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Standard Guide for Brownfields Redevelopment¹

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1. Scope

1.1 This guide covers redevelopment of a Brownfields property for all stakeholders. This guide identifies impediments to Brownfields development and suggests solutions to facilitate redevelopment. The sustainable Brownfields redevelopment process is a voluntary effort that actively engages property owners, developers, government agencies, and the community in conducting corrective action, economic evaluation, and other actions to promote the long-term productive reuse of a Brownfields property.

1.2 It is the intent of this guide to encourage a sustainable Brownfields redevelopment process through responsible private/public investment and redevelopment of Brownfields properties. Brownfields redevelopment is not strictly an environmental issue. In some cases, the environmental issues may be a minor component of the redevelopment project. The interrelated financial, regulatory, and community participation aspects of Brownfields redevelopment should also be addressed. Decisions made in one of these areas may affect responses in other areas. The “quality of life” issue is often a major focus of the community. For example, a community’s goals for the ultimate use of a property may affect corrective action and the cost of potential remedial action that, in turn, may enhance the redevelopment.

1.3 This guide is intended to describe a highly flexible process. This process is not linear, and not every project requires full use of all components of the process for effective implementation. The key to the process is the active engagement of government, developers, and the community to ensure successful sustainable Brownfields redevelopment process.

1.4 *This practice offers a set of instructions for performing one or more specific operations and should be supplemented by education, experience and professional judgment. Not all aspects of this guide may be applicable in all circumstances. The ASTM Standard Guide does not necessarily represent the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project’s unique aspects. The word*

“standard” in the title means only that the document has been approved through the ASTM consensus process.

2. Referenced Documents

2.1 ASTM Standards:²

- E1527 Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process
- E1528 Practice for Limited Environmental Due Diligence: Transaction Screen Process
- E1739 Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites
- E1912 Guide for Accelerated Site Characterization for Confirmed or Suspected Petroleum Releases
- E1943 Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites
- E2081 Guide for Risk-Based Corrective Action
- E2091 Guide for Use of Activity and Use Limitations, Including Institutional and Engineering Controls
- E2137 Guide for Estimating Monetary Costs and Liabilities for Environmental Matters
- E2205 Guide for Risk-Based Corrective Action for Protection of Ecological Resources

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *activity and use limitation*—legal or physical restrictions or limitations on the use of, or access to the property to eliminate or minimize potential exposures to chemicals of concern.

3.1.2 *Brownfields*—Real properties where expansion or redevelopment is complicated by the potential or confirmed existence of chemical(s) of concern environmental media.

3.1.3 *Brownfields redevelopment coordinator*—a local or regional government official, economic development agency, or nonprofit organization responsible for facilitating Brownfields redevelopment.

3.1.3.1 *Discussion*—The Brownfields redevelopment coordinator is generally associated with local government. However, the Brownfields redevelopment coordinator can be an official of a regional, state, or federal government agency.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

3.1.4 *chemical(s) of concern*—the specific constituents and their breakdown products that are identified for evaluation in the risk-based corrective action process.

3.1.4.1 *Discussion*—Identification can be based on their historical and current use at a property; detected concentrations in environmental media; and their mobility, toxicity, and persistence in the environment. Chemical(s) of concern may include, but not be limited to, petroleum, metals and chemicals related to industrial activities.

3.1.5 *community*—the individuals living or working within the area that may be affected by Brownfields redevelopment.

3.1.5.1 *Discussion*—The community should be defined on a property-specific basis.

3.1.6 *corrective action*—the sequence of actions that include property assessment and investigation, interim remedial action, remedial action, operation and maintenance of equipment, monitoring of progress, and termination of the remedial action.

3.1.7 *developer*—a private or public entity that intends to redevelop a Brownfields property and may provide all, part, or none of the funds.

3.1.7.1 *Discussion*—The developer of a Brownfields property is often an organization or company whose primary business is typically unrelated to redevelopment of Brownfields properties. As an example, a developer may be the owner of a company that wants to purchase an adjacent parcel of property for expansion of the existing business.

3.1.8 *exposure pathway*—the course a chemical(s) of concern takes from the source area(s) to an exposed organism. An exposure pathway describes a mechanism by which an individual or population is exposed to a chemical(s) of concern originating from a property.

