Brownfield Redevelopers' Perceptions of Environmental Insurance: An Appraisal and Review of Public Policy Options

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Abstract

All real estate investments involve some risk associated with time and costs for construction as well as property market conditions. Brownfield properties, with past contamination concerns, pose greater uncertainties, associated with site conditions and market responses, and thus are far riskier than development on land without environmental quality concerns. Environmental insurance (EI), that permits risks to be capped or transferred to others, can contribute to a more effective and efficient market for brownfield sites, and thus to restraining the spatial segregation, underutilization of urban centers, and spatial expansion that has accompanied abandonment of suspect sites.

In this paper, we report on the results from a survey and interviews of brownfield developers on the role that EI plays in facilitating brownfield redevelopment. Our objectives were to add to the sparse body of empirical data on brownfield sites—providing information on both general characteristics of brownfield properties as well specific features of EI use—and to draw on this information to inform public policy and approaches to insurance use at brownfields.

We found that developers' EI utilization rates are relatively low, reflecting in part poor knowledge of the availability of the tool, but also potentially due to the exceptional cost of the risk transfers for smaller development projects. To the extent that EI is used, the most important coverages appear to be protections for losses due to business interruption due to onsite pollution, cleanup of previously unknown onsite pollution, legal defense costs, and reopeners due to future regulatory actions. Insurance appears particularly relevant at sites where high risk financing capital is used, off-site contaminant migration is likely, or institutional controls on future land uses are prevalent. It also appears more important to a developer for projects that provide new and exceptional investment opportunities, for those that threaten major impacts on the firm's reputation and financial health in the event of a substantial uninsured loss, or when the firm lacks adequate risk spreading across its investment project portfolio.

Local governments and nonprofit organizations can promote EI utilization through information dissemination, active intervention to promote risk pooling in local markets, and financial subsidies to developers for EI use. Community-based organizations similarly could use the EI tools for their larger projects and/or may be able to promote risk pooling in their neighborhoods.

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Brownfield Redevelopers' Perceptions of Environmental Insurance: An Appraisal and Review of Public Policy Options

1. Introduction

Land markets for previously used sites have suffered from owners' and redevelopers' fears of their possible environmental liability. In the absence of some knowledge about the history of the uses to which a given parcel of land had been put over time, all developed sites are somewhat "suspect" in environmental terms. The concern over possible contamination—perceived pollution—qualifies those sites as "brownfields." Redevelopment investors cannot rule out the possibility of some cleanup or containment expenses—and the possibility of inheriting other forms of environmental liabilities—without a site assessment.

The concern over exceptional risks associated with brownfields mostly originated with the 1980 Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA). Court rulings on the law have found that parties involved with a site can be held responsible for costs even if they did not create any contamination, and that any one party may be charged with all of the costs involved if others who might be liable do not have the financial capacity to pay.

Brownfield redevelopment has also been impeded since debt financiers have been reluctant to provide capital for redevelopment projects due to other loan risks. While 1996 amendments to CERCLA provided liability relief for lenders by clarifying actions they could take to avoid being classified as owners and/or managers of a brownfield, two primary concerns about lending on the properties remain relevant to decisions in 2002. First, a borrower's ability to repay a loan may be jeopardized if unexpected cleanup costs should occur, since those cost overruns weaken project cash flow and financial condition. Second, lenders fear that if they do have to foreclose on a non-performing loan, some remaining environmental problems might lower the value of their collateral, even if they, as simply sources of capital, are not liable for the on-site conditions.

The exceptional risks associated with brownfields have been addressed by private markets forces in the same manner as other risks: insurance has become available. In effect, some financial institutions (insurance companies) have come forward to accept the risks and uncertainties that other organizations are not willing to accept. The fees they charge cover their insurance underwriting costs, projected expenditures for claims, and an allowance for uncertainty in their estimates of both underwriting and claims costs.

The Environmental Protection Agency initially hailed the emerging availability of insurance as a major breakthrough in efforts to promote brownfield redevelopment (USEPA 1996). The actual rate of utilization of the coverages is below what the insurers might have hoped, and the policies have not had as broad an impact as was originally expected. Much of the brownfield redevelopment currently proceeding in the United States has, in fact, been undertaken without insurance and many private developers and local economic development agencies do not consider the benefits of the risk transfer

provided by insurance to be worth the cost of coverage. Despite this experience, many states and municipal organizations have expressed interest in developing insurance programs to promote brownfields, with programs already implemented in Massachusetts and Wisconsin and California initiating policy development in 2002.

This study is an examination of the attitudes of individual developers towards the different types of environmental insurance coverages available and their practices in using the protections. Our objective in undertaking the research was to use the private sector experience on the relatively large scale brownfields that have, to date, been the focus of most brownfield activity, to inform public policy and approaches to insurance utilization for the myriad small sites that constitute the lions' share of the 500,000 or more urban brownfields in the nation.

We proceed as follows in reporting our findings. First, we review the problems that the brownfield risks can pose for urban land markets in particular and urban regeneration more broadly. Next, we briefly review the liability concerns of developers and the ways in which those fears may have retarded their investment in brownfields. Prior to assessing developers' attitudes and behaviors, we outline the three major forms of environmental insurance and their potential contributions to risk transfer at different stages of the brownfield project process. We then turn to our survey of developers' usage of the different coverages and the findings of that specific empirical study. We conclude with an interpretation of our results and their implications for, first, the extent to which public and non-profit economic regeneration efforts should commit their limited resources to stimulating utilization of insurance, and, finally, some tools and approaches needed to most cost-effectively facilitate insurance-based brownfield project risk transfers.

2. Risk, Urban Land Markets and Insurance Potentials

From a public policy perspective, the specter of liability at contaminated sites and stalled cleanup and redevelopment has been a concern of municipalities since the advent of CERCLA (Wernstedt and Hersh 1998b). Overall, the "brownfields problem" has affected both the supply of previously used sites available for redevelopment and the demand for those sites by investors, thus weakening the market for regeneration and contributing to underutilization of available urban land assets (Meyer 2000; Wright 1997).

On the *Land Supply-Side*, the problems have reflected current owners' and possible past polluters' concerns in selling contaminated properties. As a result:

1. "Warehoused properties" are withheld from the market, even in prime locations, by major companies concerned about possible future liability claims, thus making area redevelopments in older industrial zones difficult to impossible for many municipalities.

2. Seller-imposed deed restrictions on conversions of sites put on the market to new uses (that may pose higher risk to humans) limit conversion of previously industrial sites to new, "higher and better" uses.

3. Sale prices demanded are above "real market values" since sellers, fearful of future liability claims, demand a *higher* price for brownfield sites to compensate them for their risks or in order to *de facto* keep their properties from being reused and thus exposing them to new liabilities.

4. Abandoned and/or tax delinquent properties may never be acquired by the public sector for redevelopment in municipalities in which state law does not require such foreclosures. Since many public bodies fear inheriting liability risks, such sites remain underutilized and historical patterns of spatial segregation of people and activities do not get addressed.

On the *Land Demand-Side*, problems relating to viability or profitability of brownfield utilization for new private sector uses have meant that:

1. Many developers are not willing to invest in brownfield projects due, in part, to the cleanup cost uncertainties and liability risks associated with entering chains of title for such sites, with or without state approvals or signoffs through "voluntary cleanup programs."
2. Willing brownfield redevelopers often have great difficulty in obtaining financing, or obtain debt finance at adverse terms, due to lenders' concerns about environmental risks and uncertainties.

