Strategies for Reclaiming Urban Postindustrial Landscapes

by

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ABSTRACT

Expanding the primarily expert-driven and site-specific efforts to solve brownfield problems, this thesis develops a process framework for planners and developers to organize the brownfield redevelopment process through strategy formulation based on a site-context relationship with interacting social, economic, and ecological factors.

This thesis explores the theory and practice associated with brownfield redevelopment and, through a broader perspective, postindustrial landscape reclamation. Key issues and ingredients for success in the brownfield redevelopment process are distilled from the investigation of two case studies, one of which is Nine Mile Run in Pittsburgh, Pennsylvania. The process framework’s design serves to recreate the general project context and scope represented by Nine Mile Run and promotes integrative planning and restorative redevelopment practice that augments brownfield redevelopment activity.
# Table of Contents

Chapter 1: Introduction ................................................................................. 5

Chapter 2: Framing the Issues .................................................................... 9
  Brownfields ......................................................................................... 9
  The Postindustrial Landscape ................................................................. 17
  Brownfield Redevelopment in Theory and Practice .................................. 26

Chapter 3: Case Studies ................................................................................ 29

Chapter 3.1: Nine Mile Run and Summerset at Frick Park ......................... 31
  Regulatory Environment ........................................................................ 32
  History ............................................................................................... 33
  Context and Planning Efforts ................................................................. 38
  Area Description .................................................................................. 41
  Development Process .......................................................................... 42

Chapter 3.2: Village Farms and Steelfields .................................................. 54
  Regulatory Environment ........................................................................ 55
  History ............................................................................................... 58
  Context and Planning Efforts ................................................................. 62
  Area Description .................................................................................. 66
  Development Process: Village Farms (Site A) ......................................... 68
  Development Process: Steelfields (Site B) ............................................. 71

Chapter 4: Lessons Learned ........................................................................ 75
  Evaluation ........................................................................................... 75
  Key Issues ........................................................................................... 82
  Ingredients for Success .......................................................................... 85
  Alternative Frameworks ....................................................................... 89

Chapter 5: Redevelopment Process Framework for Reclaiming Postindustrial Landscapes ................................................................. 99
  Findings ............................................................................................... 99
  Redevelopment Process Framework ....................................................... 100
  Evaluation ........................................................................................... 106
  Conclusion .......................................................................................... 107

Bibliography ............................................................................................. 110
  Case Study Reports ............................................................................ 114
  Interviews ........................................................................................... 116
  Lectures .............................................................................................. 116
Chapter 1: Introduction

Technological innovation and structural economic change over the past several decades has transformed the Nation's industrial base and left cities with an epidemic of underused, idled, and abandoned industrial properties. Scholars remark that "virtually every community in the United States has a declining or closed industrial site within its boundaries."¹ The federal Department of Housing and Urban Development reports that an estimated 5 million acres of abandoned industrial property exist in urban areas across the country, which roughly equals the size of New Jersey.² The highest concentrations of these properties generally occur within or around urban core locations of cities with historic economic activity centered on heavy industry, such as Detroit, Pittsburgh, and Buffalo.

potential presence of a hazardous substance, pollutant, or contaminant.” Brownfields—ranging in size from the neighborhood dry cleaner to a former steel mill site—impede redevelopment efforts with high cleanup costs, concerns over contamination liability, elevated uncertainty, and negative market image. These obstacles effectively discourage private enterprise from undertaking brownfield redevelopment projects without significant public assistance and thus push development to less encumbered sites such as greenfields, previously undeveloped and presumed “clean.”

Within every problem there is an opportunity. Derelict and contaminated industrial sites are unrealized resources for initiating urban regeneration and ecological restoration. These sites are often in advantageous locations near city centers, situated along waterways, supported by existing infrastructure, and adjacent to residential communities that offer a potential labor pool and customer base. Brownfields are environmentally-impaired assets that need to be cleaned up, returned to productive use, and reintegrated into the surrounding community. The current practice of brownfield redevelopment, however, is primarily site-specific and driven by economic development motivations, which does not offer the full potential for sustainable reuse and revitalization that extends beyond property lines.

The U.S. Environmental Protection Agency (EPA), through its Brownfields Program, acknowledges the importance of a contextual approach to brownfield redevelopment. This Program, supported by new federal legislation enacted in 2001, provides assistance to public and private sector redevelopment efforts under “a new model of environmental stewardship that protects the environment, promotes partnerships, strengthens the marketplace, and sustains reuse.” The EPA employs four types of brownfield grants as the primary vehicle for achieving its objectives. These grants range from $200,000 to $1 million and consist of: Assessment Pilots/Grants awarded to public or private entities for creating brownfield inventories, planning, environmental assessments, and community outreach; Revolving Loan Fund Grants that

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help in brownfield cleanup; Cleanup Grants that specifically assist cleanup activities for properties with planned green space, recreation, and other nonprofit reuses; and Job Training Grants that provide environmental training for residents living in neighborhoods with brownfields. Together these grants expand a site-specific brownfield focus to a wider community approach.

This thesis builds off the EPA's approach to brownfields and investigates derelict industrial sites within a context of community and environmental factors. When looked at together, site conditions and surroundings create a postindustrial landscape with complex interacting systems that requires holistic redevelopment practice in order to restore environmental health and promote sustainable reuse. This approach relates in theory to integrative planning and restorative redevelopment. As an alternative to expert-driven and isolated brownfield redevelopment practice, integrative planning and restorative redevelopment function through a collaborative process and interdisciplinary cooperation in order to address issues at multiple scales and across diverse areas of concern. This approach brings derelict industrial sites back to productive use while combining with community and environmental efforts to improve the value and livability of an urban area.

The concept of postindustrial landscape reclamation combines brownfield redevelopment with integrative planning and restorative redevelopment. For a specific site, the reclamation effort cleans up and redevelops contaminated property for productive use, which also serves to eliminate blight, foster community participation, provides jobs or homes, and boosts municipal tax revenues. At a larger scale and across multiple sites, this effort can restore natural processes and functions, regenerate areas of the city, and promote sustainable growth. Reclamation redefines the postindustrial landscape through community-based, interdisciplinary action that integrates longer-term solutions based on social, economic, and ecological objectives. Collaboration in brownfield redevelopment, however, faces many challenges in a competitive market.

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5 See Ferguson, Pinkham, and Collins for further discussion restorative redevelopment. In relation to these two topics, see discussion on a new paradigm in environmental management in edited works by Costanza, Norton, and Haskell; Knight and Bates; and Esty and Chertow. These concepts are discussed in Chapter Four and Five.

system not equipped to economically support the interdisciplinary discourse necessary for
the application of integrated solutions. This thesis addresses an important element in the
effort to reclaim the postindustrial landscape—strategy formulation in the brownfield
redevelopment process.

Nine Mile Run in Pittsburgh, Pennsylvania provides an example of an effort to
reclaim a postindustrial landscape devastated by millions of tons of slag. Explored as a
case study in this thesis, Nine Mile Run consists of two separate yet interconnected
components—a residential development and public open space/watershed restoration
project. The case study investigates the intersection between these two components and,
supported by additional case studies and a body of literature relevant to brownfields,
proposes a redevelopment process framework to assist developers and planners in
strategizing for postindustrial landscape reclamation efforts based on social, economic,
and ecological parameters.

This thesis is organized into five chapters. After this introduction, the second
chapter discusses the issues associated with brownfields and the postindustrial landscape,
as well as current theory and practice behind brownfield redevelopment. Chapter Three
presents the case studies of Nine Mile Run/Summerset at Frick Park in Pittsburgh,
Pennsylvania and Village Farms/Steelfields in Buffalo, New York. These cases are
described and studied in terms of their history, context, and development process.
Chapter Three evaluates the case studies in order to ascertain key issues and transferable
lessons learned from their redevelopment activity. The final section of Chapter Three
explores existing frameworks that organize efforts in landscape planning, brownfield
redevelopment, and environmental management. Chapter Five synthesizes findings from
Chapter Four and develops a redevelopment process framework for reclaiming
postindustrial landscapes. This final chapter concludes with an evaluation of the
proposed framework and reflection on the research of this thesis.

7 Collins and Reiko Goto, “Urban Reclamation: Place, Value, Use: The Nine Mile Run Project” (STUDIO
2003), paragraph 9.
Chapter 2: Framing the Issues

An essential first step to understand the postindustrial landscape requires an agreed upon vocabulary and identification of the key issues. A derelict industrial site with real or perceived contamination falls under the subject of brownfields, a classification that connects the site with local, state, and federal programs that offer assistance for redevelopment. Despite a long history of contaminated property as a result of industrial activity, the term brownfield only came into common use during the 1990s and has quickly evolved since. The most recent definition incorporates types of sites beyond the focus of this thesis, but investigation of the term’s evolution provides relevant context for a discussion on the postindustrial landscape.

Brownfields

Our research has indicated that, while the problems surrounding reuse of contaminated sites are crucial ones in the nation’s traditional industrial centers, they are by no means confined to such communities. The issue of brownfields is widespread, having surfaced in every state across the country.

—Charles Bartsch, Northeast Midwest Institute
Statement before U.S. House of Representatives, 2002

Definition

Webster’s Dictionary defines “brownfield” as “a tract of land that has been developed for industrial purposes, polluted, and abandoned.” This definition contrasts with “greenfield,” which implies “land (as a potential industrial site) not previously developed or polluted,” such as farmland and woodland. The used and polluted nature of a brownfield makes it the antonym of greenfield. Without support to do otherwise, risk-adverse, for-profit developers logically seek the environmentally unimpaired site. Greenfields thus attract development to the urban fringe while brownfields remain neglected in extant built environments.

In a 1998 report, the EPA defines “brownfields” as “abandoned, idled, or underused industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.” The EPA’s definition broadens Webster’s to include commercial use, such as a gas station or dry cleaner. The brownfield classification pertains to a facility no longer in full operation; the characteristics of under-used, idled, and then abandoned suggest a process of decline uninterrupted by reinvestment. Contamination issues prevent intervention in this process and thus become the prevailing characteristic of brownfields. Furthermore, brownfields can be found in city, suburb, or rural countryside.

Also in 1998, the EPA defined a “brownfields site” as “property, or portion thereof, that has actual or perceived contamination and an active potential for redevelopment or reuse.” While the definition in the paragraph above identifies a brownfield as a facility, this definition references the facility’s underlying property. With the term “active potential for redevelopment or reuse,” this definition distinguishes brownfield sites from others with more debilitating contamination issues, such as those on the EPA’s National Priority List, known as Superfund sites, which pose significant threat to public health and involve excessive costs and time frames in cleanup. The “active potential” also implies that demand may exist but possible contamination prevents the site’s “highest and best use,” which implies the use legally, financially, and physically possible that will create the greatest net return to land or buildings over a given period of time. The contamination issues, therefore, prevent the site from redevelopment or reuse under normal market conditions.

The Congressional “Brownfields Revitalization and Environmental Restoration Act of 2001” (Brownfields Act) generally defines a “brownfield site,” with certain legal exclusions and additions, as “real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous

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substance, pollutant, or contaminant.”¹³ This definition expands to encompass residential use, as with a vacant house lot contaminated by lead paint waste, or any property environmentally impaired by a substance from past or current use. Furthermore, a brownfield site exists where the contamination has “come to be located,” such as with a plume of contaminated groundwater that has migrated to affect another property.

The Brownfields Act defines “brownfield site” as a guideline for applicants seeking funding under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and thus has certain legal exclusions and additions. The Act excludes property listed on the National Priorities List, classified as the “most serious uncontrolled or abandoned hazardous waste sites identified for long-term remedial action under Superfund.”¹⁴ The Act also excludes property subject to administrative and court orders under CERCLA, and property subject to the jurisdiction, custody, or control of the U.S. government. These exclusions support the notion previously stated that an active potential for redevelopment or reuse characterize a legally-defined brownfield site.

Legal additions to the Act’s brownfield site definition include sites specifically eligible for funding, such as those contaminated by controlled substances, petroleum or a petroleum product, and mine-scarred lands.¹⁵ The addition of controlled substances, for example, may include a private residence that was formerly used for the manufacture and/or distribution of illegal drugs and there remains the presence or potential presence of the controlled or related hazardous substances. The definition under the Brownfield Act has thus broadened to a primarily substance-oriented focus, which creates wide-ranging parameters to promote economic and community development.

The now-closed U.S. Office of Technology Assessment provided a definition of brownfield that expanded upon the EPA’s to include contextual constraints. This definition indicates that, in addition to potential contamination, poor location, old or obsolete infrastructure, and other less tangible factors often linked to neighborhood

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¹⁵ A “controlled substance” is “a drug or other substance, or immediate precursor” as listed in the Controlled Substance Act. Legal additions listed on the EPA’s website, <http://www.epa.gov/brownfields/html-doc/10902a3.htm#3.49> (cited 23 Feb. 2004).
decline may hinder the redevelopment of a site.\textsuperscript{16} This definition moves beyond a
substance-oriented focus to acknowledgment of a site-context relationship, which begins
to demonstrate the broader impact that derelict and contaminated industrial sites have on
their surroundings and, in turn, the obstacles their surroundings create for redevelopment.

Scope, Impact, and Character

Efforts to determine the total number of brownfield sites in the U.S. has proven
difficult because of imprecise brownfield definitions, an abundance of unlisted sites, and
the reluctance by some to identify contamination issues and thus stigmatize property.\textsuperscript{17}
John Mazzarino of Cherokee Investment Partners, a private equity group that acquires
brownfields, estimates that approximately 2 million contaminated properties plague the
Nation.\textsuperscript{18} Mazzarino also estimates that 12 to 15 percent of all non-residential
commercial real estate has some level of contamination. Various sources that specifically
identify brownfields estimate national totals that range from 450,000 to 650,000 sites.\textsuperscript{19}
With 650,000 sites, the total cost to restore these properties to productive use could reach
in excess of $650 billion. Perhaps the claim that “every community includes some type
of brownfield” provides the most important and compelling answer to how many sites
there are in the U.S.\textsuperscript{20}

The sites vary by size, use, extent of contamination, and the required level of
cleanup. In 2003, the U.S. Conference of Mayors determined that brownfields average 5
acres in size based on a survey of 205 cities that cumulatively reported more than 24,000
sites.\textsuperscript{21} Contamination issues generally result from land use impacts associated with: \textsuperscript{22}

\textsuperscript{16} Todd S. Davis, “Defining the Brownfields Problem,” in Brownfields: A Comprehensive Guide to
\textsuperscript{17} Simons, 28.
\textsuperscript{18} John Mazzarino, lecture entitled “Private Equity and Environmentally Contaminated Real Estate,” Sloan
School of Management, Massachusetts Institute of Technology, MA, 4 May 2004.
\textsuperscript{19} Government agencies list about 450,000 sites. Simons estimated 500,000 sites in 1998, which excluded
gas stations with leaking underground storage tanks and residential brownfields, 29. The Council for
Urban Economic Development estimated at least 600,000 sites in 1999. George Washington University’s
study conducted in 2001 stated that as many as 650,000 brownfield sites exist.
\textsuperscript{20} Simons, 4.
\textsuperscript{21} U.S. Conference of Mayors, “Recycling America’s Land: A National Report on Brownfields
Redevelopment, Volume IV” (Washington D.C., 2003), 14,
\textsuperscript{22} Niall Kirkwood, lecture on the issue of brownfields, Rebuilding Devastated Landscapes, Harvard
University, Cambridge, MA, 9 October 2003.
Most urban redevelopment projects, especially in the Nation's older cities, encounter property contamination issues due to a long history of past use. Site assessments typically report polycyclic aromatic hydrocarbons, petroleum, metals, and asbestos. The presence of contaminants can create major cost and schedule issues for these projects. When the presence of contaminants leads to complications that prevent redevelopment under normal market forces due to high remediation costs and other related factors, the site falls under the legal definition of a brownfield. For sites with development potential, Simons estimates that remediation costs average about 10 percent of total development costs. Additionally, the Council for Urban Economic Development conducted a study in 1999 that examined 107 completed brownfield projects and determined that cleanup represented an average 8 percent of total development cost.

Brownfields often exist in an economically disadvantaged context. The Council for Urban Economic Development also analyzed demographic data within a one-mile radius of its 1999 case studies and found that the median minority population was 35 percent, while the national average was 24 percent; median per capita income was $10,202, while the national average was $14,420; and median percent below poverty was

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24 Simons, 76. Brownfield sites without feasible development potential, according to Simons, include highly contaminated properties such as Superfund sites, which "are not regular brownfields," and poorly located property, 3.
25 percent, while the national average was 12.6 percent. Impaired site conditions and troubled surroundings make public assistance an important component of brownfield redevelopment projects. The Council for Urban Economic Development’s study determined a median leverage of 2.48, which implies that the public sector contributes one dollar for every $2.48 contributed by the private sector.

Brownfields in urban core areas offer numerous locational advantages with proximity to downtown and concentrated activity. However, when compared to development locations unburdened by environmental impairment and economically disadvantaged surroundings, the practice of brownfield redevelopment faces many challenges that may include:

- Difficulties in site assembly;
- Inadequate interstate highway access (although serviced by existing infrastructure);
- A perception of crime;
- An available but under-skilled labor force;
- Uncertain demand;
- High development costs associated with site work and rehabilitation or demolition of obsolete structures; and
- Uncertainty about cost and liability relative to cleanup.

These factors, as well as poor market conditions, have caused brownfields to remain inactive for extended durations.

Regulatory Background

Until use of state voluntary cleanup programs and enactment of the Brownfields Act, environmental laws unintentionally made brownfield redevelopment too risky and unprofitable for private enterprise. Early laws thwarted development with expansive liability provisions, enforcement policies that targeted lenders, and unpredictable cleanup costs. Additionally, these environmental laws did not incorporate the science of contaminated property. Legislation unfavorable to development and unsupported by

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27 Council for Urban Economic Development, 28. This leverage amount attributed publicly supported debt to the public sector.
28 Simons, 9-11.
science created an atmosphere that made the brownfield dilemma inevitable. The following paragraphs present a brief outline of the federal and state regulatory environments as they relate to brownfield redevelopment, which demonstrates how legislation has evolved to address the problem with contaminated property. Additionally, the U.S. EPA administers the federal legislation and state environmental protection agencies administer the voluntary cleanup programs.

**The Resource Conservation and Recovery Act**

The Resource Conservation and Recovery Act, enacted in 1976, regulates the generation, transport, treatment, and disposal of hazardous wastes from "cradle to grave." The Act legally obligates manufacturers who produce hazardous wastes to identify themselves to state and federal environmental protection agencies, and then mandates that these agencies track the hazardous wastes in order to determine that the manufacturers properly dispose of them.

The Resource Conservation and Recovery Act impacts brownfield redevelopment in two ways. First, it regulates underground storage tanks commonly found on sites with a history of industrial use. Second, the Act provides authority for governments or citizens to require cleanup at sites that pose significant threat to public health and the environment or where hazardous wastes are released in violation of a permit or other requirement of the legislation. For violations, the Act typically holds owners or operators of the land, even if not causing the contamination, responsible for cleanup or reimbursement to state and federal agencies for cleanup.