3.1.8.1 *Discussion*—Each exposure pathway includes a source of release from a source, a point of exposure, and an exposure route. If the exposure point is not at the source, a transport/exposure medium (for example, air or water) also is included.

3.1.9 *Remedial Action*—Activities conducted to protect human health and the environment by meeting acceptable risk-based site-specific target levels by using any combination of actions such as natural attenuation; institutional controls; source removal; engineering controls; and design, maintenance, and operation of remedial action equipment. Remedial action includes activities that are conducted to reduce sources of exposures to meet corrective action goals, or to sever exposure pathways to meet corrective action goals.

3.1.9.1 *Discussion*—For Brownfields properties the agreed upon remedial action may require a combination of active removal and exposure management methods that are protective of human health while allowing cost-effective property redevelopment.

3.1.10 *risk-based corrective action*—a framework in which exposure and risk assessment practices are integrated with property assessment activities and remedial action selection to ensure that the chosen action is protective of human health and the environment (a consistent decision-making process for the assessment and response to chemical releases based upon protection of human health and the environment).

3.1.11 *site-specific target level (SSTL)*—Risk-based target levels for chemical(s) of concern for human receptors developed for all applicable media of concern on a Brownfields property

3.1.12 *stakeholders*—individuals, organizations, or other entities that directly affect or are directly affected by the Brownfields property or its redevelopment.

3.1.12.1 *Discussion*—Stakeholders include, but are not limited to, owners, buyers, developers, lenders, insurers, government agencies, and community groups.

3.1.13 *sustainable Brownfields redevelopment process*—a voluntary effort that actively engages property owners, developers, government agencies and the community in conducting corrective action, economic evaluation, and other actions to promote the long-term productive reuse of a Brownfields property.

3.1.14 *transferee*—the buyer, other recipient by deed or lessee of the Brownfields redevelopment property.

3.1.15 *transferor*—the seller or lessor of the Brownfields redevelopment property.

3.1.16 *warranty*—a representation made by one party to a second party of a contract of the existence of a fact upon which the second party may rely (for example, that the property is in compliance with certain laws) thus relieving the second party of establishing that fact.

4. Significance and Use

4.1 Guidance for Brownfields redevelopment can be useful in promoting the acceptability, and, therefore, viability, of such redevelopment.

4.2 Sustainable Brownfields redevelopment can be achieved through the productive reuse of properties that have been abandoned or idled. This reduces the need to develop new land by satisfying the needs of the present without compromising the ability of the future generations to meet their own needs. Both the current environmental conditions and the future use of the property need to be considered in order to ensure sustainability. Following the process and concepts discussed in this guide will provide the user with a sound framework for decision making and assist the user in balancing the needs of both the present and future generations through involvement of all of the stakeholders in the process. However, this guide does not give specific criteria for assessing the sustainability of a Brownfields redevelopment project.

4.3 It is recognized that certain communities have already formulated their own, effective, processes. It is not the purpose of this guide to impose a set of guidelines where successful formula exist. Indeed, elements of successful models from around the country have been integrated within this guide. The audience for this guide is all potential stakeholders.

4.4 Redevelopment of underutilized properties is a key objective of federal, state, and local environmental agencies in environmental policy. The Small Business Liability Relief and Brownfields Revitalization Act of 2002 provide funding, liability relief, and regulatory authority for brownfields redevelopment. Many states have developed Brownfields legislation to facilitate this redevelopment effort. State voluntary corrective-action programs play an important role in implementing an effective Brownfields regulatory policy. Many states have

applied risk-based decision-making concepts to their voluntary corrective action programs. Some of the Brownfields redevelopment projects will involve voluntary corrective action while other corrective actions may be mandated by government order. Risk-based decision making may be a viable option for corrective action at many Brownfields redevelopment properties.

4.5 This guide is intended to provide a framework for the sustainable Brownfields redevelopment process and identify critical functions and impediments that need to be overcome in order to achieve sustainable development. In this respect, this guide can be used by state and local government to establish and operate a viable redevelopment program for their communities.