3. The availability of capital from lenders may be restricted further by low property valuations in those instances in which the appraised values are reduced by allowance for stigma and other environmental risk-related factors, so vacant sites may remain polluted and idle.

The refinement since the mid-1990s of environmental insurance (EI) products for coverage for the exceptional risks associated with brownfields has the potential to significantly change the prospects for redevelopment efforts (Anderson 1998; Meyer and Chilton 1998; Neumann 1999; Yount 2000). In particular, improvements in access to environmental insurance among the smaller brownfield properties that permeate urban areas are critical. Such improvements offer an opportunity to redevelop tens of thousands of sites in distressed urban areas, revitalize neighborhoods, and address problems of spatial segregation, some of the brownfield redevelopment goals articulated by Congressional legislative proposals in the late 1990s (Wernstedt and Hersh 1998a). In fact, the new 2002 brownfields legislation expressly permits the use of federal funds for the acquisition of insurance coverages as a means of promoting redevelopment.

Public sector decision-makers already are increasingly aware of the possible roles EI could play and are considering its potential contributions to their brownfield programs. Institutional barriers on both the buyer and seller sides, however, have impeded the growth of this market (Yount and Meyer 2000): Local governments are ill-prepared to purchase tailor-made products that serve both risk management and economic development departments, and for which providers' bids would need to be made public in most procurement processes. On the other hand, there is a shortage of insurance brokers and agents who are qualified to structure EI coverages, and they have more than enough

business catering to large private sector client needs. Moreover, the local branches of major brokerages do not want to call in the specialists, since doing so would cut into any commissions that they could otherwise earn.

Clearly, the role played by environmental insurance in brownfield reuse has warranted more in-depth study so that its importance could be assessed relative to that of other tools employed to stimulate regenerative investments. Our objective was to fill this knowledge gap and to provide input to better public and non-profit sector decision-making about the utility of different insurance tools. To the extent possible, we pursued determination of the costs and benefits potentially associated with efforts to subsidize or otherwise stimulate employment of environmental insurance in brownfield redevelopment efforts. This study also constituted a logical next step in the brownfields agenda pursued by the Lincoln Institute in light of its sponsorship of prior studies of land reclamation efforts (Black 1997; Iannone 1995; Leigh 2000; Wright and Davlin 1998).

3. Liability and Brownfield Regeneration

CERCLA established a liability scheme with respect to contaminated lands. As we have noted, the courts have found that the Act imposes "retroactive, strict, and joint and several liability" for the costs of cleaning up hazardous substances and for any damage done by the pollution. (Any person or organization that has any history of involvement with a site may be considered to be a "potentially responsible party" or PRP.) These facets of liability each create different problems for developers and can retard redevelopment efforts.

Retroactive liability refers to the principle that PRPs may be found to be liable regardless of whether their hazardous substances were disposed of before or after the enactment of CERCLA. Thus the contamination that redevelopers face may have been legally dumped long before the 1980 passage of the act, but still needs to be addressed.

Strict liability means that owners and operators may be held liable for environmental cleanup without regard for negligence or fault (that is, even if they did not create the pollution or were abiding by the law at the time they did create it). Thus, the redeveloper that acquires a brownfield may, simply through the act of purchasing a parcel, become liable for cleaning up that historical pollution.

Joint and several liability applies to situations where more than one potentially responsible party exists. CERCLA created three general classes of responsible parties: generators of the hazardous substances found at the site, owners and operators of the site, and transporters who have the authority to select the site for disposal. The courts have held that any of the three classes of parties may be held liable for the entire cost of site cleanup, unless it can be shown that the harm is "divisible" (for example, where there are two or more physically separate areas of contamination). In short, any one party can be assigned the full responsibility by the government for contaminants created by several parties, even if the damage was done before the party owned or occupied the site. A party held liable, in turn, may seek contributions from other PRPs. Without some relief of liability, therefore, a redeveloper may—at an indeterminate future date—be held

responsible for the contamination at a far distant site to which the pollutants or polluted soil from a regeneration project might have been shipped.

CERCLA regulations and implementation did offer liability protection in the "innocent landowner defense." (Moreover, the Small Business Liability Relief and Brownfields Revitalization Act signed in 2002 legislates a series of innocent purchasers, expanding this safe haven. However, the precise requirements for getting that status and relief under the act are not yet formulated, let alone tested in courts of law.) To successfully claim this protection under CERCLA, owners have had to prove that they (a) bought the property after the pollution was placed on the property; (b) did not know and had no reason to know that the site was contaminated when they bought it; and (c) exercised "due diligence" before purchasing the property, i.e., they conducted all appropriate inquiry that was consistent with "good commercial and customary practice."

In order both to determine pollution cleanup or containment costs, if any, and to set up the foundation for innocent landowner protection from liability, redevelopers now conduct or require environmental site assessments before proceeding with a purchase. These assessment costs thus have become a standardized component of real estate redevelopment project transactions, leading to higher costs to buyers (or lower returns to sellers) and thus serving as a barrier to investment at the same time as they undermine project risk management efforts.

In summary, the liability provisions of CERCLA and those of the new 2002 law still leave developers with uncertainties and possible financial risks on brownfields that do not arise on greenfields—undeveloped non-urban sites. Brownfield redevelopment has the potential to provide urban regeneration and expansion of economic opportunities along with denser, more cost- and environmentally-effective expansion of housing, commercial facilities and other job sites. That potential will not be fully realized until the differential risks and uncertainties associated with brownfields are better managed. Public sector support for redevelopment has to be as efficient as possible to maximize the regeneration potential of reusing environmentally risky sites—insuring against the higher current risks of brownfield redevelopment may be more cost-effective than public subsidies to borrowing costs or offers of future tax abatements.

When President Bush signed Public Law 107-118, the Small Business Liability Relief and Brownfields Revitalization Act, on January 11, 2002, a new era may have begun for redevelopers of sites burdened with contamination concerns. To be sure, the law provides substantial additional funding to support redevelopment, but its real impact may be through its effects on the real and perceived liability exposures facing new purchasers and users. And here's the rub: while the intent appears to be a break in liability chains and provision of greater certainty about federal non-interference in state-approved remediations, the guidances and possible implementing regulations are not yet in place. In addition, since states will continue to run brownfield programs under memorandums of agreement or understanding with the U.S. Environmental Protection Agency, liability concerns are likely to vary across the country. Moreover, the court findings in brownfields cases have never been predictable, and the judicial interpretations of legislative intents may undermine the apparent relief the new act offers. In short,

notwithstanding the provisions of this new law, many risks and uncertainties and thus the demand for insurance remain.

4. Environmental Insurance Tools and Their Uses: A Typology

Insurance is a vehicle for transferring risk and uncertainty. If premiums are not excessive, and if the coverage is appropriately designed for the specific brownfield project, insurance can address exceptional project uncertainties that are due solely to questions about environmental conditions (Anderson 1998; Meyer and Chilton 1998; Meyer 2000). Thus, risk transfers through insurance have the potential to directly address the problems on both the land supply and demand sides that have been generated by the uncertainties and costs associated with brownfield concerns.

Three different types of environmental insurance policies directly applicable to brownfields have been developed by underwriters, each with its own set of options and conditions, and each playing a different role in supporting redevelopment by capping and quantifying risk for investors and their financiers (Yount 2000).