**Comprehensive Environmental Response, Compensation, and Liability Act**

In 1979, the City of Niagara Falls, New York experienced a record amount of rainfall that caused toxic waste to surface in the Love Canal neighborhood, which consisted of 100 homes and a public school. The story has been called one of the "most

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appalling environmental tragedies in American history."\(^{31}\) A reporter at the time remarked: "What is worse is that it cannot be regarded as an isolated event. It could happen again—an anywhere in this country—unless we move expeditiously to prevent it."\(^{32}\)

The Love Canal tragedy and concerns for public health, environmental, and financial threats posed by hazardous waste sites pushed creation of CERCLA. Quickly enacted by Congress in 1980, CERCLA established the federal Superfund law to underwrite the cost of environmental cleanups. When approved, however, experts believed that the hazardous waste problem was limited to fewer than 400 sites nationwide.\(^{33}\) CERCLA underestimated the pervasiveness of environmentally-impaired property and did not attempt to address the various levels of site contamination. Furthermore, CERCLA did not consider the consequences to the revitalization of urban areas burdened by contaminated industrial and commercial properties.

CERCLA, governing cleanup and transfer of contaminated property, affects brownfield redevelopment in two significant ways based on its policy of "strict, joint, and several liability." First, the statute holds past and present owners or operators of a property responsible for the cleanup of contamination, even if these owners or operators did not cause the problem, and classifies them as the potentially responsible parties. Second, CERCLA affected financial lending decisions on two fronts: contamination issues could devalue property used as collateral to secure a loan and lender liability through involvement with the property.

**State Voluntary Cleanup Programs**

Beginning in the 1990s, states have tackled contamination and liability issues that create barriers to brownfield redevelopment through adoption of legislation in the form of voluntary cleanup programs. These programs set out to achieve the dual objectives of environmental cleanup and economic development by addressing issues of contamination liability, cleanup standards, and financial feasibility in redevelopment.\(^{34}\) Voluntary cleanup programs allow private parties to initiate site cleanup through a cooperative

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\(^{32}\) Beck.
\(^{33}\) Collaten and Bartsch, 20-21.
\(^{34}\) Simons, 21-22.
agreement with state agencies. This partnership avoids costs and delays associated with an enforcement-driven cleanup program. Simons evaluates state voluntary cleanup programs based on six critical elements to brownfield redevelopment that involve: the use of risk-based corrective actions that limits the level of cleanup according to the end use, availability of no further action letters and covenants not to sue, a memorandum of understanding between the state and the EPA, financial incentives to encourage redevelopment, lender liability exemptions, and comprehensiveness.35

**Brownfields Revitalization and Environmental Restoration Act**

In 2001, President Bush signed into law the Brownfields Act, which significantly amended the liability provisions under CERCLA in order to facilitate brownfield redevelopment and support communities in efforts to reduce environmental and public health risks, capitalize on existing infrastructure, attract new businesses and jobs, and improve their tax base.36 The Brownfields Act removes barriers to brownfields cleanup and redevelopment by providing liability protection to prospective purchasers, innocent landowners, contiguous landowners, and persons who cleanup property under state voluntary cleanup programs. The Act also provides federal funding of brownfield cleanup and state voluntary cleanup programs. While not absolute, the Act’s liability provisions demonstrate an evolution of brownfield legislation that now assists purchasers and property owners to undertake projects that cleanup and redevelop contaminated property.37

**The Postindustrial Landscape**

Brownfields imply contaminated property, but this does not fully describe the extent of the problem related to the postindustrial landscape. The U.S. Office of Technology’s definition of brownfield, as discussed above, indicates that surrounding conditions, particularly neighborhood decline, further complicate redevelopment efforts.

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35 Simons,
37 Hird, xxxv.
The following discussion connects brownfields, specifically derelict and contaminated industrial sites, with a spatial and systemic context. Exploring a site-context relationship describes a more complete picture of the challenges that confront brownfield reuse, and it begins a path that expands brownfield redevelopment activity to postindustrial landscape reclamation.

**Definition**

**Landscape**

The contemporary American definition of landscape is described in two-dimensional terms as "a portion of land or territory that the eye can comprehend in a single view."


39 Elana Giglio Ingegnoli in Vittorio Ingegnoli’s *Landscape Ecology: A Widening Foundation* argues that landscape is wrongly defined considering its etymology. Spirn in *Language of Landscape* argues that dictionaries need to be revised to reflect the older meanings of landscape. Jackson in *Discovering the Vernacular Landscape* argues that a new definition is needed.


The field of landscape ecology defines landscape as a system of ecosystems in a recognizable configuration that range in scale from approximately ½ to 55 squares miles. In consideration of this definition, an ecosystem concerns the functional relations between component communities of living things and the non-living elements of their environment. For example, living things include humans, animals, and plants; non-living elements include rocks, climate, and pollution. Ingegnoli argues that it is impossible to study an ecosystem below the scale of community without knowing its component populations. Similarly, to study an ecosystem at a larger scale leads to interrelationships with other ecosystems and the necessity to define a landscape. Naveh and Lieberman, considering biological and technological process together, propose seven major types of landscape: natural, semi-natural, semi-agricultural, agricultural, rural, suburban, and urban-industrial. The city thus functions as a landscape. These notions have relevance for the argument that brownfield redevelopment practice falls short of its potential without assuming a broader approach that acknowledges the interrelatedness of its surrounding environment.

Jackson proposes a new definition for landscape that captures a people-place relationship, but from a perspective without the ecological foundation. He defines landscape as “a composition of man-made or man-modified spaces to serve as infrastructure or background for our collective existence; and if background seems inappropriately modest we should remember that in our modern use of the word it means that which underscores not only our identity and presence, but also our history.” Jackson’s use of landscape pertains to the built environment as a reflection of the community in a particular place; he sought to describe the vernacular landscape. Fundamentally, landscape is an inhabited place important for people to establish an

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42 Vittorio Ingegnoli, Landscape Ecology: A Widening Foundation (New York: Springer-Verlag, 2002), 26. Additionally, a landscape has structure and function. Structure refers to the spatial relationships among the elements of the landscape. Function involves the interactions among the spatial elements.
43 Ingegnoli, 24. The classical definition of ecosystem is “a piece of earth of any size that contains interacting biotic and abiotic elements and that interacts with its surroundings.”
44 Ingegnoli, 75.
organization of space and time. People shape the landscape and in turn derive an identity from it, which provides a means to participate in the world.

While not fully employing the definition of landscape from the field of landscape ecology, this thesis uses the concept of interrelated social, economic, and ecological systems. Jackson's idea of people interacting in a built environment with some similarity of purpose also provides a parallel concept. This notion connects people to place in a three-dimensional shared reality. For example, the former steel mill site looked at in Buffalo created a powerful relationship with the surrounding residential community. Workers at the steel mill often lived in adjacent neighborhoods and residents were severely impacted by the closure and abandonment of the steel mill. A landscape is composed of the interrelatedness of function that connects an abandoned industrial site with a process of neighborhood decline. The definition of landscape used in this thesis expands upon Jackson's and incorporates the dimension of ecology in order to address the contamination caused by the prior industrial activity, as well as other issues of environmental degradation that often characterizes older urban areas. A landscape, therefore, consists of people, processes, and the environment recognized through a degree of commonality.

*Postindustrial*

To understand the term postindustrial, discussion must begin with a brief overview of the Industrial Era and subsequent deindustrialization. The Buffalo case study looks at a site once dominated by the production of coke and steel by the Hanna Furnace Corporation and Republic Steel Company beginning in the early 1900s. These companies were part of an industrial economic engine that facilitated Buffalo's livelihood and growth through jobs and taxes—heavy industry signified opportunity and progress. Similarly, Pittsburgh's numerous steel mills offered thousands of jobs and their output helped shape the Nation's built environment and caused the devastation that characterizes Nine Mile Run. For many, the smoke that polluted Pittsburgh's sky became associated

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47 For example, many older urban areas face problems with combined sewer overflows that pollute waterways when it rains.
with prosperity.\textsuperscript{48} Cities like Buffalo, Pittsburgh, and others associated with the Great Lakes basin thrived in their dependence on heavy industry and were considered in the industrial heartland of America. Deindustrialization, however, brought large-scale plant shutdowns in the auto, rubber, and steel industries between 1969 and the 1980s, which repositioned the region from heartland to Rust Belt.\textsuperscript{49}

Deindustrialization created severe economic, social, and ecological repercussions.\textsuperscript{50} Cities grew in proportion to the scale of their industries and loss of industry without a comparable shift to new forms of economic activity eroded the tax base and caused a “ballooned public sector.”\textsuperscript{51} Government became oversized and inefficient in managing a city that was economically struggling and shrinking in population. For remaining industrial operations, technological advances substituted labor with capital. In Buffalo, General Mills’ grain milling operation employed over 2,000 workers in 1935, but fewer than 200 in 1985 despite the same level of productivity.\textsuperscript{52} Relatively well paying blue-collar jobs were not equally replaced by a growing service sector. Price describes the overall economic transformation as a game of musical chairs with the chair removed representing a net loss in jobs, which led to dramatic levels of unemployment and poverty.\textsuperscript{53} Working in parallel with deindustrialization, the construction of an interstate highway system and federal homeownership programs facilitated decentralization and urban core out-migration (i.e., white flight to the suburbs). Interregional population shifts also occurred with the lure to Sunbelt states.

The Industrial Era left behind a legacy of derelict landscapes. Urban core areas became economically disadvantaged, socially distressed, and environmentally degraded through industrial contamination and a process of decline. The use of postindustrial in this thesis reflects the lack of renewal that followed the disappearance of heavy manufacturing and other industrial uses in urban locations.

\textsuperscript{49} Steven High, \textit{Industrial Sunset} (Toronto: University of Toronto Press Incorporated, 2003), 4.
\textsuperscript{51} Alfred D. Price, personal interview, 22 March 2004. Price stated that the City of Cleveland, Ohio recently laid off approximately 1,600 municipal workers, which demonstrated the repercussions from a ballooned public sector.
\textsuperscript{52} Price, personal interview.
\textsuperscript{53} Price, personal interview.
Dereliction

Dereliction represents an attribute of the postindustrial. As a classification of spatial and temporal dimensions, the concept requires further examination in order to understand how it operates in the postindustrial landscape. A 1946 British report defined derelict land as: “Land which has been so damaged by extractive or other industrial processes or by any form of urban development that in default of special action it is unlikely to be effectively used again within reasonable time and may well be a public nuisance in the meanwhile.” A 1966 definition, also British, defines derelict land as: “Land so damaged by industrial and other development that it is incapable of beneficial use without treatment.” These definitions imply that modern living equates to large material needs and intensive land use that radically degrades the landscape, i.e., “living = disturbance = damage.”

The term dereliction implies an intentional abandonment, and relevant to this discussion an obsolete use of the word related to failure, especially of physical or mental powers. The derelict landscape has failed to operate, and its abandonment has demoralized remaining inhabitants. Dereliction also involves a process of change; it exists at varying degrees and can be partial or pervasive. Jakle and Wilson describe the phases of landscape dereliction, specific to industrial decline, as follows:

1) Facilities become inefficient through physical or functional obsolescence;
2) Deferred maintenance then results from disinvestment and underutilization, which leads to physical deterioration and blight;
3) Vacancy often follows, providing opportunity for intrusion, theft, vandalism, and arson; and
4) With prolonged vacancy complete abandonment and degradation can follow, creating urban desolation.

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55 Bridges quoting British Ministry of Housing and Local Government, 2.
58 Bridges, 2.
60 Disinvestment implies exploiting physical assets by deferring maintenance to increase short-term profitability.
These phases identify dereliction as a process of decline without interruption by reinvestment. From a landscape perspective, derelict property amidst troubled socioeconomic and environmental systems can cause a trend of disinvestment. Through a site-context relationship “blight contagion” spreads over property lines and affects neighborhood and community. The barriers to site redevelopment thus become more formidable with economically disadvantaged and stigmatized surroundings.

Waste operates across the postindustrial landscape and takes the form of abandoned industrial facilities and fallow industrial land. The wasting of the urban environment includes tenantless commercial stores, deserted houses, vacant lots, and boarded up churches. This dereliction reflects structural changes in the economy, political decision making, societal preference, and a sustained process of decline. As waste operates in the urban core, suburban growth continues on new land. Rust Belt cities have exemplified this model of core area abandonment.

Postindustrial Landscape

The postindustrial landscape represents an urban area once defined by productive industrial uses that are now underused, idled, and mostly abandoned. The stigma of dereliction and real or perceived contamination presently characterize these industrial sites. The surrounding community, when affected through shared economic struggle, also composes this landscape. An environment with interrelated processes creates commonality with the industrial sites and community, a site-context relationship between built and natural structure and function. Voids and degraded systems describe the postindustrial landscape. The voids represent the abandoned industrial sites, as well as desertion in the neighborhoods. The degraded systems relate to social, economic, and ecological function affected by a lack of opportunity, impoverishment, and environmental contamination and pollution. The voids need to be filled and the degraded systems restored.

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61 Price, personal interview.
Reclamation

Four concepts in environmental science—restoration, regeneration, reclamation, and healing—relate to the process of resolving problems associated with damaged ecosystems. Restoration, typically, returns an ecosystem to its original structure and function. This thesis uses the term restoration (e.g., restorative redevelopment) similarly with regeneration, which revives an ecosystem in structure and function, but does not specifically return it to a former state. Reclamation, in simple terms, enhances value and livability and improves visual characteristics. Healing works to make the ecosystem more self-sufficient in its function.

This thesis uses the term reclamation to encompass the general effort of transforming the postindustrial landscape from a derelict and degraded state to a viable system. Reclamation involves social, economic, and ecological improvement—a triple-bottom-line approach. The effort recycles abandoned industrial sites for productive use and remediates environmental contamination; and it also works at a larger scale that goes beyond property lines in order to revitalize the surrounding community and restore the attendant ecosystem. The process of reclamation attempts to heal the postindustrial landscape in order to promote a more sustainable development through the incorporation of integrated solutions.

Historical Value

Industry indifferently shapes cities and a process of industrial transformation presents a difficult transition from old to new. The uneven development of capitalistic change bypasses certain areas in preference for others; it functions as a creative force of

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64 Ingegnoli argues that true restoration of an ecological system is theoretically impossible, as suggested by non-equilibrium thermodynamics, 266.
65 Triple bottom line, at its narrowest, is used a framework for measuring and reporting corporate performance against economic, social, and environmental parameters. In broader terms, it implies a set of values, issues, and processes that individuals and groups must address in order to minimize negative impacts that result from their actions and to create social, economic, and ecological value. SustainAbility Online, “What is the Triple Bottom Line?” <http://www.sustainability.com/philosophy/triple-bottom/tbl-intro.asp> (cited on 11 May 2004).
destruction that exhibits a dramatic discontinuity in the development of the built environment. The Industrial Era began a new age of technological progress and unequal but significant prosperity at the sacrifice of environmental health. Industrial transformation spurred by new technologies, shifting geographies of production, and a changed economy left behind previous modes of production and the environmental problems that they caused. Many industrial facilities were not reused or the land recycled. A process of decline ensued that became characterized by social distress, economically disadvantaged areas, and environmental impairment. The postindustrial landscape reflects the dramatic discontinuity of capitalistic change. Jackson generally discusses this cycle and the consequent necessity for ruins, which “provide the incentive for restoration, and for a return to origins.”

A return to origins offers an understanding of the past and a re-centering on the landscape. To reclaim what has been ruined and abandoned surely brings greater excitement and justification than the development of natural and cultivated open space. The steel mills, milling operations, shipping ports, and railways represent an opportunity to celebrate an important industrial past and a challenge to clean up and fill the voids of their remnant sites. Reclaiming the wastelands that afflict the postindustrial landscape thus provides a chance to rediscover and newly interpret history, as well as begin a story of renewal and hopefully one that sustains for many generations.

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68 The justification is one of sustainable development, where infill and redevelopment is favored over sprawl and loss of open space at the urban edge. Additionally, while economic justification may not warrant or support the reuse or redevelopment of postindustrial sites, a sustainable perspective could provide economic justification in the longer-term.

Brownfield Redevelopment in Theory and Practice

The theory and practice behind brownfield redevelopment has evolved in important and progressive ways since coordinated action began several decades ago. Kirkwood describes three overlapping developmental phases behind the cleanup and reuse of brownfields. The first phase began as an exclusively scientific approach with an objective to restore contaminated property to a pristine state, which gives little or no consideration to the site’s intended end use. This objective creates a rigid, sequential, and multiphase remedial strategy that generally consists of the following steps:

1) Preliminary site assessment
2) Site investigation/risk assessment (Phase 1 and 2)
3) Feasibility study
4) Remedial design/engineering
5) Remediation of affected area

This remediation strategy commonly prolongs site investigation and feasibility study phases at the expense of a delayed cleanup process, while the studies consume a substantial amount of development funds. Early federal, state, and private programs with

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a primary objective of environmental cleanup thus created a linear and protracted process that deterred widespread brownfield redevelopment.\textsuperscript{72}

The second phase assumed a broader focus and pursued brownfield redevelopment as an economic development vehicle suited to rebuild the economic base of communities. Brownfield initiatives provided liability protections and incentives to promote redevelopment. These initiatives also informed remediation programs, which led to the practice of risk-based corrective action that began in the 1990s. Because commercial and industrial uses can generally tolerate higher site contaminant levels than residential or community uses and still maintain "no significant risk" to human health or the environment, site cleanup criteria could vary in accordance with the intended end use.

The third phase integrates brownfield redevelopment with larger planning efforts to address regional issues of environmental health and economic competitiveness. Although current practice lags behind theory in the third phase, Kirkwood states an integrated planning model offers the potential to foster economic development, implement smart growth practices, and promote livable communities.

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<td>Scientific</td>
<td>Environmental Cleanup</td>
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<td>Second</td>
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With a "Brownfields Mission" to "empower States, communities, and other stakeholders in economic development to work together in a timely manner to prevent, assess, safely cleanup, and sustainably reuse brownfields," the EPA's theoretical approach reflects the economic development and integrated planning models.\textsuperscript{74} Additionally, in "A Sustainable Brownfields Model Framework" (EPA Framework), the EPA advocates for the sustainable reuse brownfields under ecological, social, and economic parameters, which relates to the potential benefits of the integrated planning

\textsuperscript{72} Cichon, 348.
\textsuperscript{73} Niall Kirkwood, "Why Is There So Little Residential Redevelopment of Brownfields?: Framing Issues for Discussion" (Joint Center for Housing Studies, W01-3, January 2001), 5.
model described above. The EPA Framework asserts that the inherent complexity and context of brownfields make a triple-bottom-line approach imperative.