5. Sustainable Brownfields Redevelopment Process

5.1 There are four main components in the sustainable Brownfields redevelopment process: initiation, evaluation, transaction, and implementation (see Fig. 1). In addition, a sustainable Brownfields redevelopment process requires the involvement of a variety of stakeholders. Some stakeholders remain at the core of the process as one component develops into the next. Other stakeholders will move closer to or further away from the core during the process. Thus, stakeholders will bring a different perspectives or agendas to each component of the process. The sustainable Brownfields redevelopment process is not linear and not every project requires full use of all components of the process for effective implementation. It works best when the interests of all stakeholders are identified early on and the parties work together as a team to satisfy each of the party's interests using an open, non-adversarial approach to negotiations. These components and the stakeholders' goals are described in the following sections and in Fig. 1.

NOTE 1—Stakeholders who have an interest in the Brownfields redevelopment are listed in Table 2. Some stakeholders have notable cash or cash equivalents at risk, while other stakeholders have an interest in promoting sustainable development goals are achieved and maintained.

6. Initiation

6.1 Sustainable Brownfields redevelopment begins with a vision of the redevelopment and reuse of a property or properties. The process is initiated when a stakeholder recognizes a need or a business opportunity. The process can be initiated by a number of different stakeholders either individually or as part of a team effort. It is important to realize that most Brownfield sites are redeveloped based on economic issues. However, stakeholders should realize that the new development will have an impact and may improve the quality of life in the community. One of the critical activities of the initiation component is the identification of the potential stakeholders. The form of initiation will depend upon the stakeholders' goals (see Table 2).

6.1.1 *Initiate Process*—The sustainable Brownfields redevelopment process can be initiated by any one or more of the potential stakeholders.

6.1.1.1 *Owners, Prospective Transferees and Developers*—Owners, prospective transferees or developers or a combination thereof, may initiate the sustainable Brownfields redevelopment process by identifying a property or properties for

redevelopment based upon their belief that the project will yield an appropriate return on investment or community benefit, or both.

6.1.1.2 *Not-for-Profit Organization*—A not-for-profit organization may act as a facilitator, investor, or partner in the redevelopment of a particular Brownfields property or properties.

6.1.1.3 *Community*—The community may initiate the process through dialogue with owners, prospective transferees, or government agencies. Community groups often have a vision, plan, and expectations for redevelopment in their place of residence and business. This vision may be based on history and tradition particular to the neighborhood and may include expectations of improved economic opportunities and physical surroundings.

6.1.1.4 *Local Government*—Government may initiate the sustainable Brownfields redevelopment process as a developer, owner, potential transferee, and investor, or otherwise facilitate Brownfields redevelopment by providing technical expertise, financial incentives or community education, or a combination thereof.

6.2 *Identifying the Stakeholders*—It is incumbent upon the Brownfields Redevelopment coordinator or the stakeholder(s) initiating the process, or both, to carefully evaluate the project and identify key stakeholders before proceeding in the redevelopment process. The stakeholders are determined by more than the physical proximity to a Brownfields property slated for redevelopment, the percentage of capital invested in a particular property, or the effect a Brownfields redevelopment may have on them as a particular group or as individuals. It is crucial that the identification of the stakeholders include all parties that have a stake in the outcome of the redevelopment process.

6.2.1 *Owner, Prospective Transferee, or Developer*—The owner, prospective transferee, or developer should typically consider a number of factors in deciding on whether or not to invest in a Brownfields property. These factors may include:

6.2.1.1 *Planned Use of the Property*—It is important for the owner, prospective transferee or developer to understand the limits of local zoning ordinances and the degree to which variances and/or conditional use permits can provide deviations from the zoning. The owner, prospective transferee or developer should contact the local health department or environmental health services department to ascertain if activity and use limitations on the property or adjacent properties constrain potential Brownfields development. The owner, prospective transferee, or developer should avoid overly simplistic paradigms. For example, an area might be zoned "industrial," but the actual use of the property where chemicals of concern are present is "mixed use". In this case, one should avoid using simplistic industrial risk assessment scenarios based solely upon zoning designations alone.