Cleanup Cost Cap insurance includes at least four different clauses among which purchasers must select coverages. Policies protect against cost overruns on pollution containment and removal actions. These overruns may result either from unexpected costs to address known conditions or from discovery of contaminants not initially identified. These are normally short-term policies, since they are intended to cover the actual period of remediation. Some cleanups, such as those that rely on phytoremediation (using plants to gradually neutralize toxics in the soil) or those that involve extended pump and filtering operations (for contaminated groundwater), may require longer-term policies.

Pollution Liability policies involve deciding upon the appropriate mix of at least twenty-eight different coverage clauses. The insurance provides the covered party with protection against lawsuits involving any of the special brownfield risks, regardless of the claimant, and includes coverage for both damages and legal defenses against lawsuits. This form of coverage is usually acquired for an extended period. Policies may be written so that successive owners inherit the protection and are constructed to cover both regulatory agency and third party claims. This extended protection contributes to maintaining the value of the property in successive transactions, despite its possible history of past contamination.

Secured Creditor policies protect lenders against loss of principal for brownfield loans in the event of defaults, eliminating any need for foreclosures, and may include more than six different types of coverage clauses. These policies do not protect developers or new owners from risks, so other forms of coverage may be needed by those undertaking redevelopment if they have concerns about their liabilities. The policy term purchased is generally the term of the loan. Banks and other lenders can buy policies themselves, passing the cost on to borrowers, or may demand that borrowers obtain coverage as a condition for lending.

It is obvious that each broad type contains many possible provisions and varieties of coverage, and that the three types cover completely different types of risks. As a result, the insurance purchase decision is extremely complex. (An enumeration of the major elements of the different coverages is provided in Appendix A.) Not only must the buyer decide which type of coverage to buy, but also which clauses or provisions to purchase within each product type. Moreover, the different types of coverage become more or less important as a redevelopment project progresses, so the coverage purchase decision must also take into consideration the timing and current progress of a project.

The availability of insurance, if it can be obtained at a price that is consistent with the perceived value to buyers and sellers of the risk transfers they obtain, can have substantial impact on land markets. In particular, the potential for brownfield redevelopment may be improved significantly through the effects of risks and uncertainty reductions on both the land demand and land supply sides of the market.

On the ***land demand*** side, anything that may help to reduce uncertainty, permit determination of costs or simply contribute to the quantification of risk facilitates decision-making and, even without otherwise affecting the financials of a project, may promote the redevelopment of sites that are currently overlooked.

Cost Cap (CC) Coverage provides a basis for risk quantification and management of the uncertainties associated with any cleanup or redevelopment that may uncover previously undiscovered contamination.

Secured Creditor Coverage acts as the equivalent of a loan guarantee and insulates a lender from risks associated with environmental factors.

Pollution Liability (PL) Coverage could eliminate uncertain costs of stigma effects, stabilize appraisal valuations and increase community acceptance of risk-based corrective actions.

On the ***land supply*** side, the different coverages may bring idle and underutilized lands to market, providing the potential for new private returns to landowners, and public benefits from the reuse of the sites.

Cost Cap Coverage may provide certainty about cleanup costs and thus encourage owners to remediate sites for sale, and could also make public acquisition of abandoned sites easier by defining maximum municipal cleanup cost burdens.

Pollution Liability Coverage, especially if available for extended periods of time, may address the concerns of sellers that they may become liable for future claims based on their current CERCLA or other liability for existing environmental conditions, thus inducing them to bring their properties to market at reasonable prices and to reduce reuse constraints.

Secured Creditor (SC) Coverage that is available to potential buyers may lead current property owners to reassess their assumptions that their sites were not worth the effort involved in putting them up for sale, and may lead them to put idle assets on the market.

Overall, the insurance products on the market appear from their nature and coverage to be extremely valuable to developers, both for the purpose of convincing the owners of properties in prime location that have been reluctant to sell due to open-ended prospective liability for past contamination to sell their sites and for their own risk quantification and control purposes. In practice, the real value they provide is a function of their cost and availability for specific projects. Moreover, the insurance cost, given the complexities of coverages, involves more than the premiums: the time and effort required to negotiate the needed manuscripted policy can be substantial. Finally, availability involves more than the possibility of purchasing a policy: the terms and period of coverage must be sufficient to serve the needs of the insured. (By way of simple example: a secured creditor policy that has a shorter term than that of a loan is less useful than one that covers the projected period of indebtedness.)

Brownfield redevelopers' usage of insurance provides the best possible measure of whether or not the insurance products actually available in the market can accomplish the risk management functions that they have the promise to deliver. We thus turned to a survey of the actual uses of insurance by developers.

5. Surveying Brownfield Developers' Utilization of Insurance

Notwithstanding the theoretical and conceptual arguments about insurance, there is much to be learned about actual decisions made on purchases of coverage by the key brownfield actors the site redevelopers. Data from the insurance industry or other parties could only tell us what coverages were or were not purchased, not about why the investors in brownfield reclamation did or did not transfer some of their risk to insurers. Surveying developers provided the only prospect for uncovering the logic of their risk taking and risk transfer decision processes.

The Survey—Instrumentation and Sampling

Knowing that locating brownfield redevelopers was going to be a difficult task, we used several different approaches. A developer identification protocol previously used for brownfields research provided our starting point: utilization of metropolitan yellow pages and their web analogues to find self-identified urban regenerators and commercial and/or industrial realtors who could identify such developers—often their clients (Walker, *et al.* 1998). We also relied heavily on identification of developers through a search of the participant lists of the annual EPA Brownfields Conference for 2000 and 2001 and on lists of developers participating several different states' voluntary cleanup programs. We also posted a description of the study on a widely-read website with news about brownfield investment policy and practice, *Brownfields Weekly* (at <http:/www.brownfields.com>) and included a request for participants. Lastly, using a snowball sample approach, we used successful contacts from the above sources to generate additional lists of developers.

Contact Method

Prospective survey participants were either phoned or e-mailed as the initial contact. At least two attempts were made for each identified prospect, and, if the first attempt was via

e-mail, the second attempt effort shifted to the telephone. When contact was made and a developer agreed to complete a survey, the instrument was either faxed or e-mailed, depending on the developer's preference. A reminder and second copy of the survey was sent two to three weeks after the initial survey was sent. A final reminder was sent again about three weeks later.

We show the response rate to this approach in the table below. As the numbers highlight, we lost potential respondents each step of the way from our initial attempt to establish phone or e-mail communication with a potential respondents to the respondents follow through and completion of the survey. Our nearly 500 contacts resulted in less than a 10% completion rate, although the completion rate is more than doubled when calculated as a percentage of developers with whom we were able to establish communication. In the end 42 percent of those agreeing to complete the survey did so.

Our relatively low completion rate is explained in part by the coarseness of our contact lists, where more than half of our initial sample list fell out simply because we could not establish any communication with a potential respondent. In our yellow page search through commercial and industrial real estate agents and developers, we ended up with many contacts who were actually ineligible: they had not engaged in projects on contaminated land; many of those with whom we failed to make contact may similarly have not worked on brownfields, so we really did not expect them to reply to our e-mails or phone messages.