Similarly with the EPA's objective to sustainably reuse brownfields, postindustrial landscape reclamation directly applies to an integrated planning model, but it functions at a smaller scale that pertains to the site and its surrounding community. While the notion of reclamation discussed in this thesis could readily combine with regional planning efforts in order to implement smart growth practice and promote livable communities, an intermediary phase is needed between Kirkwood's second and third developmental phases described above. This intermediary phase would still operate under an integrated planning model, but practice would serve to revitalize community and restore ecosystem health. The scale of this practice thus relates to site, community, and attendant ecosystem (i.e., landscape scale as defined in this thesis). An intermediary phase is also necessary as a foundation to make large-scale regeneration feasible, in other words regional efforts depend on local action. The EPA's Brownfields Mission, brownfields grants, and Framework acknowledges and operates at site-community scale more than a regional context. Municipalities and communities primarily use the Agency's grants for localized efforts. Postindustrial landscape reclamation pursues this practice scale, and the Nine Mile Run case study in Chapter Three exemplifies its implementation. The chart below presents a modified version of Kirkwood's phases in theory and practice of brownfield redevelopment.

### Modified Phases in Theory and Practice of Brownfield Redevelopment

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76 The Nine Mile Run project, as will be discussed in Chapter Three, also fits within a county-wide (large-scale) regeneration effort that relates to ecosystem restoration.
Chapter 3: Case Studies

As primary case studies, this chapter investigates Nine Mile Run and Summerset at Frick Park in Pittsburgh, Pennsylvania (sub-chapter one) and Village Farms and Steelfields in Buffalo, New York (sub-chapter two). The following paragraphs discuss the real estate development process and present how the case studies categorize this process.

The real estate development process generally consists of four phases:

- Predevelopment
- Commitment (final approvals and contract)
- Construction
- Occupancy and use

Predevelopment involves the due diligence and planning necessary to determine project feasibility and gain community, political, and financial support. During the commitment phase, developers form a joint venture and/or public/private development agreement, gain final permit approvals, secure financial commitments, set up the construction contracts, and negotiate the prelease agreements. During construction, developers undertake preleasing, demolition, environmental remediation, infrastructure work, installation of utilities, and building construction and/or rehabilitation. The remediation process in brownfield redevelopment may involve the following courses of action:

- Do nothing, no real (only perceived) contamination issues
- Use administrative controls
- Use design controls
- On-site remediation (in situ)
- Off-site remediation (ex situ)

The final phase, building occupancy, includes the activities related to the ongoing management of real estate, such as property and asset management. The building occupancy phase in brownfield redevelopment may also require long-term monitoring and maintenance of site remediation. The third and fourth phases can also overlap in projects where developers divide the site in phases. This thesis groups the

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predevelopment and commitment stages into a “mobilization” category and construction and building occupancy into an “implementation” category.
Chapter 3.1: Nine Mile Run and Summerset at Frick Park

This case study investigates Nine Mile Run in Pittsburgh, Pennsylvania, a 238-acre site devastated by millions of tons of slag, a by-product of the steelmaking process. In 1995, the Pittsburgh Urban Redevelopment Authority purchased the site and initiated a plan for its redevelopment. Two separate yet interrelated projects resulted: Summerset at Frick Park, a 710-unit neotraditional residential development facilitated through a public/private partnership between the Urban Redevelopment Authority and a team of developers; and the Nine Mile Run Greenway Project, a community-based, interdisciplinary effort launched by the STUDIO for Creative Inquiry at Carnegie Mellon University to address the public open space component of the site.

Nine Mile Run consists of a valley and stream, an environment once noted by Frederick Law Olmsted, Jr. for its natural beauty and potential use as a large park. Industrial progress, however, claimed Nine Mile Run for another purpose and then left
the site for ruin. After nearly three decades of abandonment, the site is being transformed into a residential neighborhood and, true to Olmsted's idea, a public park. The Greenway Project conducted the planning and design for the open space component of Nine Mile Run, an effort which evolved beyond site boundaries to encompass a watershed perspective. This expanded effort continues today through the Nine Mile Run Watershed Association. Additionally, several other projects developed during the same time frame that relate to Nine Mile Run and served to provide momentum and credibility to its reclamation, such as the Pittsburgh Regional Parks Master Plan, the aquatic restoration of the Nine Mile Run stream conducted by the U.S. Army Corps of Engineers, and remediation of the sanitary sewer problems in the surrounding watershed. Together, these efforts connected the redevelopment of a derelict industrial site with broader community issues and a watershed ecosystem scale.

This dual-part case study begins with an outline of the regulatory environment that pertains to brownfield redevelopment in Pennsylvania. The second section provides an overview of Pittsburgh's industrial history and inheritance of devastated landscapes. The remaining parts describe the Nine Mile Run site and surrounding area, and then examine the Summerset development and Greenway Project.

### Regulatory Environment

#### Brownfield Definition

Pennsylvania defines brownfields as “abandoned, idle, or under-used industrial or commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.”

#### Brownfield Cleanup Programs

Pennsylvania’s initiated its state voluntary cleanup program, called the Land Recycling Program, in 1995. This Program identifies risk-based cleanup standards, simplifies the approval process through standardized review and time limits, and offers

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full release of liability with completion of approved cleanup standards. Pennsylvania legislation also provides fiduciaries, lenders, and economic development agencies protection from environmental cleanup liabilities if they did not cause the site contamination in question. Additionally, the Pennsylvania Department of Community and Economic Development and Department of Environmental Protection provide various financing programs and incentives to attract private investment to brownfields, such as the Industrial Sites Reuse Program and Job Creation Tax Credit Program.

Commentary

The Department of Environmental Protection has approved 1,378 brownfield cleanups in 64 counties under the Land Recycling Program since 1995. Harvard University and the Ford Foundation nationally recognized the Program through the Innovations in American Government Award. Additionally, the Department of Environmental Protection created an on-line “one-stop-shop” resource for brownfields called the PA SiteFinder. This resource assists users to market, find, redevelop, and finance brownfield transactions. As support for the PA SiteFinder, Brownfields Inventory Grants provide up to $50,000 to municipalities and economic development agencies to inventory their brownfield properties. For each inventoried and available property posted on PA SiteFinder, the grantee receives $1,000.

History

Pittsburgh’s Industrial History

Located west of the Alleghany Mountains in Southwestern Pennsylvania, the City of Pittsburgh grew amidst hills and at the confluence of three rivers—where the Alleghany and Monongahela converge to form the Ohio. The region’s natural resources played a vital role in its urban history. Southwestern Pennsylvania’s extensive bituminous coal field, an available timber supply, and network of waterways set the stage for its industrialization and predominance in metallurgy. Even today, the World Coal Institute labels coal as the “power for progress.”

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79 Bartsch and Dean, 79.
80 Even today, the World Coal Institute labels coal as the “power for progress.”
require the main ingredients of iron ore, coke (made from coal), and limestone. Approximately 1 ton of coal serves to produce 1.4 tons of steel.81

By 1803, iron production became Pittsburgh’s most valuable industry.82 By 1875, the steel industry had moved to Pittsburgh and Southwestern Pennsylvania soon became the Nation’s steel empire. This region’s mass production of steel played an important role in the industrialization of America, as well as shaping its built environment. Steel from the Pittsburgh area supports such iconic structures as the Brooklyn Bridge and Empire State Building.

Industrialization and rapid urban development, however, had significant consequences on the area’s environment. Frenetic economic growth without land use restrictions and environmental regulation translated into public health issues and an ad hoc development pattern. Progress supplanted quality of life and landscape aesthetics as air quality, water supplies, and terrain became severely impacted.83 The riverfronts were overtaken by steel mills, rail lines, and other industrial uses that cut off public access. As result of intensive industrial activity along these shorelines, the Monongahela River, for example, was known to reach temperatures of 120 degrees Fahrenheit.84

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84 McElwaine, 2.
Site History

Late nineteenth century uses in the Nine Mile Run valley included a salt mine, several farms and houses, and a small golf course. Prior to the valley becoming devastated by slag, images from the early twentieth century depict a lush valley with little development. At this time, Nine Mile Run represented one of the largest undisturbed areas that remained in the city and the last significant connection to the Monongahela River uninterrupted by industry. Hired by the Pittsburgh Civic Commission in 1910, Frederick Law Olmsted, Jr. prepared the “Pittsburgh Main Thoroughfares and the Down Town District” plan, with recommendations that included a new system of downtown roads, the conservation of steep slopes, and riverfront enhancement. The Olmsted report also made note of Nine Mile Run:

Perhaps the most striking opportunity noted for a large park is the

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85 McElwaine, 3.
valley of Nine Mile Run. Its long meadow of varying width would make ideal playfields; the stream, when it is freed from sewage, will be an attractive and interesting element in the landscape; the wooded slopes on either side give ample opportunity for enjoyment of the forest, for shaded walks and cool resting places; and above all it is not far from a large working population in Hazelwood, Homestead, Rinkin, Swissvale, Edgewood, Wilkensburg, Brushton, and Homewood; and yet it is so excluded by its high wooded banks that the close proximity of urban development can hardly be imagined. If taken for park purposes, the entire valley from the top of one bank to the top of the other should be included, for upon the preservation of these wooded banks depends much of the real value of the park.  

In 1923, Pittsburgh passed an ordinance that zoned all 238 acres of Nine Mile Run for residential use, but this effort came too late. The Duquesne Slag Products Company of Pittsburgh purchased 94 acres of the site in 1922 for the disposal of slag. Claiming a grandfathered status, the company was able to proceed with dumping operations despite the residential zoning. Stretching this grandfathered status arguably beyond its legal limits, Duquesne Slag expanded its dumping operation on property it continued to purchase until 1962. After 40 years the company owned nearly 200 acres of the Nine Mile Run valley.

Industrial progress devastated Pittsburgh’s landscape, as described in 1930 by

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86 McElwaine, 5.
87 The timing of Duquesne Slag Products Company’s purchase seems suspect; McElwaine states: “Although there is no evidence that the company was influenced by the pending zoning decision, one wonders whether they made the purchase in order to preempt protective legislation,” 8.
88 McElwaine, 10.
R.L. Duffus writing in the *Atlantic Monthly*:

From whatever direction one approaches the once lovely conjunction of the Alleghany and the Monongahela the devastation of progress is apparent. Quiet valleys have been inundated with slag, defaced with refuse, marred by hideous buildings. Streams have been polluted with sewage and the waste from the mills. Life for the majority of the population has been rendered unspeakably pinched and dingy. ... This is what might be called the technological blight of heavy industry. 89

![Slag dumping operation (Greenway Project)](image)

Heavy industry caused a Faustian arrangement that sacrificed the natural value of Nine Mile Run for the material gains achieved in the name of progress. The "technological blight" that characterized the valley demonstrates the inefficiency of steel production, where 1 ton of steel results in ¼ ton of blast furnace slag. Where does it get dumped—"slag in the park."90 Located within miles of the nation's largest steel mills, Nine Mile Run gave Duquesne Slag a competitive advantage with lower transportation costs. The mills owned by the Jones and Laughlin Steel Company became the valley's main contributor of slag. After 50 years of dumping, this "quiet valley" became inundated with 17 million cubic yards of slag that reach heights of 200 feet and left slopes as steep as 80 percent, which corresponds to the material's maximum angle of repose when dumped.

The prevailing value system in Pittsburgh's industrial era supported progress over

89 Tarr, 533.
90 McElwain, title.
environmental protection. Despite its natural beauty and potential for public open space, Nine Mile Run became the dumping ground for a by-product of the steel industry. Fortunately now, the National Slag Association has reclassified slag from a by-product to "co-product" of steel production. As co-product, the construction industry uses slag as "premium" asphalt aggregate and a raw ingredient in Portland cement manufacture. The National Slag Association, though founded in 1918 before Nine Mile Run became filled with slag, has even adopted the mantra of sustainability and states: "Protect the environment. Think re-use and use slag, a renewable resource, in your next Green project." 

## Context and Planning Efforts

### Wastelands in the City

![View of Nine Mile Run slag-filled valley with evidence of midnight dumping.](image)

In 1972, Duquesne Slag ceased their dumping operations and Nine Mile Run became an urban wasteland. Its dereliction invited further "midnight dumping," as evident by garbage and rusted out automobiles that still exist there today. Site

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91 Tarr, 540.
assessment reports also indicated construction debris from adjacent Interstate 376. Auto traffic that headed east on Interstate 376 toward downtown had direct view of the valley’s devastation for nearly 30 years. The slagheap was part of the scenery; shocking to onlookers who saw it for the first time and embedded in the awareness of those who regularly passed by. Although area locals joke about slag being the second soil in western Pennsylvania, Nine Mile Run represents an unwanted monument to the steel industry and the technological blight that it caused.

View of Interstate 376 from Nine Mile Run.

Urban Redevelopment Authority’s Track Record

The costly and uncertain endeavor of derelict and contaminated industrial site redevelopment largely precludes the unassisted for-profit developer. The Urban Redevelopment Authority acts as a “developer of last resorts,” and facilitates private sector involvement through various incentives and subsidies. Marc Knezevich, Senior Project Development Specialist and involved with Nine Mile Run, attributes the Agency’s success in brownfield redevelopment to its ability to incorporate challenging environmental issues as part of a feasible development process. The following track record demonstrates the scale and complexity of projects that the Agency undertakes:

Pittsburgh Technology Center

The Jones & Laughlin Steel Company used this 48-acre site as part of their integrated steel

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93 McElwaine, 12.
94 Weber, 1.
mill operation, which consumed almost 3 miles of riverfront along both sides of the
Monongahela. The Urban Redevelopment Authority has guided the site’s ongoing
redevelopment toward advanced technology uses, such as facilities for the University of
Pittsburgh in biotechnology and Carnegie Mellon University in computer science.

![The new industry: Pittsburgh Technology Center with downtown Pittsburgh in the background.](image)

**Washington’s Landing**

This 42-acre island served as a rest stop for livestock, cattle rendering operations,
meatpacking, and a rail car repair yard. As a multiuse redevelopment, Washington’s
Landing now features office, light industrial, residential, and recreational uses.

![Residential component of Washington’s Landing.](image)

**Hays Ammunition Plant**

The U.S. Army remediated and then donated the property to the Urban Redevelopment
Authority in 1993. The only site not located riverside, a developer rehabilitated the
former ammunition plant in 1996 for a light industrial use.
**South Side Works**

Similarly to the Pittsburgh Technology Center, the Jones & Laughlin Steel Company's used this 130-acre site as part of its integrated steel mill operations. Its proposed redevelopment involves a mixture of residential, retail, office, and waterfront recreational uses.

In the cases listed above, the Urban Redevelopment Authority purchased the site and partnered with private developers. The Agency generally develops infrastructure for the projects and then retains ownership of leasable property. The Agency takes a lead role in redevelopment in order to efficiently secure and administer public financing, maximize “public benefit” through greater site control, readily generate multilevel government support, and manage project economics for flexibility in attracting private developers.96

**Area Description**

The Nine Mile Run site consists of a slag-filled valley and stream 238 acres in size. Frick Park, consisting of 476-acres, borders the site to the north and the Monongahela River to its south. The Nine Mile Run stream first daylights in Frick Park, travels through the site, and outflows into the Monongahela. The name “Nine Mile Run” identifies a stream nine miles distance up the Monongahela River from Point State Park in downtown Pittsburgh.97 For its duration through Frick Park and the site, the waterway signifies one of the last visible streams in the city. Slag fills the stream’s floodplain and confines its course amidst a steep ravine of up to 200 feet. Approximately 48,000 people live in the 6.7-square-mile watershed associated with the stream, which includes portions of Pittsburgh and the boroughs of Edgewood, Swissvale, and Wilkinsburg. Frick Park and Nine Mile Run make up a significant amount of the watershed’s 34 percent open space.

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97 Point State Park is in downtown Pittsburgh, located where the Alleghany and the Monongahela Rivers converge to form the Ohio River.
Development Process

Mobilization

Early Attempts

Despite the slagheap, Nine Mile Run has significant locational value with access to an interstate highway, proximity to downtown, and adjacency to Frick Park and the Monongahela River. With their operations ending, Duquesne Slag conducted several environmental studies to determine the feasibility of redevelopment, which considered options to culvert or relocate the stream. A study completed in 1974 presented preliminary foundation recommendations for the support of low- and high-rise buildings on areas of slag.\textsuperscript{98}

In an attempt to initiate redevelopment of Nine Mile Run, the Urban Redevelopment Authority submitted a plan in 1982 that identified the site as the last sizable tract of developable land within city limits between the Alleghany and Monongahela Rivers.\textsuperscript{99} The agency’s mixed-use development proposal consisted of residential, office, research and development, and light industrial uses. The plan,


\textsuperscript{99} The Urban Redevelopment Authority did not own the property when they prepared this plan.
however, did not attract private sector interest.\textsuperscript{100} In 1987, a private developer proposed a large-scale mixed-use project that involved a 3-million-square-foot regional shopping mall with four major department stores, four office buildings, and a hotel. Neighborhood opposition, however, prevented this project from moving forward.\textsuperscript{101} Nine Mile Run presented many challenges to redevelopment, both in devastated site conditions that created high uncertainty and stigma, and neighborhood opposition over a project that would generate too much traffic.

\textit{Summerset at Frick Park}

For 20 years Mayor Tom Murphy jogged the trails in Frick Park and through Nine Mile Run. Then one day he realized the slag-filled valley was ideally located close to downtown, within an established area, and had terrific views of the Monongahela and surrounding hills.\textsuperscript{102} Nine Mile Run offered a valuable opportunity. After elected in 1994 he created a brownfield redevelopment fund in an effort to recycle Pittsburgh’s abandoned industrial lands. A 50-year Rust Belt trend of population decline and job loss motivated his actions. The Urban Redevelopment Authority subsequently purchased Nine Mile Run in 1995 for $3.8 million, the Agency’s largest acquisition to date, and initiated the site’s redevelopment.

Commissioned by the Urban Redevelopment Authority, Copper Robertson & Partners released a neotraditional neighborhood design for Nine Mile Run in 1996. The plan proposed a mixture of uses with an objective to “create a compact, urban place.”\textsuperscript{103} The scheme involved 950 to 1,200 housing units comprised of single-family attached and detached houses, stacked townhouses, and apartments; 15,000 square feet of retail space that included an offsite component of 100,000 square feet; an elementary school; open space for neighborhood active and passive recreational use, as well as a link between Frick Park and the Monongahela; other amenities such as institutional or civic sites for a church, post office, and daycare; and a neighborhood community/recreation center.

Few developers responded to the Urban Redevelopment Authority’s request for

\textsuperscript{100} Stikkiers, 9.
\textsuperscript{101} Stikkiers, 9.
proposals because of the stigma associated with the site. Developers feared the inability to sell homes built on a slagheap. The Agency selected Summerset Land Development Associates, composed of a team of developers, and intended construction to begin in 1998. As with previous projects, the Urban Redevelopment Authority retained ownership of the site and formed a public/private partnership in order to carry out the development process. This arrangement allows the Agency to receive a percentage of the proceeds from each lot sold. The Urban Redevelopment Authority, however, did not conduct a public review process for the project and the release of the plan met with strong neighborhood opposition over traffic generation and environmental issues. To address this opposition, the agency held more than fifty meetings in 1997, and the plan went through numerous revisions. Additionally, a citizens’ task force convened in 1999 to facilitate ongoing neighborhood involvement in the development process.