6.2.1.2 Cost of corrective action and associated liability,

6.2.1.3 Potential time delays associated with corrective action,

6.2.1.4 Potential return on investment,

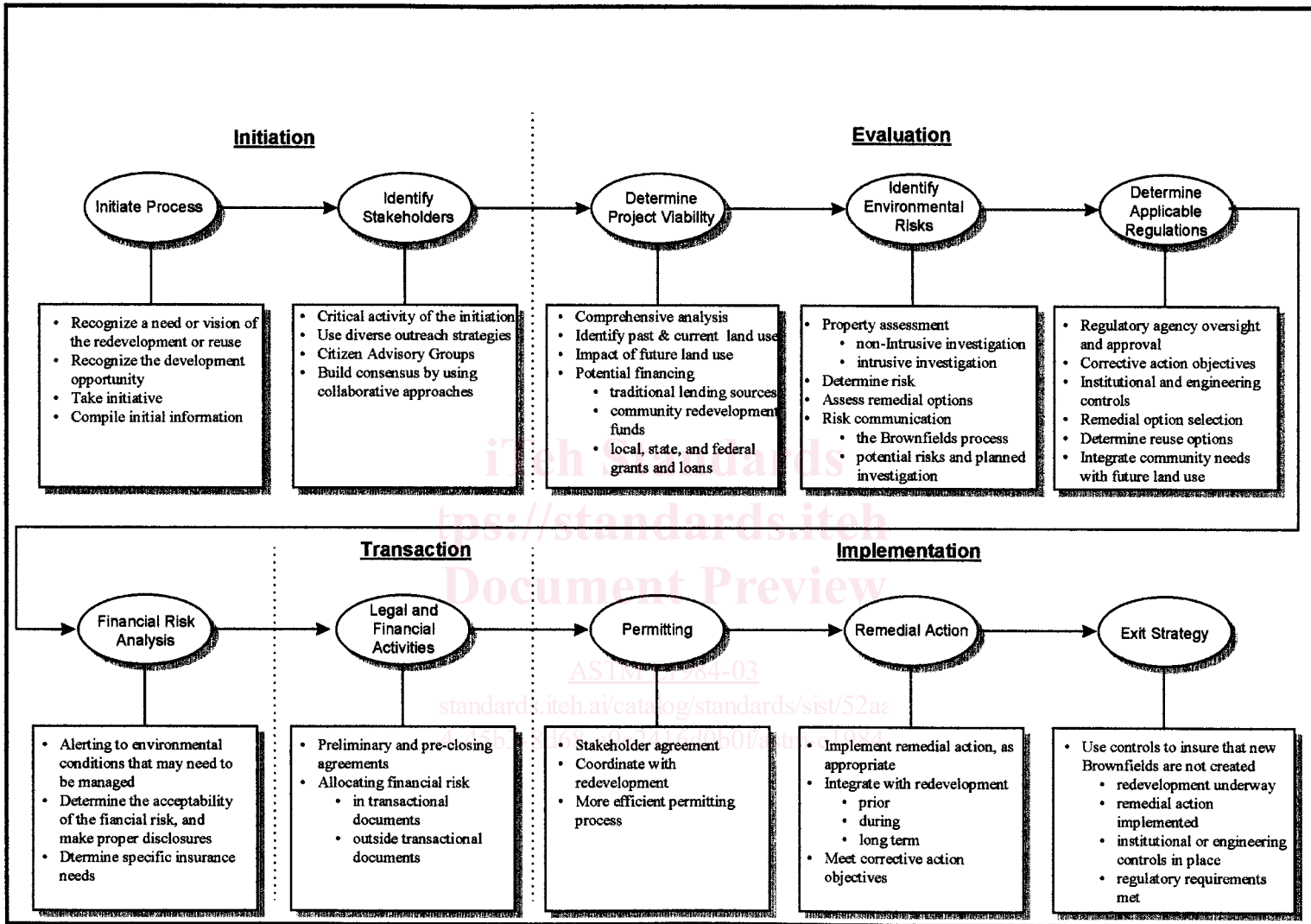


FIG. 1 Brownfields Redevelopment Process

TABLE 1 Example of the Stakeholders that Could Be Associated with the Basic Components in the Sustainable Brownfields Redevelopment Process

Initiation	Evaluation	Transaction	Implementation
Community Government Owner/Transferor	Community Government Owner/Transferor	Community Government Owner/Transferor	Community Government Owner/Transferor
Prospective Transferee Developer	Prospective Transferee Developer Insurers	Prospective Transferee Developer Insurers lenders	Developer Transferee Insurers Lenders