Table 1: Developer Survey Universe Pursued and Sample Obtained

Interaction and Response	*N*	% of "Contact Attempted"	% of "Contact Established"	% of "Agreed to Complete"
contact attempted	499	100	—	—
contact established	244	49	100	—
refused to complete survey	133	27	54	—
agreed to complete survey	112	22	46	100
actually completed survey	47	9	19	42

Of those with whom we were able to establish communication, the 133 non-participants provided varied explanations for their refusal to participate in the survey. Many were not really developers, others only undertook projects on uncontaminated land, still others had not done any redevelopment project since insurance became more common, some were only in the very early development stage and had not addressed risk management yet, and the remainder simply claimed to be too busy or said they routinely refused to respond to surveys. A surprising number of the latter spent substantial time talking on the phone and even in person, but they still perceived taking the time to fill out a survey as costly. (We report on some of those verbal inputs below.)

Others who agreed to look at the survey, later contacted us to say they would not complete it, noting that the instrument would take too much time to complete. This latter is not surprising since the survey does require the developer to give some fairly specific financial information about the redevelopment project and insurance packages that the developer used. That information may not have been easily accessible to the individuals we contacted. This is especially true for developers who more than likely spend a great deal of time on the sites of their projects rather than at their desks.

Several individuals misunderstood the instructions or the intent of the survey and responded that they did not use environmental insurance or did not have to perform any clean-up of the site and thus could not provide us with any useful information. Once having reviewed the survey, a number did not think they could offer us useful information because their project "did not fit," or noted that "the survey was not relevant to our project." Other potential respondents refused to complete any of the survey because they believed that much of the information we requested was confidential or proprietary, often citing consultations with attorneys on whether they could release information. This refusal persisted despite reassurances that the data collected would not be connected to their company, any individual or the specific redevelopment site. We can only interpret these refusals as reflections of continued high levels of concerns about environmental liabilities, even on the part of parties who had told us they had covered their risks with insurance policies.

Those who did take the time to complete the survey were often people who had a prior interest in brownfields, understood the need for knowledge about environmental insurance, or had a particular strong opinion about environmental insurance. Social or professional pressure encouraged some to respond when we were able to use a colleague's name as a referral source. Self-selection bias, therefore, severely limits the generalizability of our survey responses.

Some additional generalization from this study as a whole, however, may be permitted by the responses from a number of individuals who did not complete the survey after receiving it, but who spent significant time talking to us about environmental insurance and brownfields. Those individuals may have thought that we got the information we needed during the conversation and may not have considered their further input in the survey useful. While their observations contributed to our understanding and to this report, we could not include their responses in the "survey" results we report.

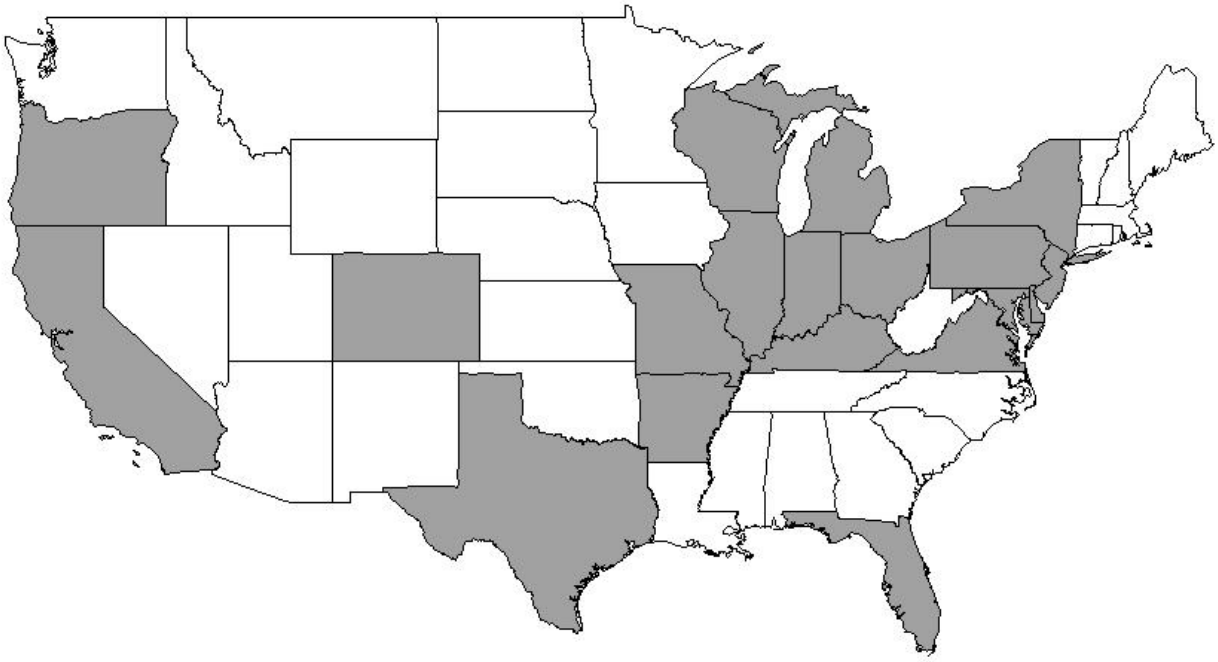
Whatever our success in getting responses from developers, the generalizability of any findings depends on the representativeness of the projects and firms from which we collected data. We thus begin by reviewing project and developer characteristics and comparing them to data on brownfield project features from other research. After assessing the extent to which they can be generalized, we then report on key findings about uses of insurance.

Representativeness of Sample Observations

Our 47 responses came from 19 states across the nation, but with nearly 20% of the sites located in Pennsylvania and another 11% located in two others, Wisconsin and Maryland.

Figure 1 maps the states in which projects described by our respondents were located. Most of the projects lie in metropolitan areas; while their locations reflect nationwide metropolitan area characteristics in terms of income, they are generally in neighborhoods that are exhibit higher than average population densities.

Figure 1: States with Brownfield Redevelopments Included in the Survey Responses



The median income in the census places in which the brownfield projects studied are located is $28,300, almost identical to the $28,400 median income of metropolitan areas in the 1990 Census. However, the projects are generally located in areas that have incomes below the relevant state-wide median income of the 19 states in our sample. Looking at the census tracts for the 34 sites where we have street addresses, we find the median census tract income is $23,100, well below the metropolitan-wide averages.

In terms of population density, the projects appear to be located in areas that are generally more densely settled than national norms. The median population density of census tracts in which one or more projects are located is 3,800 people per square mile while that for all those metro areas that host projects in our sample was only 540 people per square mile. Thus, in terms of *neighborhood characteristics*, we find the sites are typical brownfields, generally in slightly impoverished areas, but not in locations that are so depressed as to offer minimal appeal to real estate development investors.

In terms of *characteristics of specific sites*, acreage is one of the fundamental features of a project, and size is an important feature of brownfields. Small sites comprise the vast majority of all brownfield parcels, but they are the most difficult to redevelop due to indivisibilities in project transaction costs. Moreover, sites under 0.5 acres are almost

always developed for their own use by some small business—not by firms in the development business, who were the object of this study. Five and twenty acres are the smallest size limits most commonly referenced by brownfield developers in describing their project selections (Meyer and Lyons 2000). Sites over 100 acres are generally the province of large firms operating simultaneously in many different geographic markets.

Table 2: Development Project Size

Project Acreage	**n**	**%**
up to 2 acres	9	20
2–5 acres	6	13
5–10 acres	9	20
10–20 acres	1	2
20–100 acres	14	31
100 acres or more	6	13
Total reporting size	45	100

Note: The acreage measure is "up to the maximum":
a 5 acre site is in the 3rd category, not the second.

