutional controls are needed to shield public health from competitive pressures. This also will allow State officials to innovate without fear of future Federal sanctions.

- *The Federal government should continue efforts to discourage public investments in development that increases the competitive disadvantage of brownfields.*

The Federal government plays an indirect but important role in influencing the location of private investments across regions, States, metropolitan areas, or localities. In recent years, particularly with passage of the Inter-modal State Transportation Efficiency Act (ISTEA) that encourages new regional planning initiatives, the Federal government has backed away from earlier uncritical support for suburban economic development. Federal policymakers should encourage better targeting of Federal Community Development Block Grant and industrial development bond investments, which do not have to be targeted to distressed areas.

- *Direct or Indirect Federal Investments in the form of capital subsidies for brownfield redevelopment should be explicitly linked to local capacity-building efforts.*

The USEPA now administers a brownfields pilot program that encourages formation of new local partnerships for brownfields developments. These partnerships consist of relationships among public agencies, developers, lenders, and community representatives to create capacity to redevelop brownfield sites. We think this approach makes sense: new local institutions can sustain momentum once Federally-funded efforts end. We warn, however, that direct Federal investment in local development projects makes little sense unless explicitly tied to a demonstration model that seeks broader programmatic lessons. (Federal funders lack knowledge of local development needs, policies, and markets to make informed choices among alternative development proposals.)

In sum, we found through this research that under the right circumstances, brownfields redevelopment on contaminated sites can proceed. These circumstances include underlying market demand, savvy developers, and reasonably sophisticated networks of developers, lenders, and public agencies. Although environmental conditions can present critical obstacles, we found that most deals worth doing can be completed successfully in spite of these conditions. We also found that liability assurances can be of significant benefit in encouraging brownfield investments, but that these assurances, alone, can't offset more serious concerns over remediation costs. Finally, packages of government support for capital investment and help through the regulatory maze are important, but need to be targeted effectively to yield much in the way of long-term public benefit.

Chapter 1

Background and Research Issues

Policy Issues

Over one hundred and fifty years of industrial development in the wealthiest nations in the world have left their mark, and since at least World War II, economic production has relied on ever more quantities of complex chemical compounds. As a result, hazardous substances pervade the US economy. The Congressional Budget Office estimated that Americans are responsible for generating more than one metric ton of hazardous waste per person per annum (Congressional Budget Office 1985). Over the same period, increasingly mobile capital has fled inefficient production locations, leaving behind potential environmental hazards.

This environmental contamination aggravates well-known comparative disadvantages of previously developed "brownfield" sites in urban centers relative to undeveloped "greenfield" locations in suburban, exurban, and rural areas. As previously-developed sites, brownfields often contain buildings and facilities from earlier industrial periods. These facilities typically are liabilities, not assets, because they cannot accommodate more recent production processes. These sites require clearance, sometimes the acquisition of many smaller plots to form a single large site for modern single-story production facilities, and otherwise present redevelopment costs not found in previously undeveloped, greenfield, sites.

When sites are contaminated, not only must buildings be cleared for new uses, but chemicals stored on the properties and spilled into the soil must be removed. Thus older industrial areas - often major portions of the land areas of urban centers (which continue to house large proportions of the population)--face growing problems in attracting new development capital. In addition, the continuing underlying problem with brownfield sites is the presence or apparent risk of environmental hazards that threaten nearby residents.

The Federal government has articulated a national purpose to protect citizens from hazardous materials, *and* to help States and localities redevelop economically depressed areas. In 1976, the Congress passed the Resource Conservation and Recovery Act (RCRA), and following a four-year debate over the promulgation of implementing regulations, the 1980 Comprehensive Environmental Reclamation, Cleanup, and Liability Act (CERCLA). The 1980 CERCLA now sets the Federal framework for assigning liability for past contamination and for the

most seriously polluted sites (so-called “Superfund” sites) for direct expenditures for site clean-up. (Within the Federal framework, States and localities have crafted a variety of legal, financial, and regulatory responses to site contamination. This legal framework will be discussed, below.)

This national interest in cleanup of contaminated sites can be justified on a number of grounds. First, the current generation benefits from the accumulated wealth amassed by past generations. Arguably, all U.S. residents have benefitted from the high economic growth made possible, in part, by use of toxic chemicals and its attendant environmental neglect. In effect, we borrowed from the future by not cleaning up. Of course, the debts thus incurred were often not voluntary or conscious: the dangers of indiscriminate disposal of chemicals were not known or well-understood. But these “loans” are now being called. Repayment takes the form of cleanup and safe disposal of the chemical and other toxic residues of past production practices, and is arguably a national responsibility.

Second, the immediate potential health - and indirect economic - impacts of hazards do not affect all citizens or parts of the country equally; i.e., national intervention can be argued on equity grounds. Hazards appear to be concentrated in areas adjacent to abandoned or underutilized old production facilities (and those near plants continuing to produce with potentially hazardous industrial raw materials). U.S. population dynamics suggest that the residents of those areas are disproportionately poor and minority. Thus the brownfields problem and the linked issues of cleanup and redevelopment inequitably affect the least-advantaged groups among us, and those least able to exercise the “mobility” option. These groups also live in jurisdictions--central cities and older industrial suburbs--that are least able to mobilize the financial capital needed to clean up or contain hazardous sites.

Third, site contamination deters redevelopment. Central city industrial decline, combined with (often Federally-subsidized) suburbanization, poses broader environmental and economic efficiency issues. Growth of urban sprawl, increased reliance on single occupancy cars for travel to work and loss of leisure time to commuting imposes environmental costs of their own (e.g., deteriorated air quality). Urban fiscal problems have been exacerbated by loss of revenues from abandoned lands while environmental hazards on those sites may have driven up local healthcare costs. Returns to public capital--roads and bridges, water and sewer systems, and so on--are depressed while potentially productive sites are held off redevelopment land markets. Successful reclamation, redevelopment and reuse of brownfields may be expected to not only reduce broad urban environmental problems such as air quality, but also enhance metropolitan area economic capacity.

However, these legitimate national interests can conflict. On the one hand, protection of health and safety obliges action to clean up or contain contaminated sites, and to appropriately distribute the costs of doing so. On the other hand, economic efficiency and the resulting redistribution of employment and income to the economically disadvantaged argues for clean-up standards and cost allocations that do not deter investment. How contradictory are these general policy goals? Given the multiple barriers to urban redevelopment--land values, site configuration, deteriorated infrastructure, security costs, and a litany of other concerns--how consequential are the deterrent effects of environmental hazards and regulations? This policy issue drives our first research question (described in the next section).

A second policy issue is the unintended consequences of environmental protection policy. Some analysts of urban land markets have suggested the considerable uncertainties created by Federal remediation standards and assignment of liability for clean-up costs chill the market for brownfield sites, and indirectly, for proximate sites, as well. It has been argued that current holders of property "sit on" under-used sites even though they could be put to productive use, for fear of incurring unknown, but potentially very high, clean up costs. It also has been argued that owners, investors, and potential redevelopers may exaggerate the potential costs. Therefore, even though the goal of site clean-up standards and assignment of liability is to promote site remediation, aspects of current policies may in fact deter investors from pursuing options that would do just that. Our second research question is on the relative importance of costs and uncertainty about costs in deterring brownfields investment.

Finally, this research examines, indirectly, the inter-governmental dimension of the policy problem. National legislation has established the basic framework within which States are free to devise policy solutions that augment Federal efforts or mitigate their adverse effects. States have chosen varying mixes of policies. How well do various mixes work to promote urban redevelopment without sacrificing site clean-up objectives?

Each of these three issues--the significance of environmental costs relative other deterrents to investment, the relative effects of components of environmental costs, and the effectiveness of State interventions--are treated in turn, below. It should be noted at the outset that our analytic approach holds constant cleanup standards and technologies; i.e., we will not examine the issue of "how clean is clean" nor will we assess the appropriateness of alternative toxic remediation procedures.

Research and Analysis Questions

Three research questions constitute the core of this study:

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1. How significant are site contamination concerns as a deterrent to urban brownfield redevelopment, compared to other factors that retard re-use?
 2. Which of the environmental costs and uncertainties most deter investments in brownfield redevelopment?
 3. Which combinations of State policies and programs best encourage investment in brownfield clean-up and redevelopment?

Factors shaping urban redevelopment are national and global in scope: technological change shifts the spatial requirements for production facilities, international capital markets affect flows of funds to US urban areas. This research limits its focus to the role played by the presence, or fear, of contamination on brownfield sites. Data collection was tied directly to the uncertainties and costs of contamination on particular sites and contextual factors at play in the urban areas and States in which sites were located. We control for these factors through our selection of States and urban areas within States. Our basic analysis approach (described in the next section) is to examine how public and private parties to redevelopment decide to accept or reject the costs of clean up and the potential risks and liabilities in redeveloping brownfields.

- 1. How significant are environmental hazards and regulations as a factor in discouraging redevelopment of urban brownfields compared to other deterrents?**

Urban brownfields collectively present an enormous redevelopment problem if hazards or regulations raise project costs or discourage capital flows compared to greenfield alternatives. There are several reasons why Federal law should be expected to have this affect: the requirement that sites be cleaned, and the assignment of liability for cleanup costs.

The Federal law embraces the principle that "polluters pay;" that private sector (or at least, non-Federal) funds pay for clean-ups. The central tenet of CERCLA and its successor laws--imposition of *strict, retroactive, joint and severable liability*--means that the entire chain of property owners, and potentially their advisors and other investors, can each be held liable for any and all contamination on a site and for any damage caused by that pollution. These are "potentially responsible parties." Further, these parties can be held liable whether or not the damage occurred while any one held title ("strict" liability). Acceptance of full liability by one party cannot absolve others of potential liability in the event that the costs of mitigation exceed the assets of the party accepting responsibility (liability is "joint and several").

Thus, in addition to potentially high costs to remediate past pollution, considerable uncertainty surrounding potential liability abounds for all parties with any present or past relationship to a contaminated or potentially polluted property. Both costs to remediate and uncertainties about liability have discouraged at least some lenders from placing mortgages on brownfields properties because they may of questionable value as collateral and because lenders may fear incurring cleanup liability if they foreclose. (Schnapf, 1992; Toulme & Cloud, 1991). Witkin (1992) argues that to reduce this uncertainty, some lenders avoid *potentially* polluted land altogether; others demand very extensive site investigations. Uncertainties also may depress projected returns on investment in property development and thus impede clean-up and re-use of under-employed and potentially (not necessarily actually) contaminated land.

Developers also may avoid contaminated brownfield properties because they produce inadequate returns compared to non-contaminated brownfield sites or greenfields. This can be because:

- Brownfields pose higher costs, including both remediation costs and transaction costs such as environmental assessment fees, project delays pending full investigation of the scope of contamination, increased loan underwriting costs, reserves to cover unpredictable clean-up costs; and legal expenses to reduce due diligence liability risk and reassess evolving regulatory requirements in view of changing legislation and case law.
- Sites generate lower revenues because of property “stigma” that reduces its marketability at prevailing rents, long-term monitoring and continuing legal expenses, or
- Developers require higher rates-of-return to compensate for the uncertainties over mitigation cost, changing standards for mitigation over time as legislation and case law evolve, improved detection and mitigation technologies, that tend to lead in time to more stringent regulatory standards; and lender- or agency-imposed deed restrictions, restricting development options;

But despite depressed potential returns from investment in brownfield property, simply removing risks of environmental liabilities or costs of cleanup will not necessarily have any effect on rates of brownfield re-investment. The list of other factors that deter brownfields investment is well known. Clearance and site-preparation costs on brownfield sites usually exceed those of greenfield sites (especially if they are served by comparable infrastructure). Costs of construction may be higher on brownfields, especially those associated with vehicular access, off-site removal of debris, and on-site security. Costs of information - locating potentially available brownfields that

may not be formally listed for sale - may help push capital toward the greenfield alternatives, regardless of environmental conditions on inner city lands.

Environmental factors will pose problems for redevelopment only if associated risks and costs convert competitive investment prospects into noncompetitive ones. If the policy goals of regeneration and environmental clean-up do not conflict, there are no compelling reasons to relax environmental standards. Clearly, contamination is not an absolute barrier to new investment, and even regulatory requirements regarding cleanup of contamination to stringent standards - and the imposition of liability for the damages done by pollution and for future cleanup requirements - do not always deter brownfields reinvestment. Some portion of urban areas, including polluted sites, has been and continues to be attractive to new investment (Bartsch and Collaton, 1995.) For some developments, projected costs associated with possible contamination (or even known pollution) may be a constraint, but they are not the critical constraint; that is, projects may not be shaped or rendered uneconomic as the result of these constraints, given other limits on - and opportunities facing - investors.

The significance of the possibility - or knowledge of - pollution on a site can be expected to vary with the characteristics of the project and local real estate and development markets, as well as local financial capacity and institutions. Among the factors shaping the significance of the possibility of pollution on a "go - no go" decision on a redevelopment project are local metropolitan area conditions such as:

1. The relative competitive position of central city land compared to suburban and exurban property in the local real estate market, which will be a function both of the mix of local economic activities (since different activities exhibit varying location demands) and the strength of the overall local economy.
2. Differential infrastructure availability across the metropolitan area and the infrastructure demands of local expanding sectors, which may indicate a competitive disadvantage for older developed areas.
3. Zoning and land use controls in the city and surrounding areas, the size of available land parcels available in different jurisdictions, and the scale and space demands of local or potential in-migrant expanding firms.
4. Characteristics of the metropolitan area population and that of the population in the neighborhood of a possible project, insofar as they affect investment returns and profitability. (For example, this may reflect either demands for certain types of housing in

different parts of a metropolitan area or business demands for, or avoidance of, certain types of neighboring production units.)

These issues will be discussed in Chapter 3.

2. Which environmental costs or uncertainties are the most significant deterrents to brownfield redevelopment?

Developers routinely discount potential returns based on perceptions of risk (or put another way, demand higher returns commensurate with risk). Therefore, the uncertainty engendered by the CERCLA processes is expected to affect investment behavior. Several of the cost items listed in the preceding subsection pertain directly to costs of uncertainty. Risk exaggeration produces undervaluation, and developers may avoid economically viable projects.

There is a strong belief among many policy analysts and practitioners that CERCLA liability has significantly retarded efforts to renovate brownfield lands and buildings through its impacts on *perceived* real estate investment returns (Glaser 1994). This view is further promoted in Congressional hearings testimony (US House 1989, 1991; US Senate 1991, 1993). For example, Edward Kelley of the Federal Reserve argued at one Senate Hearing that CERCLA reduces the willingness of lenders to extend credit to businesses, explaining that, "With the average projected cost of remedying contamination at sites on the National Priority List climbing to over 25 million dollars, liability in CERCLA cases may far exceed the amount of the lender's original loan" (1991:101).

Research suggests that bankers' fears of additional costs are exaggerated. Unreasonable risk avoidance may stem from lenders' perceptions that all contaminated sites require the high clean-up expenses typical of National Priority List (NPL) sites, even though NPL sites number fewer than 1,500 of the estimated 400,000 or more potentially contaminated sites in the U.S. In testimony presented in House hearings, however, the Small Business Administration (SBA) presented data on its losses as a lender to small businesses (the very type of enterprises expected to present the greatest risk to financial institutions), showing 140 cases involving contamination problems and agency losses (SBA 1989), covering roughly eight years' experience under CERCLA for an agency making thousands of loans annually. Projected losses due to cleanups required on properties owned by SBA averaged under \$300,000, and losses due to abandoning properties with excessive cleanup burdens were under \$550,000 per site.

Because SBA is a government agency, not a for-profit lender, its efforts at due diligence--assaying risks due to possible past or current contamination of property--would be expected to be

less strenuous than those of private financial institutions. If the experience of this one nonprofit lending institution resembles that of the entire financial sector, fears of major losses due to CERCLA liabilities may well be exaggerated.

This extended example shows how one feature of the CERCLA requirements affects lender decisionmaking. Other examples could be adduced to explore the effect of remediation costs in circumstances where extent of contamination is well known. Still others could show that although remediation costs were low, the initial site assessment cost proved an insuperable initial hurdle to further efforts to redevelop a site. Therefore, this research examines the relative balance among environmental costs and uncertainties, including:

- The extent to which the transaction costs associated with site assessments, that is, CERCLA Phase I and Phase II investigations, constitute a barrier to consideration of some sites as possible investments.¹
- The extent to which cleanup costs alone constitute a barrier to pursuit of redevelopment. (A corollary to this issue is the extent to which cleanup costs are determined by requirements at different levels of government or whether such efforts are dictated by other pressures.)
- The extent to which anticipated restrictions on land uses and requirements for future monitoring of environmental conditions on brownfields constitute a barrier to reinvestment in them.²
- Investor concern about stigmatization of land labeled as previously polluted, and the extent to which such fears produce lower estimates of returns on investment and divert capital from such projects.³

¹ There is a risk that mere anticipation of these costs, which would be incurred in the course of investigation of the possibility of a development project on a given brownfield site, may keep a site from ever being considered by some developers or financiers. The problem lies in the costs of the site information to the potential redevelopers, the transaction costs associated with the decision itself, which are distinct from the costs of the project (Yount and Meyer 1994.)

² Such restrictions and monitoring may arise now under CERCLA and RCRA if temporary abatement solutions are adopted as interim measures; the probability of such future controls would tend to rise if policies imposing different cleanup standards as a function of intended site use are more broadly accepted and employed.

³ The stigma associated with past pollution has been a significant factor in shaping European Union contaminated land policies (Meyer, Williams and Yount 1995: Chpt 5). It, apparently, was also a factor in the EPA decision to remove 25,000 sites from the CERCLIS list in early 1996 (US GAO 1995:7).

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- The role played by experienced or feared project delays due to regulatory requirements in undermining potential investor interest in brownfields redevelopment, and
 - The extent to which liability exposures under CERCLA constitute the primary barrier to redevelopment when other cost factors are favorable.

These issues are covered more fully in Chapter 4.

3. Which combinations of State policies and programs best encourage brownfield clean-up and redevelopment?

Site remediation and redevelopment occurs within a legal, regulatory and financial framework of Federal, State and local governments. The Federal framework has been touched on, above. It establishes clean-up standards, requires joint, strict, and several liability for clean-up of past contamination, and provides financial support for remediation of sites determined to be of national priority. Within this framework, States are free to devise a variety of policies that augment efforts in these areas. Local governments also may establish policies that affect site remediation, or offer financial support for site clean-up. In addition to these sets of environmental policies, governments also adopt legal, regulatory, and financial policies to further redevelopment goals. Given the legal and financial powers of State government compared to local jurisdictions, and their relative activism in brownfield contamination issues, they will receive primary attention in this research.

All 50 States have passed their own "Superfund" legislation, establishing standards, specifying forms of liability for cleanups, and sometimes providing funds for site remediation. These statutes allow States to play a role in enforcement of Federal environmental statutes, and promote remediation of sites that fall below the size or level of contamination needed to trigger direct Federal responses. These statutes can contain provisions that provide:

1. Liability protection for at least some potentially responsible parties and/or those who may join the chain of title and responsibility; and,
2. Financial assistance to address costs associated with the possible presence of hazards that undermine the economic viability of redevelopment efforts.

Liability protection takes the form of proportional liability, departures from "strict" liability, and Covenants Not To Sue (CNTS) or "no further action" letters, and sometimes certificates of

(partial or total) cleanup completion. Under proportionate liability, cleanup costs assessed to parties cannot exceed the share of clean-up cost (or damage to third-parties) attributable to their actions, unlike the Federal statute, which can hold “deep-pockets” responsible for a high share of the costs even though their blame may be quite small. Relief from strict liability means that those without fault incur no blame; for example, current property owners cannot be held liable for contamination caused by previous owners. Covenants Not To Sue, executed between the State and property buyers, shield innocent purchasers of contaminated properties from action under State statutes (and in the few cases where USEPA is a signator, under Federal statutes, as well). No Further Action Letters declare a State’s satisfaction that remediation of a contaminated site has satisfied State requirements, subject to conditions (e.g., groundwater monitoring) specified in the letter.

As noted, most common are forms of assurance that protect property owners from liability under State statutes, with little protection from private lawsuits pursuing PRP contributions or direct USEPA liability claims or other Federal charges. (Only one State so far offers the "carrot" to mitigators of full Federal as well as State liability protection on completion of cleanups to a specified standard.)

Financial assistance may be brownfields- or contaminated land-specific, or may simply be available for all economic development projects that meet State policy criteria. Most assistance takes the form of reducing costs of capital for development projects and investments, appearing as loan subsidies, reduced interest rates, loan guarantees, and the like. Assistance tied specifically to land contamination may State or local government funding for Phase I site assessments, Phase II assessments for projects in the development stage, and/or remediation. Brownfields-specific assistance is not available in States that do not also have some form of liability protection program.

