

Land Reuse and Redevelopment Toolkit

A Developer's
Guide to Creating Healthfields



Image of a Brownfield. Source: Lloyd DeGrane, 2014.



U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

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Image of a Brownfield. Source: Lloyd DeGrane, 2014.

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This Toolkit's Purpose

The *Land Reuse & Redevelopment Toolkit* provides a Developer with information, procedures, and resources needed to identify, cleanup, and redevelop Land Reuse Sites to positively impact a community's overall health. Let's start with the basics.

The Basics

Land Reuse Sites are sites that are slated for redevelopment but may have chemical contamination. Land Reuse Sites include **Brownfields**, as well as other types of hazardous or potentially hazardous sites, such as landfills or Superfund sites. In essence, they are potentially contaminated sites that may be abandoned or underused industrial, commercial, or residential properties. A variety of Land Reuse Sites exist in the United States, including Brownfields.¹

These types of sites qualify as Land Reuse Sites:

Brownfields are defined by the United States Congress through a 2002 amendment to CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) as real property — the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. There are some exclusions to the definition of "Brownfield site," including facilities that are listed or may be placed on the National Priorities List, or are subject to corrective action under the Solid Waste Disposal Act.

The Environmental Protection Agency (EPA) estimates that there are **more than 450,000 Brownfield sites in the United States making them the most common** type of Land Reuse Site.² As foreclosures and manufacturing downturns increase, so may the number of Brownfields.

Federal facilities include lands and improvements to lands such as buildings, structures, and equipment that are owned by or leased to the federal government. Some of these sites may be contaminated. Federal facilities must comply with environmental regulations.³

Resource Conservation and Recovery Act (RCRA) Regulated Sites (RCRA corrective action sites) are regulated for the management of solid waste (e.g., construction debris or garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. Past and present activities at RCRA sites sometimes have resulted in the release of hazardous waste and hazardous substances into soil, groundwater, surface water, sediments, and air. The RCRA requires investigation and cleanup of these hazardous releases.³

Superfund Sites are sites that are uncontrolled or abandoned places that contain hazardous waste and potentially affect local ecosystems or populations. These sites may be noted on the government's [National Priorities List](#).³

Underground Storage Tanks refer to any underground storage tank and underground piping connected to the tank that has at least 10% of its combined volume underground. The EPA regulates tanks that contain petroleum or any hazardous substances.³

Landfills are sites that can receive solid waste from municipalities, industrial facilities, construction activities, and medical facilities. Landfills must be designed to comply with federal regulations to protect the environment from contaminants that may be present in the waste stream.⁴

As a developer, you may already have familiarity with these land reuse sites or even have experience redeveloping them. You may be new to the redevelopment of potentially contaminated sites. You might even unexpectedly encounter some contamination during development of a site thought to be green space or “clean”, such as an old underground petroleum tank, buried 55-gallon drums, or a chemical odor as you are moving soil during development. If you are concerned about unexpected contamination, you can contact the local municipality, the local health department, the state environmental agency, or an [ATSDR](#) regional office for assistance.

For a holistic view of Land Reuse Sites across the country, the EPA provides an [interactive map](#), which allows you to identify different types of sites and understand quantities and locations of each by entering community information, such as an address, ZIP code, county, watershed, or other parameters.

Healthfields are redevelopment projects that address community needs such as access to healthcare, fresh food, community centers, and parks.

Image of a Brownfield.
Source: GettyImages, 2017.



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The Risks and Dangers of Land Reuse Sites

Land Reuse Sites or previously unidentified contaminated sites can harm your community's health in many ways. The dangers include poor air quality, increased risk of disease, limited access to healthy foods, a lack of options for physical activity, poor housing quality, and environmental damage leading to toxic air, water, or soil. These sites can be redeveloped into healthier and safer environments, or "Healthfields." In addition to providing cleaner environments and health benefits, the redevelopment of Land Reuse Sites can stimulate the local economy by bringing in new businesses and creating jobs.

Miles Ballogg, a member of the Brownfields & Reuse Opportunity Working Network ([BROWN](#)), is one of the original supporters of the "Brownfields to Healthfields" concept. Ballogg has promoted and helped develop Healthfields throughout his home state of Florida.⁵

Redevelopment Benefits

Cleaning up and investing in Land Reuse Sites:

- Protects the health of communities
- Removes development pressures off undeveloped land
- Optimizes the use/reuse of existing infrastructure
- Facilitates job growth
- Increases local tax bases
- Transforms environments into healthy and safe places

The ultimate goal is to enhance community health by reducing potentially harmful exposures to hazardous substances. If you redevelop a site with the health of the community in mind, you can help residents live a healthier overall lifestyle.

This toolkit provides the information you need to improve the environment and create a healthy community or Healthfield.

Who We Are

The **Agency for Toxic Substances and Disease Registry** (ATSDR) is a federal public health agency headquartered in Atlanta, Georgia. ATSDR is responsible for evaluating and protecting community health by preventing effects from harmful exposures and diseases related to toxic substances.