TABLE 2 Example of Stakeholder Goals During the Initiation Component

Stakeholder	Goal
Community	Improvement of physical and aesthetic conditions; Community and economic revitalization
Government: Redevelopment Agencies Environmental and Health Agencies	Economic revitalization; Increased tax base Compliance with environmental, health, and safety requirements; Identification of concerns and potential areas for improvement
Transferor/Transferee	Enhancement of property value and achieved less costly and faster approaches to corrective action; Identify options to reduce and transfer risk and liability
Prospective transferee	Better understanding of the opportunities and barriers; Opportunities to purchase a property with potential return on investment or to achieve a benefit to the community, Manage liability for environmental condition(s) that they did not cause
Developer	Opportunity to add value to the property, Manage liability for environmental condition(s) that they did not cause

6.2.1.5 Surrounding land use and economic viability of surrounding properties including potential long-term changes in land use,

6.2.1.6 *Infrastructure*—Roads, sewers, water availability, public transportation, and utilities,

6.2.1.7 Environmental condition within and adjacent to the Brownfields redevelopment property,

6.2.1.8 Security,

6.2.1.9 Physical surroundings (parks, view, consistency with neighborhood character),

6.2.1.10 Education/training facilities for employees,

6.2.1.11 Commitment of the local government to an area-wide development plan, and/or

6.2.1.12 Property taxes and financial incentives.

6.2.2 *Community*—The community includes local residents, workers, organizations, and institutions. Community involvement is a critical component of the Brownfields process. Even with the best of intentions, what seems to be the best plan may not meet with acceptance and success. Those charged with the responsibility of conducting the community outreach may need to get help in identifying who the relevant community and its leaders are and in designing a meaningful public participation process. The sustainable Brownfields redevelopment process can only occur through a constructive dialogue that acknowledges the needs and expectations of the community. It is important to consider a variety of public participation techniques for different size projects and avoid a one-size-fits-all

approach. In some cases, the project may not be big enough or complex enough to warrant extensive or lengthy public involvement. Other components of community involvement may include:

6.2.2.1 Community education,

6.2.2.2 Community input on the proposed development and potential corrective action,

6.2.2.3 Presentation of the conceptual plan to the community,

6.2.2.4 Recognition of community leadership,

6.2.2.5 Local political realities,

6.2.2.6 Effective community outreach, and/or

6.2.2.7 Other community characteristics, including, status of the infrastructure, alternative or additional properties for redevelopment, and adjacent communities' experience with Brownfields redevelopment.

6.2.3 *Government*:

6.2.3.1 *Local Government*—The local government is key to the sustainable Brownfields redevelopment process. Local government weighs the benefits and concerns of economic development on the community. Local government may be the Brownfields coordinating agency whose functions may include:

(1) Information source on health and environmental conditions at Brownfields properties,

(2) Community outreach,

(3) Planning for area-wide development,

(4) Advocate for both the developer and the community,

(5) Solicitor of developers and financial institutions, and/or

(6) Coordinator assisting all relevant governing and approval agencies work together toward a common goal of redevelopment, and/or

(7) Identifying potential changes in future property uses.

6.2.4 *State Government*—State government can assist with economic development and meeting environmental objectives. The state government may consider:

6.2.4.1 Streamlining in permitting,

6.2.4.2 Flexibility and streamlining in the corrective action process to achieve environmental objectives including use of:

(1) Risk-based decision making for human and ecological receptors,

(2) Property-specific land use and ground water use as a basis for corrective action decisions,

(3) Streamlined assessment processes,

(4) Flexible approach to determining remedial action alternatives including institutional and engineering controls,

(5) Use of specific exposure assumptions when establishing future exposure scenarios,

(6) Mechanisms for release of liabilities or covenants not to sue, and/or

(7) Identifying potential changes in future property uses.