The project sizes in our sample—as Table 2 indicates, the median value is 8 acres and the mean value is 80 acres—are similar to project sizes reported by the U.S. Conference of Mayors (2000).[1] Our median site size is the same as that reported in their survey of brownfields in over 200 U.S. cities across 44 states. While our mean is significantly higher than the 46 acres reported in that study, this statistic appears due one very large project reported by one respondent. Excluding that site, our mean size is 45 acres for 46 projects, matching the mayors' survey.

However, both our study and the U.S. Conference of Mayors report appear to under-represent smaller sites. A recent review by ECS and the Council for Urban Economic Development (2000) of media coverage of more than 250 brownfield projects in 36 states reports a median acreage of 27 acres, while an earlier survey of 107 sites in 20 states (Council for Urban Economic Development [CUED] 1999) reported median and mean project sizes of 4 acres and 14 acres, respectively. Miller *et al*. (2000) examined in detail over 85 brownfield sites enrolled in New Jersey's Hazardous Discharge Site Remediation fund (a grant and loan fund that provides financial resources to assist in the investigation and assessment of contaminated sites) or already under development. Those sites exhibited a median size of less than 1½ acres and a mean of 18 acres. This difference is probably attributable to the fact that our study excluded the smaller self-developed

[1] The median and mean from the US Conference of Mayors report are determined by dividing, for each city that responded to the Conference of Mayors survey, the estimated total number of brownfield acres in each city by the estimated total number of brownfield sites in that city.

sites—and the Mayors' data, coming from public development agencies, is similarly likely to have overlooked the very small redevelopments since they are less likely to apply for public assistance.

The other obvious measure of scale is project cost. Given very different post-remediation intents (immediate sale, development for lease, preparation for own use), *total* project costs could not permit consistent comparisons. We thus relied on *remediation* cost, when it was reported (10 of our cases refused to give any cost data at all in their responses and several reported zero costs). Our summary figures on costs in Table 3 compare favorably to those of the 1999 CUED report, which recorded median and mean remediation costs of $57,000/acre and $124,000/acre, respectively.

Table 3: Remediation Cost

	Total Cost	**Cost/Acre**
Mean	$1,550,000	$124,000
Median	$500,000	$45,000
Quartile Cut-offs		
Lowest 25%	$200,000	$19,000
Third 25%	$1,250,000	$108,000

n = 33

A final important feature of site remediation and redevelopment relates to the land use activities. Nearly ¾ of our respondents indicate that the planned land use after redevelopment at their site differs from the pre-development land use. The three most common prior land uses were reported were light/heavy industry (32% of sites), mixed use (26%), and commercial (22%). The three most common post-development uses were commercial (43% of sites), mixed use (39%), and residential (11%). One HUD study found some residential use on over 50 percent of state-approved redevelopments in Pennsylvania and almost 30 percent of such projects in Michigan (ICF Consulting and The E.P. Systems Group 1999). Lower levels of conversions to at least some residential uses, closer to our findings, were reported in the 1999 CUED and 2000 ECS/CUED studies. Their results, based on media coverage of projects and thus not only projects gaining covenants not to sue or other approvals, also reflected the most recent trend away from reliance on industrial reuse of brownfields.

On balance, then, while the survey responses reflect a relatively low response rate there is no evidence to suggest any specific bias with respect to key project characteristics. Size and neighborhood features are comparable to those of prior studies and intended site uses

seem consistent with a trend toward an increasing diversity of new activities on brownfields.[2]

6. Findings on Brownfield Developers' Utilization of Insurance

The survey just described is only part of the findings we report on here, since we also have extended interviews with some developers who would not respond to the more limiting survey instrument. Thus we begin with a review of survey results and then turn to interview and comment data to amplify and clarify findings.

Survey Results and Findings

Brownfields are, first and foremost, real estate deals. 56 percent of respondents indicated that the expected profitability of their brownfields projects was better than their average returns, with about ¼ of these indicating that it was exceptional. These results reflect the above-average risks on such projects, as does the fact that almost 90 percent of the developers cited these favorable profits as an important factor in making the project desirable. Other factors cited in 45 percent or more of the responses included public subsidies for site assessment, cleanup, and low cost loans. The availability of environmental insurance itself, however, was indicated as important or very important by 44% of respondents.

Before moving to the discussion of survey results on insurance use, it is worth noting the sources of financing for the projects on which the developers reported. 63 percent of the projects used at least some bank finance, while only 28 percent employed any venture capital or other high risk funding. These numbers suggest some pressure on developers to take a conservative approach to managing risk, since loans with high uncertainty and unquantifiable risk are difficult for regulated lenders to approve.

Clearly, one or more outliers had major impact on the mean cleanup cost, with the median at a mere 36 percent of the mean and more than 75 percent of all the reported projects' costs the mean level. From the point of view of insurance acquisition, these data suggest that little cleanup cost cap coverage may have been bought, since the availability of that risk transfer for cleanups under $1 million was very limited as of late 1999, and the supply has shrunk and costs increased since then (Yount 2000; Meyer 2001). Liability coverage, however, was not that limited, and appears to have been used for projects involving smaller scale cleanups, as we will explain below.

A relatively small proportion of our respondents reported that they had purchased environmental insurance for their brownfields project—22 percent (10 developers)

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[2] The response rate we experienced is not, in fact, low for studies of such entities as development firms. Descriptions in June, 2002, made to two of the authors by brownfield specialists about comparable research efforts at the Urban Land Institute and National Association of Home Builders suggest that our response rate was above the average obtained—even from their own members—by such developers' organizations.

purchased pollution liability coverage and only 11 percent (5 firms) got cleanup cost cap. Given our small sample size and the generally limited interest in cleanup cost cap insurance, we will restrict most of our comments below to pollution liability coverage.

The principle reasons noted for purchasing pollution liability (PL) coverage are to protect the respondent from cleanup of previously unknown onsite pollution, business interruption due to onsite pollution, and delayed construction costs due to onsite pollution. Over 40 percent of the respondents who purchased PL indicated that these features made it "extremely important" to purchase the coverage. In those cases where a respondent had purchased brownfields property for redevelopment, over ¾ of these respondents indicated that PLL provided important protection in lieu of having an indemnification agreement between the seller and buyer.

A number of features may reflect a developer's decision to purchase or forego insurance, including the contamination at a site, the remedy selected at the site, whether institutional controls are used, and financing.

1. When it comes to cleanup and prospective liability of lands previously in industrial and commercial uses, conversion to residential uses poses the greatest risks, both from the possible costs associated with mitigation to higher standards and the possible liability claims of residents who spend whole days, not just work shifts, on site. 72 percent of the study sample indicated some change from prior to intended project land use. Ironically, the importance assigned to EI purchases by respondents rose with intensity of use, from residential to commercial to industrial, while the common wisdom would have predicted to opposite.

2. It must also be noted that, of the 31 developers reporting their contamination problems in responding, 8, or 26 percent, recorded that they had contamination below levels requiring remedial action, given the intended uses to which the sites were to be put and the institutional controls on future land uses that were part of their agreements. This figure is comparable to the percentages reported in the HUD assessment of state brownfield programs (ICF Consulting and The E.P. Systems Group 1999).

3. Fully 62 percent of the 45 projects for which we had data utilized some form of institutional or land use controls. This is a somewhat higher proportion of sites with no residual contamination relative to the 1998 data just cited, which had comparable percentages of 26, 25, and 37 percent for Massachusetts, Michigan and Pennsylvania, respective. The broadly increased reliance on such controls to limit cleanup costs since 1998—and the generally increasing trend in their use since CERCLA was first enacted (Hersh et al. 1997; Wernstedt and Hersh 1998b)—may influence the development of the insurance market since there appears to be a link between the use of ICs and the purchase of insurance.