Following policy evaluation research practice, we will assess State policies according to criteria of effectiveness, efficiency, and fairness. Effective policies are those that produce more site clean-ups, more quickly, compared to alternative policies, holding constant cost, severity of contamination, type of reuse, and other factors. Efficient policies are those that effect site clean-ups at least cost compared to policy alternatives. Fair policies are those that distribute costs according to relative benefits. Our assessment of policies on each of these criteria will recognize their differential effects across types of properties, projects, urban areas, and States. (We recognize, of course, possible tradeoffs among these criteria; e.g., the most efficient policies may not be the fairest.)

We expect a number of factors to influence how well any set of State policies perform in relation to these criteria. These factors also can affect conclusions regarding the “appropriate” distribution of responsibilities and discretion among Federal, State, and local governments. These factors include a State’s relative priority to polluted land cleanup and reuse, extent of geographic targeting of funds for clean-up and redevelopment, industrial histories and urbanization, administrative/fiscal capacity and need for reinvestment, topographic and climatic conditions, and variations in land use patterns, and residents’ interests in safeguarding public health and environment

Our analysis of these issues can be found in Chapter 5.

Analysis Approaches and Methods

Our overall research strategy called for decisional analysis--examination of the incentives and disincentives to investment decisions on the part of primary actors in a sample of redevelopment projects. We then compared data on actors’ decisions and redevelopment project outcomes across projects, controlling for characteristics of local land and capital markets and State policies.

Decisional analysis relied on data on actors’ perceptions, motivations, and self-reported behaviors. There are three reasons for relying on reportage rather than measurement of actual behaviors and project characteristics. First, costs of prospective liability or the effect of environmental restrictions on future land values cannot be measured directly. Second, we are not in a position to reconstruct the full project economics of redevelopment deals, both for reasons of complexity and confidentiality. Third, economic decisions (and how they are affected by policy) are made based on decision-maker perceptions of expected returns.

To conduct the decisional analysis, we collected information on three elements of the urban redevelopment process. (1) the “system” of actors involved in redevelopment project decisions, (2) the stages of a redevelopment project, and (3) the broader institutional and legal environments within which urban redevelopment and environmental efforts take place. Each of these are treated in turn, below.

Redevelopment Project Actors

There are many parties to redevelopment efforts -- developers, lenders, public officials, and so on -- who must cooperate to effect successful economic redevelopment. These parties can

be thought about in terms of local “systems,” in which redevelopment actors, who belong to institutions with clear financial or policy interests in redevelopment, interact in relatively predictable ways. Across localities, systems differ their capacity to undertake redevelopment effectively; for example, in developers’ or lenders’ understandings of various environmental statutes.

The types of actors potentially involved in brownfield site redevelopment are shown on Table 1.1. The table distinguishes between Primary Actors and Secondary Actors, based on whether their financial interest is direct or indirect. There is arguably always at least one actor from the first group for all sites or possible projects (there could be more than one), but there may or may not be any of the second group involved. The primary actors on the table are linked to associated secondary actors; “associated” because the primary actor usually is the most direct financial link to each associated secondary actor.

It is impossible to predict exactly how many actors might be involved in any one redevelopment prospect, and each actor described above can take on a number of characteristics that affect his or her decisional calculus. These characteristics, for each type of actor, include:

Developers or redevelopers can vary primarily by size, expressed in total value of projects put in place over the past 3 - 5 years, or per annum; geographic scope (local, regional, State, national, global); headquarters location (local, regional, distant domestic, overseas); race/ethnicity of owners or local senior personnel; profit-motivation, including for-profit, nonprofit, and public; land ownership status (owner of property to be developed, developer only) and previous experience in redevelopment of brownfield sites (number & value of projects proposed, projects completed).

Table 1.1: Actors Involved in Urban Regeneration Efforts	
Primary Actors (Direct Financial Interest)	Associated Secondary Actors (Indirect Financial Interest)
Developers or Redevelopers	Site Assessment Engineers State-Sanctioned Cleanup Certifiers
Current Landowners	Current Tenants or Site Occupants Current Lien or Collateral Holders
Others with Current Financial Interests	Potentially Responsible Parties
Economic Development Agencies	Environmental Protection Agencies Tax Collection Agencies
Potential Redevelopment Project Financiers	Potential Liability Insurers
Potential Redevelopment Clients	Redevelopment Client Financiers Redevelopment Client Insurers
Neighboring Property Owners	Neighborhood Organizations

Site assessment engineers may have a variety of relationships to the property, and might actually have been retained by financiers rather than owners; some will have engaged in at least preliminary (typically CERCLA Phase I) studies before any project really moves forward.

State-sanctioned cleanup certifiers operate under State contracts or licenses under some State programs; they may be the same engineering firms as do site assessments.

Current landowners might include the municipality in which the site is located, or might be irrelevant or inaccessible in the case of "orphan" abandoned properties. In addition to variables of *profit motivation, geographic scope, headquarters location, and size* (extent of local land-

holding), variation can include sector if the owner is engaged in economic activity in addition to land-holding;

Current tenants or site occupants would be affected by a redevelopment project forcing them to relocate, and may have lease rights for which compensation may be due; they also may contribute to, or have to share in the costs of, pollution cleanup. (Note that occupants might include squatters or other informal or illegal users, the displacement of whom may still have neighborhood effects.)

Current lien or collateral holders could include a variety of parties, some not even in the financing business, since land and facilities might be offered as collateral for large scale purchases of inputs to a production process, and liens might exist for other purposes, such as utility rights of way, the maintenance of which could limit redevelopment options.

Others with current financial interests in a site include all parties with financial ties to the current owners or users of the property, since, whether or not the facilities are offered as collateral, the financial condition of the owners and occupants may be affected by the redevelopment effort, whether through the funds obtained from sale, the costs of relocation caused by a sale, or costs arising from need for mitigation of site contamination. Variation includes characteristics of *size* (extent of local lending, other investments, and other economic activity), *geographic scope*, *headquarters location*, and type of institution, including bank, insurance company, mortgage company, investment fund (bank trust department, retirement fund, etc.), and private investor.

Potentially Responsible Parties may not want to have financial interests in a site, but the presence of any contamination that requires mitigation may lead the current owners, lenders, and users to turn to others in the chain of title (thus sharing joint and several liability) for financial participation, in which case the latter may attempt to influence mitigation and development strategies. Variation includes, in addition to *size (expressed as annual revenues or sales)*, *geographic scope*, and *headquarters location*, extent to which they are known: clarity of the chain of title and use of the site; and extent of orphan share-holding: known bankruptcies and cessations of trading of parties in the chain of title or use;

Economic development agencies or organizations may be public, private, or partnership, and one or more that may be involved, through promoting a property, closing a financing deal, and/or providing redevelopment incentives. They vary according to scale (municipal, county regional, State), type (public department, independent agency or authority, public-private partnership or government-sponsored nonprofit, private nonprofit, for-profit), programs (types of lending/subsidy/promotional programs operated (including dollar values and terms and conditions

of assistance), and proportionate effort in the area selected for study (if the scale is regional or State).

Environmental protection agencies in the public sector will not ordinarily be intensively involved unless some problem is uncovered on the site; depending on the level of sophistication of environmental compliance monitoring at the local level, there may be involvement from all three levels of government. Variation includes *scale, programs, proportionate effort*, and proportionate budget to urban land and groundwater problems.

Tax collection agencies may be important for several reasons: (1) because unpaid tax liabilities can lead to tax liens and public sector acquisition of property title, (2) because the value to the public sector of a redevelopment will depend on the revenue increases deriving from it, that this agency may be expected to forecast, and (3) the willingness of the public sector to get involved in subsidizing or promoting a redevelopment project may depend on the revenue yield projections.

Potential redevelopment project financiers include banks, insurance companies, retirement plan administrators, and so on. Their type and number may, but is not necessarily, be associated with the type and scale of redevelopment project involved. Variation includes *type of financial institution, geographic scope, proportionate effort, headquarters location, and economic sector*.

Potential liability insurers can affect willingness to lend by providing protection from losses associated with environmental (among other) liabilities; these insurers may be arms of the public sector (such as economic development or even environmental protection agencies), but their insurance role would still need to be distinguished from their other functions.

Potential redevelopment clients include the expected renters, lessors or purchasers of the redeveloped properties, especially when projects are pre-sold or pre-rented; the more formal the plans to pass property on to other parties, the more important those parties may be to the investment decision. Variation includes *geographic scope, headquarters location, and activity type* proposed for the site, including headquarters, production, research and development, distribution, etc.

Redevelopment client financiers may be critical if a project depends on lease or resale, the intended occupant is willing, but the financiers on whom that party relies balk at supporting the project.

Redevelopment client insurers could similarly affect the outcome of a project, especially insofar as they make available, or deny, coverage for certain environmental liabilities to the re-purchaser or lessee, or to that party's financiers.

Neighboring property owners may have strong financial or environmental concerns associated with the spillover externalities of any redevelopment project. These may be positive or negative, and may extend well beyond immediately adjacent properties. Different owners may, in fact, perceive different impacts, a fact which may be obvious when considering commercial relative to residential users. However, uniformity in assessment of impact, and thus of probable role in supporting or opposing a proposed project, cannot be assumed, even across owners of properties with the same land uses.

Neighborhood organizations, if they exist, may be recruited to play a role by neighboring property owners. These organizations may be very diverse, and include actors both for and against any proposed change, including commercial organizations, such as a downtown business association, and or community-based, involving primarily residents and/or property owners.

The Major Stages of the Redevelopment Process

We distinguish major stages of the redevelopment process because a number of different actors enter and exit the process over time, and because different environmental and non-environmental problems appear and are resolved at different stages of the process. Stages include:

1. Initiation. Identification of a possible project by a developer or current landowner.⁴ This stage includes "due diligence" searches to acquire background information about the parcel(s) of land involved. This can be quite difficult if current owner(s) cannot be found (or no longer exist). The due diligence search determine the need for an assessment, or it's possible by-pass.

2. Environmental Assessment . Assessment of site contamination (CERCLA Phase I and II, if needed), and possible negotiation with current owner(s) and other potentially responsible parties over mitigation and/or payment of cleanup costs. This potentially costly stage may be the first project breaking point, and may be repeated several times, especially if potential financiers of the project are unwilling to accept site assessments not done to their own standards.

⁴ The initiator of the redevelopment and *de facto* developer may be a business that wants to utilize the property for expansion or new location, in which case the intended occupant of the property is also the developer; this is a frequent pattern for inner city lands, for which the demand flows from firms already opting for central city locations.

3. Pursuit of Financing . Financial packaging, possibly involving multiple funding sources (or possibly only self-financing), including funding for site mitigation and cleanup costs. This may require multiple efforts with multiple lenders before a package is made final. Repeated failures may lead to the need to pursue Stage 4, which might otherwise be by-passed.

4. Pursuit of Regulatory Relief and/or Subsidies . Negotiation with regulatory authorities and/or economic development agencies for aid in boosting returns on investment.

5. Remediation Planning and Implementation. Completion of hazards mitigation and related site remediation, including any parcel assembly and clearance. Risks linked to remediation may only appear at this stage and may halt further work, especially if the market has shifted over a long development period.

6. Site Redevelopment and Reuse . Redevelopment and initiation of new site use by the developer or others to whom the land is leased or sold.

The impacts of environmental hazards and regulations can be felt at any stage. Problems with environmental conditions on site can cause repeated recycling through stages 3 through 5. However, the very risk of contamination can deter Stage 1 initiation, and the presence of hazards will shape the magnitude of phase 2. A history of contamination, despite successful mitigation, may also affect phase 6, reducing the lease or purchase price(s) the end user(s) of the site may be willing to pay. The different stages at which the hazards or regulations affect project outcome may suggest different policy modifications or interventions.

Among the factors shaping redevelopment potential that are independent of the existence of environmental hazards or regulations are physical and economic features of the effort. For the *development site* these include:

- site characteristics, including size and current market value of the site, number of parcels comprising the site and need for land assembly, and distinguishing or unique topographic or geological characteristics,
- past uses and evidence of past pollution, and current status and use (including active, idle and abandoned sites),
- current ownership (and potential title holders, in instances in which creditors or tax lien holders have elected not to take title), and

-
- zoning and current land uses of adjacent and nearby properties

For the *physical and financial characteristics* of the proposed redevelopment:

- Proposed new land use, and demonstrated market for this use,
- Extent and types of development near to the site of the proposed redevelopment
- Scale of redevelopment effort (in dollars)
- Reliance on public sector subsidies or other public participation in this project, and developer/project capacity to debt finance or self-finance the project.

Contextual Factors Influencing Redevelopment Project Outcomes

Variation in contextual characteristics may shape redevelopment project outcomes more than the presence or extent of hazards or the legal provisions covering these hazards. The dimensions along which the project context may vary includes the broad market, legal and regulatory context, specific aspects of State and local policies, and a number of site characteristics, as illustrated in Table 1.2.

Table 1.2: Factors Influencing Redevelopment Project Outcomes	
Factor	Characteristics of Variation
State Political/Legal Context	State legal provisions and development priorities regarding local regeneration
Standards for Cleanup	reliance on uniform, risk-based, or future use cleanup standards in State policies
State-Mandates for Control over Land Uses	State legal bases for local land use controls

Table 1.2: Factors Influencing Redevelopment Project Outcomes

Factor	Characteristics of Variation
State Powers to Take Land	extent of, and constraints on, eminent domain and other "takings" powers, including appraisal and payment requirements
Preservation and Development Limits	scope of architectural preservation and green space creation/maintenance requirements
State Approaches to Liability for Damages and Cleanup	State legal provisions for assisting firms with the costs of their Federal liability exposures
Environmental Damage Liability	extent of State protection from liability
Cleanup Liability	extent of State protection from liability
Required Disclosures and Treatment of New Landowners	actions required as conditions of sale, provision of information to buyers, and protections provided to new site purchasers
State Subsidies and Cost-Sharing Provisions	extent of State subsidies available to assist with site assessment or cleanup and/or provisions for cost sharing with private parties
Treatment of Future Liability	extent of State acceptance of responsibility for future cleanups resulting from discovery of new risks
Current Policy and Political Pressures	State and local historical and current factors that affect concerns and cleanup priorities
Experience with CERCLA and Past Cleanups	Extent of Superfund site cleanup activities in the State or local area and other cleanup efforts involving CERCLA intervention or oversight

Table 1.2: Factors Influencing Redevelopment Project Outcomes	
Factor	Characteristics of Variation
Experience with Accidents or Spills Involving Hazards, Chemicals or Wastes	Extent of recent accidents and severity of impacts on human health and the environment
Strength of Local Environmental Groups	Number, types, and power of State and local organizations with environmental agendas
Access to Capital and to Liability Insurance	Financial resources available for site mitigation
Local Private Sector Lending Practices	Extent of capital availability and varieties of practices in loan and risk pooling
General Liability Insurance Practices and Experiences	Extent to which coverage under State regulations is available for environmental liabilities
Local Employment and Real Estate Market Conditions	Elements of the State and Local Economic and Market Conditions Facing the Redevelopment Project
Local Experience of Spatial Displacement and Capital Flight	Rates of redevelopment investment and the extent to which local funds flow out of the area
Local Property Values and Price Trends	Local property value changes relative to national or State norms
Local Employment Levels, Recent Changes and Long-term Trends	Local unemployment rate shifts relative to national or State norms

The lists of actors, stages in the redevelopment process, and factors influencing redevelopment outcomes presented in the preceding sections imply a lengthy inventory of data items, most of which are quantifiable, in theory. We did not, however, collect exhaustive, systematic, and easily comparable data on all projects selected for analysis. Rather, we used

readily available data to characterize each area and each project selected for investigation. Our most important source of information were the actors engaged at each stage in the redevelopment process. Development project actors provided information on:

- the bases for the decisions made about redevelopment project type, including: a) scale and market value factors, b) site condition factors, and c) regulatory and public policy factors;
- contributors to, or detractors from, project success and completion, including a) individuals, institutions and organizations: roles played and their impacts, and b) regulations or public policies, by level of government; and
- estimated site clean-up cost and basis for cost estimates.

Our method for collecting these actor evaluations is presented in the next chapter.

Chapter 2

Characteristics of Sampled States, Areas, and Projects

This study's nested sampling design called for selection of redevelopment projects in each of three urban areas in each of four study States. This chapter summarizes our selection process, documents the characteristics of projects selected for analysis, and reviews our data collection methods.

State Sample

States play significant legal, regulatory, and possibly financial roles in redevelopment of previously-used properties. Our State sample was intended to generate data on the sub-national regulatory context of redevelopment efforts, with variation across the major elements of State-level intervention in the CERCLA regulatory requirements and process.

As discussed in Chapter 1, State brownfields policies take on two dimensions: liability protection for at least some potentially responsible parties and/or those who may join the chain of title and responsibility; and, financial assistance to address costs associated with the possible presence of hazards that undermine the economic viability of redevelopment efforts. Our sampling design called for selection of four States with variation on these two dimensions, including:

- A State with no special provisions directed at stimulating brownfield site redevelopment, and no program for identification and/or mitigation of severely polluted land (Category 1).
- A State providing some level of protection from the risk of environmental liabilities, but no brownfield-targeted financial assistance (Category 2).
- Two States providing some protection from the risk of environmental liabilities, as well as targeted financial assistance to brownfield redevelopment projects (Category 3).⁵

In selecting States, we considered the chronology of States' environmental policy and regulation. Current State policy at the time of our research was of less interest than the regime in place when our sampled redevelopment projects were initiated. Further, because our design called for selection of two redevelopment "cases" associated with a particular site (a completed project and a prior redevelopment

⁵ We initially believed that four categories were appropriate; the fourth was a State that offered prospective liability. On closer inspection, we found no State that satisfied this criterion. We therefore collapsed Categories 3 and 4 into the current Category 3.

project which was terminated), we selected States that had a stable policy environment for both development “cases,” roughly the period 1992 through 1994. As a practical matter, we expected it would be difficult to locate parties to redevelopment efforts earlier than 1992. Projects initiated in 1995, meanwhile, were unlikely to have been completed at the time of data collection.

We adopted two additional substantive criteria for the State sample--regional location, and the likely availability of candidates for the urban area portion of our nested sample. The urban area sample was intended to reflect a geographic diversity. Accordingly, we adopted a State sample that includes States from each for the four Census regions: South, West, Northeast and Midwest. At the same time, our State selection was influenced by our goal to select, in each State, three different-sized cities with a history of industrial and commercial development.

States and Policies

Project staff updated earlier work done by the Northeast-Midwest Institute on each State’s environmental policy and regulations to arrive at a State-by-State listing based on the 1996 mix of brownfield related programs and policies. We then grouped States into our three policy regime categories. (See Table 2.1)

- *Category 1. States with no special provisions directed at stimulating brownfield site redevelopment, and no program for identification and/or mitigation of severely polluted land*

Although many States do not have a voluntary cleanup program, almost all States participate in USEPA’s implementation of CERCLA via a State superfund program. Only Nebraska had no State voluntary cleanup program *and* no State superfund program at the time of our research. (Nebraska subsequently passed this legislation.) Rather than select a State with absolutely no role (and few brownfields, by reputation), we selected from among the least active States remaining in this group.

Two candidates, Virginia and Louisiana, assumed a minimal mediating role in application of Federal regulations vis-a-vis brownfield redevelopment between 1992 and 1994. Although Virginia did have superfund and voluntary clean-up programs on the books during this period, the State yielded jurisdiction over superfund clean-up to USEPA following Governor Allen’s election in 1993, and effectively suspended its voluntary clean-up program. Lacking financial resources, Louisiana yielded jurisdiction over superfund site clean-up, as well. We selected Virginia for this category; the State’s diverse industrial history promised the greatest pool from which to draw an urban area sample, and a sample of redevelopment projects.