**Nine Mile Run Greenway Project**

The 1996 plan for Nine Mile Run proposed to partially culvert the stream and regrade the steep slopes over it. By making the valley smaller and at a higher level, a larger area was available for development. This original proposal involved approximately 240 to 490 more housing units than the project under construction today, which, without the stream culverted, will have a total of 710. The plan stated that culverting Nine Mile Run was the most viable option and that the filled area, in addition to more development, would provide a path connection between Frick Park and the Monongahela River. This ecologically insensitive redevelopment approach for the site sparked wide community protest and initiated what later became the Nine Mile Run Greenway Project. The proposal to culver the stream was subsequently abandoned, but the overall lack of planning for the 130-acre public open space component offered an opportunity for further action.

The Greenway Project began in 1997 by a team of artists, a lawyer, scientists, and

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105 Stikkers, 10.
106 Copper Robertson & Partners, 5.
designers that set out to develop an experiment in postindustrial public space. This team submitted a proposal to the Urban Redevelopment Authority to design and develop the open space component of Nine Mile Run. The Greenway Project worked out of the STUDIO for Creative Inquiry, a research center in the College of Fine Arts at Carnegie Mellon University with a mission to "support creation and exploration in the arts, especially interdisciplinary projects that bring together the arts, sciences, technology, and the humanities, and impact local and global communities." The Greenway Project sought to deviate from the conventional expert-driven approach to brownfield redevelopment and instead undertake a collaborative public process to reclaim a portion of the Nine Mile Run postindustrial landscape.

The Greenway Project worked under a three-point philosophy that involved restoration ecology, reconstructive postmodern art, and community dialogue. The first theoretical approach, restoration ecology, provides an integrative strategy to repair damaged ecological systems, both functionally and aesthetically, and pursue the notion that "restoration practices which hold firm to ecological fidelity and embrace social and cultural goals are much more likely to prosper and endure." Working with the community in an interdisciplinary capacity, the Greenway Project intended to identify environmental problems with Nine Mile Run and develop solutions that met social, economic, aesthetic, and ecological objectives. The second theoretical approach, reconstructive postmodern art, combines socially-based art practice and reclamation art in order to connect the public to environmental issues, create a sense of social responsibility, and provide greater understanding of ecological systems. This approach would engage the community in a creative process that educates and aesthetically enhance a devastated landscape. The third theoretical approach, community dialogue, pursues informed democratic discourse in order to understand complex public issues, such as those inherent to the postindustrial landscape. Community dialogue serves to build an interactive relationship between public participants and experts in a decision-

making process that facilitates greater understanding and ownership of a project. This process informs plan development and leads toward the Greenway Project’s goal of sustainable stewardship of the open space. The Greenway Project’s organizers intended to use the three theoretical approaches as foundation for creating alternative development models for the public open space component of Nine Mile Run.

While not comprehensive, the following paragraphs provide a description of the collaborative and momentum-building planning effort that surrounded the Greenway Project. The Greenway Project began with obtainment of a $65,000 grant from the Heinz Endowments that facilitated “Ample Opportunity: A Community Dialogue,” a year-long series of public charrettes that set out to explore “the meaning and function of postindustrial public space” within a social and ecological perspective. A diverse group attended educational workshops that focused on the following topics: history, context, and public policy; urban stream remediation; soil, slag, and habitat; and sustainable open space. The workshops followed a five step process that involved: distribution of a white paper on the topic, on-site tours, expert discussion on the issue and alternative approaches, integrated expert/citizen community dialogues, and analysis of expert and citizen comment with equal weight. Carnegie Melon University also provided an on-site classroom and community resource center in the form of a trailer with sanitary facilities. At the end of the year-long process, the Greenway Project published a report that included white papers, transcripts of the community dialogues, and analysis.

In year two, the Greenway Project continued the community dialogue and conducted an ecological study of the Nine Mile Run landscape. The interdisciplinary team also studied the site’s cultural and historical background, as well as infrastructure. The City of Pittsburgh Planning Department participated with the STUDIO for Creative Inquiry in this effort to prepare a proposal entitled “Nine Mile Run – Frick Park Watershed Project,” which addresses site brownfield and stream issues, connection to Frick Park and the Monongahela River, and larger watershed problem. The Greenway Project used these findings, with an additional $250,000 grant from the Heinz Endowments, to develop a set of design alternatives for the open space, which were then presented for a community decision-making process and development of a final plan.

In the third and final year, from July through August of 1999, a downtown Pittsburgh gallery hosted the Nine Mile Run Greenway Project’s public exhibit called “Conversations in the Rust Belt: Brownfields into Greenways.” This exhibit consisted of two levels, one that described Nine Mile Run’s industrial history and the other the consequential postindustrial and how to redefine this landscape. In December of 1999, the Greenway Project published its final report, “Final Recommendations—The Nine Mile Run Greenway Project: An Institutional and Economic Plan with Conceptual Design Guidelines.” This report, extending beyond the Nine Mile Run site and into the larger watershed area, encompasses the public open space functions, management structure, and funding requirements. The Greenway Project also has a webpage that

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111 This proposal, released in 1998, occurred under the Pennsylvania Rivers Conservation Grant Program.
posted Nine Mile Run related information and publications, as well as an interactive CD for distribution that presents its work.

During the same time frame as the Greenway Project, there were three separate yet interconnected planning efforts underway that affected Nine Mile Run. For one, a Pittsburgh Regional Parks Master Plan acknowledged the Nine Mile Run greenway as an extension of Frick Park, which opened up funding opportunities for both capital improvements—constructing components of the Greenway Project’s plan—and future maintenance. Additionally, the Regional Parks Master Plan established principles to guide future park development and maintenance that were compatible with the Greenway Projects efforts. These guiding principles included:

- Integrate current use, ecology, and history;
- Build sustainable landscapes that preserve and restore ecology and history;
- Develop long range stewardship, maintenance, and management practices; and
- Foster a network of connections.

The U.S. Army Corps of Engineers also took part with an “aquatic ecosystem restoration” project initiated in 1998 for Nine Mile Run that extends from Frick Park to the Monongahela River. After conducting studies, the Army Corps of Engineers issued a report in 2000 that found the uncontrolled release of sewage from sanitary sewer overflows and combined sewer overflows as the primary contamination of the Nine Mile Run stream. The work currently underway to restore the degraded aquatic habitat includes channel stabilization and wetland creation to mitigate erosion during high water periods. Ultimately, as exhibited on the Summerset development’s marketing material, the restoration project will reincorporate fish into the stream habitat.

The third planning effort began in response to the documented problems of chronic sewage overflows into the Nine Mile Run stream. Similar problems also troubled the region as a whole, as made evident in 1997 when the U.S. EPA initially cited more than 50 communities in the Allegheny County Sanitary Authority service area for sewage overflows that violated the federal Clean Water Act. Assisting to addressing this issue,

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112 As response, the 3 Rivers Wet Weather Demonstration Program began in 1998 to help Alleghany County municipalities address these sewer infrastructure issues, <http://www.3riverswetweather.org/> (cited 5 May 2004).
the STUDIO for Creative Inquiry, Rocky Mountain Institute, and other participants collaborated in a three-day public charrette and produced a proposal entitled “Re-Evaluating Stormwater: The Nine Mile Run Model for Restorative Redevelopment.” This proposal utilizes a “restorative redevelopment” approach to alleviate the sanitary sewage overflow problems and recommends watershed-wide strategies that disconnect pavement and roof drainage from sewer lines, collects runoff in infiltration basins, utilize tree plantings, restores historic streams, etc. The proposal claims that implementation of these strategies can occur through technically and economically feasible retrofit and redevelopment projects, which improve value and livability of the city while effectively restoring the watershed’s natural functions.\(^{113}\) The effort officially began in 2000 when the Pennsylvania Department of Environment Protection signed a “Consent Order and Agreement” with local municipalities and the Pittsburgh Water and Sewer Authority to eliminate sanitary sewage discharge into the Nine Mile Run stream. As part of the Greenway Project’s final proposal, a not-for-profit Nine Mile Run Watershed Association was established in 2001 to continue the effort and support watershed residents’ efforts to increase greenspace, promote lot level solutions to stormwater problems, provide citizen training for urban ecological stewardship, and act as a clearinghouse about key watershed issues.\(^{114}\)

**Implementation**

**Remediation: Summerset at Frick Park**

The derelict landscape of Nine Mile Run required significant treatment in order to become developable. The Urban Redevelopment Authority, Planning Department, and developer team entered into a “Consent Order and Agreement” with the Pennsylvania Department of Environmental Protection for the cleanup and redevelopment of Nine Mile Run. The greatest challenge, however, did not result from contamination issues but from the site work needed to support development in an environmentally considerate and publicly safe manner. In order to avoid transferring the problem elsewhere, all existing


materials were kept on site. Summerset Phases 1 and 2 used on-site slag, concrete debris, and other materials for grading. In regards to off-site material, the development plan only permitted natural soil for use in the soil/slag/mulch blend for treating the slag slopes, and later the natural soil cover for all slag areas.5

A 2002 report for Nine Mile Run characterizes the slag as potentially expansive, a quality that can result in instability under foundations and potentially cause ground heave.116 In order to address, the report recommends that the entire subgrade be “proof where space permits with five passes of a 50-ton rubber-tired roller” and that slag fill used to support structures, subgrades of roads, etc. be compacted to 95 percent of its maximum dry density.117 The suitability of slag as a base for construction thus depends on the appropriate design. Murray Rust of Montgomery & Rust, Inc., a partner of the Summerset developer team, stated that his company modified its house designs to accommodate for potential ground expansion.118 He further stated that the re-enforced design adds $4,000 or $5,000 extra construction cost per house, and that this increased cost provides functional value but no house value.

Aside from dealing with the steep slopes, the U.S. Department of Health and Human Services stated in a “Health Consultation” that the Nine Mile Run slag area “poses no apparent public health hazard to site workers and nearby residents as long as contractors use appropriate dust control measures during grading and construction.”119 Without such control measures, “uncontrolled dust from grading could pose a chronic airborne-manganese inhalation exposure problem,” though unlikely. Additionally, a Summerset Phase 2 area environmental report concluded that potential environmental hazards encountered during grading and infrastructure construction involve isolated and small areas of waste oil mixed with slag.120 This report also found semi-volatile organic compounds and metals in surface and subsurface slag. To address this contamination, it

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5 GAI Consultants, Inc., “Geotechnical Investigation: Phase 2 Area” (prepared for Pittsburgh Urban Redevelopment Authority, December 2002), 12.
117 GAI Consultants, Inc., 12.
120 GAI Consultants, Inc., “Pre-Grading Environmental Sampling Report” (prepared for Pittsburgh Urban Redevelopment Authority, November 2002).
stated that application of a 30-inch clean soil cover to all slag areas within the
development area not covered by streets or homes would eliminate exposure by future residents.\textsuperscript{121} Final site remediation before homes could be occupied, therefore, simply
involved capping the slag with soil cover. As a result of the underlying slag and the
potential for expansion, use limitations prohibit pools and in-ground sprinkler systems.

\textit{Remediation: Mile Run Greenway Project}

Constituents in the slag impact water quality in the Nine Mile Run stream.
Leachate that enters the stream from the highly permeable slag areas develops a pH level
of 9.6 to 10.6.\textsuperscript{122} This high alkalinity inhibits plant growth and thus negatively affects the
stream’s aquatic habitat. To address this, the Summerset development redirects a
significant amount of drainage from on top of the slagheap directly into the stream.
While this measure represents a solution to prevent high pH-level leachate from entering
the stream, as well as prevent expansion of the ground and damage to houses in
Summerset, the outflows discharge at 90 degree angles directly into the stream banks and
pose erosion issues, which works counter to the Army Corps of Engineers’ aquatic
ecosystem restoration project.

In addition to slag leachate, upstream sewerage overflows pollute the stream.
Olmsted noted this sewage problem in 1910, and it persists today. All four Nine Mile
Run watershed municipalities contribute to the stream’s problems, which involve inputs
of domestic sewage from unauthorized sewer discharges to the upstream culverted
section, sewer leakage or unauthorized sewer discharges to storm water sewers, and
sanitary and combined sewer overflows. As discussed under the Mobilization section
above, the Greenway Project’s original site-specific focus expanded into Frick Park and
eventually to encompass the entire watershed through the continuing efforts of the Nine
Mile Run Watershed Association. Supported by related municipal and county efforts, the
Watershed Association conducts community outreach activities that promote awareness

\textsuperscript{121} U.S. Department of Health and Human Services, 4. Quantity of semi-volatile organic compounds and
metals found in the slag had on occasion exceeded “Act 2 Standards,” but the report maintains that
“environmental conditions of the site will not present a hazard to site users once the final cover soils have
been placed.”

\textsuperscript{122} Advanced Technology Systems, Inc., “Volume 1: Clean-up Plan for Nine Mile Run Slag Area, Final
Report” (prepared for Pittsburgh Urban Redevelopment Authority, May 1999), 26.
and restorative redevelopment practice to address sewage overflow problems.

*Construction: Summerset at Frick Park*

The developer team eventually named the project “Summerset at Frick Park,” which capitalizes off of the proximity to Pittsburgh’s largest park and its extension, via the Nine Mile Run greenway, into the site. The Summerset development represents a significantly scaled down version of the original scheme proposed in 1996, which now consists of 710 units (with no commercial component) broken down into three phases for build-out in 10 years. Construction began in 2001 and more than 2,000 people turned out for the model home opening. The builder then held a lottery for selling the 42 homes available in Phase 1A, and with 75 people on the list the homes sold in an hour. Summerset provides mixed-income housing types, but no subsidized affordable units. Sale prices for Phase 1A ranged from $250,000 to $700,000. The first residents moved in on May 2002. Summerset has benefited from a strong housing demand, convenient location, and its high quality product. Though not at the previous rapid pace, sales remain strong for Phase 1B. Phase 2’s progress has been delayed because of the public/private partnership between the Urban Redevelopment Authority and the Summerset developer team. Under this partnership, the Agency responsibilities include site grading and infrastructure construction. Development thus depends on the Urban Redevelopment Authority’s execution, and the City of Pittsburgh’s current “financial

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123 Weber.
“crisis” has slowed spending.\textsuperscript{124}

\begin{figure}[h]
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\includegraphics[width=\textwidth]{summerset_frick_park}
\caption{Summerset at Frick Park.}
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Construction: Nine Mile Run Greenway Project

Pennsylvania’s governor awarded $7.5 million in Capitol Budget Redevelopment Assistance funds in 2000 to implement the Nine Mile Run greenway plan as an extension of Frick Park. Though implementation of the greenway plan has not begun, the Army Corps of Engineers is currently performing work on the aquatic ecosystem restoration project.

\textsuperscript{124} Marc Knezevich, Senior Project Development Specialist at the Pittsburgh Urban Redevelopment Authority, personal interview, 24 March 2004.
Chapter 3.2: Village Farms and Steelfields

This case study investigates the Republic Steel site in Buffalo, New York, formerly used for steel and coke manufacture and currently divided into two sites with one owned by the Buffalo Economic Renaissance Corporation and leased to Village Farms of Buffalo, Inc. (Site A) and the other owned by Steelfields Ltd. (Site B). The Renaissance Corporation and Village Farms, in a public/private partnership, redeveloped Site A into a large-scale greenhouse and distribution facility for growing hydroponic tomatoes. Steelfields is currently taking Site B through a remediation process under the State’s voluntary cleanup program with the first phase nearly complete and the remaining phases due for completion in 2007. The “South Buffalo Redevelopment Plan” envisions Site B as a “rail to truck” and “truck to truck” goods transfer facility, light industrial/office park development, and golf course. The South Buffalo Plan, proposed in 1997, targets over 1,200 acres of contiguous brownfield properties that extend south of downtown along Lake Erie and into the City of Lackawanna; the Republic Steel site represents 351 acres within that area.

The EPA played an instrumental role in Site A’s redevelopment and Site B’s ongoing cleanup when it refined the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLA List), an automated

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125 At the time of sale and site redevelopment, the Buffalo Economic Renaissance Corporation was known as the Buffalo Enterprise Development Corporation. The Buffalo Economic Renaissance Corporation is a quasi-public, not-for-profit local economic development corporation pursuant to the statutes of New York State.
inventory of site information for potential or confirmed hazardous waste sites addressed under the Superfund program. As part of the EPA’s Brownfields Economic Development Initiative in 1995, the CERCLA List reform allowed for the archiving of evaluated sites that do not require further Superfund work. Prior to this archiving effort, the EPA combined these sites with ones that needed further evaluation or cleanup. As a result, the perceived threat of Superfund liability hung over any site on the inventory list. While not necessarily free of contamination, a site with archive designation does not require cleanup under the federal Superfund program, which can serve as a key variable in redevelopment decisions. The EPA’s removal of the Republic Steel site from the CERCLA List allowed for Site A’s redevelopment and Site B’s voluntary cleanup activity.¹²⁶

This two-part case study begins with an outline of the regulatory environment for brownfield redevelopment in New York State. The second section provides an introduction to Buffalo’s industrial history and the consequential inheritance of devastated landscapes. The third section provides descriptions for the Republic Steel site and its context, followed by descriptions of the projects related to Site A and B relative to their development processes.

**Regulatory Environment**

**Brownfield Definition**

New York State, through the new Brownfield Cleanup Program enacted in 2003, defines brownfield as “any real property where redevelopment or re-use may be complicated by the presence or potential presence of a hazardous waste, petroleum, pollutant, or contaminant.”¹²⁷ Before the Brownfield Cleanup Program, New York non-statutorily defined brownfield as “an abandoned, idled, or underused property where

expansion or redevelopment is complicated by real or perceived environmental contamination."\(^{128}\)

**Brownfield Cleanup Programs**

Remediation efforts at Site B fall under the New York State’s Voluntary Cleanup Program initiated in 1994 by the State Department of Environmental Conservation. As an administrative tool for the Agency, specific statutory authority did not support the Cleanup Program.\(^{129}\) The Program allows applicable volunteers to enter into an agreement with the Agency to investigate and/or clean up contaminated property. As part of this agreement, volunteers pay for Agency’s oversight costs in exchange for a no-further-action letter and a release from liability for historical contamination. The Department of Environmental Conservation’s no-further-action letters, however, are subject to “reopeners” that allow the State to require additional site cleanup upon discovery of certain conditions.

The Cleanup Program also permits risk-based corrective action based on the site’s intended future use. For example, since Steelfields proposes a light industrial/office use for Site B, the Department of Environmental Conservation allows cleanup standards designed to achieve “no significant risk” for that level of use. To enforce this, the Agency will require Steelfields to place an institutional control on the property that restricts its use.

Approved under the Clean Water/Clean Air Bond Act in 1996, the Environmental Restoration Projects, or Brownfield Program, also promotes brownfield redevelopment in New York for municipality-owned sites. The Brownfield Program reimburses municipalities for up to 90 percent of on-site eligible costs and 100 percent of off-site eligible costs for brownfield investigation and remediation activities.\(^{130}\) The Brownfield Program then gives liability release and indemnification to municipalities and subsequent owners, lessees, and lenders.\(^{131}\)

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\(^{130}\) Governor Pataki enacted enhancements to the Brownfield Program in 2003. Previously, reimbursements for investigation/remediation costs only covered 75 percent.