4. Where environmental insurance was available, nearly 60 percent of our respondents indicated that this insurance was "important" or "very important" for moving ahead with the project when institutional controls were being used. In

contrast, at those sites without institutional controls, less than 40 percent of respondents indicated that insurance was "important" or "very important" for moving ahead. Looked at somewhat differently, at sites with institutional controls a much higher proportion of respondents chose to purchase PL (40 percent) than was the case at sites without institutional controls (19 percent). This finding explains the perverse result on prospective land use and the importance assigned to insurance coverage: the likelihood of reliance on institutional controls is highest for industrial uses, then for commercial and finally for residential reuse.

Our study sample, unlike those reported on in prior research using examples taken from state and federal brownfield program data, included projects for which the only contaminants might have been asbestos and petroleum products. Petroleum, in particular, while not covered under CERCLA, and very likely to require action, can be contained if not removed completely, but approaches typically involve natural attenuation in the soil or pumping and filtering for water pollution, both of which treatments require temporary land use limitations. In fact, petroleum was the major problem reported by our respondents, present in over three-quarters of the soil pollution cases—and 85 percent of those contaminated sites required remedial action. While almost half the sites also had toxic chemicals in the soil, only one third of those contaminations required remedial effort, and on average, slightly more than a quarter of the sites did not require mitigation for substances other than petroleum or asbestos. These figures also are consistent with past studies.

Developer Characteristics

Survey respondents were by and large unwilling to provide much data about their organizational structures and finances, so we are limited in our ability to describe our sample in detail. Two items on which we have data, both relating to size of organization, provide some interesting insights.

First, the number of real estate projects completed in the past five years serves as an indicator of both experience and operational scale as a development organization. The diversity in our sample as indicated by the range and the skew around the mean is reassuring, given the characteristics of brownfield redevelopers that vary from a firm deciding to reuse a site for itself to the specialist doing over a dozen brownfields at any given moment, with other in between doing a brownfield or two as part of a larger development portfolio. This diversity is further evidenced by examination of the distribution of project involvements. It appears that at least six of the developers in our sample were likely building for their own use, while at the other extreme, three are very active developers, albeit we do not know the extent of their brownfields specialization.

Table 4: Projects Undertaken in Last Five Years

Distributional Measure	Number of Projects
mean	14
median	8
min	1
max	75
Development Projects	**Number of Developers**
Only 1	6
2–5	12
6–19	14
20–49	9
50 or more	3

n = 44

The second interesting characteristic of the developers is that most were independent operators. Only 11 percent, or five firms, reported being part of a larger organization. In this era of merged multi-product, multi-activity enterprises, this figure appears to underscore the entrepreneurial character of the private firms engaged in any brownfield activity at all. It further suggests that, in some measure, the responses of these firms reflect similar concerns about liability risks and the financial viability of the developer as those facing non-profit community-based property redevelopment organization, most of which do not have financial ties or access to the deep pockets of a parent organization, even when they are subsidiaries of well-established community development corporations.

Utilization of Environmental Insurance

By and large, respondents reported relatively low utilization of EI, with some significant differences in their reliance on the two major coverages examined. Table 5 shows that insurance is not considered a useful tool by a substantial majority of those surveyed. Not only is insurance acquired by only a small minority of the developers, but as many or more of the of the respondents indicated they had checked out coverage and would not purchase coverage, and the majority said they were not even bothering to investigate the risk transfer, with two-thirds of all respondents noting that they had not investigated and did not expect to ever purchase cost cap coverage.

Table 5: Environmental Insurance Actions

EI Actions Taken and Planned	pollution liability	cost cap
coverage purchased (%)	22	11
investigated and will purchase in future (%)	4	7
investigated and will not purchase in future (%)	22	16
did not investigate and will not purchase (%)	51	67

n = 45

Not surprisingly, 80 percent of the ten developers buying pollution liability coverage and the five who bought cost cap policies described the risk transfer as "very" or "critically" important to their projects, with the majority claiming coverage was critical. What is of greater interest to those considering such policies, is which coverage clauses were deemed most important by purchasers. Table 6 reports the judgments from nine of the purchasers of pollution liability coverage who rated key policy elements. The key finding here is the difference in the importance assigned insuring against the more "traditional risks" and those that are clearly linked to the regulation of brownfields.

Only one form of risk transfer, for the "cleanup of previously unknown onsite pollution," was considered extremely important by the majority of the respondents. This importance may reflect that fact that these developers had sites too small to get affordable cost cap coverage for their mitigations were relying on a broad pollution liability policy to cover this risk. (In most cases, it should be noted, they would not be protected.) The importance assigned to business interruption coverage reflects the extent to which respondents were planning to own and operate the sites they were redeveloping. The last two coverages, for construction delays and reopeners, were highly important to some respondents but not even bought by others—the latter bring among the five developers who already had the coverage through their cost cap policies.

Table 6: The Importance Assigned to Different Pollution Liability Coverages

Risk Protected by the Coverage	number not buying	Number Rating Importance as		
		"some"	"very"	"extreme"
bodily injury lawsuits due to pollution moving offsite	2	4	1	2
property damage lawsuits due to pollution moving offsite	2	3	2	2
costs of cleanup of pollution moving offsite	2	5	1	1
legal defense costs	0	3	4	2
cleanup of previously unknown onsite pollution	0	2	2	5
business interruption loss due to onsite pollution	1	0	4	4
delayed construction costs due to onsite pollution	3	1	1	4
additional cleanup, ordered by a regulatory agency after a planned cleanup (re-opener coverage)	2	1	3	3

Developers' decisions on which coverages to obtain—and on whether to buy insurance altogether—may depend on other parties to the transaction. In some instances, the sources of financing can dictate decisions, especially when debt financiers are more risk averse than developers. Conventional wisdom suggests that lending institutions, at least partially because they are regulated entities (with loan practices subject to review by the Federal Reserve System, Federal Deposit Insurance Company, Office of Thrift Supervision, etc.), are more likely to demand higher levels of risk management—and thus insurance—than more free-wheeling source of financing such as venture capital firms. Our data in Table 7 show an opposite pattern in purchase of liability coverage. (The number of respondents on each row is the number of developers reporting having used that source of capital; obviously, many projects used more than one source.)

Clearly, the risk transfers associated with the pollution liability coverage were more important to the projects using venture capital than to those not using this source of capital. We cannot conclude from this, however, that venture capitalists are more risk averse than bankers or public officials. A more plausible explanation lies in the nature of the projects that are likely to turn to venture funding, despite its much higher demands for return on investment. Such projects may be too risky for traditional lenders to bankroll, or for such lenders to be willing to support at loan to value ratios that permit complete financing. Thus, the twelve projects using venture capital must be presumed to have

higher risks than those not using such funds, and the higher reliance on insurance is thus understandable.