Table 2.1
Classification of Sampled States
(as of November, 1996)

States (By HUD/EPA Region)	State Program Category		
	Voluntary Cleanup Program Only (N = 30)	Voluntary Cleanup Program and Financial Assistance (N = 10)	No Operational Voluntary Cleanup Program (N = 20)
Region I	Maine Massachusetts New Hampshire Rhode Island Vermont	Connecticut	
Region II	New York	New Jersey	Puerto Rico
Region III	West Virginia	Delaware Pennsylvania	Maryland Virginia
Region IV	Alabama Georgia Kentucky S. Carolina Tennessee		Florida Mississippi West Virginia
Region V	Illinois Indiana	Minnesota Ohio Wisconsin Michigan	
Region VI	Arkansas Louisiana Texas		New Mexico Oklahoma
Region VII	Nebraska	Missouri	Iowa Kansas
Region VIII	Colorado Montana S. Dakota		N. Dakota Utah Wyoming
Region IX	Arizona California		Hawaii Nevada
Region X	Oregon Washington	Idaho	Alaska

-
- *Category 2. States providing some level of protection from the risk of environmental liabilities, but no brownfield-targeted financial assistance.*

There are 30 States in this category. None of these States provide financial assistance targeted specifically for brownfield redevelopment, although some offer non-targeted financial support that can be used for that purpose. To avoid ambiguity, we excluded this subset (California, Illinois, Washington and Wisconsin) from further consideration. Among the remaining candidates, we selected Oregon. With a program in place since 1991, Oregon had a stable regulatory environment for the duration of our target project initiation period. By contrast, other candidate States underwent regulatory changes (some more substantive than others) between 1992 to 1994, with the exception of Alabama. Having selected another southern State, Virginia, we selected Oregon to achieve geographic diversity.

- *Category 3. States providing some protection from the risk of environmental liabilities, as well as targeted financial assistance to brownfield redevelopment projects*

There are ten States in this category and among these, we selected Pennsylvania and Minnesota. Pennsylvania's appeal was threefold: (a) a stable regulatory environment prior to a major reform initiative in 1995, (b) Northeastern representation, and (c) a State with in-ground contaminants very similar to other major industrial States. We selected Minnesota because it offered (at the time of selection) the most comprehensive assurances on liability. Although many other States offer assurances similar to those available in Minnesota, no other single State offers potentially responsible parties such a wide range of possible assurances. Minnesota also offered a stable policy context throughout our 1992 to 1994 window.

Urban Area Sample

Our urban area sample was driven by three requirements; it had to:

- “control” for local variation in factors which can influence brownfields redevelopment such as access to capital, economic conditions, and historic development experience;
- provide, in each sample city, at least two matched-pair development projects (four development cases); and,
- provide a pool of development cases which assures variation at the project-level in terms of end-use, scale, and contamination.

To address all three requirements adequately required a complex procedure--effectively, we could not finally select an urban area sample without almost simultaneous selection of development projects. First, we first classified urban areas (cities, in effect) according to the main factors we wanted to “control” for. Second, we identified a preliminary urban area sample. The results of these two efforts

are reported in this section. Third, we investigated via telephone reconnaissance and field visits whether recommended cities could provide enough (and the right mix of) development cases. Our final selection depended on this reconnaissance and consultation among members of the project team.

Our ideal classification would have grouped cities according to their access to capital (and overall system “sophistication”) and historic development experience. However, to avoid primary data collection, we used readily available proxies for these dimensions:

- Access to capital. We used population size (1995) as a proxy for access to capital. All other things being equal, we expect larger cities to offer greater access to capital in terms of the number and types of loans and other investment available for redevelopment. We also expect larger cities to have more “sophisticated” economic development and environmental protection systems to support access to redevelopment capital. We divided cities into three size categories: large cities over 200,000; medium cities between 80,000 and 200,000; and small cities between 40,000 and 80,000 (although our Oregon small city fell below 40,000).
- Historic development experience. We used manufacturing employment change (1977-87) as an indicator of secular decline. Cities witnessed greater rates of manufacturing decline are likely to have a greater supply of previously-used sites for redevelopment. We divided cities into two categories according to this criterion: cities with a “declining” manufacturing base in which manufacturing employment declined faster (or grew slower) than a regional average; and cities with a “stable/increasing” manufacturing base in which manufacturing employment declined slower (or grew faster) than a regional average.

The matrix below presents the full slate of candidate cities according to these two criteria, and also identifies (in bold) our urban area sample. We identified two cities from each of six cells, and also applied the following criteria: we selected one city in each population size category for each State; we did not select more than one city from the same metro area; and finally, we accounted for logistics including (in Oregon) the distance between sample cities, and prior team contacts with city-level economic development and environmental agency staff. Table 2.2 shows the candidate cities in each of these categories; sampled cities are shown in bold.

Table 2.2
Urban Area Sample

Manufacturing Employment Change	Population Size		
	Small	Medium	Large
Declining	Edina, MN Medford, OR Altoona, PA Bethlehem, PA Harrisburg, PA Reading, PA York, PA Danville, VA Lynchburg, VA Petersburg, VA Suffolk, VA	Duluth, MN Salem, OR Eugene, OR Allentown, PA Erie, PA Newport News, VA Portsmouth, VA	Minneapolis, MN Portland, OR Philadelphia, PA Pittsburgh, PA
Stable/Increasing	Brooklyn Park, MN Burnsville, MN Roseville, MN Coon Rapids, MN Minnetonka, MN Plymouth, MN St. Cloud, MN St. Louis Park, MN Albany, OR Beaverton, OR Corvallis, OR Hillsboro, OR State College, PA Lancaster, PA York, PA Charlottesville, VA	Bloomington, MN Alexandria, VA Chesapeake, VA Roanoke, VA	St. Paul, MN Richmond, VA Norfolk, VA

Project Sample

We selected four projects in each of the sampled urban areas, for total of 48 projects. Our project sample was intended to meet a number of objectives, the most important of which are listed below:

- *Mix of Contamination Severity.* Our initial screen called for excluding any project that did not raise environmental issues during a Phase I site assessment. Beyond that, we strove

for a broad mix of lightly or not-at-all contaminated projects together with very seriously impacted sites.

- *Mix of Project End Uses.* We strove to achieve a mix of industrial, commercial, and residential end-uses in the sample. This goal dictated an interactive sampling approach, in which the mix of projects selected in the first States undergoing field data collection affected the mix of projects selected in later rounds. We did not, however, wind up with a highly unusual mix in our last study State (Virginia).
- *Mix of Project Sizes.* Because so much of brownfields redevelopment falls below the screen of Federal EPA, and we suspected that different decisional factors would affect redevelopment of large, complex projects versus smaller ones, we tried to get a wide mix of projects. Excluding one very large “showcase” project, the average redevelopment cost for our project sample came to approximately \$5 million.
- *Mix of Financing Sources.* Our initial point of entry into each urban area was through local economic development staff. We then began developing project lists based on these conversations, and referrals from development staff to other actors in each city. We also contacted private real estate brokers or other private sector actors for their project nominations, to ensure that we did not wind up with a pool consisting only of publicly-subsidized projects. Our sample included projects that were wholly developer-financed, financed by private lenders, and financed by government in participation with private parties.
- *Matched compete-incomplete pairs.* Our goal of randomizing site location as much as possible called for a sampling strategy that matched incomplete and subsequently complete development attempts *on the same site*. It was not always possible to achieve this, particularly in small cities.
- *Developer Cooperation.* Initial reconnaissance in Oregon highlighted the reluctance of some developers (and other parties) to cooperate with the study unless we offered full anonymity.
- *Help in the City Selection Process.* We gave priority to reconnaissance in and confirmation of small city selection into our sample. Selection of development projects in medium and large-sized cities was based on the characteristics of projects we have been able to identify in small cities.

The characteristics of the project sample on several of these dimensions are shown on Table 2.3.

Table 2.3
Characteristics of the Project Sample
(N of Projects)

	Project Completion Status		
	Terminated Cases	Completed Cases	All Cases
All Projects:	20	28	48
Matched:	13	13	26
State:			
Minnesota	4	6	10
Oregon	6	8	14
Pennsylvania	6	7	13
Virginia	4	7	11
End Use:			
Residential	2	6	8
Commercial	13	17	30
Industrial	5	5	10
Financing:			
Self-Financed (In Part)	1	11	12
Privately Financed (In Full)	5	9	14
Publicly Financed (In Part)	14	8	22
Developer's Capacity:			
"Unsophisticated"	5	1	6

Finally, our analysis relied heavily on developer-identified factors that presented “obstacles” or “facilitators” to redevelopment. (We provided a list of possible obstacles and facilitators, then asked developers to add more, if they found it better reflected their views.) For each type of obstacle or facilitator, we asked developers to rate whether they were “critical” or “important” to project development. (We subsequently added a category of “frustration” to capture comments that did not merit more substantive concern, but which affected developer perceptions of the process, nevertheless.) “Critical” obstacles or facilitators are make-or-break factors; “important” obstacles or facilitators are less critical, but consequential, factors abetting or retarding success.

In certain places, we refer to the combination of both critical and important rankings as "significant."

Chapter 3

Environmental v. Non-Environmental Factors

This chapter examines the importance of environmental hazards and regulations as barriers to redevelopment of urban "brownfield" sites, compared to factors long known to affect the relative attractiveness of these sites for industrial, commercial, residential, and recreational reuse. Some policy analysts and local economic developers believe the costs associated with environmental remediation undermine the competitiveness of vacant or underutilized urban sites relative to suburban or exurban "greenfield" sites. The competitiveness of brownfield sites is further diminished, it is argued, because investors demand a greater return-on-investment to compensate for uncertainty about remediation standards and potential liability. Together, these "costs" are said not only to deter investment in brownfield sites known to need cleanup, but also to chill prospects for redevelopment of sites that may or may not need remediation. This chapter explores the veracity of such claims and, in so doing, frames the subsequent discussion about the relative importance of different environmental factors (Chapter 4), and the effect of public intervention to mitigate environmental concerns (Chapter 5).

The chapter begins with our summary assessment of the significance of environmental hazards and regulations. Do concerns associated with known (or potential) contamination in fact matter most in determining the outcome of brownfield redevelopment projects? Or, do project fundamentals such as market demand and the non-environmental costs of redeveloping and operating projects on urban sites matter more? Our study shows that although environmental contamination can kill deals, the underlying economics of a deal are ultimately most important. Among the redevelopment cases investigated for this study, developers of a sizable minority did not encounter any impediments related to environmental hazards or regulations even though the study intentionally focused on projects where a Phase I assessment had raised initial concerns about contamination. But without exception, developers cited *non-environmental* factors, especially market demand, as being "critical" to the implementation of completed projects. Therefore, although State intervention to mitigate environmental impediments can be necessary, it is rarely sufficient, alone, to guarantee the outcome of a proposed brownfield redevelopment project.

The chapter goes on to examine in depth the circumstances under which environmental factors are more or less likely to adversely affect the prospects for redevelopment on brownfield sites. Clearly environmental factors *can* represent a tight constraint on redevelopment of vacant or underutilized urban sites, but they are *less likely* to do so: when market demand means that a project can command sufficient return-on-investment to recoup the “costs” related to contamination; when the parties to a project are familiar with the ramifications of contamination and pursue strategies that diminish the impact of environmental concerns; and, when State or local governments pursue policies and programs which offset the costs associated with brownfield redevelopment, or improve the predictability of the redevelopment process.

To reach these conclusions, the chapter relies on a decisional analysis, focusing on the factors that entered into the decisional calculus of developers in urban brownfield sites, and the stated relative importance of these factors. The chapter relies to a lesser extent on alternative perspectives provided by other parties to the development of sample cases, most notably lenders, as well as the field researchers’ own interpretation of the factors which influenced the implementation or termination of different projects. Where such alternative perspectives are employed, they are so noted.

Environmental Impact

Environmental factors can of course kill efforts to develop previously-used urban property, however, this study demonstrates that the underlying economics of a deal and other factors not directly-related to the threat of contamination are ultimately more important to the feasibility of brownfield redevelopment. Most deals worth doing will not be fatally harmed by environmental contamination or liability concerns.

That environmental factors are an impediment to brownfield development is apparent from the rate at which investors identified environmental factors as a concern. Asked to identify impediments to the development of their projects, developers of 33 of 48 projects cited environmental factors such as the cost of conducting site assessments, the cost of conducting site remediation, and concerns about liability as “critical” (20 projects) or “important” (13 projects). Investors in the remaining 15 projects did not identify environmental issues as a concern. This pattern may not at face-value support our conclusion. However, given the study’s methodology, it is significant that developers did not cite environmental factors as an impediment to development, unanimously.

Two separate aspects of the study’s design could have raised the significance developers attached to environmental concerns. Projects were selected for this study only when

environmental contamination (or at least the threat of environmental contamination) had been identified as a concern in a Phase I assessment. That is, the previously-used urban sites selected for analysis were purposively pre-disposed to illustrate problems associated with environmental issues--whether that be the cost of assessment, the cost of clean-up, or the “cost” associated with liability. In addition, the study’s focus on the potential impact of environmental hazards and regulations should, if anything, have increased the likelihood that respondents would highlight the detrimental impact of environmental concerns in their responses about projects.

Developer reports about the factors that impeded terminated projects and factors that facilitated completed projects underline the importance of non-environmental versus environmental concerns. Our project sample contained 20 terminated and 28 completed projects. Although environmental issues were the “critical” and sole factor that killed 14 of 20 terminated projects, 6 projects were terminated as a result of a combination of environmental and non-environmental factors, or by non-environmental factors alone. This means that the outcome of a sizable minority of the study’s terminated projects resulted from the projects’ underlying economics. On the other hand, investors cited non-environmental factors such as market demand and public economic development incentives as being most important in the implementation of completed projects. In fact, while developers reported that non-environmental factors were “critical” to the redevelopment of all 28 completed projects, investors at just 6 of 28 completed projects said State intervention to mitigate environmental concerns was a “critical,” make-or-break factor in project implementation. Therefore, although State intervention to mitigate environmental impediments can be important, it is rarely sufficient, alone, to guarantee the outcome of a proposed brownfield redevelopment project.

The most compelling evidence on the relative significance of environmental and non-environmental factors in “brownfield” redevelopment can be derived from the study’s matched terminated and completed projects. The matched pairs, consisting of a terminated and completed redevelopment effort at the same site, effectively “control” for variation in factors tied to specific sites and their locations including contamination. Controlling for site specific factors using the matched pair design, our research shows that under the right circumstances development is feasible at a site even though a prior development effort at the same site was killed by environmental factors.

Table 3.1 categorizes the study’s matched pairs according to the factors which presented a “critical” barrier to implementation of the terminated case. According to developers, environmental concerns were a “critical” deal-killing factor for the terminated case in 11 of 13 matched pairs -- in 8 cases environmental concerns were more important than any other impediment, and environmental concerns killed another 3 terminated projects in combination with

non-environmental obstacles. As the table shows, State intervention to mitigate environmental concerns was “critical” in just 4 of the corresponding completed cases, and always in combination with non-environmental factors. In the other 7 corresponding cases, ultimate project outcome (i.e., completion) resulted from non-environmental factors.

**Table 3.1
Matched Pairs—Impediments to Terminated Cases and
Facilitators to Corresponding Completed Cases**

Critical Obstacles In Terminated Case	Number of Cases	Critical Facilitators in Corresponding Completed Cases		
		State Environmental Mitigation	Combination	Non- Environmenta l Factors
Environmental	8	0	3	5
Combination	3	0	1	2
Non- environmental	2	0	0	2
Total	13	0	4	9

Source: Compiled by the Urban Institute from Developer Interviews.

Our goal is not to make blanket statements about environmental versus non-environmental factors, but to show that under the right circumstances, development of urban brownfields can proceed regardless concerns about the “costs” of environmental contamination. That is, many deals that fail due to perceived environmental obstacles may well have succeeded under other circumstances. What are the right circumstances? How could an investor successfully implement a project at a particular site without State intervention when a prior redevelopment effort at the same site failed primarily because of environmental concerns? These questions are the subject of the following discussion about the circumstances under which environmental concerns are more or less likely to adversely affect the prospects for redevelopment of a brownfield site.

Market Demand

The feasibility of any redevelopment effort hinges on the project’s anticipated return-on-investment. Presumably, all the projects investigated for this study made at least preliminary economic sense to their developer, however, developers report that market conditions played a significant, though varying role in the ultimate outcome (termination or completion) of their projects. In fact, the importance developers attached to market conditions suggests a corollary to a well-known real estate maxim; when it comes to the viability of brownfield redevelopment “location, location, location” may not be as important as “demand, demand, demand.”

Market demand (or the lack thereof) can both mitigate and exacerbate the impact of environmental costs associated with brownfield properties. Under the right market conditions, brownfield redevelopment projects can command sufficient return-on-investment to recoup the costs associated with contamination (or potential contamination). However, market conditions can have the opposite effect and impede development in instances when environmental concerns are otherwise surmountable. For 27 of 28 completed projects, developers rated market demand “important” (12 projects) or “critical” (15 projects) to implementation. Poor market conditions were an impediment in 7 of 20 terminated projects investigated for this research, and in 5 of these 7 cases the failure to command sufficient market demand for the proposed development was cited by investors as being equally or more significant than environmental impediments.

Our research shows the impact of market demand on the viability of brownfield redevelopment can take several different forms. First, the viability of a brownfield redevelopment project may reflect the competitiveness of the region where the site is located--that is, the demand for developable property in a region as a whole. Regardless of environmental concerns, projects are more likely to go forward in strong real estate markets. Second, a brownfield project’s viability may be affected by the overall competitiveness of brownfield locations in a region compared with greenfields. Regardless of environmental concerns, and regardless the strength of a region’s economy, brownfield redevelopment is more likely to occur when the supply of alternative greenfield sites is constrained and/or when public policies increase the competitiveness of brownfield sites. Finally, a brownfield project’s economic feasibility may depend on site or deal specific factors which spur demand for a particular site. These different facets of the impact market demand on the viability of brownfield redevelopment are investigated further below.

Regional competitiveness. Market demand for brownfield redevelopment sites will reflect the state of a region’s economy, or regional competitiveness. Brownfield redevelopment, like any kind of property development will be more likely to occur in stronger markets, and, in this sense, demand for brownfield sites is no different than demand for alternative greenfield sites. Did the economic conditions in different cities selected for this study outweigh all other concerns? No. However, the study does demonstrate that the variation in economic conditions between different metropolitan areas (or the shift in one metropolitan area’s economic conditions over time), can have a dramatic effect in terms of the feasibility of brownfield redevelopment.

The impact of a region’s economy on the feasibility of brownfield redevelopment is best illustrated in this study by the development cases selected in Virginia. In Virginia, Alexandria projects generally moved forward with relative ease because of clear local market strength. Alexandria is a near suburb of Washington with strong demand for the few developable sites that remain after several decades of growth. All of the Alexandria projects investigated for this project,

even terminated projects, benefitted from a strong local market that rendered environmental concerns insignificant in view of the potential returns.

By contrast, the other cities selected in Virginia (Richmond and Lynchburg) sustained a loss of population and employment since 1980 (although the Counties have surrounding Richmond have seen a net gain). Accordingly, the Richmond and Lynchburg projects typically suffered from poor market demand. And, when projects in these cities did proceed, it was typically a result of site specific factors which enhanced the viability of individual projects, or as a result of public sector economic development assistance (both elaborated further below).

In one of the stronger markets in our sample, development of a light industrial facility proceeded despite significant environmental contamination. Uniquely sited and within a strong market, the property owners/developers not only accepted responsibility for remediation, but to reduce future liabilities, they conducted an assessment process that was more extensive than necessary. The developer placed a warehouse on the site, essentially to generate interim revenues in anticipation of more speculative gains in future.

Brownfield competitiveness. Regardless the state of a region's economy, the demand for brownfield redevelopment will reflect the overall competitiveness of brownfield sites in that region. The competitiveness of previously-used sites will be a function of the supply and distribution of brownfields compared with alternate greenfield sites. It can also be influenced by public sector land-use and economic development policy.

The competitiveness of any individual brownfield will depend on factors unique to that site's particular location and the intended end-use. However, our study suggests that overall competitiveness of brownfields may also depend on their spatial distribution relative to alternate greenfield sites, and the extent to which this pattern reinforces any competitive advantage (or disadvantage) brownfield sites accrue from their location. If greenfield sites are so near to brownfield sites as to negate any competitive advantage resulting from brownfields' central city location, the costs related to contamination (or potential contamination) at brownfield sites will play an exaggerated role in investors' decisions to pursue development. In York, Pennsylvania, for example, this study found that easy access from suburban greenfield sites to the city center substantially reduced incentives to take on the potential complications of a previously-used site. For projects that benefit from a central city location, the competitiveness of central city brownfields will be greater (all other things being equal) in larger as opposed to smaller cities. In other words, all other things being equal, the demand for brownfield redevelopment will be stronger in

Pittsburgh than in York. However, if central city location does not bestow any competitive advantages, neither large nor small cities will fare well, on market grounds alone.