\(^{131}\) Salinger, 783.
In 2003, Governor Pataki signed legislation that created the new Brownfield Cleanup Program, modeled after the State's Voluntary Cleanup Program. In the Brownfield Cleanup Program, the Department of Environmental Conservation and the Department of Health determine the acceptable level of cleanup based on the present or intended use of the property. The Brownfields Cleanup Program will eventually provide for a multi-track approach that uses cleanup objectives for three land-use scenarios—unrestricted, commercial, and industrial. Until the Agencies develop these soil cleanup objectives, they will evaluate unrestricted and site-specific proposed remedies on a case-by-case basis.

Commentary

Programs for promoting the cleanup of brownfield sites must balance environmental, community, and economic development objectives. Sandy Nasca, an attorney in Buffalo's Strategic Planning Department that deals with brownfields, commented that the Brownfield Cleanup Program, while not tried and tested, appears to weigh more heavily on the environmental side than economic development, at least for Upstate New York.\(^{132}\) The multi-track approach, when implemented, would require brownfield developers to evaluate the site as if pursuing all of the various land-use scenarios. For example, even if proposing a light industrial use, a developer would still evaluate the remediation required to use the site for residential purposes.

Nasca mentioned that the environmental horror of Love Canal continues to strongly influence brownfield legislation in New York. Furthermore, Nasca indicated that brownfield legislation with environmentally biased regulations may still allow for profitable development in the competitive market of New York City, but the depressed economic conditions in much of Upstate New York could prevent costly brownfield redevelopment and instead push developers to abundant and less expensive greenfield sites.

\(^{132}\) Sandy Nasca, personal interview, 23 March 2004.
History

Buffalo’s Industrial History

Buffalo became a thriving industrial city that revolved around steel production, grain milling and shipping, and its function as a lumber port. By 1901, heavy industrial activity helped Buffalo grow to the eighth largest city in the U.S. Buffalo had sixty millionaires at that time, more per capita than any city in the Nation. In 1910, Buffalo was the largest grain port and second largest milling center in the world (behind Minneapolis). In 1914, the Concrete Central grain elevator was the largest in the world and the Urban Company was the first flour milling operation in the U.S. powered by electricity. During World War II, Bethlehem-Lackawanna Steel became the world’s biggest steelmaking operation.

![Image of the Concrete Central grain elevator]

The Concrete Central grain elevator adjacent to the Buffalo River and near the Republic steel site.

Buffalo’s grain elevators—concentrated along the Buffalo River near the Republic Steel site—present dramatic architecture of “zero adornment.” Frequently seen in European publications, images of these grain elevators played a role in shaping the Modern architecture movement. Architects Walter Gropius and Le Corbusier knew these photographs. Erich Mendelson went to see them for himself, as did many others.133

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Buffalo’s industrial success resulted in large part from its competitive advantage in transportation. Access to Lake Erie and later the Erie Canal connected Buffalo to points east and west. Erie Canal’s western terminus in Buffalo created a “Gateway to the West,” helping both the Midwest and New York City grow by facilitating the flow of goods between the areas.

Buffalo was also a national rail hub. In 1891, the New York Central Railroad began operating the Empire State Express between New York City and Buffalo, the first regularly scheduled high speed train. In the first half of the 20th Century, Buffalo was behind only Chicago as the second largest railroad terminus in the U.S.

Site History

The Republic Steel site functioned for approximately eight decades in steelmaking and six decades in coke manufacture. Prior to this period, various other industrial and even residential uses occurred. Reviewing this history provides an important connection with current site condition, both for remediation purposes and telling a story that illuminates a currently troubled area.

Republic Steel Corporation and then LTV Steel Company (under Truscon Company) owned Site A, which consists of 22 acres. It contained a warehouse, “laydown storage area” for finished steel products, and a parking lot used in relation to
the adjacent steelmaking operation. Site B totals 329 acres and the following presents its subdivision into parcels according to former use:

Site B.1 – Republic (LTV) Steel Plant
Site B.2 – Donner-Hanna Coke Plant
Site B.3 – Republic (LTV) Steel Warehouse
Site B.4 – Donner-Hanna Coke Yard
Site B.5 – Marilla Street Landfill

The following paragraphs review the historical use of each parcel associated with Site B.

Republic (LTV) Steel Plant
R. Evans & Son Glue Factory operated in the 1800s and preceded the steel plant. By 1900, Sanborn Maps indicated vacant and dilapidated buildings associated with the glue factory. In 1906, Donner Steel Company, Inc. began iron smelting and steelmaking on the portion of the site formerly occupied by the glue factory. Republic Steel took over the operation in 1931 and then LTV by the 1980s. For approximately 80 years this 91-acre area operated as an integrated steel mill. In 1989, LTV decommissioned and demolished the facility.

Donner-Hanna Coke Plant

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Prior to the coke plant use, this 53-acre area contained the August Fiene Co. Structural Steel Works and fourteen dwelling on streets that existed at the time. From 1919 until 1982, the Donner-Hanna coke plant produced coke and various byproducts from coal, including coal tar, light oil, and ammonium sulfate. The coke production capacity was approximately 3,000 tons per day. Typical gas production at the facility was approximately 11,500 standard cubic feet per ton of coal. The manufactured gas was refined and sold to Iroquois Gas Company, which used a portion of the site. Koppers Company Whole Tar Products also shared the site. In 1990 and 1991 the coke plant buildings, associated structures, tanks and piping were decommissioned and demolished.

**Republic (LTV) Steel Warehouse**

Lackawanna Bridge Company first used the LTV warehouse parcel, consisting of 43 acres, for its bridge shop. Bethlehem Steel Company then constructed a warehouse in the 1920s for use with its nearby operations, and Republic Steel subsequently used the facility for storage and maintenance of equipment. LTV demolished the warehouse at approximately the same time as the steel plant.

**Donner-Hanna Coke Yard**

Donner-Hanna used the 32-acre parcel for storage of coke and coal and, allegedly, the disposal of acid sludges and tar from the steel and coke plants. The coke yard use did not begin until after 1940. Prior to this time the area had three streets and was otherwise a meadow or wetland. By 1960, piles of fill were noted on most of the site and by 1972 the site was covered.

**Marilla Street Landfill**

The 110-acre Marilla Street Landfill was used for the disposal of slag, demolition debris, and steelmaking by-products through the mid-1980s. The landfill area was properly covered and closed. The Department of Environmental Conservation approved a Post Closure Plan that requires and outlines continued monitoring and maintenance.
Postindustrial Challenges

Once among the top ten largest cities in the nation, continued depopulation has plagued Buffalo since the 1950s and dropped its ranking to 58.\(^{135}\) Between 1950 and 2000, the City lost approximately 287,000 people, bringing its population down to 293,000.\(^{136}\) Without the emergence of new industry to combat deindustrialization, loss of jobs, among other factors, has created a shrinking city. With respect to this problem, Chuck Thomas, Deputy Director at the Office of Strategic Planning, remarked that the City has 23,000 vacant or abandoned housing units, which represents 16 percent of the total housing stock.\(^{137}\) White flight and suburban sprawl also describe the loss of Buffalo’s residents as the surrounding County grew by nearly 340,000 residents during the same time frame.\(^{138}\)

The cities of Buffalo and Niagara Falls create a metropolitan area that falls within Erie and Niagara County, respectively. Between 1950 and 2000, suburbanization grew the developed areas in these counties by 132 percent. Their population peaked around 1970 at 1.35 million then declined to 1.17 million in 2000. Despite the loss of 180,000 people, land consumption in the two-county area still increased by 33 percent between 1970 and 2000, which represents a paradoxical sprawl without growth. As development bypasses and wastes the abandoned and underdeveloped built environment, continued land consumption wastes the value of open space.

Context and Planning Efforts

Wastelands in the City

In a speech given at the International Brownfields Exchange held in 1999, Buffalo Mayor Masiello reported that “approximately 2,000 acres of brownfields” exist


\(^{136}\) Data from the U.S. Census Bureau and OSP Information and Data Analysis as presented in the City of Buffalo’s “Queen City in the 21st Century: Buffalo’s Comprehensive Plan,” June 26, 2003, 4.


\(^{138}\) Buffalo remains the nation’s eighth most segregated metropolitan area (out of 331) in terms of separation between white and black residents.
throughout the city, which represents 8 percent of the city’s total land area. Buffalo’s postindustrial decline has created striking and extensive urban wastelands. While rich in industrial history, a depressed economy and declining population have left the grain elevators and other industrial structures abandoned and in deterioration. Many industrial facilities have already been demolished, leaving behind an abundance of open land and contamination issues. The wastelands also spread beyond the city limits, and the county government recently announced its goal to clean up 500 acres of brownfields over the next five years and has committed more than $10 million for six projects.

The focus of the South Buffalo Plan targets an extensive area of abandonment, which encompasses the Republic Steel site. While an economic wasteland, much of this area has revegetated and provides wildlife habitat. Deer roam in large numbers only a few miles from downtown. Abandoned areas provide opportunity for exploration by foot or vehicle, and neglected access roads offer spots for “midnight dumping.” These wastelands persist while attractive incentives continue to lure businesses to suburban “greenfield” locations unburdened by past industrial uses and economically distressed surroundings.

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140 County Executive Joel A. Giambra made this announcement as reported by Tom Ernsnt, “Progress is being made on cleanup of brownfields,” The Buffalo News/Sunday, January 25, 2004.

141 Legal battles based on the State’s anti-pirating law occur between Buffalo and its suburb Amherst with respect to suburban incentives that lure businesses away from downtown, Matt Glynn, “Forging Ahead,” The Buffalo News/Sunday, January 25, 2004.
South Buffalo Redevelopment Plan

The disproportionate share of urban wastelands along Lake Erie and the Buffalo River prompted the South Buffalo Redevelopment Plan, which covers an area bordered by the Buffalo River to the north and Lake Erie to the west. In partnership with the City of Lackawanna, Erie County, Erie County Industrial Development Agency, and other stakeholders, Buffalo proposed a “conceptual comprehensive master plan for over 1,200 acres of ‘brownfield’ properties.” Envisioned as an inter-municipal, inter-agency cooperative effort, it plans for the economic revival of a postindustrial wasteland with the development of 2.5 million square feet of light industrial, office, warehousing, and distribution activities.

The South Buffalo Plan’s vision for the expansive area resembles more a suburban development pattern than one found in a city. Buildings surrounded by parking areas in a sprawled campus setting characterize the scheme. In regards to this design, Douglas Swift of City View Properties, a Buffalo-based real estate development

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144 The South Buffalo Plan actually states in regards to its design: “…similar to those found in satellite cities or suburban areas,” 3.
company, stated that the light industrial potentially in a Buffalo city location prefer single-level buildings with large floor plates.145

**Buffalo’s Comprehensive Plan**

The Buffalo “Draft” Comprehensive Plan released in 2003 provides a strategic framework for making physical land use decisions and guiding public/private investment in the city through 2025. With the exception of a reference to the South Buffalo Plan, the Comprehensive Plan ignores the vast expanse of industrial wastelands that exist south of downtown. Furthermore, the Comprehensive Plan makes only passing reference to the importance of brownfield cleanup and facilitating redevelopment, despite the city’s epidemic of underused, idled, and abandoned industrial properties. The Comprehensive Plan states: “A detailed survey and analysis of the brownfield potential, with specific recommendations for short, medium and long-term reinvestment location, was beyond the scope of the Comprehensive Plan, but is clearly needed.”146 The vast acreage of brownfields in Buffalo provides vital opportunities in large-scale economic development, needed environmental restoration, and re-knitting a disconnected urban fabric. For those reasons and others discussed in this thesis, the “brownfield potential” should be primary to any comprehensive planning effort in Buffalo.

**Buffalo River Planning Community**

The Buffalo River Planning Community—one of twelve designated “planning communities” in Buffalo—encompasses the Republic Steel site. The area, located in the southwest portion of the city south of downtown and along Lake Erie, consists of over 3,000 acres of land, roughly half being vacant. As part of its Comprehensive Plan, the City proposes several unspecific “community action items” in order to improve the Buffalo River Planning Community, such as zoning changes and waterfront revitalization programs.

The Buffalo River bisects the Planning Community from a southeast to northwest direction, where it feeds into Lake Erie. Large-scale grain elevators and other industrial structures located along the river create dramatic scenery. Most of these structures stand

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idle amidst vacant land as ruins of an industrial past. Although the Planning Community fronts Lake Erie, industrial sites and an arterial roadway (Route 5) create boundaries that inhibit direct access to the waterfront. The Planning Community also contains the Tifft Nature Preserve, a 264-acre area located on the inland side of Route 5 adjacent to the waterfront. The site was formerly used as a diary farm, livestock yard, transshipment center for coal and iron ore, and a dumpsite for city refuse. In the 1970s, the City capped nearly 2 million cubic feet of solid municipal waste with soil excavated from another portion of the site. The landfill area now appears as rolling grassy hills, and in other areas ponds were enlarged and vegetation re-introduced. Its current reuse as a nature preserve provides valuable wildlife habitat with meadow, woodland, and a 75-acre freshwater cattail marsh. Enthusiasts claim that roughly 200 species of birds annually visit the preserve and 65 species breed there.

The Planning Community has three distinct residential neighborhoods, typically composed of single- and double-family housing. Fewer than 5,000 people currently live in these neighborhoods, and estimates indicate that their population will continue to decrease through 2010. With less than 2 percent of Buffalo’s total population, the Planning Community makes up 12 percent of the city’s land area. As discussed in Chapter Two, brownfields often exist in an economically disadvantaged context and this characteristic strongly holds true for the Buffalo River Planning Community. The area has an average home value of $22,394, lower than the city-wide average of $58,740; average residential rents of $297 per month, lower than the city-wide average of $359; and average household income of $18,040, lower than the city-wide average of $24,803. Mostly notably, the Planning Community has a poverty level of 33 percent, 8 percent higher than the city’s average.

Area Description

Site A and B benefit from their advantageous locations and existing infrastructure. South Park Ave, a medium-size road improved by the City prior to the Villages Farms

project, passes between the properties. Site A and B provide easy access to Interstate 190, about \( \frac{3}{4} \) of a mile away, which leads to downtown in approximately 2 miles, Interstate 90 in 3 miles, Canada in less than 5 miles, and Niagara Falls in about 25 miles.

The Buffalo River serves as the northern boundary for Sites A and B, and a major railroad corridor forms Site B’s western boundary. The existing Village Farms greenhouse, storage and support facilities, a paved parking area, and perimeter fencing characterize Site A, while Site B consists of vegetated flat-lying graded fill and evidence of remediation activities. Fences with locked gates mostly surround Site B and a large earthen berm exists along a portion of its eastern boundary, which serves to visually separate the site from the Hickory Woods residential neighborhood.
Development Process: Village Farms (Site A)

Mobilization

The City of Buffalo acquired Site A from LTV for $100,000 in the mid-1990s to use as a storage/disposal area for decommissioned utility and service vehicles. After this acquisition, the City discovered the site's contamination issues. In 1997, the South Buffalo Plan envisioned a “ship to truck” transfer facility for Site A due to its location on the Buffalo River and proximity to Interstate 190. The current project, however, began before release of the South Buffalo Plan when Village Farms (also known as Agro Power Development) requested a 30-acre site in Buffalo to develop a greenhouse and packing/support facilities. Village Farms, headquartered in New Jersey, grows and markets greenhouse grown, hydroponic produce—tomatoes, peppers, and cucumbers—throughout the U.S. Additionally, the company operated a 12.5-acre greenhouse in Wheatfield, about 20 miles northeast of Buffalo. The success of that operation led Village Farms to consider a project in Buffalo.

Site A offered an opportunity for Village Farms with its size and easy access to Interstate 190. As an enticement to attract development, the City carried out $100,000 in infrastructure improvements for the area. Additionally, an EPA brownfields grant for $200,000 provided assisted in site assessment, cleanup, and redevelopment; Nelson Rauch of Alternative Technology Development and Management provided technical assistance and strongly advocated for the project; and the Buffalo Economic Renaissance Corporation purchased the site from the City in order to facilitate the deal.

Implementation

Remediation

Lenders required a Phase I investigation as a condition of providing financing. Consultants estimated $1 million in cleanup after site investigation. The contamination

was caused by two above-ground storage tanks that had rusted and leaked between 150,000 and 180,000 gallons of petroleum into the soil. The estimated cleanup cost severely challenged the deal.\footnote{151}

Site A’s remediation did not go through the Voluntary Cleanup Program. Although Village Farms initiated negotiations to enter into a Voluntary Cleanup Program agreement, financial challenges halted progress.\footnote{152} When resolved, Village Farms required a fast-track remediation process to keep the deal alive. Although proceeding with the full cooperation of the Department of Environmental Conservation, this fast-track approach avoided the Voluntary Cleanup Program’s requirement for a public process.

When the Department of Environmental Conservation approved the proposed cleanup in late 1996, the Buffalo Economic Renaissance Corporation purchased the site from the City for $100,000. Remediation involved the removal of 17,000 cubic yards of contaminated soil for off-site treatment and then returning it to the site. Because the intended end use of a greenhouse/distribution facility would not interact with the soil (the plants are grown aboveground in a nutrient solution), Village Farms cleaned up the property to an industrial standard. Finished in 1997, the cleanup process took about three months. LTV, as the responsible party and through bankruptcy proceedings, provided $550,000 and the Renaissance Corporation contributed $250,000 (in part funded by the EPA brownfields grant) to cover an upfront $800,000 cleanup cost.\footnote{153}

\footnote{151} Price, 29.
Construction

The redevelopment of Site A occurred through a public/private partnership between the Renaissance Corporation and Village Farms. The Renaissance Corporation retained ownership and leased the property to Village Farms with an option to purchase. Renaissance Corporation intended to recover its costs and potential recognize a capital gain from the arrangement.

Village Farms pulled together approximately $14 million in financing for project construction and business start up, with a reported loan-to-value ratio of 60 percent. Total development costs were roughly at $15 million. Additionally, Site A’s location within a New York State Economic Development Zone and Federal Enterprise Zone provided tax incentives to help the economic viability of the project.

Village Farms redeveloped the site into an 18-acre greenhouse with packing and support facilities totaling 54,450 square feet. Production began in 1998 and at the operation’s height, 175,000 plants yielded 8 million pounds of tomatoes annually. Village Farms employed 70 to a 100 people, with a significant number of jobs available for local residents. Additionally, the City estimated that the project would generate approximately $774,000 in local property taxes.

154 Price, 30.
155 Price, 30.
By 2002, however, tomato production in the greenhouse had ceased. The company’s CEO Ken Hollander stated that high natural gas prices made the operation unprofitable. Village Farms’ evaluation of alternative uses for the Buffalo greenhouse includes sale or lease of the facility. Villages Farms currently uses the facility as a distribution center.

Development Process: Steelfields (Site B)

Mobilization

The South Buffalo Plan envisions productive economic reuse of Site B. LTV and Hana Furnace, co-owners of Site B, responded to this concept by funding site assessment reports between 1997 and 2000 that covered 219 acres (excluding the Marilla Street Landfill). Environmental consultants prepared a Voluntary Cleanup Plan to support future site redevelopment as a light industrial/office park. The Department of Environmental Conservation reviewed the Voluntary Cleanup Plan and requested additional data to better characterize soil and groundwater conditions. Review continued until 2000 and then all activity ceased.