Table 7: **Sources of Funding and Liability Insurance Purchases**

Source of Financing	Number of Projects Using Financing Source	% Purchasing PLL
Internal	27	22
Lending Institution	27	22
Venture/High Risk Capital	12	67
Public Subsidies	19	21

It seems clear that utilization of insurance overall is tied to the developers' perceptions of the consequences of an unexpected catastrophic loss for the company or its personnel. The importance attributed to having coverage is clearly greater among those who see a major financial blow to a project adversely affecting their firm. Table 8 demonstrates these differences, with the first panel reflecting the relationship between perceived reputation impacts and value placed on insurance, and the second panel illustrating that between financial impacts and insurance. The skepticism over the value of insurance is clearly evident I the fact that over one third of respondents rated EI as "not important" even if the impact of a major loss were to be "very serious or catastrophic" to either reputation or financial viability.

Table 8: Perceived Impact of a Major Uninsured Loss and Importance Given to Insurance

Impact…	**Importance Ascribed to Insurance (% rating as)**		
on Staff Reputations	**not important**	**important or very important**	**n ***
insignificant/troublesome	76	24	21
very serious/catastrophic	33	67	18
on Firm's Financials			
insignificant/troublesome	93	7	14
very serious/catastrophic	36	64	25

** Excludes respondents who indicated insurance was not available when asked to rate EI importance.*

Insurance utilization—or, at least, the importance ascribed to the coverage—also varies with the significance of the project to the firm. Table 9 compares the importance assigned to insurance to the contribution the brownfield project makes to the well being of the developer. The first panel relates insurance to the expected profitability of then individual

project, and the second to the expected new opportunities to be gained from successful completion of the brownfield redevelopment. Significant differences between the panels are evident, even though the majority of respondents in all four groups still claimed insurance was not important.

Table 9: Perceived Value of the Project to the Firm and Importance Given to Insurance

Contribution to…	**Importance Ascribed to Insurance (% rating as)**		
Profits	**not important**	**important or very important**	**n ***
Below average—average	53	47	17
Above average	63	37	19
New Opportunities			
Below average—average	71	29	14
Above average	52	48	23

** Excludes respondents who indicated insurance was not available when asked to rate EI importance*

Above average profit expectations seem to be seen in part as a cushion against uninsured losses, since the percentage of respondents rating coverage as important or very important is lower for those with higher profit expectations. On the other hand, it appears that, if one of the objectives in undertaking a brownfield project is opening up exceptional new opportunities for the developer, then the consequences of an uninsured loss appear to be considered much more significant, raising the importance assigned to insurance. This difference most likely lies in the no common practice of creating a separate legal 'company' for each brownfield redevelopment, permitting the developer to declare bankruptcy for the single project firm if financial losses loom too large. Only in the case in which project completion could have contributed significantly to generating new business or investment opportunities for the parent developer would the abandonment of a redevelopment effort have an exceptional impact on the parent firm. Thus only in the case of lost opportunities, not just lower profits or losses on a project, does insurance appear to be come more important, as evidenced in the last row of Table 9. We will return to this issue in discussion below.

As might be expected, insurance was deemed more important by those with redevelopments involving contaminants that were more likely to migrate off site than those on which the pollution condition did not pose such a threat. Similarly, and also related to groundwater contamination issues as was the matter of migration, insurance was seen as more important when some form of extended post-remediation monitoring was required as part of the site mitigation process. Table 10 shows the findings. Migration is clearly seen as a major uncertainty factor, requiring some risk transfer, but this is not so obvious for monitoring. While there is a strong sentiment against spending on insurance if no monitoring is needed, opinions are about evenly divided on the

importance of insurance when monitoring is required, whether by the developer or the state. This division probably reflects differences in individual developer risk perceptions, an issue we can best examine with profiles of the operations and decisions of two developers with whom we had lengthy interviews, to which we now turn.

Table 10: Migration Risks, Monitoring Requirements and Importance of Insurance

Uncertainty…	**Importance Ascribed to Insurance (% rating as)**		
Off-site Migration Risk	**not important**	**important or very important**	**n ***
impossible or not likely	68	32	28
somewhat or very likely	20	80	10
Monitoring Required			
none	83	17	12
state responsibility	44	56	9
site owner responsible	50	50	12

** Excludes respondents who indicated insurance was not available when asked to rate EI importance.*

Conversations with Brownfield Redevelopers

As we noted in discussion of our survey response rates, we found some developers we contacted willing to talk at length rather than fill out the survey instrument. Their comments and explanations helped, collected through in-person and telephone interviews, put meat on the bones of the survey numbers and thus added substantially to our understanding even though we could not use them in our survey and they are recorded in the non-response counts. Rather than describe individual redevelopers in detail here, we describe two archetypes that reflect different operations and approaches to risk management and insurance. In this manner, we can protect the anonymity of our respondents while characterizing what appear to be the two dominant divergent logics and risk-perception-driven modes of operations of these for-profit redevelopers.

First, the commonalities across these developers need to be stressed:

- ✓ All were risk-takers, redeveloping brownfields because of hopes of exceptional returns on their investments;
- ✓ They specialized in brownfield redevelopments, regardless of how they came into the business, and did not pursue lower risk greenfield projects as a risk spreading approach;
- ✓ Most had multiple projects at different stages of redevelopment going at any one time, with each one undertaken by a separate limited liability company or corporation so losses on one would not undermine others;

- ✓ The developers wanting to talk at length generally operated in more than one real estate market, partially to spread risk and partially to gain access to more investment opportunities;
- ✓ Their first projects in new market areas were thus very important in opening new investment opportunities, and they were more cautious on the risk they faced on those efforts;
- ✓ Project scales generally were larger than for the respondents to the survey, involving cleanups of $1 million or more, so insurance was affordable; and,
- ✓ They obtained funding from many different sources, some relying almost completely on self-financing by a parent, with others relying on banks, and yet others on venture capital.

They thus were generally larger than the majority of our survey respondents, of whom 40 percent had undertaken five or fewer real estate projects in the preceding five years, with 30 percent launching or completing six to fifteen projects, and the rest over fifteen projects over the five year period. This size is probably what permitted the firms the luxury of someone spending as much as two hours talking with a researcher.

The dominant lesson to be learned about insurance from these developers was that the purchase of coverage was more a matter or internal risk management and spreading than it was dictated by external considerations. The three dominant factors that shaped the insurance purchasing decision were the relative magnitudes of the projects pursued, the risk profile of the projects the firms undertook, and the number of projects ongoing simultaneously. Each of these elements affects the capacity to manage risk internally, and needs to be understood in the context of the organizational structure all the developers used for brownfields projects. We thus review the loss limiting legal fiction used for high risk developments before returning to these factors.

Brownfield redevelopment ventures are routinely undertaken by a *limited liability company (LLC)*. This legal fiction is defined differently in each state and may include partnerships and sole proprietorships as well as corporations. The function of the organization is clearly specified in its name: it is a legal entity separate from its parent(s) with maximum liability defined by its capitalization. That is, the investors in the firm (its parents) can lose no more money than they have invested in the firm. Those investors cannot be held liable for any environmental liabilities resulting from the actions of the firm or its failure to act, so long as the actions taken are within the law. Should environmental costs (whether mitigation obligations or liability claims) get too high, the limited liability company can declare bankruptcy and its investors are freed of any further obligations, having lost their investments but no more. The LLC structure thus permits a real estate redeveloper to walk away from a brownfield with no trailing legal obligations if some problems arise that renders the project uneconomical to complete.

In effect, the LLC offers a form of insurance: protection against uncontrolled liabilities on any one project undermining the financial stability of a development firm as a whole. However, this insurance is of value only insofar as any one project does not dominate a firm's activities to the extent that writing off the investment as a dead loss eliminates the firm's liquidity or ability to attract funding for projects. The risk-limiting value of

organizing projects as LLCs, therefore, depends on the same three factors cited above as relevant to decisions on purchases of insurance.