"I recognized at the time that the available industrial/commercial real estate was finite and that there was an evolving issue with regards to wetlands development [where] a large part of the city's industrial land inventory that had yet to be developed happened to be....So in the last couple of years, the market for industrial property has gone from maybe a \$1.00 a foot for smaller, ready-to-build sites, to \$2.00 to \$2.50 a foot."

---- Developer (Oregon)

The public sector can be an important influence on the competitiveness of brownfield properties through land use and economic development policies. Among the States and cities investigated for this research, the clearest example of this kind of effect is in Oregon, where urban growth limits have effectively restricted the supply of developable greenfield sites. Currently, there is a strong demand for previously-used developable land in Oregon, largely because urban growth limits set in the early 1970s are now being reached. In all three cities included for this project (Albany, Eugene, and Portland), both completed and terminated projects could take advantage of demand stimulated by growth limits.

States that pursue aggressive economic development policies also can play an important role in increasing (or reducing) demand for brownfield sites. Economic development incentives can dramatically affect the outcome of brownfield redevelopment by making an otherwise financially unworkable project viable, however, public policies can also broadly adjust what would otherwise be an uneven playing field for brownfield and greenfield sites. At face value, State economic development policies frequently are neutral with regard to brownfield versus greenfield location, however, this study suggests that the *de facto* differential impact of economic development policies can have the same effect. For example, with few exceptions, Pennsylvania economic development incentives do not explicitly support either brownfield or greenfield locations. Nonetheless, our study suggests that the State's long-term practice of administering programs through regional county-based (as opposed to city-based) development authorities, together with a bias toward subsidizing new industrial park development, systematically reduced the competitiveness of brownfields. For example, in both the York and Erie areas, public economic development subsidies have been directed to suburban industrial parks, to the detriment of brownfield redevelopment prospects.

Site competitiveness. Ultimately, the market demand for a particular brownfield redevelopment will depend on site specific characteristics; i.e. location, location, location. Regardless the State of a region's economy, or the competitiveness of brownfields in that region,

a particular brownfield redevelopment may proceed as a result of the demand for the particular site and/or proposed reuse. Of course, site specific, non-environmental factors can also undermine the feasibility of investment at a particular brownfield site.

Site specific factors can be divided into two groups, those that are customer-driven (i.e., demand-side), and those that pertain to the unique characteristics of the site (i.e., supply-side). Our investigation uncovered examples of both. Customer driven, demand-side factors include the availability of a guaranteed tenant or buyer for a redeveloped property. Several of the matched pair projects where the terminated project was impeded by environmental concerns, subsequently proceeded because a guarantee from a tenant or buyer made the project financially viable.

In some instances, an end-user's demand for the redeveloped brownfield will derive from its location adjacent to an existing facility. In a terminated Virginia case, for example, the developer (and prospective buyer) was interested in expanding an adjacent industrial park to accommodate the growing space demands of existing tenants. In other instances, a site's strategic location nearby transportation links or a major customer was important. In another Virginia case, an investor was willing to pursue development of a site with non-trivial contamination because of the sites location at the intersection of two major Interstate highways.

The demand for particular brownfield sites, and therefore the viability of brownfield development also can be enhanced (or diminished) by the supply-side factors. The configuration and facilities of a brownfield site may be of particular benefit to the end-user, although brownfields may more frequently suffer because fragmented sites and out-modeled facilities and layouts are unsuitable for today's industrial or commercial uses.

Capacity and Strategy

Although this research demonstrates the underlying significance of market factors, it shows that the capacity to realize market opportunities, and the strategy for doing so, can be equally important. Regardless of market conditions, successful redevelopment of a brownfield site depends on the developer's ability to implement a financially sound development strategy and simultaneously address environmental concerns. This research shows that not all developers are equally equipped to do this. In fact, in some instances, a developer's familiarity with brownfield redevelopment made a clear difference in the outcome (i.e., completion or termination) of sample projects. Variation in the capacity of other parties to a development can have a similar impact on project outcome. Brownfield site owners, prospective lenders, and public agencies all can pursue strategies which enhance the prospects for redevelopment, or the reverse. In sum, environmental factors are less likely to deter redevelopment when the developer and other parties to a project

have prior development experience (especially prior experience with brownfield development), and an understanding of the ramifications of contamination. With this experience and understanding comes the capacity to pursue development strategies that can diminish the potential impact of environmental problems.

Our research shows that several common themes regarding the capacity to implement brownfield redevelopment projects apply across different kinds of stakeholder:

- Prior experience with brownfield redevelopment and understanding of the ramifications of contamination is likely to vary by location. States and cities differ in the extent of their industrial histories, and familiarity with brownfield redevelopment varies accordingly. In the sample selected for this study, developers and other project stakeholders generally were most familiar with brownfield redevelopment in Pennsylvania where decades of industrial decline have resulted in a long track record of brownfield redevelopment. By contrast, in Oregon (especially in the smaller communities of Albany and Eugene) brownfield sites are the exception not the norm, and parties to brownfield redevelopment projects were less familiar with ramifications of potential contamination.
- Strategies developers and other stakeholders pursue to encourage brownfield redevelopment frequently are the same as strategies used to develop sites where there is no threat of contamination. This underlines the significance of non-environmental versus environmental factors, and the fact that brownfield redevelopment deals are generally not viewed as environmental remediation projects by experienced developers who undertake them.
- Capacity to implement strategies that encourage redevelopment will not necessarily guarantee pursuit of optimal remediation strategies. Because deals are typically viewed as redevelopment projects first, and remediation projects second, the goal of redeveloping a particular site may in fact be at odds with the goal of remediating site contamination appropriately.
- Familiarity with the ramifications of contamination may increase stakeholders' capacity to implement brownfield redevelopment projects, but it does not necessarily mean that other parties to a particular site will be willing to do so. Developers and public agency officials normally will share a common interest in seeing a site redeveloped but, other parties to a development (especially brownfield owners and lending institutions) may perceive their best interest quite differently. The capacity to implement brownfield redevelopment is therefore necessary but not sufficient alone to guarantee a project's outcome.

With these common themes in mind, the discussion below highlights capacity and strategy issues as they pertain to developers, brownfield owners, lending institutions, and the public sector.

Developers. There is no simple way to capture a developer's capacity to implement brownfield redevelopment, however, our study reveals that a familiarity with development, and a familiarity with brownfield redevelopment in particular can have a significant impact on the outcome of a redevelopment project.

Familiarity with the brownfield redevelopment process, with the tools and technologies employed for site remediation, and with the availability of public sector incentives, together mean that a developer can select an appropriate remediation strategy. A developer with prior brownfield development experience is more likely to be able to accurately predict the different components of a development related to contamination, including :

- the scope of remediation necessary for the intended end-use at the site;
- the best approach to conducting that remediation;
- the costs of remediation;
- the costs of liability resulting from both remediation activities as well as potential claims of governmental agencies and third parties; and,
- the timing of the proposed remediation, including the time required to obtain government permits and sign-offs.

Our study demonstrated the potential impact of a developer's prior experience with brownfield projects. In Minnesota the study included developers who are self-described brownfield development experts; i.e., developers who are familiar with the brownfield development process, who are familiar with the State's voluntary cleanup program and other incentives, and who have built a business based solely on the redevelopment of contaminated or potentially contaminated sites. By contrast, the project sample included 6 projects undertaken by developers with no prior brownfield development experience, all but one of which were terminated prior to completion. Furthermore, among the study's matched-pairs there are sites where the developer's capacity to interpret information about potential contamination and its likely ramifications had a direct impact on project outcome. For example, an initial redevelopment effort ended abruptly at one Pittsburgh site when the prospective buyer learned the results of a Phase I assessment. In the words of another party involved with the redevelopment effort, the developer "freaked" over the results from the Phase I assessment, even though they were inconclusive. A subsequent developer judged the same property relatively clean, especially since it was used previously for metal processing,

and this conclusion was borne out by further investigation. With minimal contamination at the site resulting from a leaky underground storage tank, the project proceeded without a hitch.

One Pennsylvania case involved a piece of industrial property intended for industrial re-use. The first prospective purchaser balked as soon as leakage from underground storage tanks was discovered; the possible buyer insisted on extensive testing of adjacent sites before going forward. A second, more experienced, buyer with considerable recent history in brownfield site redevelopment negotiated a buyer-seller agreement to split liability, with the State's help. The buyer was highly motivated by the need to achieve rapid start-up of industrial operations, and recognized that he faced a fairly straightforward remediation problem. The site is in active use with only groundwater monitoring required.

What other strategies did developers adopt to expedite projects? Our research shows that the developer's reuse strategy, i.e., the decision on how to reuse a brownfield site can help offset the typically higher redevelopment costs associated with brownfield projects. These greater costs require a similarly high cash flow to meet normal real estate industry returns, compared with clean sites; brownfield properties must be able to generate a return commensurate with the additional risks of environmental problems. Therefore, higher density redevelopment projects have a better chance of producing an adequate bottom line. This is exemplified in many of the successful projects identified as part of the project sample in all of the States including multi-family housing, office developments, and shopping centers. Lower density projects may need larger public subsidies or yield a lower rate of return.

"Had there been no Phase I, there wouldn't have been a Phase II and there definitely wouldn't have been a Phase III. From a strategic perspective, take the least contaminated, high amenity location... put that to some good economic use, and then sort of work toward the darker hole, the black hole. Only because then you've got economics working for you, you can create a synergy...that works. If it's not a high demand area, or can't be created into a high demand area, it doesn't matter what you do."

---- City Brownfields Coordinator (Oregon)

Regardless whether a brownfield project involves a lower or higher density end-use, our research shows that the ultimate feasibility of a brownfield redevelopment project will depend on the developer's ability to read the market. As noted above, sites characterized by strong

fundamentals, such as location or market demand, are essential to ensure that they would be able to stand on their own financially after site remediation. But equally important is the developer's ability to devise a reuse strategy which takes advantage of a market opportunity. In this sense, redevelopment of contaminated (or potentially contaminated sites) is no different from any other development. On the one hand, if the developer does not have the wherewithal to accurately gauge market demand for the proposed end-use, then it is less likely that the project will proceed. On the other hand, if the developer is able to conceive a project for which there is an end-user, then, assuming environmental and other costs are not too high, the project is likely to proceed.

The importance of the developers' capacity to read the market was demonstrated by a number of the study's sample projects, including matched-pairs in which the outcome of the terminated case can be attributed to the developer's mis-read of the market. For example, in one Pennsylvania matched-pair, an initial effort to redevelop a historic machine tool facility as a mixed-use project failed because the developer overestimated retail demand at this particular location. Though the project's residential component was successful, the project ultimately was unsustainable because of its reliance on retail use. A subsequent redevelopment effort at the same site benefitted from a better read of the market--the new developer's plans increased the amount of office and residential space, and removed almost all retail. With this revised mix, the project proved financially viable.

This research also shows the importance of developers' strategies for implementing projects. Developers strengthened several sample projects by opting to phase development, i.e., by developing sites incrementally. By doing so, developers were able to proceed with a project that otherwise would not have been economically viable, sometimes using income generated from initial stages to help finance later site reclamation. In one Minnesota project, the developer was able to use this strategy to generate income from a portion of the site with minimal contamination problems before tackling the more complicated task of remediation in the remainder of the site. Developers expedited other projects by employing marketing strategies designed to enhance the demand, and/or reduce the potential negative impact of stigma resulting from potential (or actual) contamination. For example, in one Virginia case the developer attracted a high-profile public use to a portion of the site (a Federal court) by donating the property for this purpose, and in so doing provided a solid anchor for the proposed residential development elsewhere on the site.

Finally, developers can affect the outcome of brownfield redevelopment projects with the financing strategies they employ. The sample projects revealed that developers sometimes opt to self-finance projects as a strategy to develop projects outside the scope of public sector review and participation. Developers self-financed several small projects in Oregon. This strategy is interesting, for a couple of reasons. First, and most problematically, these site developers chose

to avoid the environmental scrutiny that a private lender would demand: due diligence, site investigation, and loan proceeds contingent on a satisfactory cleanup. Self-financing as a cleanup avoidance strategy can only work in the long term, therefore, if owners are willing to finance subsequent sales themselves. Second, this strategy effectively limits the scale of redevelopment. This strategy is most likely to be pursued, as it was in Oregon, by small-scale developers with limited capital resources. In one Oregon case, for example, the developer was unable to fully redevelop a site because the costs of self-financing the entire project were too high.

Brownfield Owners. As with developers, the strategies that brownfield owners adopt in dealing with their properties can have a dramatic impact on the outcome of, or even the opportunity to conduct, brownfield reuse projects. Some brownfield owners, especially large, heavy industrial operations, view themselves as the “deep pockets” in liability claims, and choose not to sell their sites at all, even those which they have long abandoned. Some companies are simply mothballing obsolete facilities; fencing them off and limiting entry. This study did not include any such cases because the sampled projects all had undergone at least a development attempt. However, our sample did reveal other owners cautiously exploring a different strategy to expedite development--reuse options where they lease their facilities to new users, but do not sell them.

This approach can be mutually beneficial for both the existing owner as well as the prospective developer, and in the process enhance the prospects for brownfield redevelopment. For existing owners, the principal advantage of retaining title is that the new user does not call the shots with respect to remedial action -- in the terms of one chemical company official, his operation does not want to “get stuck paying for a Cadillac cleanup when a Ford will do.” Retaining title permits the original company to maintain some control over site access and enforce deed restrictions, which can ultimately limit the owner’s exposure to toxic tort suits. Retaining title also gives the owner control over relations with Federal and State regulatory agencies, remediation needs, and timing. For the developer, on the other hand, the opportunity to undertake a project with a lease-purchase arrangement reduces the uncertainty associated with potential contamination. In effect, a lease-purchase deal can create a “fearless” buyer.

An alternative strategy owners adopt to expedite redevelopment of brownfield sites is to discount property sales prices to offset the remediation costs. If the true extent and nature of a site’s contamination is unknown, this approach does not create a “fearless” buyer. It can, however, increase site marketability site by shifting from developer to seller all or a portion of the anticipated remediation cost. In several of the study’s cases (including matched cases), sellers encouraged the purchase and development of brownfield properties by discounting property sales price.

Lending Institutions. Our site sample confirms that lenders have changed the way they look at brownfields, affecting the reuse prospects of specific sites and contributing to a shift in the broader climate for lending on brownfields. Financial institutions grappling with issues of environmentally- impacted collateral value and borrower credit worthiness remain reluctant to lend on brownfield projects, but our research suggests that lenders' approaches have evolved from an earlier skittishness based on unfounded fears of lender liability. More banks appear to have acquired the staff expertise to distinguish between the real and perceived risks of brownfield lending. And, with increased expertise, more banks have adopted environmental risk management programs to help limit their exposure, making brownfield lending more attractive.

According to some lenders participating in study projects, they insist on several underwriting "rules" that limit their own exposure to risk, but also make private financing easier to access and more predictable for other parties in a development. These underwriting standards typically include:

- low loan-to-value ratios, to ensure that collateral value will still exceed loan amounts even if undetected contamination and clean-up liability reduces property values
- professional assessment of environmental remediation costs and potential liability, which cannot exceed 40 percent of property value;
- a cleanup contingency of at least 15 percent, to cover surprises (with more lenders encouraging the use of insurance for this purpose);
- an agency-approved cleanup plan and schedule before most project funds are advanced (with projects in States having recognized voluntary cleanup programs often given a leg up on this factor); and
- a transaction structure and documentation to include appropriate indemnifications, warranties and representations, and notifications.

Our research also shows that some lenders have gained sufficient confidence in the quality and credibility of State voluntary programs that they now, at least informally, use State assurances when determining whether or not to make a loan for a brownfield reuse project. Interestingly, Minnesota officials recounted how some developers sought to take their previously used sites through the State voluntary cleanup program, even if no contamination was suspected, because gaining the State's "seal of approval" was viewed as an advantage in local financial markets.

Public Agencies. Public agencies at both the State and local level can provide important support to inexperienced developers contending with contamination issues on development projects. They can also bolster the ability of more sophisticated developers to tackle brownfield sites. Conversely, a lack of public sector capacity, or the absence of a public sector strategy to expedite brownfield redevelopment, can inhibit brownfield reuse. Below, we discuss how public sector support encouraged redevelopment of brownfield sites in our sample, and which agencies and levels of government were involved.

From concept to completion, the path of a brownfield redevelopment can be long and circuitous, even with careful planning. Some of the most effective public programs are those that broker information on site locations, opportunities, public planning objectives, and available resources. Agencies also can bring certainty and speed to the regulatory process: for instance, Minnesota and (to some extent) Pennsylvania agencies have standardized permitting and approvals, thereby saving developers and other parties considerable time and money. Our research shows that more sophisticated developers (usually those with the most ambitious redevelopment proposals) are most likely to value public efforts to streamline, according these an importance equal to direct financial aid.

Several cities, including St. Paul, Minnesota, from among our study sites, have created a broader brownfield “framework” that incorporates economic development and environmental policies. The St. Paul strategy identifies brownfield needs and opportunities; devises strategies to take advantage of these opportunities; and packages financial and technical assistance to carry out these strategies. Particularly important are the broader effects of cooperative, rather than adversarial, relationships among government the public, developers, and lenders. Cooperative relationships are one of the main reasons why several Minnesota developers in our study have been able to build businesses based solely on brownfield redevelopment.

Although a more proactive approach has evolved in some communities -- particularly in States such as Minnesota and Pennsylvania that have built a brownfield reuse track record through State voluntary cleanup and financial assistance programs -- our research found multiple brownfield projects undertaken on an *ad hoc* or scattershot basis, in which developers pursue (and communities encourage) reuse of any site that can pass through the regulatory and money maze. This approach appears to be particularly frequent in small towns and rural areas. These communities typically lack the capacity -- in the form of trained staff, locally generated development resources, and sufficient access to outside finance and expertise -- to establish a redevelopment framework that permits economically-viable projects to proceed efficiently. In fact, some cities have not established ongoing local links to State programs cannot provided the often-intensive level of “hand-holding” needed to get a project completed.

Public Sector Intervention

The public sector can do much to make brownfield sites more viable prospects for redevelopment. As described above, public sector land use and economic development policy can play an important role in determining the competitiveness of brownfields versus greenfields. Further, public sector agencies can play an important role by coordinating the efforts of private parties to a brownfield redevelopment. However, public intervention specifically to mitigate concerns about the environment, the main focus of this report, can also be important in providing the right circumstances for brownfield projects to proceed. Public sector interventions will be elaborated elsewhere in this report, but are summarized here to the extent that they made a difference in the viability and ultimate outcome (termination or completion) of investigated projects.

Although State intervention to mitigate environmental concerns did not, according to developers, outstrip the significance of market factors in determining the outcome of sample projects, it was cited as being either a “critical” or “important” facilitator in 18 of 28 completed cases and 7 of 20 terminated cases. The project sample reflected great diversity in the types of interventions that can prove helpful, reinforcing the view that no one “best” approach will fit the needs of all brownfield sites, which can vary in terms of size, nature and level of contamination, and basic marketability. According to developers, though, the public interventions we identified during the course of the State-level and site research were used to meet two main goals.

First, public programs reduced lenders’ risks by financing the cleanup needed to establish maintain collateral value or by clarifying legal liability through a State voluntary cleanup program. As cases in Minnesota illustrated, voluntary cleanup programs -- with their covenants not to sue or letters of “no further action” -- can help overcome lender reluctance to accept a particular property as loan collateral and increase the value of that collateral. They also can help ease lender fears that additional, surprise cleanups, could erode borrower ability to repay. In addition, lenders can use voluntary cleanup program-inspired cleanup standards and any deed or land-use restrictions to help determine possible future value of a property.

Second, State and local public programs operated by economic development agencies directly reduced development costs and increased rates of return on investment, making projects economically viable. There are three generic types of these programs, all of which were used by brownfield redevelopers in our sample:

- reduced borrower financing costs by offering discounted loans or providing services that reduced loan underwriting and documentation costs;

-
- improved project cash flow through tax credits or abatements; and
 - provided capital to cover the cost of project components that would not be bankable by private sources.

Whether State aid was packaged as environmental remediation or economic development assistance, both involved direct reductions in the cost of development. Developers reported economic development assistance was either “critical” or “important” to the implementation of 10 of 28 completed cases, and 7 of 20 terminated cases. In one Virginia case, for example, a public sector commitment to keep a high profile commercial headquarters in the central city effectively led to a pledge of development subsidies deep enough to offset serious environmental contamination, had it been discovered. The public sector always can provide enough subsidy to overcome environmental as well as non-environmental concerns about project feasibility. The appropriateness of different kinds of public sector intervention to encourage brownfield redevelopment is the subject of Chapter 5. First, though, Chapter 4 explores which environmental factors matter most based on our case study research.