In October of 2002 the City settled environmental litigation against LTV and Hanna Furnace. Under the terms of this settlement, bankrupt LTV and Hanna Furnace agreed to contribute $16.5 million to remediate the 219 acres associated with Site B. Steelfields then purchased Site B after the settlement, a purchase which included the Marilla Street Landfill.

Steelfields represents an interesting evolvement. Malcolm Pirnie, environmental engineers, prepared the first site assessment report for LTV and Hana Furnace. Paul Werthman, P.E., who worked for Malcolm Pirnie on Site B, left the company and started Turnkey Environmental Restoration, LLC. Turnkey replaced Malcolm Pirnie as the

156 "Buffalo greenhouse hits a cold spell," Business First, January 28, 2002,
project’s environmental consultant. Werthman and a steel industry attorney then started Steelfields in order to receive the $16.5 million for remediating Site B.\footnote{158}

**Implementation**

**Remediation**

Site B contamination involves metals and polynuclear aromatic hydrocarbons, a class of chemicals commonly found in tar and asphalt. Petroleum products in the soil and benzene in the groundwater also pose problems. Steelfields entered into a comprehensive Voluntary Cleanup Plan with the Department of Environmental Conservation to cleanup and deliver Site B as “shovel ready” for commercial and/or industrial redevelopment. Gregory Sutton, P.E., an environmental engineer with the Department of Environmental Conservation, ranks Site B as having “top complexity” when compared to other sites he has dealt with.\footnote{159} In fact, the Agency reports that Steelfields will perform “one of the most expensive and largest cleanup projects ever done under the New York State Voluntary Cleanup Program.”\footnote{160} The Voluntary Cleanup Plan will: \footnote{161}

- Remove approximately 20,000 cubic yards of contaminated tar/soils for off-site disposal;
- Consolidate and properly cover (cap) an estimated 40,000 to 75,000 cubic yards of contaminated soils on the site;
- Remove an estimated 80,000 cubic yards of coke for recycling and/or reuse;
- Remove about 1,000 feet of underground piping;
- Construct erosion controls along the bank of the Buffalo River;
- Install a groundwater collection and treatment system; and
- Implement a long-term groundwater monitoring plan.

\footnote{159} Gregory Sutton, personal interview, 23 March 2004.
\footnote{161} New York State Department of Environmental Conservation.
As part of an agreement negotiated by the City of Buffalo, Steelfields has also undertaken the “Hickory Woods Value Protection Program.” Hickory Woods abuts Site B immediately to the east and consists of a 6-block mixed residential and commercial neighborhood. As part of this Program, Steelfields will fund up to $1 million in a fair market protection plan, which allowed eligible residents to choose either annual cash payments totaling $7,500 or re-imbursement for lost market value.

The history behind this Program dates back to the City’s purchase of the property underlying Hickory Woods (another former Republic Steel site) from LTV in the late 1980s. Using federal and state funds, the City redeveloped the property without thorough site assessment, despite the area’s history, into approximately 60 homes. Construction began in 1988 and this drastic environmental oversight became evident but not corrected in 1993 when a limited environmental assessment resulted in the partial cleanup of 13 lots. The City funded another limited environmental assessment in 1995, which failed to discover the “cindery black coke wastes, refractory bricks and an oozing black substance in the soil” that builders noted in 1998 while constructing a basement for a new home. With severity of the environmental contamination finally realized, through investigations were conducted and reports listed high levels of polynuclear aromatic hydrocarbons,

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carcinogens associated with steelmaking, and a benzene-contaminated leaking underground storage tank.

The Department of Health then warned residents not to dig below 4 to 6 inches in their yards unless remediation occurs. Residents, however, had already planted trees and gardens, as well as built fences and decks. Many Hickory Woods’ residents report various forms of cancer, respiratory ailments, and birth defects, which they attribute to the neighborhood’s contamination and its proximity to the Republic Steel site looked at in this case study. In 1999, the City finally passed a resolution calling for relocation of residents who wanted to leave, comprehensive site remediation, financial assistance to residents who suffered economic losses, and comprehensive testing to address health concerns of residents.

This unfortunate incident has also stigmatized the City’s approach to brownfields. The 1997 South Buffalo Plan, released before the worst of the Hickory Woods contamination became known, involved a residential component in the redevelopment scheme. When questioned about this component, the Office of Strategic Planning indicated that residential development is no longer a part of the Plan and alluded to the problems at Hickory Woods, as well as the abundance of vacant housing that already exists in the city.

Construction

For Site B, the South Buffalo Plan envisions “ship to truck” transfer facilities along the Buffalo River, “rail to truck” transfer facilities along the main railroad corridor, “truck to truck” transfer facilities, light industrial/office park uses, and a golf Course for the Marilla Street Landfill. Steelfields states that potential future uses include manufacturing, warehousing, and distribution facilities and offices. The Work Plan also indicates that the Site B’s significant frontage on the Buffalo River could provide waterfront public access and park opportunities.

163 Sierra Club Brownfields Case Study.
Chapter 4: Lessons Learned

The case studies investigated in Chapter Three demonstrate a wide range of issues and characteristics that make up the postindustrial landscape. The first section uses the categories of mobilization and implementation in the development process to evaluate these case studies. Informed by this evaluation, the following sections identify and describe key issues and ingredients for success with respect to brownfield redevelopment practice. Partly informed by the case studies, the final section explores alternative approaches that generally deviate from conventional brownfield redevelopment approaches.

Evaluation

Mobilization

Nine Mile Run and Summerset at Frick Park

Despite the community’s support for the transformation of Nine Mile Run, the Urban Redevelopment Authority did not include the public in their initial decision-making process. A lack of community perspective on the part of the Agency caused a project delay of about three years. Marc Knezevich stated that the Agency has since revised its practice with respect to community participation.165

An inadequate public process and environmentally insensitive design led to the mobilization of the Greenway Project, which pursued a collaborative approach to address the complexity and uncover the value in the Nine Mile Run landscape that the Urban Redevelopment Authority initially overlooked. The Greenway Project began with a compelling vision to reclaim part of a postindustrial landscape. The vision was built on a strong theoretical foundation of restoration ecology, reconstructive postmodern art, and community dialogue. Through community-based, interdisciplinary inquiry participants in this effort sought to “define, contextualize and expand the public and municipal discourse

about public-access issues in brownfield environments.” Artists, historians, scientists, engineers, designers, lawyers, government, and the community participated in a three-year effort that evolved into a watershed approach in order to address interconnected problems at the appropriate scale. The Greenway Project’s innovative and resourceful strategy integrated social, economic, and ecological processes, which presents a successful model for reclaiming public open space in a postindustrial landscape. The Greenway Project’s success resulted from its ability to adapt from a site-specific to watershed approach. This expanded focus will ultimately serve to further enhance the Summerset development with greenway improvements and restoration of the stream.

However, the overall Nine Mile Run redevelopment process could have been improved with greater interaction between the Summerset development and Greenway Project. Both Rust and Collins indicated that these two projects did not directly overlap in planning and design, although Summerset benefits from the improvement of the greenway and the Greenway Project gained impetus from association with a large-scale development project strongly supported by the City.

One reason that created the separate nature of these projects pertains to the earlier mobilization of Summerset and the Greenway Project starting in response to the initial redevelopment plans. Another reason relates to the separate responsibilities of the Urban Redevelopment Authority overseeing the Summerset development and the Pittsburgh Planning Department overseeing the Greenway Project.

**Village Farms and Steelfields**

Community participation in the mobilization stage of Village Farms did not occur because the project avoided the Voluntary Cleanup Program. The Steelfields project, on the other hand, has a website that describes its remediation program and provides activity

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168 Since the Pittsburgh Planning Department deals with the park system, the Urban Redevelopment Authority conveyed the property related to the greenway to the City so that the Planning Department could manage and coordinate activities that fell within its boundaries. Furthermore, the Planning Department acted as the coordinating body between the STUDIO for Creative Inquiry, Army Corps of Engineers, sewer authorities, and adjoining municipalities in efforts that involved the Nine Mile Run stream and watershed.
updates, although heavy in technical language and infrequently updated. Furthermore, no city planning activity supports the Steelfields project aside from reference in the South Buffalo Plan and site marketing efforts by the Buffalo Economic Renaissance Corporation. With respect to community-based organizations, the Buffalo River Partnership organized by the Friends of the Buffalo Niagara Rivers and the Industrial Trail Heritage Committee are not actively involved with the Steelfields project, despite the relevancy of its location to their own efforts. Site B’s long remediation period represents a missed opportunity by the Office of Strategic Planning, community organizations, and other stakeholders to organize concurrent efforts that support redevelopment and address interconnected issues.

Implementation

Remediation: Village Farms and Steelfields

Recent advances in contaminated site remediation relate more to regulatory than technological innovations. Regulatory innovations involve legal measures to control liability and a framework that facilitates expedited and feasible cleanups, such as with risk-based corrective measures. A successful remediation process depends on strategies that control or reduce costs and function within a set time frame.

Risk-based corrective action, supported by an accelerated remediation plan, facilitates commercial or industrial redevelopment of environmentally-impaired sites through reductions in remediation cost and time frame. Cichon argues for an accelerated remediation plan designed with the inherent flexibility needed to accommodate operating adjustments in the field. Such a plan avoids additional site investigations in the beginning of the process that delay the overall remedial schedule. If the site requires remediation, an accelerated remediation plan calls for the following actions:

1) Delineation of several remedial alternatives for site cleanup
2) Calculation of “hard-dollar” costs for implementation of each alternative without further site investigation

169 John DeVillars, Managing Partner at Blue Wave Strategies (previously at Brownfields Recovery Corporation and previously head of EPA Region I), lecture on brownfield redevelopment, Harvard University, 5 February 2004.
170 Cichon, 349-351.
3) Analysis of commercial risk and cost sensitivities associated with each alternative
4) Determination of the best approach for implementing the remediation and managing risk

An accelerated remediation plan addresses uncertainties through an observational tactic and the ability to accommodate additional site investigations during the remediation. The inherent flexibility in an accelerated remediation plan represents a design-build approach that allows development on cleaned up areas to proceed while remediation continues in other areas. Cichon also underscores the importance of community involvement in brownfield redevelopment with respect to site remediation. To facilitate this involvement, the environmental expert must translate remediation processes for the general public to understand, in other words limit the use of technical language. Simons proposes the following broad remediation strategies for developers of brownfield sites:

- Remove only hot spots
- Use risk-based corrective action
- Use on-site remediation
- Cap or encapsulate contamination
- RemEDIATE to surrounding levels
- Encapsulate residual contamination under roadways
- Maintain internal documentation and soil sampling
- Consider litigation to recover your costs
- Keep the public informed

As the case studies in Chapter Three demonstrate, developers employed many of these strategies in order to expedite and reduce costs in the remediation process. For example, Village Farms utilized risk-based corrective action to expedite the development process of Site A and facilitate a use that posed “no significant risk” with an industrial standard cleanup. Steelfields’ remedial strategy for Site B also utilizes risk-based corrective action because of the intended industrial/commercial end use. Other characteristics of Steelfields’ remedial strategy align it with an accelerated remediation plan. Because of the scale of the remediation program, Steelfields’ “Remedial Design/Remedial Action Work Plan” (Work Plan) for Site B describes the project as design-build so that implementation of parts of the Work Plan can proceed as design continues on other parts. Steelfields envisions property transfer, commercial redevelopment, and remedial

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171 Simons, 76.
construction activities overlapping. Steelfields also proposes alternative remedial actions in its Work Plan in an effort to maintain flexibility for pursuing the most cost-effective solution.

The formation of Steelfields as an entity specifically organized for the cleanup of Site B and its five-year experience with the site, serves to provide an advantageous position for addressing challenging contamination issues. Steelfields’ proactive and ad hoc formation rescued Site B from decades of bankruptcy litigation and continued inaction, potentially resulting in abandonment. Although Site B’s remediation process continues, an evaluation does provide several important lessons. The Department of Environmental Conservation estimates a $15 million cleanup cost and Steelfields must also provide up to $1 million in the Hickory Woods Program. Sutton indicated that Steelfields earns the balance of the settlement after site cleanup.172 This incentive has motivated Steelfields to pursue creative and innovated methods to reduce costs, such as recycling materials for on-site reuse after remediation and selling materials for off-site reuse. These methods, while potentially more time consuming, eliminate expensive disposal costs and suggest the importance of a remediation strategy that remains open ended and opportunity focused throughout the process with respect to reducing costs and time under legally acceptable parameters.

Construction: Nine Mile Run and Summerset at Frick Park

The Department of City Planning received funding from the EPA and Pennsylvania Department of Environmental Protection to explore full-scale, low-input revegetation approaches on the steep slag slopes within the greenway. The goal was to identify specific, sustainable, low-cost methods to revegetate the slopes and valley. This effort represents a resourceful and innovative strategy for addressing a unique site condition, where a solution to a problem was discovered through experimentation.173

Rust, with respect to Summerset development, automatically incorporated a higher contingency factor because of his experience with brownfield projects. In past experience with house construction on a former industrial site, Rust used a system of

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reinforced footers to guard against settlement in conditions where the below-grade composition was not completely known. At Nine Mile Run, the opposite condition presented itself with a potentially expansive slag subgrade, which Rust adapted to with a new system of reinforced footers for house construction.\textsuperscript{174}

With respect to the development process for Summerset, a public/private partnership made the project possible but also caused minor problems with coordination and delay. The City’s financial crisis prevented the Urban Redevelopment Authority from constructing the project’s infrastructure on schedule, which poses additional risks for the Summerset developer team. Rust also indicated coordination issues with sidewalk construction performed by a City-hired sub-contractor, which Rust addressed by assuming the responsibility to construct project sidewalks despite the extra cost.

The Summerset project contains high-performance homes built with integrated systems, a characteristic that relates to the sustainable reuse of brownfields. These homes, marketed as “green” and eligible for Energy Star status, are 30 percent more energy efficient than average new homes and have greater longevity.\textsuperscript{175} Construction of each home must follow performance standard guidelines, and the effort involves contractor training and product testing, evaluating, and monitoring. These high-efficiency homes represent an ethic of stewardship in construction and add further value to a project that already represents a sustainable form of development.

The Summerset development pursues a neotraditional neighborhood design, which incorporates elements of Pittsburgh’s esteemed early twentieth century neighborhoods located in the vicinity of Nine Mile Run. This design approach addresses the value in creating a site-context relationship. The neotraditional elements of Summerset homes include small setbacks from the street, sidewalks, front porches, gabled roofs, garages serviced by back alleys, and a mixture of housing types and styles. An architectural review process for each home guarantees adherence to approved design principles. The completed phase of the Summerset development provides a closer-knit atmosphere often absent in new subdivisions with house placement spread out and disconnected from potential street activity. Despite an objective for neotraditional

\textsuperscript{174} Rust stated that housing design modification to guard against ground expansion was developed specifically for the Nine Mile Run and not used before.

\textsuperscript{175} Rust.
neighborhood developments to reduce reliance on the automobile through public-transit options, the Summerset development, at least so far, presents the strong feel of an auto-reliant neighborhood.  

**Occupancy: Nine Mile Run and Summerset at Frick Park**

Brownfield redevelopment projects, once completed, often involve activity and use limitations and requirements for continued site monitoring. These factors play into site marketability and potentially funding issues. The Summerset project’s activity use limitations indicate greater owner/user responsibility with brownfield redevelopment sites and the need for longer-term considerations, which relates to the importance of an ongoing education process and stewardship.

**Occupancy: Village Farms**

At first, Village Farms represented an international model for brownfield redevelopment practice. Rauch referred to the hydroponic greenhouse operation as “employment for cities in transition.” He envisioned the greenhouse use as transitional and being replaced by more permanent industry in 20 to 25 years with a strengthening of the city’s economy. The greenhouse facility, because of its simple construction, could easily be taken down and transported to another site or the glass recycled.

Additional factors made the Village Farms project a model for the sustainable reuse of a brownfield. For one, the EPA reported that the petroleum waste in the soil removed from the site was recycled to make asphalt. As another factor, the Village Farms operation proved beneficial to the community by employing a significant number of local residents in jobs that required relatively little training. The New York Times reported that “700 people lined up for 175 jobs” when Village Farms interviewed for positions. The greenhouse use also grew produce that served local markets. Furthermore, it used an innovative energy source—surplus thermal energy siphoned from natural gas boilers produced hot water to heat the greenhouse. Ironically, a rise in natural

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176 Though bus lines pass by on adjacent streets, it is undetermined whether bus lines will pass through the Summerset neighborhood when fully built out.
gas prices reportedly shut down the operation. Village Farms’ inability to continue its operations represents an enigmatic development, especially considering the extensive greenhouse operations in nearby Canada and the importance of this project for the city. This once international model for brownfield redevelopment practice should have received greater support from a city in dire need of economic development and a renewed image.

The Pennsylvania Horticultural Society’s Philadelphia Green program studied the Village Farms of Buffalo as part of their Green City Strategy, which produced a study in 2000 entitled: “The Feasibility of Urban Agriculture with Recommendations for Philadelphia.” This study noted Village Farms as an exception to relatively unprofitable urban agricultural uses. The report indicated that key issues for urban agricultural projects involve: entrepreneurial and competent management and planning; a creative financing structure that employs a broad range of public and private sources; utilization of tax and other financial incentives if available, as well as pursing public/private partnerships to expedite the acquisition and development process; and strong consideration to environmental factors, both with site conditions and surrounding community. These key issues, while proposed for urban agricultural uses, also fit a brownfield redevelopment model.

Key Issues

“There are more failures in brownfields than successes.” Reducing failure begins with mapping out general key issues and then those specific to a project, an important first step in any real estate development process but a vital step with environmentally-impaired sites that exist in a troubled context. Development teams that understand key issues and use these to guide their project strategy have a better chance at success. Key issues with brownfield redevelopment involve:

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180 John DeVillars, Managing Partner at Blue Wave Strategies (previously at Brownfields Recovery Corporation and previously head of the EPA Region I), lecture on brownfield redevelopment Harvard University, 5 February 2004.
Public Perception

Public perception of the site plays an important role and relates directly to an informative and understandable development process based on community participation. Rust said that the negative public perception and complex site issues associated with Nine Mile Run eliminated competition in the Urban Redevelopment Authority’s request for proposals. Most developers, as Rust described, believed that slag and residential marketability did not mix. It took a relatively daring developer team with brownfield experience to pursue Nine Mile Run’s redevelopment.

Costs and Time

Higher costs and a longer development process due to extensive site work and remediation programs challenge brownfield redevelopment activity. Community concerns with environmental issues, on top of development impacts, can significantly increase the project’s time frame, as demonstrated by Nine Mile Run. In Buffalo, Site B’s remediation process will take a total of five years and represents the one of the largest and most expensive cleanup projects under the New York State Voluntary Cleanup Program.

Social Justice

Social Justice pertains to a community’s equitable access to resources and the benefits derived from them. Brownfield redevelopment generally occurs in some form of public/private partnership, which potentially creates a greater sense of public ownership in the development process. For example, Rust stated that because the Nine Mile Run project uses a significant amount of public money, some residents feel they have a right to advocate issues such as greater handicap accessibility.182 Social justice also relates to brownfield redevelopment as a community development practice in addition to economic

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development. Local community and civic groups thus push for equitable access to opportunities available through brownfield redevelopment.