6.2.4.3 Assisting local governments in redevelopment efforts through provision of technical expertise, assessment and remedial action technologies, grants and loans to local government for property assessment, demolition, and remedial action at a Brownfields redevelopment property, and community education on environmental issues,

6.2.4.4 Providing funding or assisting in obtaining funding, grants and loans to local government for Brownfields redevelopment property assessment, demolition, and remedial action,

6.2.4.5 Covenants not to sue or releases from liability or comfort letters under state statutes, and/or

6.2.4.6 Legislative and regulatory changes to facilitate Brownfields redevelopment.

6.2.5 *Federal Government*—The federal government may assist with economic development and meeting environmental objectives by supporting risk-based decisions in corrective action for Brownfields properties and consider:

6.2.5.1 Funding or assisting in obtaining funding, grants and loans for Brownfields redevelopment property assessment, demolition and remedial action,

6.2.5.2 Assessments, revolving loans, and tax incentives,

6.2.5.3 Use of human and ecological risk-based decisions for corrective action tied to reasonably anticipated land and ground water use,

6.2.5.4 Where state voluntary corrective action programs exist, delegation of federal corrective action oversight to the state under the voluntary corrective action program and allowing for release from liability,

6.2.5.5 Prospective purchaser agreements for releases from liability or comfort letters under federal statutes, and/or

6.2.5.6 Legislative and regulatory changes to facilitate Brownfields redevelopment.

6.2.6 *Tribal Government*—Tribal governments may have a strong interest in preserving cultural resources as well as ecological resources. In these cases, the impact of proposed Brownfields redevelopment on archeological sites should be considered. Conservation activities may need to be considered. These could include structural rehabilitation of historic buildings.

6.3 *Lending Institution*—In some cases, lending institutions become involved in Brownfields redevelopment. They may provide part of the necessary funding for development and thus take on a portion of the financial risk associated with a project. Neighborhood economic and social stability are often motivators, since a healthier neighborhood economy is beneficial to lending institutions in the area.

6.4 *Other Interested Parties*—Some parties may not be considered stakeholders at this point due to the limited extent to which that party may be affected by activity at the redevelopment property or the redevelopment process. However, such interested parties often play important roles in the process, and the involvement of these parties will depend on the needs and interests of the various stakeholders. Therefore, other interested parties who are actually involved should be determined by the stakeholders.

7. Evaluation

7.1 The purpose of the evaluation component is to determine the viability of proceeding with the Brownfields redevelopment. In addition to traditional real estate issues, a number of environmental and legal issues should be evaluated (see Table 3).

7.2 *Determine Project Viability*—As the project warrants, a comprehensive analysis may be undertaken to determine the

TABLE 3 Example of Stakeholder Goals for the Evaluation Component

STAKEHOLDER	GOAL
Community	Participate in the evaluation process and the development of appropriate options for improvement of the Brownfields property
Government: Redevelopment Agencies	Community understanding of the economic considerations planned use
Environmental and Health Agencies	Ensure corrective actions are protective of human health and the environment; ensure community understanding of these objectives, ensure requirements of multiple regulatory programs are satisfied
Transferor/Transferee	Find a solution that enhances the property value; achieves less costly and faster approaches to corrective action; identifies options to reduce and transfer risk and liability.
Prospective transferee	Better understanding of the opportunities and barriers; understand the financial/liability risk management options
Developer	Better understanding of the opportunities and barriers and reducing the uncertainty associated with time to complete and costs of completion
Insurer	Understanding the factors that could influence financial and environmental risk

viability of the envisioned redevelopment and other alternative uses. Factors that may be considered include:

7.2.1 Current and future land use of the Brownfields property,

7.2.2 Impact of existing and potential future land use in the surrounding area,

7.2.3 Needs of the community including health and quality of life impacts,

7.2.4 Demographics,

7.2.5 Access to markets,

7.2.6 Return on investment, and

7.2.7 Financing including:

7.2.7.1 Traditional lending sources,

7.2.7.2 Community redevelopment fund,

7.2.7.3 Federal, state, and local grant and loan programs, and

7.2.7.4 Insurance products or other risk transfer or risk management funding options.

7.3 *Identifying Risks*—The successful implementation of the sustainable Brownfields redevelopment process is dependent on a clear understanding of the environmental condition and associated economic impact on the property or properties. This is critical to the risk management process.

7.3.1 *Identifying Environmental Risks*—Examples include soil, groundwater, surface water and building contamination issues.

7.3.2 *Identifying Human Health Risks*—The successful long-term implementation of Brownfields redevelopment could also be contingent upon an examination of potential human health risks from exposure to contaminants and identifying a means to manage an unacceptable exposure.

7.3.3 *Property Assessment*—The primary objective of the property assessment is to collect information necessary to identify and determine the completeness of both human and ecological exposure pathways and to determine the likely distribution of a chemical(s) of concern. The collection of these