Chapter 4

The Relative Importance of Different Environmental Concerns

In the preceding chapter, we discussed the relative importance of non-environmental and environmental factors in shaping the outcomes of brownfield redevelopment efforts. In this chapter, we examine the effects of different environmental issues. Of particular interest is the role of initial environmental cleanup costs versus liability for future cleanup in deterring brownfields investments.

In the discussion to follow, “costs” refer to known and relatively straightforward costs of assessment, remediation, legal expenses, and other punitive or civil penalties linked to a known or anticipated contamination. “Liability” refers to the risk that additional costs may be incurred as a result of the discovery of previously unknown or unanticipated contamination, future litigation to recover damages from potentially responsible parties (including those with “deep pockets”) and other uncertain events. Included in liability risk are future changes in environmental standards and remediation technologies that may require additional outlays to clean up sites already “remediated.”

To summarize the findings of this chapter, we conclude that the cost of mitigation relative to total project costs dominates all other factors as an investment deterrent. However, we do find differences among different types of costs and their overall importance depending on types of financing used, whether or not a project was completed or terminated, and a site’s intended end use. In addition, some of these differences are associated with perceived, not real, environmental conditions or their cost implications: matched pairs of terminated and completed projects show that exaggerated fears may have killed significant proportion of terminated redevelopment efforts. Finally, we find that several environmental risk or cost factors often cited as important appear to have been of minor or ancillary significance.

After our review of the different environmental factors shaping brownfield projects, we conclude with a discussion of the role played by the different State programs and policies in altering perceptions or reducing obstacles associated with environmental conditions. State programs and regulatory interventions are expected to reduce the burdens on efforts to cleanup brownfields. However, our research shows that some efforts may be counter productive in some

local real estate markets, where access to information and capital is uneven, or where local experience with brownfield projects and State intervention has been negative.

The analysis in this chapter relies on the developer-attested importance of various “obstacles” to redevelopment and “facilitators” that aided project implementation. “Critical” obstacles or facilitators are make-or-break factors; “important” obstacles or facilitators are less critical, but consequential, factors abetting or retarding success. We refer to the combination of both critical and important rankings as “significant.” In addition, we note factors that posed “frustrations” to developers as their projects went forward.⁶ In the first section to follow, we examine the broad influence of cost versus liability concerns. In the next section, we discuss the relative importance of different sub-issues of cost and liability. In the final section, we examine the various factors that influence the overall balance between cost and liability issues.

The Relative Importance of Environmental Costs and Liabilities

Because an important aspect of this discussion centers on cost, we first examine environmental costs as percentage of total cost. Of the 28 completed cases sampled, we obtained data on both environmental and total project costs for 17 projects. For all projects, environmental costs, including compliance with Federal, State, and local requirements, averaged 1.6% on a total investment of \$300 million. (See Table 4.1.) However, if we exclude one large “showcase” development project costing \$217 million, with exceptionally small environmental costs (0.5 percent), average environmental costs rise to 4.6 percent of total project costs.

The table shows costs for projects of over \$1 million and under \$1 million in total costs. Larger projects averaged higher environmental costs as a share of total cost: 4.4% of total costs compared to 13.0% of total cost for smaller projects. If two smaller projects for which environmental compliance and cleanup activities amounted to over 25% of the costs are excluded, the four remaining projects show an average environmental cost burden to the developers of 3.5%, roughly the same as the share for larger developments.

In both cases of high remediation costs, developers received a massive break on the sales price. Our data sheds no light on possible tradeoffs between remediation costs and sales prices. Dollar amounts shown in Table 4.1 are the funds committed by developers only, and do not

⁶ When significant factors did not deter redevelopment efforts, the problems most prominent in the minds of many developers interviewed were their most recent frustrations.

include any costs incurred by sellers prior to purchase. They also don't account for discounted property purchase costs due to the presence of contaminants. Nevertheless, we believe that they are reasonably accurate order of magnitude estimates.

These data, however incomplete, show that average environmental clean-up costs are not insubstantial as a fraction of all costs. For example, other research shows that local zoning and land use controls alone can impose cost burdens of 1.5-2.0% on average for projects with no exceptional environmental action requirements. Localities with more stringent set-back, planting and other requirements, locations near sensitive streams, on hillsides, or other exceptional areas and certain economic activities near residential areas may have even higher cost burdens. Thus, the 4.6 percent average environmental cost figure to comply with all regulatory requirements, including brownfield cleanup, may be comparable to (but in addition to) other regulatory compliance costs. A 4.6 percent premium on development costs may be a substantial burden where brownfields already suffer a competitive disadvantage compared to greenfield sites.

Project Size	Total Cost	Environment Cost	Percent Environment	N of Projects
Total	\$302,725	\$4,820	1.6%	17
Total Without "Showcase"	85,725	3,970	4.6	16
Large (Over \$1 million)	300, 835	4,575	1.5	11
Large W/out "Showcase"	83,835	3,725	4.4	10
Small	1.890	245	13.0	6

Note: Showcase project was large, \$217 million development.

Our research suggests that environmental cleanup costs tend more often to be significant obstacles to redevelopment than liability concerns: Developer cite cost concerns more frequently than liability issues, and liability concerns never appear as the sole significant environmental obstacle affecting site redevelopment. Table 4.2 shows developer ratings of cost and liability factors as obstacles to site redevelopment, by State and project outcome (terminated or completed). As the table shows, cost concerns appear more frequently than liability issues:

clean-up costs were cited as “critical” 11 times, and “important” 14 times. Developers rated liability concerns “critical” 6 times, and “important” 9 times. Adding the “critical” and “important” ratings, costs were significant in 25 of the 48 cases; liability in 15 of 48. However, the overlap in projects is not shown on the table; *we had no instance in which a liability concern was found to be significant in the absence of a known or anticipated cost concern.*

Two other findings from the table are worth noting. First, the significance of cost and liability concerns are linked to project completion status. As an example, clean-up costs were perceived as

Environmental Obstacle	State				Project Completion Status	
	Virginia	Penna.	Minn.	Oregon	Completed	Terminated
Liability						
Critical	2	0	1	1	1	5
Important	3	0	1	1	5	4
Cleanup Costs						
Critical	2	1	2	6	1	10
Important	3	5	3	3	11	3
Financing						
Critical	1	3	3	4	1	10
Important	1	0	0	0	1	0
Neither Finance/ Cleanup						
Both Finance/Cleanup	6	6	3	5	16	4
Used State Program	2	2	1	4	2	7
Total Projects	11	13	10	14	28	20

a “critical” obstacle in 11 of 13 terminated cases, but were viewed as critical in only 1 of 12 completed cases. A similar, but less dramatic, difference is true of liability concerns, as well. (As

noted in the preceding chapter, critical environmental obstacles did “kill deals,” but other, non-environmental factors were most important to their successful resolution.) Second, a high proportion of the completed projects in the sample participated in a State’s voluntary cleanup program, which played a role in reducing both cost and liability concerns (a point to which we return, below).

In addition to their effect on developer willingness to proceed with redevelopment projects, cost and liability issues often are raised by policymakers as barriers to lender willingness to finance brownfield development.⁷ Lenders may resist making loans to properties suspected of environmental contamination because they may fear liability for cleanup costs in the event they foreclose on a contaminated property, or they may fear that contamination will diminish the value of the collateral that secures their loan or the credit-worthiness of the borrower.

In our project sample, we uncovered little evidence that lender liability concerns had much of a deterrent effect. Rather, our evidence suggests that collateral value or borrower credit-worthiness was of most concern. Table 4.2 also shows developer ratings of clean-up problems and financing problems due to environmental costs as obstacles to redevelopment. As the table shows, 16 of 20 terminated projects and 12 of 28 completed projects had problems with either clean-up or financing due to environmental concerns. All of the completed projects had cost concerns, two of which also had financing problems. Thirteen of the 16 terminated projects had cost concerns (seven of which also had financing problems). Only three of the ten terminated projects with financing problems did not have corresponding cost concerns; none of the completed projects did so.

This finding is supported by data (not shown on a table) that distinguishes between terminated projects sponsored by developers with past redevelopment experience and those without such experience. (Financing issues may be particularly difficult for neophyte developers.) Our sample contained seven cases of experienced developers who terminated redevelopment efforts for failure to get financing; all seven cases involved “critical” or “important” cost concerns. In no case did lender liability concerns alone appear to have blocked financing.

In the next two sections, we turn to the effects of other cost factors and liability, uncertainty, and regulatory compliance issues that proved less significant obstacles in our sample of projects. In the last section, we examine the factors that influence the relative importance of cost and liability concerns.

⁷See the discussion of lender fears in Chapter 1.

Issues of Environmental Costs

Some of the previous policy literature stresses developers' and lenders' general perception that brownfields properties are expensive to redevelop because of the large remediation costs involved, even though contamination levels on most parcels available for redevelopment are low. As an example, properties selected for redevelopment as part of the Chicago Brownfields initiative were found to have much lower-than-expected levels of contamination and remediation costs. *Our research supports the view that developers over-estimate clean-up costs. In seven of ten completed redevelopments, developers indicated that, in retrospect, "anticipated" rather than "actual" clean-up costs presented significant obstacles.*⁸ Importantly, all of these cases involved "experienced" developers; i.e., developers with prior brownfields redevelopment experience.

"Neville Island is a good case in point, because of the image that it is just a chemical waste dump, and it is not that at all. I've done about seven sales there in the last year and every one of them has come up clean. That doesn't mean every site down there is clean, but even the image is an impediment to try and get things done."
---- Commercial/Industrial Realtor (Pennsylvania)

In addition to costs to remediate contamination, projects can incur other costs to comply with environmental requirements. In our research, we asked developers whether assessment costs, legal costs, and long-term costs to comply with environmental requirements were "critical" or "important." Developers cited these costs infrequently, even though they are often mentioned in critiques of CERCLA as barriers to brownfield investment decisions

Developers cited site assessment costs in only 4 of our 48 cases and these costs never appear as the sole significant obstacle. Only one project appeared to receive public help with assessment costs. However, characteristics of our sample may have reduced the frequency of this obstacle:

- All sampled cases already had a Phase I assessment (the majority had completed at least Phase II) thus excluding developments that may have stalled because of expected Phase I assessment costs.

⁸We did not collect sufficiently detailed data to allow comparisons of when the parties to the redevelopment process exaggerated costs and when more realistic estimates were made.

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- By the time of our interviews, developers had final cleanup cost figures for all completed cases and estimates for a large number of the terminated ones. The cleanup cost amounts compared to assessment cost totals may have led developers' to downplay the significance of assessment costs in retrospect.
 - 42 of the 48 projects involved developers experienced in brownfields development; these may have accepted assessment costs as *a routine* cost of doing business, and thus unworthy of comment to researchers.

Superfund sites and other cases in which financial responsibility for cleanups is allocated across many parties involve potentially massive legal expenses. In our sample of less-severely contaminated properties, legal costs due to environmental issues were raised in only two cases, both in Virginia, a State without a well-developed environmental regulatory process. *Legal transaction costs do not appear to warrant special attention for cases not requiring negotiation among multiple Potentially Responsible Parties , which are the majority of brownfields cases.*

Issues of Liability and Other Uncertainties

As noted above, liability concerns were frequently cited as obstacles to redevelopment, but almost always in combination with issues of known (or anticipated) costs. These liability concerns pertained to developers' fears that as a potentially responsible party, they are liable for the considerable clean-up costs they may incur if previously unknown contamination is found on their site. We also investigated other environmental uncertainties in the development process, which proved to be of lesser concern. Three in particular merit our attention: the potential stigma tied to brownfield sites, the uncertainty surrounding future compliance costs, and problems linked to navigation of the regulatory process. Each of these are treated in turn.

First, the policy literature notes the potential uncertainty faced by developers in their ability to market property to those who know that it was previously contaminated. In other words, must potential returns from property investments be discounted to account for the effects of "stigma?" *Our research found no evidence of stigma as it pertained to the marketability of developed properties.* Stigma was mentioned as an obstacle to development in only one of the 48 projects examined -- an incomplete project in Oregon on a property with so many problems that it may qualify for National Priority List status. Certainly stigmatization may occur with Superfund cleanups and instances of highly publicized pollution (although adverse effects on marketability or property values are not inevitable, as shown by the successfully re-marketing of Love Canal.) Our research suggests that stigmatization appears unlikely to have significant effects on viability of most brownfield redevelopment projects.

Second, some analysts believe that uncertainty surrounding current and future regulatory compliance costs, including that associated with multiple layers of regulatory oversight, can be a major deterrent to developers. We found that these risk factors play no determinative role in any case. State policy makers, developers, and increasingly, financial institutions understand that sites of small size or with limited contamination fall below the threshold of Federal concern. Less positively, however, developers in smaller cities and in less contaminated areas (notably Oregon) experienced a marked lack of concern - even awareness of - Federal environmental requirements. *Outside of the inherent risks associated with prospective liabilities, brownfield developers do not consider environmental or regulatory uncertainties to be major factors in determining project outcomes.*

Of related concern, *post-project site monitoring and reopenings of previously approved cleanups mattered little to developers' decisions in the cases examined.* (Some Virginia exceptions apparently stemmed from lack of knowledge of regulations.) Although a highly publicized reopening might inhibit redevelopment in a city, our evidence suggests that developers who act in accordance with State and Federal regulations will assume that they are not subject to reopeners. Post-cleanup monitoring similarly did not arise as a significant issue in developer decisions, although frustrations with monitoring, and expenses of continuing compliance loomed large in developers' retrospective views of project difficulties.

Third, although public policies can foster redevelopment, developer difficulties in navigating the regulatory process posed a significant frustration to them. Nine out of the twenty-eight developers of completed projects found some aspect of the regulatory process - other than mitigation costs - to be worthy of note. Four of these cited issues of inter-agency conflict; four others cited duplication of regulatory requirements or permits.

Issues tied to the regulatory process also arise when developers are asked about the major "facilitators" aiding completion of their projects. *Developers of completed projects cited State technical assistance with environmental regulatory compliance as a major factor 16 times (out of 28), more than any other facilitator.* State limitations of liability also were cited often (13 times), but they were less often tied to project completions. Assistance with regulations, unlike liability relief, immediately reduces transaction costs, and interventions that reduce immediate costs may be most valued by developers. These findings suggest that smooth, well understood and predictable regulatory oversight can contribute to project completion, and that *liability relief is simply one of a number of financial factors that enter into project assessment and lending decisions.*

Factors Affecting Environmental Costs and Liabilities

In Chapter 3, we found that although market factors were more important than environmental concerns in driving brownfield redevelopment prospects, some types of projects or project situations tended to be more vulnerable to contamination issues. In the beginning of this Chapter, we discussed the predominance of remediation costs over liability concerns as deterrents to redevelopment. However, we find that the relative influence of cost and liability issues also is linked to characteristics of projects and project locations. In this section, we discuss the effect of project end-use, type of financing, the sophistication of the developer or local “system” in which the development takes place and the effect of State program participation.

Project Type

For some time, legislators have proposed CERCLA revisions to permit cleanup standards that vary with the intended end use of a redevelopment effort. These standards would allow “less-than-pristine” uses -- industrial projects, primarily, but also commercial projects -- to meet lower remediation standards than residential projects. Table 4.8 arrays environmental obstacles by intended land use and whether or not the proposed project was completed. Note that the project sample is heavily represented by projects that involved commercial activity (31 projects), compared to industrial (9 projects) or residential uses (8 projects).

Table 4-3 shows that cleanup costs were significant obstacles to both commercial and industrial projects. All of the completed industrial projects (4 out of 4) and seven out of 17 commercial projects faced significant cost obstacles. Cost issues were similarly high for industrial and commercial project terminations. In addition, financing problems were cited as significant in half of terminated, but in none of the completed commercial redevelopments. By contrast, financing posed a significant problem for *both* completed and terminated industrial projects. Remarkably, few residential cases experienced serious environmental problems, even when prior use was industrial. Neither cleanup costs nor access to financing was reported to be critical to any case. *These findings suggest that industrial projects are most sensitive to clean-up cost issues and the financing problems that these issues engender.*

That cleanup costs were cited as significant by developers of all industrial projects suggests that more contaminated parcels are likely to find industrial uses. In addition, State cleanup requirements in Pennsylvania and Minnesota vary with intended land use, and perhaps dirtier sites in our sample were channeled toward the uses with lower, industrial, mitigation standards.

Table 4.3
Project Obstacles and Facilitators by Project End-Use
and Completion Status
(N of Projects)

Obstacles	Project End-Use					
	Residential		Commercial		Industrial	
	<u>Termin.</u>	<u>Comp.</u>	<u>Termin.</u>	<u>Comp.</u>	<u>Termin.</u>	<u>Comp.</u>
Finance	0	0	7	0	3	2
Assessment Cost	0	0	2	2	0	0
Cleanup Costs	1	0	7	7	4	5
Liability	0	1	8	3	1	2
Facilitators						
Assessment Cost	0	0	0	1	0	0
Cleanup Cost	0	0	0	3	0	0
Liability	0	2	3	8	0	1
Regulatory Compliance	0	3	1	11	0	1
Total Projects	2	6	14	17	4	5

In contrast, environmental liabilities appeared to be of more concern in commercial projects (especially terminated ones) compared to industrial or residential projects. Predominance of cost concerns on industrial projects may have overshadowed concern for less immediate liability issues. However, commercial projects also were much more likely to have claimed State liability relief as a “facilitator,” as shown in Table 4.3. (Only one industrial developer claimed significant help on liability issues.) Moreover, commercial projects frequently received assistance with regulatory processes; this was significant to 12 of the 17 completed projects (and to 3 of the 14 terminations). Not shown on the table, assistance with regulations was a facilitator in 5 of the 13 cases on which we have a terminated and completed case on the same site.

Project Financing

Redevelopment projects can be financed from (a) developer's own equity or borrowing on personal or corporate credit, (b) tax syndications and borrowing from financial institutions, and (c) public sector subsidies. Developers sometimes select funding options with a view toward environmental concerns, and our project sample contained examples of all three types of financing.

Project success appeared to be correlated with financing sources. Table 4.4 shows project completion status and environmental facilitators by type of financing -- self-financed, private-only, and publicly-assisted. Self-financed projects were most likely to be completed (10 of the 11 self-financed projects). Projects that expected to use private borrowed funds with no government financing were least likely to be completed (8 of 21 privately-financed projects were completed).

Facilitators	Project Financing					
	Self-Financed		Private Only		Public Subsidy	
	<u>Termin.</u>	<u>Comp.</u>	<u>Termin.</u>	<u>Comp.</u>	<u>Termin.</u>	<u>Comp.</u>
Assessment Cost	0	1	0	0	0	0
Cleanup Cost	0	2	1	2	2	6
Liability	0	1	0	1	1	1
Regulatory Compliance	0	3	0	3	2	8
Total Projects	1	11	13	8	6	9

Projects with sought-for, or actual, government participation fell between these two (9 of 15 completed). Across groups, projects did not show substantial differences in the declared relative importance of environmental obstacles, although we did find important differences among project facilitators.

Public subsidy for redevelopment often brought other regulatory and development facilitators into play, the combination aiding completion of 5 of 13 matched cases (these for which we have terminated and completed projects on the same site.) Table 4.4 shows that developers who participated in public financial programs tended also to regard environmental regulatory process assistance as a facilitator more often than did developers of self-financed or purely

privately financed projects. Government participation as a financier does not guarantee project completion, as shown by the number of terminations. However, relationships with development agencies that provide project subsidy usually gains a developer access to information on, and help with, environmental compliance issues. (Government aid usually reduces risk exposure to lenders, also; see Chapter 3.)

Some developers self-financed their developments, a number of which might otherwise have been terminated. Self-financing was motivated variously by: (a) developer need for transaction speed, foregoing access to State subsidies, in one case (b) desire to avoid the demands of financial institutions for data or assurances or (c) desire to avoid environmental requirements. As an example of the first incentive, a steel company searching for a site in Western Pennsylvania or Eastern Ohio found their ideal site in an industrial suburb of Pittsburgh. Rather than taking advantage of several State of Pennsylvania programs to encourage site re-use, the company self-financed site purchase to ensure rapid start-up of operations.

Four of the 5 industrial projects completed were self-financed while all of the terminated projects relied completely on private capital. In 2 of the completed cases, self-financing allowed the developer to proceed in spite of acknowledged problems in accessing capital. Similarly, only 4 of the 17 completed, but 9 of the 14 terminated commercial projects depended exclusively on private lenders for financing, and 7 of these 9 reported significant capital access problems due to environmental concerns (related to the cost of remediation).