**Environmental Justice**

One of the poorest areas in Boston, the Dudley Street Neighborhood, has 35 brownfields within its 1.5 square-mile area, which indicates 9 percent of the city’s total number of sites in a neighborhood that hosts only 4 percent of its population. Because the concentration of brownfields disproportionately occurs in low income and minority communities, issues of environmental justice and equity warrant full attention. Environmental justice concerns the fair treatment and meaningful involvement of all people regardless of race, ethnicity, culture, income, or education level with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental equity refers to the distribution and effects of environmental problems and the policies and processes to reduce differences in those who bear environmental risks.

The Sierra Club, a national grassroots environmental organization, raises environmental justice and equity issues with respect to risk-based corrective measures in brownfield cleanup. The Organization believes that lowering clean-up standards for contaminated sites threatens the health of current and future populations exposed to those sites. The Organization further states that risk-based cleanup standards increase the possibility that unremediated contaminants will migrate off-site and cause health and environmental damage over time. The Sierra Club argues that superficial brownfield cleanup transfers public health and environmental risks and costs to future generation in order to suit the economic development needs of today, and that this unsustainable practice represents the same logic that caused the brownfield problem in the first place.

Though the Sierra Club expresses valid concerns, without the possibility of risk-based

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183 Niall Kirkwood, lecture on the issue of brownfields, Rebuilding Devastated Landscapes, Harvard University, Cambridge, MA, 9 October 2003. Kirkwood also reported that Boston has 395 brownfields sites and Massachusetts has 7,730. The size of the Dudley Street Neighborhood represents approximately 3 percent of Boston’s land area.


corrective action many brownfield redevelopment opportunities would be lost due to exorbitant site remediation costs, and worse contamination issues would persist. However, remediation science combined with social factors uncovered through stakeholder involvement and public participation should govern risk-based decision making.

Sustainability and Reliability

Reliability in brownfield redevelopment pertains to a standardized development process created by top-down regulation and characterized by transferability from one site to another. Reliability provides greater certainty and economic efficiency, which encourages development. Sustainability in brownfield redevelopment pertains to a locally-responsive approach that generates uniquely-defined solutions, but depends on a level of reliability for broad practice. Overall, sustainable development pursues a systems approach that inherently requires interdisciplinary collaboration, and it aims for the long-term health and vitality of a community within social, economic, and ecological parameters.

Ingredients for Success

The following section identifies and examines characteristics in project organization and strategy. Distilled from evaluation of the case studies and discussion on key issues, these characteristics represent ingredients for success applicable for general practice in real estate development, but vital for brownfield redevelopment. The ingredients for success involve:

- Project Vision and Leadership
- Strategic Organization and Knowledge
- Gaining Perspective and Managing Politics
- Forming Partnerships
- Community Participation and Stakeholder Involvement
- Adaptability

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186 This comment stands without a greater amount of public funds available for site cleanup.
Project Vision and Leadership

Brownfield redevelopment must begin, for many reasons, with a compelling vision. An important part of successful brownfield redevelopment depends on a cohesive team of interdisciplinary participants, government officials, community members, and other stakeholders. A compelling vision creates the foundation for the development process and can inspire team members to action.

Key project leaders, with persistence and creativity, facilitate team building and spread the vision. The Greenway Project’s vision influenced or combined with other projects that involved Nine Mile Run and thus gained momentum and durability. Leaders function within and across teams. While the inspired and charismatic leaders in the Greenway Project successfully facilitated action between a diverse group of experts and community, it took the larger project leadership of Pittsburgh’s Department of City Planning to conduct inter-agency and -group coordination, as well as secure vital funding. The dependency of brownfield redevelopment on multiple funding sources and complicated financing requires a compelling vision that also serves as a sales pitch.

Strategic Organization and Knowledge

With vision and leadership creating the foundation for action, project planners must then map out the organization behind a complex development effort and begin to develop a strategy for the development process. Similarly with the accelerated remediation plan and Steelfields’ Work Plan discussed in the Evaluation section of this chapter, strategic organization incorporates flexibility into the project strategy in order to accommodate needed adjustments in the development process. Collins described the importance of strategic knowledge in complex projects such as Nine Mile Run, which involves planning for anticipated conflict and problem areas. Rust, in the same way, incorporates a higher contingency factor and expects site-related surprises throughout a brownfield redevelopment process. Strategic organization and knowledge thus serve to

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incorporate flexibility into the development process and assist in resolving potentially derailing situations.

**Gaining Perspective and Managing Politics**

The brownfield redevelopment process depends on balancing multiple perspectives, such as from the property owner, developer, lender, government/regulators, advocacy groups, and surrounding community. The Urban Redevelopment Authority’s lack of community perspective with initial release of a Nine Mile Run redevelopment plan demonstrated the consequences of failing in this step. Additionally, brownfield redevelopment represents an increasingly political activity due to issues with contamination and social justice. This factor requires that developers understand the political environment and attempt to manage politics by winning support for the project vision.

**Forming Partnerships**

Derelict industrial sites are unattractive to private developers for a number of reasons: potential contamination issues, high construction costs, distressed surroundings, etc. Public/private partnerships provide the ability to level the playing field and facilitate development otherwise too costly. Partnerships between for-profit developers and Community Development Corporation or other not-for-profits have demonstrated advantages on several fronts: stronger connection to community, greater access to resources, and wider range of experience.

**Community Participation and Stakeholder Involvement**

Community participation and stakeholder involvement, while generally important in real estate development projects, deserve extra merit in brownfield redevelopment. Bartsch, an expert in the field, states: “Community participation and stakeholder involvement play an essential role in successful brownfield development, as dozens of stories attests.”

Public health concerns, environmental impairment, economically disadvantaged locations, long development time frames, high development costs, and the

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importance of public/private partnerships combined with conventional development issues make brownfield redevelopment a multifarious and challenging endeavor. Community participation and stakeholder involvement at the outset of a brownfield redevelopment project, if properly facilitated, can serve to breakdown the complexity inherent in postindustrial landscapes and address concerns before they turn into debilitating problems. DeVillars stated that developers should include regulators at early phases in a brownfield project, which indicates a larger upfront investment in time that pays off later with a smoother process. This advice also pertains to community participation in planning a remediation program, which could bolster support for the effort to cleanup a contaminated site and thus expedite the development process.

Facilitators of community participation and stakeholder involvement maintain a three-way conversation between project team, community, and government throughout the development process. The Greenway Project similarly pursued an approach of community dialogue, which served to build an interactive relationship between public participants and experts. This relationship facilitates greater project understanding and ownership. Furthermore, Collins describes the potential for community dialogue to promote an ethic of sustainable stewardship.\textsuperscript{190}

\textbf{Adaptability}

Government agencies must adapt to changing regulatory environments, financial mechanisms, and innovative development practices in order to promote and facilitate brownfield redevelopment. Private developers must do the same in order to reduce uncertainty and increase returns. Additionally, brownfield redevelopment requires a provision of adaptability worked into the development process in order to initially deal with unique site circumstances and “site-related surprises” as construction continues.

\textbf{Innovative Practice}

Built-in adaptability in the development process facilitates innovative practice, which implies a constant attempt to make relatively uneconomical brownfield redevelopment practice more workable. Treatment of the slag slopes at Nine Mile Run

\textsuperscript{190} Collins, “Conversations in the Rust Belt,” 257.
represents an innovative and cost-effective solution to a unique site situation. The remediation program employed by Steelfields also demonstrates an innovative practice motivated by minimizing costs. Innovative practice also entails an interdisciplinary approach that investigates how to capitalize off interconnected systems and related efforts, as exhibited by the Greenway Project.

**Alternative Frameworks**

Brownfield redevelopment needs greater momentum and an expanded focus. The postindustrial landscape presents an ideal opportunity to link economic development with community revitalization and restorative redevelopment objectives. This section builds off the case studies and explores existing frameworks to organize landscape planning and brownfield redevelopment efforts.

**The Steinitz Framework**

Steinitz rejects the “top-down” approach to landscape planning that uses a universally applicable model or method. He instead proposes a strategy that first asks questions in order to understand the situation and then from there builds up the appropriate project methodology.\(^{191}\) The Steinitz Framework provides landscape architects and other environmental design professionals with a question-driven approach to understand and organize the process of landscape planning. It asks six questions, each related to a theory-driven modeling type, which offer specific but flexible guidance for resource analysis and plan development:

- **Question 1.** How should the state of the landscape be described? This leads to *representation models*.
- **Question 2.** How does the landscape operate? This leads to *process models*.
- **Question 3.** Is the current landscape functioning well?

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This leads to *evaluation models*.

**Question 4.** How might the landscape be altered?

This leads to *change models*.

**Question 5.** What predictable differences might the changes cause?

This leads to *impact models*.

**Question 6.** Should the landscape be changed?

This leads to *decision models*.

Environmental designers pass through the Steinitz Framework at least three times in any project. They first pass downward to define the context and scope (define the questions), then upward to specify the project methodology (how to answer the questions), and again downward to carry the project forward to its conclusion (answers to the questions). The process concludes with a positive or negative decision at the end of the process. A positive decision could state “do not build.” A negative decision requires a backward feedback loop and need to alter prior levels or revisit all levels and redesign the project. A negative decision could also trigger a shift in the time and/or scale of the study. In a complex situation, designers can use the Steinitz Framework to relate the component questions and models over changes in time and scale with repetitive use of the questions. The time relationships connect a designer’s actions to past decisions and future reconsiderations. The scale relationships connect a design problem simultaneously or sequentially at different scales. Furthermore, the Steinitz Framework considers project implementation as a forward-in-time feedback to Question 1, which creates a changed representation model.

The Steinitz Framework’s flexibility and bottom-up approach to landscape planning makes it an appropriate method for organizing reclamation efforts in the postindustrial landscape. It has the potential to define a strategy catered to a specific brownfield site, as well as address unique community and environmental issues. The Framework’s major shortcoming, however, involves its openness to define the initial context and scope. Without established criteria, the approach could overlook important factors not immediately apparent.

Kirkwood adapted the Steinitz Framework to organize the issues that accompany brownfield redevelopment for residential use and in the context of an integrated planning
Kirkwood's Brownfields Planning Framework raises introductory and broad-based questions primarily concerned with brownfields policy on a national scale. He states that use of the Brownfields Planning Framework and integrative planning model would provide needed structure to brownfield redevelopment practice. This structure supports informed decision making and facilitates a necessary wider approach to brownfield issues. This thesis adapts Kirkwood's methodology of identifying key issues and then using these to formulate questions in the Steinitz Framework format.

Righting the Wrong: A Model Plan for Environmental Justice in Brownfields Redevelopment

As described in under Key Issues in this chapter, the character and location of brownfields raises environmental justice issues. The International City/County Management Association headed an effort to develop a model plan for use by local governments and communities to address environmental justice issues in relation to brownfield redevelopment. The Association based their model plan on the "City of Clearwater Environmental Justice Action Agenda." Approved in 2000, Clearwater's plan represents a pioneering effort to simultaneously address the two issues. The Association published its model plan in 2001, entitled: "Righting the Wrong: A Model Plan for Environmental Justice in Brownfields Redevelopment." The Association's report identifies a sequence of steps for local government and communities to take in order to establish a plan that addresses brownfield redevelopment and environmental justice. The model plan's relevance for this thesis pertains to its outline of the steps important for facilitating a collaborative process, which relates to three categories under Ingredients for Success in this chapter: gaining perspective and managing politics, forming partnerships, and community participation and stakeholder involvement.

To begin a collaborative process for dealing with environmental justice and brownfield redevelopment, local agencies and government departments attempt to internally coordinate programs and resources. The report discusses the importance of a "project champion" to facilitate internal coordination and gain the executive level support of brownfield issues. The project champion must help local government departments to

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define their brownfields-related roles and develop a set of goals for brownfield redevelopment and environmental justice. For the next step, local government staff inventories its own programs, resources, and skills to determine applicability for brownfield redevelopment. This inventorying process maps human skills that can be drawn on, physical resources beneficial to community collaborative efforts (e.g., parks and recreation programming), city geography in relation to service delivery and communities with a disproportionate share of brownfields, and a contact list of important partners involved in other city and community collaborative efforts (i.e., residents, non-profit and social service organizations, and the private sector). The last step identifies potential partners, which might include regional entities, state agencies, federal agencies, community groups, non-profit associations, social services entities, faith-based organizations, and private sector organizations.

Creating a strategic plan that addresses brownfield redevelopment and environmental justice occurs through community outreach that educates and builds partnerships, and then develops a plan. The first stage begins with local government forming a relationship with the media and gaining their support for coverage of issues. The next step identifies neighborhoods, communities, and sites that deal with brownfield and environmental justice issues. This step identifies areas that the strategic plan could target. Government officials then seek to recognize local leadership for connecting with the community. Local government conducts a community outreach process via questionnaires, meetings, and forums that build awareness and educate, facilitate the articulation of community issues, and formalize community input and interests.

The development stage for a strategic plan begins with organizing citizens and stakeholders into committees and interest groups that address the various aspects of brownfield redevelopment. Citizens committees then take big issues and break them into a series of smaller, manageable tasks. Stakeholders also develop a series of policies that outline principles of action. These policies guide the process and measure the outcomes of the plan. The plan development stage also requires adherence to a process that consists of a series of tasks, timetables, and specific deliverables that allow each stakeholder group to understand its own responsibilities and contributions to developing a systematic approach to brownfields and environmental justice issues.
While the International City/County Management Association’s model plan provides a notable framework for local government and communities to develop a brownfields program that addresses contaminated property and environmental justice issues in a sustainable capacity, it does not provide specific strategies for redevelopment derived from a review of multiple case studies. Furthermore, the Association indicates that the model plan must be adapted and modified as the implementation process unfolds, but the report does not provide clear direction on how feedback should be incorporated into an evolving brownfields program.

**Transitional Use**

Planners can address various complications that inhibit brownfield redevelopment through consideration of multiple stages and time frames in reuse. Simons estimates that about half of the existing brownfields could support long-term interim uses or be converted to permanent open space, parkland, or buffers between incompatible land uses. Simon directs this recommendation toward economically challenged areas that do not readily attract reinvestment. Transitional or open space options provide low-intensity productive use of marginal brownfield sites, an effort that still addresses issues of contamination and blight but allows municipalities to concentrate the majority of their resources on brownfield sites in the most marketable areas.

Interim uses also provide incremental stages in order to bring brownfields back to full productive use. Phytoremediation represents a practice that serves multiple purposes. This innovative technology utilizes the natural properties of plants in engineered systems to remediate hazardous waste sites. Although phytoremediation operates in longer time frames than conventional methods, it may prove a cost-effective solution and also serves to visually enhance a site during cleanup. The U.S. Department of Energy provides another example transitional use with its Brightfields program, which redevelops brownfields through the incorporation of solar energy. The Brightfields concept addresses economic development, environmental cleanup, and air quality challenges by bringing pollution-free solar energy and high-tech solar manufacturing jobs to brownfield sites. Examples of Brightfield projects include the placement of a solar energy

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193 Simons, 5.
manufacturing plant, building-integrated solar energy systems, and solar electric systems on brownfield sites.

Sustainable Development

The 1987 Brundtland Report, also known as “Our Common Future,” vaguely defines “sustainable development” as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”\textsuperscript{194} Consideration for future generations implies setting long-term goals that measure economic growth with social equity and environmental protection. Achieving these goals requires a multifaceted or “systems” approach to connect the many levels of society, ensure economic prosperity, and maintain ecological integrity. Sustainable development thus involves a holistic, adaptive, and bottom-up approach combined with top-down environmental policy that facilitates a collaborative decision-making process.\textsuperscript{195} Rigorous analysis, interdisciplinary scope, and an appreciation of context should guide such environmental policy.\textsuperscript{196} However, as Kirkwood similarly describes with large-scale integrated planning, current practice lags behind theory.\textsuperscript{197}

Brownfield reuse can potentially achieve sustainable development objectives in two main areas. First, a wider brownfield approach, as in postindustrial landscape reclamation, requires an interdisciplinary and collaborative process in order to address the triple bottom line and thus implements a sustainable form of development. Restorative redevelopment practice provides an example that addresses economic and environmental issues in a combined effort and through community participation. Second, economic growth in brownfield reuse occurs through redevelopment activities, not expansion at the urban fringe. With respect to alternatives to urban sprawl, researchers at George Washington University conducted a brownfield redevelopment analysis and determined

\textsuperscript{195} See edited work by Esty and Chertow.
\textsuperscript{197} Kirkwood, “Residential Redevelopment of Brownfields,” 4.
that “every brownfield acre redeveloped would have required a minimum of 4.5 acres had the same project been located in a greenfield area.”

The smart growth movement, based on the notion of growth as principled development and not sprawling expansion, represents a subset of sustainable development. By default, brownfields reuse falls under the smart growth principle to “strengthen and direct development towards existing communities.” Smart growth efforts refocus development toward existing communities in order to take advantage of extant infrastructure, utilize the resources that established neighborhoods offer, and conserve open space and irreplaceable natural resources on the urban fringe. Through a collaborative process, smart growth advocates propose diverse housing opportunities and mixed land uses amidst a compact development pattern.

The EPA Sustainable Brownfields Model Framework

This section reviews the EPA’s two-part report entitled “Characteristics of Sustainable Brownfields Projects” and “A Sustainable Brownfields Model Framework” (EPA Framework). The first report attempts to broadly explain the concept of sustainability and sustainable development and then associates this explanation with the brownfield redevelopment process. Supported by field research, the first report proposes “desirable qualities” important for developers and planners to incorporate at the operational level for brownfield redevelopment programs and projects. The report organizes these desirable qualities into parameters, elements, and characteristics. The “parameters of sustainability” relate to ecological remediation, economic development, and social equity determined by community resources and its current and future goals. The following list represents the key elements that the report associates with sustainable brownfield redevelopment:

- Community Profiling

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201 EPA, “Characteristics,” ii.
Associated with the key elements listed above, the report's proposed characteristics relate to practice of sustainable brownfield redevelopment at the local level. The EPA Framework then synthesizes these parameters, elements, and characteristics into a qualitative “model framework” for the implementation of sustainable brownfield redevelopment projects in urban and rural settings. The EPA proposes this framework for use by municipalities and other practitioners dealing with brownfield redevelopment in order to structure and plan the development process.

The EPA Sustainable Brownfields Model Framework. (1999)
The EPA Framework presents a well-researched and sophisticated study that successfully unites qualities of sustainability with brownfield redevelopment. The report provides an extensive matrix of characteristics as they relate to the key elements during each event in the development process, which could strongly support municipalities and practitioners in formulating strategy for brownfield programs and redevelopment efforts. Shortcomings with the EPA Framework, however, relate involve two issues. First, the framework does not emphasize a community-based collaborative approach to brownfield redevelopment.\textsuperscript{202} As discussed above under the section Ingredients of Success, community participation and stakeholder involvement are instrumental for building a site-context relationship that promotes the sustainable reuse of brownfields. Second, the framework’s linear sequence of events in the development process could potentially restrict adaptability and innovative practice. With an evaluation event only occurring after project planning, the EPA Framework does not support strategy refinement as new issues arise and situations change.