The factors thus affect insurance purchase decisions. Our descriptions here provide the decision logic, derived from the narratives about actual decisions made by the developers with whom we spoke at length.

1. Relative Project Magnitudes—A firm with one major project and a number of smaller ones may have so much at stake in the one big development that it cannot afford to walk away from it, in which case, it may to insure that effort. If 60 to 80 percent of the liquidity of a company is tied up in one deal, it will be concerned about limiting risk and uncertainty on its financials, regardless of how little risk it carries on the projects it funds with its remaining 20 percent of investment funds.

2. Risk Profiles—There are two aspects to the issue of risk profiles, one having to do with levels of risk across brownfield or exceptional risk projects and the other associated with a mix of brownfields with lower risk investments. With respect to firms specializing in brownfields, even if there is no one project that dominates the others pursued by a firm, insurance may be warranted if the risk associated with one deal far exceeds that of the other sites in which a firm is engaged. A firm may tend to specialize in redevelopment of gas stations, for example; if it then decides to add a dry cleaner's site to its project portfolio, it would be inclined to buy insurance for that higher risk and the greater difficulty of dealing with the possible pollution problems of such a project. For some firms, however, the brownfield project or two they may be doing may be the only risky deals in which they are involved and they see those investments as simply the high risk end of a portfolio of projects with variable risks. These investors are no more likely to look for insurance than a stock market investor who mixes aggressive stock buying with much larger holdings of very secure government bonds.

3. Number of Projects—The more diversified a portfolio, the less vulnerable an investor is to any one project going sour. This principle applies to brownfield redevelopment as well, but only affects insurance purchases when the size of the investment portfolio exceeds a key threshold. If, as is commonly the case, the premium for cost-cap insurance for a cleanup is roughly 10 percent of the estimated mitigation costs, a firm with more than 10 projects of similar size on-going simultaneously may, in effect, "self-insure." The firm may accept the risk of one of the on-going projects encountering catastrophic losses or claims in any one year, resulting in the loss of the investment, which it would expect to result in a loss that is less than the 10 percent of cleanup costs in would otherwise have to pay for insurance.

Summary Findings and Implications: Access to Insurance

These findings about the role of risks, project numbers and mixes, site characteristics, financing sources and concerns about liabilities all appear to shape the utilization of insurance by those engaged in brownfield redevelopment. However we have not yet

discussed what appears to be a dominant consideration, one that explains low utilization rates—and the low response rates obtained from developers in the survey portion of this study: knowledge, beliefs and expectations about the availability and affordability of insurance.

Twenty-nine of the survey respondents indicated that had not even investigated cost cap coverage. When asked about why they had not done so, fourteen, almost half, said they had not known of the availability of the coverages. This finding must be considered to be a reflection of the extremely small base of qualified environmental insurance brokers in the marketplace more than of the ignorance of the developers. Brownfield regeneration relies on a number of environmental professionals, from the engineers doing sites assessments to those conducting mediations to the attorneys and real estate professionals managing the deals for developers. All those specialists routinely carry environmental "errors and omissions" policies to cover their liabilities in the even of mistakes they might make.

However, the insurance brokerages who serve those professional coverage needs do not attempt to sell other environmental coverages such as cost cap or pollution liability to the clients of their insureds. That they do not do so when their incomes are commission-based reflects either that they are overworked or that they simply do not have the capacity to broker the manuscripted policies that are needed for such broader forms of environmental insurance coverage.

The situation with respondents' investigation of pollution liability coverage underscores the point. Half the twenty-two respondents who said they never checked out coverage admitted they did not know about its availability—and half claimed their liability exposure was so low as to not warrant coverage. Both these responses reflect poor advice on liability in the brownfields context and means of controlling it, whether obtained from environmental or legal consultants or from insurance professionals. The reasons cited by respondents for not buying liability coverage when it was investigated, primarily cost, length of policy term, and unavailable coverage clauses reflect information they apparently acquired, and at least suggest that market maturation and better manuscripting might serve a wider market of potential insureds.

Our effort to determine the value of environmental insurance to brownfield projects by studying developers was thus stymied in part by market limitations and constraints on access to this specific form of project risk management. On the one hand, there is a small cadre of qualified brokers, and they are critical to buyers' efforts to acquire cost-effective coverages that serve their specific risk transfer needs. Most firms do not have access to—or know how to quickly locate—these specialists. On the other hand, at the same time as knowledge about coverages is broadening and the numbers of qualified brokers is slowly expanding, the coverages available are contracting. While Yount (2000) reported affordable cost-cap coverage available for cleanups of only $100 - 500,000, and liability policies could be written for periods of up to thirty years as of 1999, Meyer (2001) noted that the cost-effectively insurable scale of cleanup grew to around $2 Million and liability policies terms shrank to ten to fifteen years by late 2001.

7. Stimulating Brownfield Reclamation and Re-Use Through Insurance

To the extent that EI can contribute to a more effective and efficient market for brownfield sites, it may assist local efforts to lower urban spatial segregation and high levels of underutilized lands. The public sector is just beginning to address its possible roles in providing access to these tools. Many states are considering design of programs to both ease the process of negotiating the manuscripted coverages and lower the cost of insurance, and four, Connecticut, California, Massachusetts and Wisconsin, have programs in place at various stages of implementation. With the exception of Wisconsin, that has very narrowly focused policy designed to address the specific long term liability risks associated with a particular cleanup approach, the states are relying on generating some forms of pre-negotiated coverages with a limited number of options for projects with state-approved clean up plans, intended to reduce both the transaction and premium costs of insurance; some also help subsidize premium payments themselves.

Cities, similarly, are looking to create insurance portfolios of their brownfield sites. The motivation at the municipal, or even neighborhood, level may be slightly different, however, since smaller areas may have their real estate markets and local economies adversely affected by brownfields who cleanup costs do not come close to even the minimum insurability thresholds that prevailed in 1999. Grouping such sites for cost cap coverage may not be so much a matter of lowering premium costs but of creating insurability by aggregating the smaller cleanups into a single pool of sufficient magnitude. Yount and Meyer (2002, forthcoming) have found great uncertainty among the insurance market players about how such pools might be legally constructed and the benefits that they offer. Their examination suggests that pools of parcels owned by a single entity (such as a municipal redevelopment agency or community development corporation) are far more likely to be both legally secure and insurable than those involving multiple owners. Because conflicts over site-specific versus group policy claim limits are less likely in a single owner situation, premiums may also be lower for comparable coverage, even for large sites that could have been individually insured.

The checkered experience of developers' utilization of insurance we have reported here should not be considered as evidence of the lack or utility or economic value potentially obtainable from the tool. Rather, it must be interpreted as reflecting the relative immaturity of the environmental insurance market. Public and non-profit organizations can help property owners and developers deal with the inefficiencies in the insurance marketplace and the gaps in coverage availability several ways:

- information dissemination about available risk transfer tools and sources of additional advice and consultative services;
- active intervention into local risk transfer markets through promotion or creation of insurance pools and programs for sites in their areas of concern; and,
- direct financial subsidies to real estate owners and developers help with premiums for coverage on strategically important projects.

By undertaking one of more of these efforts, local governments and community-based organization have the potential to accelerate brownfield redevelopment in their areas and to contribute to the economic, social and environmental benefits that such regeneration and reuse of previously used properties can bring.

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