Self-financing to avoid lender involvement in project development and, often related, to avoid environmental requirements, produced two undesirable outcomes in several of the self-financed projects in our study: redevelopment built to a less-than highest-and-best use and in some instances, developments completed without remediation of known contaminants. In the latter instance, most lenders would have insisted on both site assessments and full remediation, or at least the legal assurances that both would be completed, prior to extending a loan. *The most important finding relative to financing is the ability of some self-financed developers to evade regulatory oversight and the requirements imposed by lending institutions.*

By implication, self-financed projects tended either to be small, therefore requiring amounts that could be raised by a private developer without bank borrowing, or sponsored by companies large (and profitable) enough to have accumulated significant amounts of cash for development. Our projects included both commercial and industrial enterprises, and in all cases, these were developments where the developer was also the end-user. We did not collect data that would allow us to generalize to all types of developments, but we know from long research on small business (those with fewer than 500 employees) that these are more likely to finance start-up and

expansion by self-financing, rather than borrowing from banks. If this is true of small brownfield redevelopment projects, small businesses will be most likely to escape the regulatory oversight exercised by lending institutions.

In one small city in our sample, a prospective buyer walked away from a property discovered to have benzene in the ground. "When we found out the contamination was there, we just knew better...We just walked away from it." The subsequent purchaser acquired the property on land contract, with a purchase option able to be exercised after seven years. The developer wanted to avoid dealing with banks (triggering remediation) and placed his bet that the State would forget all about the property. "It's all basically gambling that you'll stay out of the limelight."

Surprisingly, we found no cases of lender rejection of loan requests because of lender liability concerns. Were this problem widespread, we would have expected developers to single out "unreasonable" lender requirements. Instead, developers blamed their own project finances, and high cleanup costs when rejected by potential financiers. In spite of a research design with potential bias towards exaggerated blame on excessively cautious lenders, brownfield project terminations were attributed more frequently to factors other than to lender unwillingness to support brownfield redevelopment efforts.

System Characteristics

In Chapter 1, we described the types of actors that participate in brownfields redevelopment, and classified them according to their financial involvement in project implementation. The relationships among these actors constitute a system of inter-relationships. We suspected that different types of communities would possess more or less "sophisticated" systems in terms of the resources available to carry out brownfields redevelopment effectively. We intended the tiered sample of small, medium, and large-sized cities to capture a range of system types.

Chapter 3 stressed the importance of developer capacity and an appropriate redevelopment strategy in moderating the effect of environmental concerns where projects otherwise were financially viable. To repeat the findings, five of the six cases initiated by developers that we judged to lack sophistication in zoning, financing or environmental issues were terminated. In three terminations involving neophyte developers, inability to obtain financing was critical, but neither cleanup cost nor liability exposure was important, suggesting that the developers were unable to sell their viable projects to prospective financiers. We also found developers, including those sponsoring completed projects, who responded completely

inappropriately to environmental requirements, in one instance attempting surreptitious removal of contaminants for fear of heavy-handed and costly State involvement. (The State's intercession with Federal EPA, in fact, became critical to ultimate project success.) Evidence from other projects suggests worrisome levels of developer ignorance of liability issues: developers often responded to our questions about liability with questions of their own: many saw no liability other than that for cleanups, not understanding the financial threat from possible third-party lawsuits, a concern that lenders and legal counsel referenced regularly.

"As people -- including realtors, lenders, environmental providers -- had more experience and saw other people venture in and say: 'Hey, it isn't so bad. You can actually acquire the property at a reduced price, pay the cost of cleaning it up and still come out ahead (versus going into a greenfield situation where you've got to pay development fees and bring in city water and sewer and electrical and so forth)."

---- Oregon Developer

System capacity affects project development in less documentable, but we believe tangible, ways. In a section above, we reported finding that perceived, rather than actual, environmental costs presented obstacles to redevelopment in a high percentage of cases where environmental cost concerns were evident. Of projects citing cost as "significant", virtually all the Oregon cases and the majority of those from Virginia involved anticipated costs, not actual outlays. In Minnesota and Pennsylvania, however, the major issue was not anticipated or actual dollar costs but project delays associated with mitigation. Further, potential liabilities were most often cited by developers as critical, rather than merely important, obstacles in Oregon, cited less frequently by developers in Virginia and Minnesota, and were not cited at all in Pennsylvania.

We believe that three factors produced this pattern of responses:

First, differences in State and local experience with brownfields redevelopment, and the existence of a track record of successful cleanups, partially explains these differences in the relative importance of environmental concerns across cities and States. This experience, of course, goes hand-in-hand with the severity of past pollution and the economic importance of urban regeneration efforts.

Second, the lower the level of local developer or financier experience with brownfield projects, the higher the weight he or she will assign to contingent liability risks, due to lack of evidence on what actual risks may be.

Third, as a group, developers, lenders, and public agency staff in small and medium-sized cities were often less capable of handling brownfield redevelopment issues than were their large city counterparts. This lack of capacity in brownfields redevelopment is aggravated by the easy option of greenfield development, especially in smaller and mid-sized cities. However, we did find clear examples of small and medium sized cities where actors' understandings of Federal and State environmental requirements were rudimentary, at best, and simply incorrect, at worst. In the largest sampled areas in each State -- St. Paul, Pittsburgh, Portland, and Richmond -- public officials and lenders (but not always developers) displayed reasonably high levels of sophistication.

We detected a similar difference in sophistication levels across States. In terms of brownfield experience and capacity to navigate complex environmental issues, we consider Pennsylvania as the State with the most experience, followed in order by Minnesota, Virginia and Oregon. As a rule, developers, lenders, public officials, real estate brokers, and other system actors in Minnesota and Pennsylvania displayed much more fine-grained understandings of Federal and State environmental requirements, as well as the nuances of public redevelopment financing, than was true in Virginia or Oregon.

State Program Effects

Hitherto, we have deliberately avoided discussion of participation in State programs, preferring to concentrate first on project-level factors, then characteristics of local and State systems. In this section, we discuss the effects of State brownfields redevelopment assistance and liability assurances in promoting brownfield redevelopment.

Table 4-1 (above) showed the number of projects in each State that participated in State programs for brownfield redevelopment, including funding for clean-ups and assurances on liability. Participation in State programs varied: 3 of the 14 Oregon projects, 5 of Pennsylvania's 13 projects, and 8 of 10 Minnesota projects participated in the State's program. (Virginia had no program at the time our study projects were attempted.) Table 4-5 compares, by State, terminated and completed projects and the form of State economic development or environmental compliance assistance they received. The table shows that one-third of the projects identified one or more of forms of State environmental assistance (financial or liability) as "important" or "critical" to completion (10 of 28 projects). The same number identified general State economic development incentives unrestricted to environmental remediation projects. *Unsurprisingly, the completion rate of projects getting some State assistance exceeds that of projects not citing help with environmental problems (14 of 28 completed versus 3 of 20 terminated)*

These comparisons provide context for a more detailed look at what types of State assistance made the greatest difference to brownfield redevelopment. If we distinguish between developers who claimed State environmental assistance was an important facilitator to their projects and those who reported that support was critical (data not shown on table):

- Only five of the nine projects reporting “critical” environmental facilitators were completed, suggesting that *some projects may be burdened with environmental or market disadvantages that State-assistance cannot overcome*. This finding is supported by the discussion in Chapter 3.

Table 4.5 Environmental Facilitators by State and Project Completion Status					
State/ Completion Status	Facilitator				Total Projects
	Cleanup Cost	Liability Risks	Regulatory Reqs.	State ED \$	
Virginia					
Terminated	0	0	1	2	4
Completed	0	0	4	2	7
Pennsylvania					
Terminated	0	1	0	1	6
Completed	1	4	4	3	7
Minnesota					
Terminated	1	0	1	1	4
Completed	2	4	4	3	6
Oregon					
Terminated	0	2	0	2	6
Completed	0	2	2	2	8
Total					
Terminated	1	3	2	6	20
Completed	3	10	14	10	28

- *Projects reporting that State environmental assistance was important all received help with the regulatory process and received significant economic development incentives. This package of regulatory help and general economic development aid highlights the need for*

clear understandings on the part of both environmental and economic development agencies of the imperatives that drive each others' policy role.

- *Participation in State programs to offer developers protection against liability for future remediation outlays substantially reduced developer propensity to cite liability concerns as an obstacle.*

The importance of some form of relatively straight-forward and expeditious liability allocation process cannot be overstated. The Pennsylvania programs in place since 1993 provide for explicit legal division of responsibility for past contamination, allocating potential future burdens on the basis of the pollution established in a site assessment that is current at the point of a property sale. Minnesota's eight-year-old voluntary cleanup program uses a similar process. Both programs also allow pass-through of the limited buyer liability to successor owners (such as financial institutions in the event of foreclosures).

Projects in all three Pennsylvania cities employed the State program and project developers expressed little concern over liability. Most instances where liability was raised as an issue in Minnesota came from the mid-sized city, where to our knowledge, no project had participated in the State's program. Officials in both Pennsylvania and Minnesota environmental agencies report that parties to sales of brownfield properties with pollution levels that *already meet State or Federal standards* use the State process to achieve greater certainty of future financial obligations. Clearly, the program enhances either the likelihood of a sale, or the sale price of the property, or both, or these sellers would not incur the needless expense of going through the State process.

Oregon's voluntary cleanup program makes liability coverage available but only three of the study projects participated, perhaps due to the newness of the program. In fact, only 60 projects had been completed under the Oregon program by the time of our data collection, limiting the universe of available projects. Interestingly, the Oregon cases show more developer concern with liability than is evident in Virginia despite the availability of a voluntary cleanup program in Oregon, reflecting the number of our projects that did not participate in the program.

Two factors may explain Oregon's higher incidence of expressed concerns with liability: charges for program participation and delays in reviews of mitigation plans and efforts. Oregon and Minnesota charge users for oversight (as do many other States). Such charges may be considered inconsequential by developers of large scale projects, but be perceived as extortionary on smaller developments, where fees can amount to as much as 10% of cleanup costs. Depending on the extent of environmental contamination and unforeseen problems arising during

mitigation efforts, the potentially substantial fees for oversight in the Oregon program (charged per hour of effort) could significantly reduce returns on redevelopment investments. By contrast, Pennsylvania funds cleanup oversight efforts out of general revenues, in effect subsidizing developers and sellers of contaminated land in order to accelerate mitigation and redevelopment.

“Act 2 [providing liability assurances] was really initially designed to deal with sites that were a little “brown,” not too brown, that would never really rise to the radar screen of EPA, but ... we needed some mechanism on the State level where we could do some cleanup and then get a release of liability.”

---- Environmental Lawyer (Pennsylvania)

In addition, Pennsylvania law requires the agency to respond to reports of contamination and developer-filed mitigation plans within a specified period regardless of the complexity of the problem or cleanup. Minnesota attempts to expedite responses. In contrast, Oregon offers no assurance that project reviews will be completed rapidly and the required public comment period of 8-10 weeks means a minimum of 19 weeks between a letter agreement on a simple cleanup and the beginning of work. (Some non-program cleanups in Oregon experienced very long waits for departmental approvals due, apparently, to limited staff resources caused by agency underfunding). Despite these problems, Oregon *financial institutions (many with little brownfields experience) demand State No Further Action letters prior to lending, thus further delaying, and in some instances precluding, developer access to private capital. In other words, financial institutions may screen projects strictly on the presence of a No Further Action letter, and not conduct more detailed loan reviews.* In contrast, lenders in Minnesota and Pennsylvania, more attuned to lending on brownfields, appear often to lend on State-approved cleanups even without formal liability releases.

Chapter 5

Evaluation of Brownfield Redevelopment Policies

This chapter discusses the results of the preceding chapters and what they imply for public policy, primarily policies and programs created and administered by States. First, we discuss the findings from Chapters 3 and 4 and suggest how they should inform public policy development. Second, we review market responses to brownfield problems and opportunities, and the public sector role in light of those responses. Finally, we assess the policies themselves, drawing primarily on information developed for this report. We do not limit ourselves, however, to conclusions drawn directly from the results of this research. The four States and twelve metropolitan areas we included in our sample, and the projects we reviewed, underlie much of our analysis, but we will not ignore results from other research and the insights gained throughout our data collection. (See References, at the end of this report.)

Findings from Field Research

In Chapter 3, we explored actors' beliefs about incentives and deterrents to implementation of the projects they were involved in, focusing on the relationship between non-environmental and environmental "facilitators" and "obstacles." We concluded that non-environmental factors -- in sum, the "market" -- posed the critical constraint on project progress. Finding that the market matters is not a particularly surprising finding, except that in our pool of projects, even those that failed because of "critical" environmental problems went forward without assistance targeted specifically to environmental concerns. Developers who knew their markets and sources of subsidy (where used) were able to implement environmentally-difficult projects successfully. Projects that failed (and were not subsequently redeveloped) did encounter environmental obstacles, but they never failed because of contamination or liability issues, alone.

Our goal was not simply to make statements that environmental concerns either did or did not "kill deals" but to explore circumstances under which environmental concerns gained prominence in development decision-making. We found that *environmental issues mattered most when potential market demand is weak or highly uncertain, developers and/or lenders respond inappropriately to environmental constraints, and the land cost differential between greenfield and brownfield is low (usually because of mutual proximity).*

Chapter 4 weighed the effects of environmental costs and liability in development decision-making. As we use the terms, "cost" refers to known and relatively straightforward costs of

assessment, remediation, legal expenses, and other punitive or civil penalties linked to a relatively well-understood situation. “Liability” refers to the risk that additional costs may be incurred as a result of the discovery of large amounts of unknown contamination, future litigation to recover damages from potentially responsible parties (including those with “deep pockets”) and other highly uncertain events. Included in liability concerns are changes in environmental standards and remediation technologies that may require additional outlays for contaminants already “remediated.”

Our basic issue is whether developer and lender fears of liability are the critical “environmental” deterrent to re-development, such that public policies to clarify and assign liability should be paramount. Or are costs of remediation and assessment the primary obstacle to development, which implies a priority to policies designed to subsidize redevelopment costs, as in current economic development subsidy programs? *Our research found that anticipated or actual costs to remediate environmental contamination posed the most serious obstacles to redevelopment in our project sample. Although developers frequently cited fears of liability for unknown, but potentially large, contamination remediation expenses as a critical obstacle, these concerns were always cited together with issues of actual remediation cost. Liability concerns were never the sole “critical” environmental obstacle to redevelopment.*

This chapter examines the implications of these findings for public policies to use development subsidies to regenerate markets, establish legal frameworks to assign and clarify developers’ liability for clean-ups, and disseminate information and build capacity among State and local agency officials, lenders, and developers to understand and apply environmental requirements.

First, the importance of non-environmental factors as a deterrent to redevelopment argues for public policies that respond to, rather than buck, underlying market trends. Because government can’t subsidize all worthy projects, it makes most sense to invest in those that in turn, spur unsubsidized investments by others. Further, the primacy of environmental cost concerns over liability issues as a redevelopment deterrent argues for a public policies to subsidize the extraordinary cost of urban redevelopment where broader public purposes are served.

In our four study States, one policy has clearly had a major stimulative effect on the competitiveness of brownfields properties -- Oregon’s controls on urban growth, which reduces the effective demand for greenfield sites. Because growth limits are not currently a practical option for most States and localities, targeting of subsidies to areas and projects can help concentrate funding in ways that encourage market formation. Further, coordination among programs as a policy response to issues raised by developers frustrated by confusing layers of

development and environmental agency involvement can help improve the effectiveness of programs.

Second, State attempts to lower the perceived level of liability risk are important (and have progressed rapidly in a number of States), but policymakers should not expect that State assurances, alone, will be sufficient to induce substantial new demands for brownfields properties. Earlier, we found that developers more often cited cost as a critical constraint to their ability to redevelop projects, and that where liability issues were significant, this occurred in combination with other critical factors. States have responded to cost issues by adopting land-use-based clean-up standards and allowing institutional and engineering controls that stop short of full remediation. Our cases suggest that these methods can accelerate cleanups, and that developers accept the land-use limitations these methods require. We do worry, however, about State capacity to monitor the effectiveness of these remedies over the long-term. States also have moved forward with programs that assign liability clearly to buyers and sellers and otherwise offer developers assurances that the risk of future cleanup costs are small. Developers appear to have accepted State assurances despite the ultimate risk of State or Federal re-openers.

Finally, the role of lenders as *de facto* monitors of property owner (borrower) compliance with environmental statutes, and the role of local economic development agency officials as the “entry point” for most developers into the environmental policy arena, argue for public efforts to build the capacity of both lenders and development officials to understand and apply environmental statutes. Particularly important are State and local “network-building” efforts that encourage collaborations among agencies and sectors to undertake redevelopment.

Market Changes and Government’s Role

Before turning to specific policy responses, we first discuss the underlying basis for government involvement in development decisionmaking. Most policymakers and analysts agree that government action should not displace private sector responses to redevelopment obstacles, so long as the market produces a fair allocation of risks and rewards to development actors. In this section, we argue that increased availability of insurance products and entry of new types of developers and lenders to brownfield redevelopment, represents a market response to brownfield problems and opportunities. But the “reach” of the market is not complete. State and local action still is needed, particularly in smaller markets where public officials, developers, and bankers lack a clear understanding of environmental issues, or on projects too small to benefit from insurance or public subsidy.

Insurance Products and Other Private Risk-Reduction Strategies. When considering project investments, developers weigh various kinds of risk against the value of expected returns. The higher the risk of the investment, the higher the return required to make the investment worthwhile. Unfortunately, brownfield sites suffer competitive disadvantages that make high returns unlikely. Methods that reduce the risk of brownfield redevelopment, thereby reducing developers' required returns, helps improve the attractiveness of brownfield alternatives relative to low-risk greenfield sites.

A growing number of insurance carriers have begun to offer environmental insurance to site owners to protect against environmental liabilities stemming from real or perceived risks. By capping the amount of remediation costs borne by the insured, insurance policies can help smooth transactions and promote brownfield reuse by bringing certainty to project financial projections. Policies offered include:

- *Environmental remediation insurance*, covering site investigation, defense, and remediation costs that pertain to unknown, pre-existing, or new conditions. Some policies cover contaminant migration onto adjoining sites. Typically, remediation insurance policies only cover releases that pre-date the policy, but which are discovered after the policy is written. However, insurers offer policies covering some types of contamination caused after policy purchase. Some policyholders name lenders as an additional insured, to provide them with cover in the event of foreclosure.
- *Stop-loss coverage* which protects owners against costs that exceed those projected in an approved remediation plan. These overruns can occur because of unknown site conditions, changed clean-up standards, or contractor errors and omissions. The company and the insured agree to a "stop-loss" amount, which includes estimated remediation expenses plus an additional amount for over-runs. (The later figure serves as a type of deductible.)
- *Pollution legal liability insurance*, which covers liability to third parties for off-site injury, property damage, and cleanup costs caused by migrating contamination. Most policies also cover pollution that occurs from incomplete or improper remediation activities at a site. (This type of insurance can reduce the types of risks that typically fall outside the purview of State voluntary cleanup program assurances.)

Insurance has great *potential* to increase the level of brownfield reuse activity in many areas; however, insurance companies have not yet become standard players in brownfield redevelopment projects. Several insurance brokers viewed as leaders in this arena have in fact

written only a few dozen brownfield policies; some of them have not yet had to deal with a claim. The “reach” of the insurance industry is limited because the actuarial track record for brownfield issuances is short, coverage minima and premiums are high (as much as one-third of the total coverage), policies often contain a number of “caveats”, which limits their practical effectiveness (e.g., excluding re-openers from coverage.) and brownfield sites may be caught in an insurance “catch-22,” where insurers want an approved cleanup plan in place before issuing a policy, but insurance is needed at an earlier stage to secure the financing necessary to carry out cleanup and redevelopment.⁹ For these reasons, insurance products usually are appropriate only for large-scale redevelopments.

However, the industry appears to be extending its reach to a broader market, although analysts do not believe that market saturation will take place anytime soon. First, insurers see increasing demand from developers in communities that emphasize brownfield redevelopment and in States with voluntary cleanup programs. Public redevelopment efforts may have helped stimulate project redevelopment and insurance demand, while creation of effective legal frameworks has helped reduce uncertainty, thus reducing the cost to cover remaining risks. Second, insurance is becoming more affordable, as premiums for several types of coverages are dropping. As a result, the minimum project size needed to support the cost of coverage also is dropping (from “mega projects” to those in the \$3 -- \$5 million range). Also, coverage maxima have edged up, and some companies have considered policies of \$50 million or more. Third, new products are emerging. New portfolio coverages may spur developer interest in undertaking multiple sites, and some underwriters are thinking about portfolio policies for municipalities, to cover city-owned properties.