**Ecosystem Management**

The inchoate field of urban ecology defines urban ecosystems as “complex mosaics in which the biophysical characteristics are transformed over time by a concentrated, diverse set of human activities.”\textsuperscript{203} Urban ecological study seeks to understand how human activity influences ecological systems and in turn how these changes feed back through social and economic systems to drive further change. Natural resource management that acknowledges ecology as consisting of open systems subject to internally and externally driven fluxes, both natural and human, has become known as “ecosystem management” or “process management.”\textsuperscript{204} Ecosystem management must fundamentally be able to adapt to natural change. Under a framework of adaptive management, practitioners set goals for management of the system, apply the appropriate

\textsuperscript{202} Although the EPA’s report states that sustainable brownfield redevelopment includes public involvement throughout the process, it does not explicitly incorporate this characteristic into the framework.


techniques on the system based on these goals, monitor the results, and modify tactics or goals according to what they learn from the response of the system. Adaptive management, similar to science, thus serves to test hypotheses. Additionally, ecosystem management operates through a locally-based collaborative process and functions in parallel with the concept of sustainable development.

While in practice the term ecosystem management generally relates to large-scale ecosystems such as the Florida Everglades and Chesapeake Bay, the approach in theory can apply to a wide range of ecosystem scales. The Nine Mile Run watershed approach for addressing issues with sewer overflows represents a form of ecosystem management. The concept, therefore, has direct relevance for postindustrial landscape reclamation.

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205 A smaller-scale ecosystem management approach commonly operates at the watershed level. The large-scale approach for addressing complex environmental issues has had limited success, though still an emerging field. See Layzer for further discussion.
Chapter 5: Redevelopment Process Framework for Reclaiming Postindustrial Landscapes

This thesis represents a path for understanding the issues that surround brownfields and comprise the postindustrial landscape. Through an exploration of theory and practice, Chapter Four identifies Key Issues and Ingredients for Success in the brownfield redevelopment process and then broadens this perspective through review of alternative frameworks. This final chapter presents summarized findings based on the conclusions from Chapter Four and proposes a brownfield redevelopment process framework (Process Framework) applicable in efforts to reclaim the postindustrial landscape. The remaining sections provide an evaluation of the Process Framework and conclusion.

Findings

The following presents summarized findings primarily influenced by the Nine Mile Run project and based on the lessons learned in Chapter Four:

- Strategy formulation at the beginning of and adjustment throughout the brownfield redevelopment process avoids or better addresses the inevitable "site-related surprises" and contextual issues that could significantly delay or derail the project;

- Brownfield redevelopment practice has a better chance of success and is improved with a process strategy structured around Key Issues and that incorporates Ingredients for Success;

- Site-specific, larger-scale brownfield redevelopment practice creates synergy with community-scale collaborative restorative redevelopment efforts due to the commonality of degraded environmental factors that extend over property lines and comprise a postindustrial landscape;

- Postindustrial landscape reclamation requires integrative planning and interdisciplinary cooperation to address the full range of social, economic, and ecological issues; and

- Postindustrial landscape reclamation depends upon a collaborative process of learning that adapts practice to address complex situations.
The Process Framework incorporates these findings into a system for organizing a brownfield redevelopment process as a strategy for postindustrial landscape reclamation.

**Redevelopment Process Framework**

Wong and Bradshaw describe problems in the restoration and management of derelict and degraded land that pertain to solutions either too standardized or unnecessarily elaborate and expensive.\(^{206}\) The standardized solutions do not fully recognize the physical and chemical problems associated with a site. The unnecessarily elaborate and expensive solutions do not take an adaptive and innovative approach toward solving site problems, which could reduce costs and time. Wong and Bradshaw argue that it is essential for facilitators of any site restoration effort to adopt a framework of approach at the outset, and then follow it scrupulously.\(^{207}\) They further state that despite greater initial expense, a framework can reduce overall cost and increase reliability of the process. Wong and Bradshaw propose the following major steps in the rehabilitation and restoration of degraded land: survey ecological potential of site, identify future land use, conduct workshops to plan research program, carry out experimentation, assess environmental impacts, implement program, and evaluate program.\(^{208}\)

Similarly to Wong and Bradshaw’s framework, the Process Framework incorporates an ecological survey of the site, but also expands this focus to a contextual understanding. It also facilitates the practice of workshops, experimentation, and evaluation through various measures. The Process Framework promotes the investigation of natural systems together with socioeconomic factors in order to support a landscape perspective. The following framework, therefore, emphasizes a triple-bottom line approach, incorporates qualities from the frameworks discussed in Chapter Four, and organizes the Key Issues and Ingredients of Success also discussed in Chapter Four into a redevelopment strategy. The Process Framework attempts to recreate the organizational

\(^{206}\) Wong and Bradshaw primarily discuss derelict and degraded land associated with mining and other extractive industries.


\(^{208}\) Wong and Bradshaw, 298-301.
success behind the Nine Mile Run project, which presents a notable effort in postindustrial landscape reclamation.

Designed to assist developers, planners, and other participants to organize and monitor the development process for complex brownfield projects, the Process Framework also promotes consideration of a site-context relationship in order to build project support, gain momentum, and facilitate a sustainable form of development. The following description uses the Steelfields case study in Buffalo to illustrate operation of the framework.

### Redevelopment Process Framework

**For Reclaiming Postindustrial Landscapes**

**Question-Driven Approach**

**Redevelopment Strategy and Criteria**

**MOBILIZATION**

- **Predevelopment**
  - planning
  - analysis
  - design
  - approval process

  Evaluation ➔ Refine Strategy

  Commitment ➔ final approvals
  ➔ contracts

  Evaluation ➔ Refine Strategy

**IMPLEMENTATION**

- **Remediation**
  Evaluation ➔ Refine Strategy

- **Construction**
  Evaluation ➔ Refine Strategy

- **Occupancy/Stewardship**
  Evaluation ➔ Future Strategy

**Define Social, Economic, and Ecological Context and Scope**

Define questions based on the following:
1. How should the state of the landscape be described?
2. How does the landscape operate?
3. Is the current landscape functioning well?
4. How might the landscape be altered?
5. What predictable differences might the changes cause?
6. Should the landscape be changed?

**Hypothesize Project Methodology**

How to answer questions within context and scope, address key issues, incorporate ingredients of success.

**Key Issues to Address**
- public perception
- costs and time
- social justice
- environmental justice
- sustainability/reliability

**Ingredients of Success**
- vision/leadership
- strategic organization/knowledge
- gaining perspective/managing politics
- forming partnerships
- community participation/stakeholder involvement
- adaptability
- innovative practice

**Feedback/Strategy Refinement**

**Question-Driven Approach**

A question-driven approach functions through inquiry in order to understand a situation and from there build up an appropriate project methodology, which accommodates the complex and often unique issues presented by the postindustrial landscape. Through this approach, project planners can design a strategy informed by the particular site and context. The Process Framework comes into play with identification
of a site or area for potential redevelopment activity that exists within the context of a postindustrial landscape. As the first step, a question-driven approach, based on the Steinitz Framework, defines the social, economic, and ecological context and scope (Box 1). The italicized template questions in Box 1 use the term landscape as defined in this thesis. Formulation of these questions sets the stage for looking at a site-context relationship at the outset. Planners should also revisit the question-driven approach prior to the implementation stage (a forward-in-time feedback to Question 1). The Steelfields property, although currently undergoing remediation, has not been through an approval process for an industrial/commercial redevelopment project. By employing the Process Framework at this stage, example (and simplified) questions for each sustainability parameter might ask:

1) **How should the state of the landscape be described?**
   — How can the environmental condition of the site (with risk-based remediation for industrial/office use) be described visually and in non-scientific terms in order to assist the surrounding community and potential tenants in understanding the situation?
   — How can the site be valued with risk-based remediation?
   — How can the site be described in a larger ecological context, especially with respect to the Buffalo River?

2) **How does the landscape operate?**
   — How does the Steelfields site fit into the surrounding community, particularly the Hickory Farms neighborhood?
   — What is the regulatory environment with respect to redevelopment?
   — How does the site fit into a larger ecological perspective?

3) **Is the current landscape functioning well?**
   — How does the site and larger issue with brownfields affect the surrounding community? What services does the surrounding community lack?
   — How does the regulatory environment support/hinder site redevelopment?
   — What issues arise from the site’s relationship with its attendant ecosystem?

4) **How might the landscape be altered?**
   — How could a development proposal integrate community needs? What community organizations could become involved?
— What does the market support for redevelopment? How should change occur over time as a function of the market? Should transitional uses be considered?
— How can degraded ecological systems that encompass the site be improved? How could the project combine with the Buffalo River restoration efforts? What support is needed to mobilize such a combined effort? How can the project be linked to this effort?

5) **What predictable differences might the changes cause?**
— How many jobs would the development potentially provide for the surrounding community?
— Under alternative scenarios, what are the project economics? For public relations, how much tax revenue for the city would the development provide?
— Would improving the site’s shoreline on the Buffalo River assist in larger restoration efforts?

6) **Should the landscape be changed?**
— Will the surrounding community or other interest groups support/hinder the development project?
— Do project economics support redevelopment? How do alternative project scenarios compare?
— Does the site’s environmental impairment hinder redevelopment?

This brainstorming exercise under social, economic, and ecological parameters with respect to the site and site-context relationship will potentially identify issues to further explore and anticipate before they appear unexpectedly as problems during the development process, as well as recognize larger efforts that the project can join with and thus gain momentum and support. Preparation for this exercise should involve investigation of available site and context information; thorough visual inspection of the site and context (i.e., first hand experience); and preliminary research on community composition, relevant organizations, and the municipal and regulatory environment.

**Establishment of Redevelopment Strategy and Criteria**

With questions roughly defined, the next step in the Process Framework determines how to answer the questions, or hypothesizing project methodology, which leads to a four-step process for establishment of a redevelopment strategy. First, the questions defined in Box 1 feeds into Box A, which concerns Ingredients for Success in the brownfield redevelopment process.
Ingredients for Success
- vision/leadership
- strategic organization/knowledge
- gaining perspective/managing politics
- forming partnerships
- community participation/
  stakeholder involvement
- adaptability
- innovative practice

Project planners then conduct further research and refine the questions, as necessary, based on these characteristics. With respect to the Steelfields project, planners might pose questions for how to deal with potential roadblocks in the development process (strategic organization) due to a lack of strong leadership in participating City of Buffalo agencies. Other questions might ask about additional partnerships that could be formed in order to create project momentum and how to further involve stakeholders at the outset. Questions might also be refined in order address the issue of greater adaptability in project context and scope.

In the second step, refined questions feed into Box B—Key Issues to address, which could serve to restructure relevant questions. For example, a revised question might ask how project planners could work with City agencies or other organizations such as the Industrial Heritage Trail Committee, Inc. to better improve the site and area’s negative public image. Another question might address social justice issues with the surrounding community, such as whether local contractors could be teamed up with for project construction and how potential employment opportunities would benefit city neighborhoods. Additionally, addressing sustainability issues could lead to consideration of green building design and the use of local materials for construction.

Key Issues to Address
- public perception
- costs and time
- social justice
- environmental justice
- sustainability/reliability

In the third step, refined questions feed into Box 1, which requires that practitioners hypothesize project methodology based on context and scope and the
process of incorporating Ingredients for Success (Box A) and addressing Key Issues (Box B). Similar to a framework of adaptive management as discussed in Chapter Four under Ecosystem Management, formulation of project methodology represents hypotheses that function as goals and tactics for facilitating the brownfield redevelopment process and parallel efforts. Once the development process begins, these hypotheses will be tested via evaluation and iterations through the Process Framework and thus are subject to revision based on their effectiveness. Furthermore, methodology may have to be revised due to incongruence with the regulatory environment, economic infeasibility, community opposition, etc.

In the final step, planners use project methodology with incorporation of Ingredients for Success and Key Issues to design a Redevelopment Strategy and Criteria. The redevelopment strategy represents a working document that learns and adapts as it proceeds through the development process. This process of learning occurs through iterations of the four-step process described above with feedback from ongoing evaluation. The criteria of the redevelopment strategy relate to the social, economic, and ecological context and scope as refined by the Key Issues.

**Mobilization**

When predevelopment activity begins, evaluation of planning, analysis, design, and approval process activity uncovers issues and/or opportunities (feedback) that planners employ to refine the overall redevelopment strategy. Evaluation, however, first sends feedback through the four-step process that initially determined the redevelopment strategy and criteria. Lessons learned from evaluation pass through Box A and planners determine how to deal with issues and capitalize on opportunities with the Ingredients of Success. This strategy refinement process then passes through Box B and planners check to determine whether Key Issues are addressed. With these steps completed, feedback serves to hypothesize new project methodology and planners then adapt the redevelopment strategy and criteria to accommodate issues and/or pursue opportunities.

**Implementation**

Project implementation begins with a forward-in-time feedback to the first question in Box 1 and the subsequent steps in order to revise the redevelopment strategy
for site remediation, construction, and occupancy. The innovative practice of Steelfields’ remediation of Site B demonstrates the objectives of the Process Framework. For example, Steelfields continuously revises its remediation strategy in order to reduce costs by exploring alternative methods and attempting to recycle materials. The Redevelopment Process Framework seeks to recreate such activity through evaluation and feedback that employs Ingredients for Success (adaptability and innovative practice) and Key Issues (costs and time). Ideally, the Process Framework would support developers in devising strategies to incorporate similar remediation approaches into work contracts prior to the implementation stage.\textsuperscript{209} Upon completion of the development process, project developers and planners can then use the evolved redevelopment strategy to inform future projects.

**Evaluation**

**Structure and Function**

The Process Framework provides structure for developers and planners to organize brownfield redevelopment projects within the context of the postindustrial landscape. Serving five primary and interrelated functions, the Process Framework:

- Builds up and hypothesizes project methodology unique to site and contextual circumstances;
- Facilitates redevelopment strategy formulation in order to avoid or better address complications that inevitably arise in brownfield redevelopment practice;
- Incorporates important variables (Ingredients for Success and Key Issues) that inform strategy formulation and refinement;
- Provides an iterative method for strategy refinement that operates through evaluation and learning in the development process; and
- Promotes strategy formulation based on an open-systems approach and concept of adaptive management that facilitates efforts in postindustrial landscape reclamation.

\textsuperscript{209} As discussed in the Chapter 2.2, a partner in the Steelfields entity is also the environmental engineer conducting implementing the remediation program for Site B and thus has an added incentive to reduce costs.
Limitations

This thesis presents a qualitative analysis of brownfield redevelopment through two case studies and literature review. These findings and Process Framework represent the first step in a research effort to promote the postindustrial landscape reclamation. The Process Framework’s derivation from a small number of case studies creates its primary limitations. Additionally, the incomplete statuses of the projects prevent the opportunity to assess the development process from beginning to end. The case study of Nine Mile Run remains unfinished until further research can assess the completed Summerset development and Greenway Project. Upon completion, further investigation would explore the interaction between the Summerset development and Greenway Project in social, economic, and ecological terms. These results would be weighed against other case studies with and without relationships between public/private development and community-based restoration efforts. Comparative analyses between brownfield and greenfield projects with relationships between development and community-based efforts would also provide important comparative analyses.

Subsequent steps for improving the Process Framework and overall reclamation effort would involve conducting a broader investigation of case studies, both successes and failures, and a quantitative analysis of project qualities and site-context relationships. Results from this study would then be incorporated into a more appropriately defined process framework. Further research that looks at a broad range of case studies would also provide a larger list of specific strategies that incorporate Ingredients for Success and address the Key Issues in the Process Framework. Additionally, further research would provide methodology for accurately defining project social, economic, and ecological context and scope.

Conclusion

The practice of brownfield redevelopment seeks to cleanup and reuse property contaminated by past activity and otherwise left for ruin. The national focus on recycling contaminated land demonstrates the severity of the brownfield dilemma and the
realization that these sites represent a valuable economic opportunity. Focus has shifted back to urban areas previously neglected for reasons of decline and negative perception. City living has become attractive for the same reasons that brownfield locations have value: proximity to urban amenities; concentrated uses; and an energy often lacking in sprawled, low-density development. The smart growth movement targets brownfield redevelopment as a mechanism for diverting growth toward extant urban areas and thus mitigating the destructiveness of urban sprawl. By default, brownfield reuse is a form of sustainable development.

Brownfield redevelopment in itself, however, will not restore the postindustrial landscape in its structure and function. The legacy of devastation in cities from large-scale industrial activity requires a broader approach. Ecosystem management rests on the notion that “seeing the ecosystem as a whole must precede efforts to manage it.” Such is the approach of postindustrial landscape reclamation with respect to brownfield redevelopment. Similarly with projects tackled by efforts in ecosystem management, brownfields pose complex problems—social, economic, and environmental—that require a systems approach to address the full range of issues. Conventional brownfield redevelopment practice combined with integrative planning and restorative redevelopment provide methodologies for filling the voids and healing the degraded environment that characterize the postindustrial landscape. Integrative planning functions through community-based, interdisciplinary collaboration in order to address landscape issues with the appropriate context and scope. Restorative redevelopment improves the value and livability of the landscape while restoring natural processes and functions. Together with brownfield redevelopment, these practices reclaim the postindustrial landscape.

The Nine Mile Run project, in all its components, demonstrates that postindustrial landscape reclamation can happen. Reliability is a key issue in the brownfield redevelopment process, and recreating the Nine Mile Run model for use at another location poses many challenges. After all, Nine Mile Run does not fit the category of a site strongly impacted by economically disadvantaged and socially distressed surroundings. In Buffalo, however, the 1,200 contiguous acres of brownfields that

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210 Lee, 57.
comprise the South Buffalo redevelopment area exist adjacent to neighborhoods with poverty levels as high as 33 percent. Aside from Village Farms, the spotty brownfield redevelopment activity that has occurred replicates suburban sprawl in the city, and does little to achieve reclamation goals other than limited economic development. Because of its scale, the South Buffalo redevelopment area could reroute the city toward a better direction, and combined with related waterfront and river restoration projects could recreate the city as a desirable (albeit snowy) place to live.

As discussed before, solutions to complex problems cannot be commanded but must be discovered. The ecosystem management principle of adaptive practice offers a better approach than any strategy currently employed for effecting change to the South Buffalo redevelopment area. Beginning from a scientific viewpoint, its progress toward action becomes “informed more by the observational interest of the naturalist or astronomer than by the manipulative tendencies of the engineer or entrepreneur.”211 This approach, similarly with Nine Mile Run, opened the door to a wide range of possibilities and, practically speaking, greater funding opportunities. The brownfield redevelopment process framework proposed in this these attempts to facilitate an open-door method of strategy formulation that has the potential to lead to postindustrial landscape reclamation. The concepts rests on the underlying notion that if enough momentum could be built up through collaboration, partnership formation, and a host of other tactics, then despite initial economic infeasibility, opportunity would present itself. That is the hope reclamation for the South Buffalo postindustrial landscape.

211 Lee, 57.
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