In addition to the emergence of a niche environmental insurance industry, other actors -- investors, risk management companies, developers, and others -- have begun to specialize in brownfields remediation and clean-up. By capitalizing on superior knowledge of environmental issues and urban redevelopment strategies, these parties have identified substantial economic opportunities where others have not. In Pennsylvania, Minnesota, and Oregon, for example, we came across private developers who “collect” brownfield sites for eventual redevelopment. National venture capital firms also have begun to move into this arena.

In sum, the private sector has found ways to mitigate environmental risks on some brownfield properties without direct public intervention in development decisionmaking. Our premise is that government should supplement, but not replace, these efforts. At the same time,

⁹ Some of the following are based on an EPA first-time survey of insurers about their environmental policy activity, conducted in early 1996.

there are certain markets and some types of projects that are relatively isolated from these positive market trends. Therefore, the public sector continues to play a vital role in supporting redevelopment in these circumstances. However, the public sector cannot ensure that *all* brownfield properties are redeveloped. Assurances on liability, however important, cannot resolve the cost issues that we've shown to be important in hampering development efforts. Nor does government have the money to subsidize every project that doesn't meet a market test.

A clear consensus has emerged among economic policy analysts that public sector economic policies and scarce redevelopment subsidies should encourage business formation, expansion, and attraction in sectors that build on local competitive advantages. Implicit in this view is that actors in private markets sometimes fail to realize profitable opportunities without government support. This support consists of government: (a) creation of the basic legal frameworks for private sector decisionmaking, (b) actions that encourage market formation, and (c) information and capacity-building activities.¹⁰ This means establishing basic assurances concerning clean-up liability, subsidizing investments that help make markets, and extending technical assistance and disseminating information that helps build local capacity to seize brownfield opportunities. We assess each of these areas of public sector action according to common policy analysis criteria: Are policies effective -- do they accomplish what they intend? Are policies efficient -- do benefits bear a reasonable relationship to costs? Are policies fair? Do they allocate benefits and costs equitably?

In this research, we did not set out to review the full range of public policies by each of these criteria. Had we done so, we would have adopted a different research approach. Rather, our task was to answer the basic questions covered in Chapters 3 and 4: how important are environmental issues, and which of environmental issues matter most? Nevertheless, our field investigations proved to be a rich source of insight into the strengths and weaknesses of alternative State and local policies. In the sections to follow, we draw on our field research to draw policy conclusions, which are noted in italics throughout the text. The reader should be cautioned that *these are inferences from exploratory research conducted for a purposive sample of developments. As such, conclusions should be treated as tentative, pending further study.*

Evaluation of Government Response

The Basic Legal Framework: State Liability Assurances

¹⁰The underlying rationale for all of these policies is the government's role in resolving problems of collective action, in which individual actors, each making the best deal for themselves, makes the collective prospect worse. The classic example is the community of shepherds that overgrazes the commons because each Shepard strives to increase the number of his own sheep that graze there.

Basic legal frameworks consist of the statutes and regulations that establish the rules of the game within which redevelopment transactions take place. Of primary concern in brownfields redevelopment are State assurances that affect the legal liabilities of redevelopment actors for remediation of contaminated sites. Questions of effectiveness, efficiency, and fairness include:

- Does the legal framework for ownership, transfer, and redevelopment of contaminated sites protect public health and safety? Remediation standards should not discourage investment, nor fail to protect public health.
- Does the legal framework establish clarity in remediation standards and liability assignment and establish monitoring and reporting requirements such that transactions can take place relatively efficiently?
- Does the legal framework shield purchasers and lenders from liability for contamination that occurred prior to property purchase? Access to State programs should not be substantially different across metropolitan areas within a State, nor should State program charges or fees disproportionately impact on particular classes of property.

The most successful State voluntary clean-up programs are those with comprehensive statutory frameworks that strike a reasonable balance between goals of planned economic development and responsible hazardous waste site remediation.

State programs judged most successful by policy analysts mainly include States with older, programs with an established track record: Minnesota (since 1988), New Jersey (since 1983) and Illinois (since 1986). Other States, however, have embarked on considerable policy innovation recently, including creation of voluntary clean-up programs (e.g., Virginia), reform of existing programs, generally to clarify the level of assurance offered to participants, creation of fee-for-service reimbursement for State assistance (Wisconsin, Maine), or linkage between environmental clean-up and economic development initiatives (Massachusetts).

Description of Programs in Study States

The Voluntary Investigation and Cleanup Program (VIC) in *Minnesota* is widely seen by developers and lenders in the Twin Cities metropolitan area and central and southern Minnesota as a valid way to bring certainty to the brownfield reuse process. In place since 1988, the program is unique among State voluntary cleanup programs in providing a menu of assurance levels to program participants, ranging from No Association Determinations, which provide complete

protection for parties not associated with site contamination to Certificates of Completion, available to parties once cleanup is complete.

Pennsylvania's legislative changes in 1995 expanded the range of acceptable cleanup standards for old industrial sites and extended liability protection to new developers and new owners of contaminated sites. The law scaled back cancer risk standards for non-residential development. The program allows site cleanups to meet "background" (ambient), "statewide health" (for residential or non-residential) or "site-specific" standards, depending upon cleanup costs, intended land use, geologic conditions at the site, and appropriateness of institutional and engineering controls. Additional flexibility is available to developers investing in Special Industrial Areas (SIA), under which a developer may be required only to remediate contamination that poses a direct threat to human health and the environment; The State may do further cleanup to meet long-term health standards. (SIA provisions deed-restrict future land uses.)

The Pennsylvania law protects property purchasers, developers, future users and owners, and utility companies working on-site during remediation from future liability, provided they do not contaminate the site further. The liability protection extends beyond possible future State intervention to include third-party contribution actions and citizens suits under Pennsylvania law. As with many other States, DEP has authority to re-open cases to require additional cleanup for cases involving fraud, discovery of previously unknown contamination, change in land use, new scientific information that reduces acceptable exposure levels; or availability and economic feasibility of new technology to remediate a site where institutional or engineering controls were used previously.

The *Oregon* Voluntary Clean-up Program (VCP) offers developers that fully implement a State-approved remediation plan a No Further Action letter, which declares the State's intention to forego any future action to pursue legal action on the site according to data available at the time of the remediation letter. Upon receipt of an application to the program, and agreement to pay the fee charged by the program, the OR Department of Environmental Quality assigns a project manager to manage the State's role in project implementation. Although the State's letter does not offer hard protection against Federal action under CERCLA, it virtually precludes a re-opener by declaring a State's disinterest in further action on the site.

Virginia's voluntary cleanup program significantly changed as a result of House Bill 1847, passed by the General Assembly in 1995. In the interim before approval of regulations, the Department of Environmental Quality (DEQ) has operated a stopgap program to allow application of the statute. The statute mandates cleanup standards that are site-specific, risk-based, and no more stringent than Federal cleanup standards for soil, groundwater and sediments. The

standards also must take into account future land use, and surrounding properties, reasonably available cleanup and detection technology, available institutional or engineering controls, and the natural background levels of hazardous constituents. The statute authorizes DEQ to provide a “certification of satisfactory completion of remediation” stating that no further action is necessary to clean up existing contamination.

Effectiveness of State Interventions.

In Chapter 4, we examined the relative weight of remediation cost and clean-up liability concerns and concluded that developers most often cited cost as a critical constraint to their ability to redevelop projects, and that where liability issues were significant, this occurred in combination with other critical factors. States have responded to cost issues by adopting land-use-based clean-up standards and allowing institutional and engineering controls that stop short of full remediation. They also have moved forward with programs that assign liability clearly to buyers and sellers and otherwise offer developers assurances that the risk of future cleanup costs are small. We cover these two issues -- standards and remedies and liability -- in turn.

Standards and Remedies. Policymakers have attempted to reduce the cost to redevelop brownfields by adopting variable environmental clean-up standards tailored to health risk, land-use, and geological and other technical circumstances. In Pennsylvania, State officials believe that the new three-tiered clean-up standard has prompted new developments to participate in the State’s VCP. However, the program’s applicability to existing and *future* brownfields has alarmed some stakeholders opposed to relaxing cleanup standards for pollution caused at future developments.

Our cases suggest that reduced mitigation standards for industrial projects can accelerate brownfield redevelopment for this use. As discussed in Chapter 4, cleanup costs are more often significant to industrial redevelopment efforts compared to other project types. We believe that compared to commercial projects, industrial project demand is more predictable over the long-term, projects are more likely to be self-financed, and profit margins tend to be lower, thereby increasing the sensitivity of individual deals to initial costs.

The Pennsylvania program allows different remediation techniques depending on the level of risk and costs of clean-up. Fencing, capping, and other technical fixes that do not fully remediate the contamination discovered rely on continued monitoring to ensure that the original condition has not worsened, and that institutional remedies have effectively contained further site degradation and prevented human exposure to contaminants remaining at the site.

We did not collect data on the use of institutional and engineering constraints (fencing, capping and the like) to control pollutants. Different States permit more or less frequent use of these methods, and may treat fencing and capping as more or less permanent solutions. We also have no evidence on policing of institutional constraints or maintenance of deed restrictions or easements to handle remaining contamination. But where there appeared to be relatively little fear of future changes in environmental requirements *institutional controls can reduce site preparation time and speed project timetables, thereby encouraging redevelopment for industrial use*. Further, we found no evidence that site mitigations to land-use-based cleanup standards created problems for developers. Reduced property value or marketability associated with land use restrictions tied to mitigation levels did not arise as a significant concern in this study.

Clearly, developers regarded lowered cleanup standards as more-or-less permanent. Developers in our sample did not express fears of re-openers due to changing standards or remediation technologies. Equally clearly, both variable remediation standards and use of institutional controls may prove of only temporary value *if* cleanup standards and treatment requirements change. Most State regulatory programs to accelerate brownfields reuse allow "reopeners" of previously-approved environmental treatments if human health standards become stricter, or new technologies allow cost-effective remediation where institutional controls were once used. Of course, Federal action remains possible regardless of State intervention.

To be effective over the long haul, both variable standards and institutional remedies require active monitoring on the part of State government, local government and environmental groups. Because of their superior constitutional and legal status, as well as the technical resources available to monitoring agencies, States will remain the dominant actors in ensuring property owner compliance. Therefore, State capacity to monitor those who have received some form of assurance is a major policy concern. The potential fragility of State funding for environmental programs, and the consequences of inter-state economic competition heighten these concerns.

State budgets have proven resilient throughout devolution of Federal responsibilities, but funding levels have not yet been tested by national recession. However, even in our limited study sample, we have an instance of recent sharp cuts in environmental agency budgets (Virginia). State ability to monitor remedies already in place could be compromised by budget cuts that stem from changes in political leadership. Pennsylvania offers one back-stop to this eventuality: the Land Recycling program allows municipalities to request information on developer cleanup and redevelopment plans if they entail cleanup to less-than-pristine standards. Municipalities and citizens groups can request monitoring results from the State for these properties, a back-up "compliance" strategy and source of pressure to fully fund State compliance activities. As another

example, Ohio requires random audits of cleanups featuring institutional and/or engineering controls. Such audits may miss some problems, but this technique may become more widespread as State monitoring responsibilities expand.

“In Oregon, there’s a backlog. Maybe we can decrease their [DEQ] budget even more to backlog them even worse where only one in a thousand gets nailed. If they have plenty of tax dollars to work with, it’ll be one in a hundred. More tax dollars available, it’ll be one out of ten who get nailed. So our only salvation at this point in time is to limit the amount of dollars they have to work with.”

---- Business Owner [Hoping to Avoid State Scrutiny]

State economic competition places another source of stress on State ability to establish and enforce adequate environmental standards. On the one hand, inter-jurisdictional competition has proven to be a source of efficiency and innovation in the U.S. economy (Kenyon, 1993). On the other hand, inter-State competition for investment and jobs has put considerable pressure on legislatures to relax public health, occupational safety, and environmental protection standards, as well as income and business tax rates. In addition, examples abound of inter-State bidding wars for high-profile firms seeking packages of capital subsidy, tax relief, and worker training incentives. These incentive packages have often been criticized, both before and after the fact, for their inability to generate economic and fiscal returns commensurate with their cost. *In the absence of a Federally-mandated floor on environmental standards, pressures to relax these standards below those required to protect human health are likely to be intense. These pressures stem from both fiscal stress on State budgets and inter-State competition for investment.*

Assignment of Liability. The second issue tied to the effectiveness of State voluntary cleanup programs is assignment of liability, and in particular, the clarity of the assignment and where assignment falls. Again, Pennsylvania illustrates an effective program. Pennsylvania assigns all liability for past contamination to the seller of a property, including contamination discovered up to the point of sale. After property transfer, any further contamination, either created or discovered, is the responsibility of the purchaser. The Pennsylvania program creates, in effect, a “fearless buyer,” whose risk is limited to future acts of contamination (over which he has some control) *so long as the site assessment is thorough and accurate: the buyer has every incentive to ensure that all contamination on a site is detected and removed.*

A related issue is whether the costs of these assessments are significant enough to deter redevelopment, especially when proposed projects are small relative to the costs of assessment. We found that developers were seldom deterred by the cost of a Phase I assessment; these did

not pose costs that were significant relative to the scale of proposed investments. Although Phase II and Phase III studies can cost substantial sums, these costs mount with redevelopment project scale or extent of contamination and essentially are rolled into the costs of cleanups. Nevertheless, *we conclude that public support for site assessments, if conducted on an area-wide basis as part of a property marketing strategy can help defeat general misperceptions of redevelopment areas as contaminated throughout.*

Efficiency of State Interventions.

Our research strategy did not accord high priority to an investigation on how efficiently State programs operated, but we did encounter a number of relatively efficient and inefficient practices. As noted in Chapter 4, the process of obtaining approvals, clearances, permits, and other actions from State and local agencies ranked as a major frustration to developers. Some aspects of State programs can foster speedy completion of development deals, or hamstringing the process. We discuss two issues of efficiency here: the pace of environmental approvals, and the relationships among agencies.

Pace of Approvals. Oregon approvals of remediation plans can take as long as six -to-ten months according to developers of sampled projects, producing an incentive, especially among smaller developers, to avoid the regulatory framework altogether. (Oregon's fee structure contributed to this effect.) Further, some financial institutions invested in brownfields prior to availability of the State's No Further Action (NFA) letters, which afforded lenders a degree of comfort not previously available. The NFA quickly became the new standard, even though the State cannot (or need not) ensure that all projects that request a letter can get them quickly. In the past, some developers used environmental consultants to guide them on needed cleanup actions, and lenders accepted consultants' opinions in their loan review process. Now, a consultant's opinion *and* the State's letter are needed, even though the same level of cleanup has been attained.

Therefore, excessive processing time not only introduces inefficiencies into the development process, but can render the program less effective as an aid to redevelopment. In contrast, participants in the Pennsylvania Land Recycling Program (introduced after our sampled projects were undertaken) appear to value the law's "default approval" process, whereby site remediation plans receive automatic approval if DEP fails to respond to submissions within 30 to 90 days. Nevertheless, *default approval mechanisms can break down if budget cuts erode State agency capacity to process the volume of requests within the mandated review period.* (Fee for service schemes can help overcome this problem, but they must be structured appropriately; see below.)

Relationships Among Agencies. Our interviews suggested that the Pennsylvania's decentralized administrative structure conveys advantages in coordinating project-related activities across agencies. Both the Department of Environmental Protection (DEP) and the Department of Commerce (DOC) have regional offices that operate with considerable autonomy, with authority to act on behalf of the State without detailed instruction from Harrisburg. Furthermore, local economic development agencies, prominently including regional and local industrial development authorities, have a long history of providing grants and loans for site cleanup. The authorities typically cover multiple jurisdictions, thus helping overcome the fragmentation among governments that complicate developers' ability to obtain approvals quickly.

As Chapter 4 alludes, a long industrial history and a relatively long history of industrial site redevelopment helps incubate sophisticated local "systems," in which multiple parties to redevelopment understand both the economics of urban project development and the legal framework of environmental protection. We suspect that one reason the decentralized Pennsylvania system works so well is the broad distribution of legal and technical capacity throughout the system. A new "culture of cooperation" among agencies appears important to the smooth functioning of this arrangement, according to officials and developers interviewed for this research. This attitude of assistance appears to be at play as well in Minnesota, at least among the major actors engaged in brownfield redevelopment in the Twin Cities metropolitan area, and is evident in Portland, as well. This kind of cooperation cannot be mandated, obviously, but new forms of partnership (some fostered by USEPA's brownfield pilots) appear to have made a difference in a number of States and localities.

Fairness of Public Interventions.

Mere existence of a State voluntary cleanup program does not guarantee that barriers to brownfields cleanup and redevelopment will be lowered uniformly as a result. Our field research showed the expected disparity in how developers understand the application of the State program to their projects, depending on their location in the metropolitan areas of Portland, Minneapolis, Pittsburgh and Northern Virginia versus the States' more isolated towns and cities. As noted in Chapter 4, rural lenders in Oregon sometimes demand that developers present them with a letter of assurance from the State covering future liability for contamination, even though the State is unable to produce such a letter under its program. In Minnesota, longtime mining towns such as Duluth are known to downplay the very existence of brownfields, much less welcome participation in the State's program despite its many assurances against future liability.

This unevenness speaks to the adequacy of government response to the brownfields issue as it is experienced by a range of locales; namely, the need for additional educational and technical assistance to municipalities lacking the local capacity to move brownfields sites forward. Moreover, some State policies can produce disadvantageous impacts across types of development of regions of the State despite their apparently neutral character. For example, Oregon's fees for service can discourage small developers from participating in the voluntary clean-up program, even though State officials claim that fees rarely amount to more than 10 percent of a project's total cleanup costs. Oregon's fee structure, as in many other States -- based on staff hours spent on review -- can disadvantage smaller projects, or those more dependent on cost-certainty. Virginia's new program relies on more modest fees; the lesser of \$5,000 or one percent of the cost of remediation.

Federal, State, and Local Roles.

The question of the appropriateness of Federal involvement poses a special dilemma in brownfields redevelopment. Threat of Federal involvement through CERCLA enforcement action remains a driving force behind State efforts to bring cleanup authority "in house," in effect removing any practical role for Federal officials. Yet, as the study sample shows, States have embraced this opportunity in a variety of ways and under differing economic, political and regulatory constraints. We saw how a State with a well-oiled program, such as Minnesota, can take a leadership role in establishing the confidence and certainty developers, lenders, and business need; use of the program is second nature for projects in the State's major metropolitan markets. At the same time, lack of developer participation in programs in Minnesota's and Oregon's smaller cities speaks to the powerful influence of local perceptions in discouraging strong links between State regulators and private investors.

Nevertheless, cleanup and redevelopment of brownfields is best left to the States and local development agencies, which are closer to local development issues. However, State administration is sometimes vulnerable to policy change: in Virginia massive staff cutbacks in the State environmental agency caused confusion about implementation of a number of hazardous materials programs, including the brownfields program. At the same time, legislative and gubernatorial interest in joining other States creating or improving voluntary cleanup programs signaled to private developers how State regulations might evolve. But despite expectations that the State would offer assurances on liability protection, cleanup standards and other matters, the private sector declined to participate in the State's "stopgap" voluntary cleanup program, leaving dozens of projects on the sidelines awaiting final regulations.

Considerable within-state variation in local capacity, the effect of Statewide policies, and the vulnerability of standards and enforcement to erosion from budget cuts and inter-jurisdictional competition point to a Federal government role in helping States run effective programs and assuring fairness within and between States. *Appropriate Federal roles include: providing guidance on contamination cleanup standards geared to accepted land use scenarios, encouraging regulators and private parties to explore linkages between the local project needs and regional transportation, land use, air quality, economic development and social concerns; helping with public involvement and community support strategies; and providing guidance on existing Federal technical or financial aid to redevelop brownfields.*

Government involvement in brownfields should similarly reflect the need to link the extensive resources and expertise that have built up around the traditionally disconnected disciplines fostering environmental protection, economic development and urban revitalization. Acknowledging that government resources will always constitute a minority share in the total needed to return these sites to productive use, the appropriate government role should be to maximize the ability of local players to draw on a range of programs, or upon a State's willingness to provide regulatory flexibility, that could assist in the planning, permitting, financing, remediating or redeveloping phases of brownfield projects.

Strategies to help local players work through the brownfields regulatory process could build on models adopted by successful localities employing systems to: prioritize project selection and investment based upon environmental needs and economic prospects; establish dependable networks involving project coordinators, State oversight officials, community representatives and other parties affected by the project to ensure open communication and time line adherence; ensure that State programs are responsive to information requests by assigning case managers to projects; coordinate early in a project's life at the upper levels of the State bureaucracy to reach agreement on the project concept as it is understood by all affected players, the timing for its completion, and a schedule of objectives; and to formally recognize the many State and local authorities that will need to participate and assist the project by employing a formal management/development team.

State Redevelopment Policies

Our findings from the field research that non-environmental barriers to urban redevelopment posed critical constraints argues for renewed attention to the role of State and local economic development agencies as providers of project subsidies. In view of the scarcity of redevelopment resources, we believe that policies and programs to encourage rapid *building of incipient markets* should have priority over less targeted forms of assistance. Government-

supported investments are needed to demonstrate market demand, encourage multiple and simultaneous investments that “make markets,” or pursue redevelopment that *removes imminent threats to public health*. Questions of effectiveness, efficiency, and fairness include:

- Do public investments in economic development encourage public actors to take on redevelopment efforts that make markets? Alternatively, are departures from this standard justified by health and safety concerns?
- Do economic development programs appropriately value the subsidy invested in physical redevelopment, including remediation? Both over-subsidization and under-subsidization (short of what’s needed to make an investment viable) are inefficient. Important to this determination is calculation of all sources of public subsidy -- including transportation, infrastructure development, direct capital, labor market, and other public investments.
- Economic development policies and programs similarly should be allocated to regions within States commensurate with their potential contributions to market development. Fairness also implies that claims for investment on grounds of public health should have a status competitive with genuine claims to build markets.

As used throughout this section, “economic development” policies will refer primarily to capital subsidies to development, although we discuss briefly the effect of regulatory incentives to brownfield development. Capital subsidies typically are proffered to developers to offset extraordinary infrastructure costs, make up for a temporary lack of effective demand, or absorb the extraordinary risk linked to untested markets. These subsidies can come in the form of outright capital grants, discounted loans, or tax relief. Further, subsidies can be specially targeted for brownfields assessment or cleanup, or can be generally available to development projects, regardless of the degree of contamination.

Not included in our discussion are public marketing and other programs that are not project-based; much of our analysis is based on review of particular development deals. We also ignore, for the most part, job training programs; even though these can be linked to specific developments. none of our sampled projects benefited (to our knowledge) from the availability of training program graduates. Finally, we treat economic development programs primarily as they apply to commercial and industrial real estate redevelopment.

Description of Programs

Each State in our four-State sample displays unique program features, but otherwise share common development tools. All States, for example, administer private-purpose tax-exempt bond programs that make project capital available at a modest discount over market rates. Each State also has HUD Community Development Block Grant (CDBG) money available to it, should it choose to allocate some or all of these funds to economic development purposes. Each State also has a State enterprise zone program that predates the HUD- and USDA-administered programs (in urban and rural areas, respectively). Larger jurisdictions within States (principally, counties over 200,000 population, and central cities over 50,000 population) have their own pool of CDBG funding. Finally, each State has the constitutional authority to appropriate funds for development projects, confer taxing, regulatory and spending authority on local jurisdictions, and authorize creation of special purpose development authorities.

Nevertheless, each State has adopted a different mix of taxing, spending and regulatory programs, and allocates them to different ends. Pennsylvania and Minnesota both manage a fairly complete inventory of programs, including use of State-appropriated funds for development. In addition, they are among the only ten States in the U.S. that offer subsidies specifically for clean-up of previously contaminated sites. These “brownfields” efforts supplement other State economic development programs that are available to both contaminated and uncontaminated sites. Oregon operates State programs for economic development, but they are not funded at Minnesota or Pennsylvania levels. Virginia has no established economic development effort, but offers subsidies through legislative action for major projects on a case-by-case basis.

Effective Redevelopment Policies.

Are economic redevelopment policies a successful stimulant of private investment in local markets? Our pre-eminent criterion of effectiveness for economic development policies is whether public action has successfully jump-started privately-financed economic activity. In other words, has assistance made markets? We draw three conclusions from our research. First, in our four study States, one policy has clearly had a major stimulative effect on the competitiveness of brownfields properties -- Oregon’s controls on urban growth, which reduce the effective demand for greenfield sites. Second, because growth limits are not currently a practical option for most States and localities, targeting of subsidies to areas and projects can help concentrate funding in ways that encourage market formation. Third, coordination among programs as a policy response to issues raised by developers frustrated by confusing layers of development and environmental agency involvement can help improve the effectiveness of programs. We discuss these issues in turn.

Growth Limitation. Our review of projects in Portland and Eugene show the clear effect of urban growth limits on the competitiveness of central city property. Under ordinary circumstances of relatively unrestricted development, such as obtains in the other three study States, close proximity of greenfield to brownfield sites would diminish the competitiveness of brownfields substantially. Our evidence from projects in Central Pennsylvania and suburban Minneapolis is convincing on this point. Oregon's statutory restrictions on growth, however, effectively close proximate greenfields from industrial development. As urban growth limits set in the 1970s are reached, and the price of developable greenfield parcels rises substantially, demand for previously developed urban land increases, as well.

Statewide growth limits face obvious political hurdles, even under the best circumstances for adoption -- States with hot metropolitan real estate markets. Local policies to protect open space or agricultural land also have been implemented in such markets; Montgomery County, Maryland, in the Washington, D.C. suburbs is an example. However, few cities with large numbers of brownfields in need of redevelopment are blessed with the right combination of political and economic environment to make growth controls work. However, a more limited form of growth control that builds on existing land use regulations may have more promise -- "transferable development rights," which introduce market flexibility into land use planning. Owners of protected open space may sell their right to develop property to others who wish to build to above-permitted densities elsewhere. (See Johnston and Madison, 1997.) The resulting "clustering" of development helps check sprawl. In the long run, however, as available development rights are exhausted, the resulting limits on development parcels may heighten demand for previously-used sites.

Subsidy Targeting to Areas and Projects. Concentration of funding can be a way to increase the payoff from subsidies by stimulating demand for properties where subsidies are available. *Local economic development agencies often designate areas within their jurisdictions for priority redevelopment aid. Most often, these areas are so large that the effects of multiple public investments are diluted, and do not stimulate growth local sub-markets effectively.* Where investments appear concentrated, they often result from "project" designations to areas that have unique development potential. In one city, for example, a former mill site along a major river contained a number of potential redevelopment sites, comprising a brownfield industrial park. In this instance, initial investments can be expected to lead to other, supporting investments. But on balance, we did not find concentrated area investments to be a principal feature of local economic development initiatives.

As noted above, development assistance may be targeted to brownfields, even labeled as such, or may be available to all development proposals that meet basic eligibility criteria. Both

Pennsylvania and Minnesota operated programs with explicit targeting to brownfields. Pennsylvania's Industrial Sites Reuse Program is restricted to brownfield sites with suspected or known contamination problems. As an example of agency linkage, applications are jointly reviewed by the State Departments of Commerce and Environmental Protection. Other State programs take explicit account of brownfields remediation needs, but do not accord them priority. For example, site assessment and cleanup costs are eligible expenses under the State's Infrastructure Development program, otherwise limited to typical public infrastructure investments. Finally, the State's Economic Development Set-aside Program to aid manufacturing enterprises nowhere references brownfields explicitly, but the program's targeting of distressed areas in the State may have an indirect brownfield targeting effect.

Should economic development subsidy be "earmarked" for brownfields as an effective way to deliver subsidy to this class of property? We discuss this issue below. Should economic development subsidy be earmarked for contaminated sites, or be made generally available to brownfields? We argue that subsidies should not distort local choices on which investments are likely to yield the best public returns. Contaminated sites should receive preference only in cases of imminent threat to human health; in effect, the rationale for Federal Superfund site remediation. To do this, State economic development assistance programs should be packaged together with environmental programs under a "brownfields" umbrella. Pennsylvania has done this with their new Land Recycling Program. This ensures that State DEP reviews can help identify highly-impacted project sites. It also ensures, following our discussion in Chapter 4, that needed guidance through the environmental regulatory process is closely linked to financial aid.

In every State, we sampled projects that received deep State or local public subsidies for redevelopment. In no case were these subsidies extended solely, or even primarily, to offset remediation costs. Rather, subsidies were extended to absorb the risks of a highly uncertain market (a Pennsylvania market-rate housing project) or compensate for high land acquisition and site preparation costs (a Virginia corporate headquarters expansion). By absorbing the "uneconomic" portions of a project, the public sector implicitly absorbed a share of the remediation risk on these projects, as well, rendering these concerns less important to developers and lenders than they otherwise might have been.

Finally, what activities should be subsidized? Findings from Chapters 3 and 4 suggest that general economic development subsidies designed to overcome either extraordinary costs due to remediation, compensate for soft or uncertain market demand, or both, are an important factor in promoting site re-use. Assistance specially-targeted to site remediation, for example, would not appear to have much added payoff over subsidies intended to offset other extraordinary costs. Furthermore, Chapter 4 found that site assessment costs seldom posed a deterrent to

redevelopment among our sampled projects, although the Chapter also notes reasons why we may have underestimated the effect of this factor. Therefore, *special programs to compensate developers for initial site costs would not appear to merit high priority in assistance program design. The major exception to this rule, however, is the use of assessment assistance in development area promotion.*

Program Coordination. As Chapters 3 and 4 make clear, economic development subsidies were important contributors to successful redevelopment -- “critical” in 10 of 28 completed projects. As we noted, the combination of economic development assistance and help navigating the regulatory process tended to go hand-in-hand. Two forms of coordination appeared to be important in our sampled cases -- coordination: (a) between economic development and environmental protection agencies, policies, and programs (discussed above), and (b) among various economic development programs, including programs available to all types of development and those targeted for brownfields sites.

Coordination among economic development programs can be achieved through State-level program packaging or through sub-State administrative mechanisms. Examples of the former include single application packages for multiple programs, thereby placing the coordination burden -- selecting among economic development subsidies, regulatory waivers, and other tools -- on State officials. Most States, including those in our sample, rely on agency staff to play this role to some extent, but this role is not formalized in our study States.

More common are coordinating roles played by sub-State agencies. Pennsylvania law authorizes counties and municipalities to create Industrial Development Authorities (IDAs) with power to acquire land, issue bonds, access State development program grants and loans, and conduct other economic development activities. Together with municipal agencies, the IDAs constitute the State’s economic development planning capacity. In effect, “market-making” investments are the responsibility of sub-State agencies. In this respect, Pennsylvania resembles most other States.

Development Program Efficiency.

We define efficiency in terms of the public benefits in relation to costs. Especially low pay-offs relative to investments can result if individual projects are over- or under-subsidized or subsidies are allocated to projects that yield lower returns than other possible investment.

We found several examples of projects that were over-subsidized relative to their potential returns due to over-lapping investments made by multiple jurisdictions. We also found projects

that were over-subsidized because political considerations dictated additional investments even after initial project failure. We also found projects that were insufficiently subsidized, thereby risking loss of the initial investment due to insufficient capitalization. Admittedly, economic development underwriting is inexact. Nevertheless, we found clear examples in which underwriting was done badly, or hardly at all.

More serious inefficiencies result from subsidies to the “wrong” projects. Of special concern to this research are instances in which public agencies subsidize greenfield redevelopments. We posit that unless there are payoffs from greenfield investment that meet stringent tests for public benefit, and most do not, brownfields redevelopment almost always represents a superior investment. We argue this based on the criteria introduced above: public investments should be geared to making markets or meeting imminent threats to human health. Greenfield subsidies do this only on rare occasions, insofar as they already are the location-of-choice for new manufacturing, commercial, and residential development. We detected examples of this kind of misallocation in our study sites. One pertained to investments made by a county-wide development authority in greenfield industrial parks, despite the availability of proximate brownfield sites. Another concerned a State’s planned investment in a high-profile sports facility. (In economists’ view, such investments almost always produce meager returns.)

Federal, State, and Local Roles.

In the economic policy arena, Federal, State, and local governments play well-established roles. The Federal government makes subsidies available to State and local governments, but imposes few restrictions on how these funds may be spent. States play more active roles with respect to their localities, but usually only on large projects. In practice, most economic development strategies relevant to brownfields redevelopment are crafted and implemented by local government. This pattern is highly unlikely to change in the foreseeable future.

Major Federal investment subsidies to States include State Community Development Block Grant funding and Federal housing block grant funding (HOME) administered by the Department of Housing and Urban Development, allocations of authority to issue tax-exempt private-purpose bonds and allocations of low-income housing tax credits, administered by the Treasury Department, several small economic development programs administered by the Department of Commerce, and highway and mass transit funding from the Department of Transportation. In some programs, Federal statutes limit the incomes of persons who hold jobs or occupy housing units supported by the program, but no program has an effective spatial targeting provision, including provisions to encourage land redevelopment.

Similarly, Federal support to localities involving some of these same programs do not specify that depressed areas within jurisdictions must receive aid (although HUD programs tend to be used that way by cities and urban counties), or specify the kinds of activities that must be supported. In addition, State governments tend not to establish strict area targeting policies, although they do appear to adopt “categorical” forms of assistance in which project purposes are more rigidly specified. Repeating a point made above, development strategy decisions tend to be made locally.

Re-definition of the Federal role in economic development is not a likely prospect. In the context of this research, the Federal government could promote more efficient programs through more aggressive targeting provisions. Tax-exempt revenue bonds are an especially good candidate for this approach. Recent changes to the national highway funding legislation has sharply cut-back use of funding for highway capacity expansion, a practice that tends to encourage greenfield investments. More explicit linkages between HUD and DOT local planning requirements could influence investment allocations within metropolitan areas (although these probably would have little influence on State policies). *Direct Federal support for economic development policies and programs makes little sense, however, unless framed as explicit demonstrations of programmatic approaches that yield information not widely available to practitioners through other means.*

Information, Capacity-Building, and Networks

In this research, we found that local “systems” with established histories of urban land redevelopment understand environmental issues and have incorporated the costs and risks of brownfield sites into investment decisionmaking. We also found other, less-sophisticated, systems in which lenders, developers, and public agencies lacked the capacity to understand environmental requirements and act appropriately. This unevenness in local capacity to effectively redevelop brownfield properties pushes some investment onto greenfield sites, unnecessarily. It also hinders the development prospects of poorer or more isolated jurisdictions without a well-established cadre of economic development professionals. Moreover, although some systems as a whole may be well-versed in redevelopment practice, smaller developers and lenders within these systems may fail to take advantage of profitable redevelopment opportunities.

As outlined in the introduction to this chapter, government information dissemination can play an important role in the creation of conditions for economic growth. State and local governments do this routinely, through promotional efforts intended to attract investment, thereby broadly disseminating information on the locational advantages of their jurisdictions. We argue that this role can be effectively broadened to include efforts to support more enduring networks

among parties to re-development. This section discusses some of the potential roles public agencies can play to help make this happen. Questions include:

- Do public efforts to build capacity in the system ensure that major players understand the rules of the game? Are appropriate incentives (or removal of disincentives) sufficient to encourage public and private actors to cooperate in promoting redevelopment?
- Does formation of partnerships between public and private sectors to promote transfer of information about public policies and private demands and responses help reduce the transaction costs among the parties to redevelopment?
- Do Federal and State programs to build capacity contribute to the capacity-building underway in medium and small towns?

Effectiveness of Information and Capacity-Building Programs

Under most information and capacity-building programs, information on legislation, regulation, available government assistance, and so on usually is available from State government agencies, their local offices, local governments, Chambers of Commerce, industry trade associations, and others. In addition, industry groups and public interest organizations often prepare summaries of these materials for dissemination to their members, and on occasion conduct research intended to highlight successes and problems. As we note above, well-developed networks of these actors in more “sophisticated” cities have effectively built the capacity to undertake brownfields investments. Nevertheless, in view of the findings from Chapters 3 and 4 on the relative lack of sophistication among the players in some redevelopment markets, more aggressive State action is needed. We discuss three options for State and local efforts.

First, State or local subsidies for brownfields redevelopment can be linked explicitly to the public sector’s information dissemination role. In Chapter 4 we found that site assessment costs did not prove to be a major hurdle in the projects we reviewed. Nevertheless, some States and localities have offered subsidies for site assessment costs, to help ensure that project feasibility costs do not preclude some sites from consideration. If programs fund applications project-by-project, without attention to market characteristics, we are not convinced that such programs are effective. *We do, however, believe that publicly-funded assessment programs designed to sort properties within redevelopment areas into classes based on their degree of cleanliness, and making this information available to potential developers, can be an effective strategy for development promotion.* (Chicago has implemented one such program.)

Second, we have noted the critical role played by lenders in ensuring borrower compliance with environmental requirements at the time a mortgage is placed on a property. (We also noted the sometimes excessive risk-aversion of lenders in approaching potential transactions.) It appears that some areas in particular -- our "less sophisticated" systems -- are especially reliant on the lender understanding of environmental statutes, State regulations, and administrative processes. Therefore, we argue that specially targeted efforts to ensure that lenders are linked into networks of information dissemination and legislative and regulatory policy review is particularly important. This means working through major banks and banking organizations to disseminate accessible information on environmental and redevelopment policies.

"They just keep writing these regulations and piling it up on us normal people out here. They just go on forever. I'm not going to sit down and try to understand them. It gets too complicated. There's too many of them and they change all the time."

---- Small Developer (Oregon)

Moreover, we found evidence of a urgent need for technical assistance to developers. Most brownfields are redeveloped by relatively small operators, many of whom have limited experience as developers even if they operate successfully as manufacturers or in other lines of business. *Two forms of technical assistance are particularly important: guidance in project financial packaging (and which lenders to approach at different stages of redevelopment) and guidance in regulatory compliance, especially in dealing with the permits and approvals different levels of government require. The combination of these two forms of assistance is not readily available.*

In States (or areas within States) with more recent experience with contaminated site clean-up, system capacity must be built quickly. *We believe that training of economic development agency staff on environmental standards, remediation technologies, and liability issues is critical to effective links between economic development and environmental program implementation.* Economic development agencies have well-established program delivery mechanisms, methods of financing, political and policy justifications, marketing programs, and other assets that make them central to brownfield redevelopment efforts. These agencies usually have already-established cooperative relationships with national economic development funders on the one hand, and major industrial and commercial developers on the other. Therefore, as developers' point of entry to the State on subsidized development deals, economic agencies' abilities to underwrite projects in light of environmental requirements are critical to both the financial feasibility of projects and the protection of public health.

Third, both States and localities can take steps to bolster networks for redevelopment. There are a few, but promising, examples. The Chicago Brownfields Forum is a pioneering effort to bring together almost every local stakeholder in the city (including State agencies) to review problems and opportunities linked to industrial site redevelopment. Interchange among participants contributes to a collective understanding of issues confronting redevelopment, but participants, in turn, reach others in their relevant policy communities. Newer examples of continuing interchange among actors on this issue come from EPA-funded brownfields pilots. State policies to encourage these partnerships can be an important supplement to home-grown or Federally-supported efforts. Making subsidies available only to cities, counties, or county consortia that have established some form of economic development collaborative is one way to do this. (Similar efforts in the affordable housing arena have proven extremely successful.)

Particularly important are linkages between environmental and “non-environmental” programs. Based on our project sample, and as reported in Chapter 4, project developers often pointed to both economic development aid and help with the environmental regulatory process as significant facilitators to project development. Both State and local economic development and environmental protection agencies play critical roles in many urban redevelopment deals, but it is fair to say that in most States and localities, they do not have a long history of cooperation, nor an established mechanism of formal consultation.

Therefore, State governments should promote creation of regional partnerships, especially in less-sophisticated areas. But in view of their more limited financial, legal, and development resources, State agencies will continue to play a lead role in guiding parties through redevelopment efforts. The regional office structure of the Pennsylvania Department of Environmental Protection, discussed above, has won praise from actors interviewed for this study for its ability to provide guidance swiftly, particularly to areas of the State with fewer capable developers, lenders and public agencies. As noted above, these offices have a fair amount of discretion in reviewing and approving permits, allowing more rapid responses than would be possible if all approvals were handled centrally.

State and local efforts to promote linkages within sectors -- sometimes known as industrial networks -- have come to be known as “third wave” strategies. One of the most successful of these third-wave approaches is the Cleveland Advanced Manufacturing Program (CAMP). CAMP assists Cleveland manufacturers with modernization projects, providing business management services, and arranging environmental, financial, and human resource assessments, manufacturing skills training. CAMP is supported by the Federal government, the City of Cleveland, and the Cleveland Foundation, among others. We believe that this model for public

and private supported industry networks holds much promise as a model for collaborative efforts to redevelop brownfields.

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