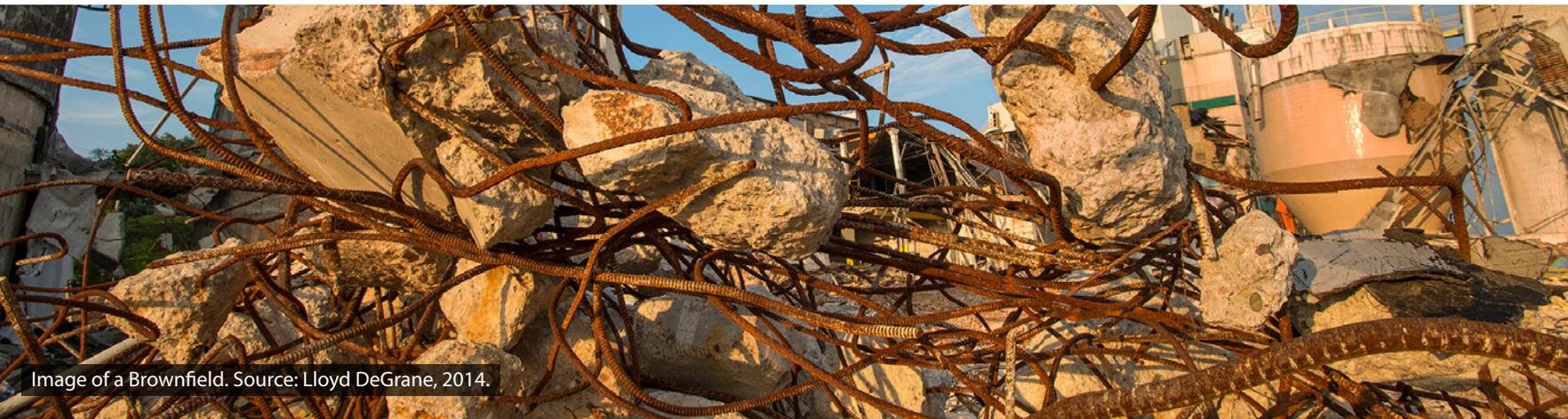


Image of a Brownfield. Source: Lloyd DeGrane, 2014.

Are You a Developer?

This toolkit is designed for a real estate Developer who's been tasked with redeveloping a Land Reuse Site to meet the community's vision to transform the area into a practical, sustainable, and profitable final product.

Still unsure? Do you identify with the following questions?

- Are you a real-estate developer who has questions about environmental contamination?
- Are you interested in helping communities rebuild for a healthy future?
- Are you interested in learning the standard procedures of environmental due diligence, in regards to a redevelopment project?
- Are you interested in communicating with key stakeholders about the practicality and feasibility of a redevelopment project?
- Are you interested in the benefits of Land Reuse properties, such as tax incentives and reusing existing infrastructure?
- Are you interested in expanding or carving out a niche as a "Brownfields redeveloper"?
- Regardless of your personal beliefs, have you been tasked with any of the above?

If you answered "Yes" to one or many of these questions, you're a Developer, and you can use this toolkit throughout the project.



Dan French

Founder & CEO at Brownfield Listings

"Sites can be like snowflakes. Learning the unique circumstances, challenges and opportunities of each site – and unlocking its potential – keeps my passion for redevelopment burning. Focusing on redeveloping our physical environment is tangible, doable and catalytic, literally eliminating the negative and restoring positive potential."

Image of Developer Dan French. Source: Brownfields Listings, 2017.

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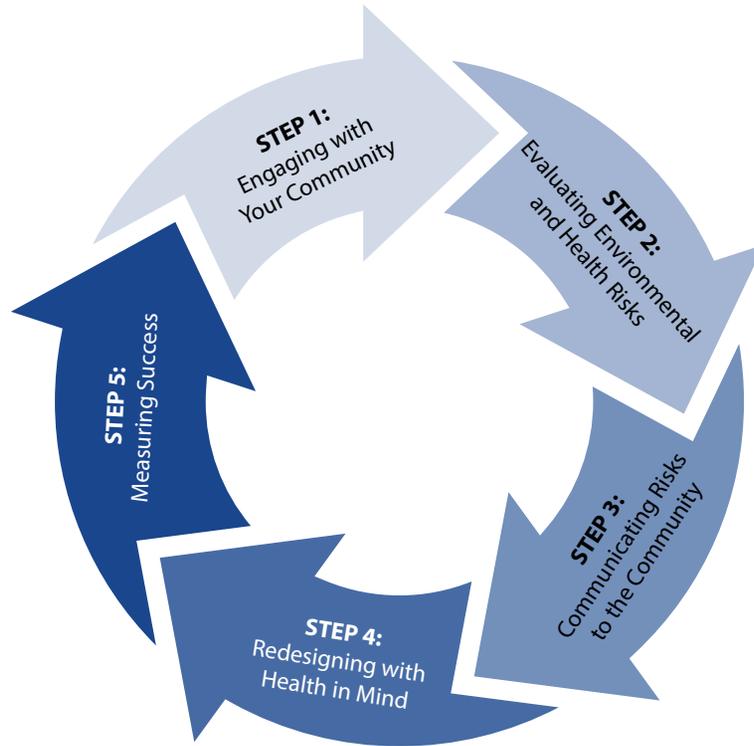
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Understanding How You'll Work within the 5-Step Land Reuse Model

The structure of this toolkit follows the **ATSDR 5-Step Land Reuse Model** used by communities to safely reuse land and improve health. As a Developer, you play a critical role in redeveloping the site with health in mind.



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Step 1: Engaging with Your Community

Get your community's support to address a Brownfield/Land Reuse Site and broaden your group into your "Development Community" – residents, nonprofits, environmental and health professionals, and anyone who shares a vision for a cleaner environment and improved health. Together, you can establish a vision, address your community's needs, and define how to spread information throughout the project. As a Developer, the community engagement for the project may have already occurred with a strong Development Community in place. In this case, you are an invited member of that community and will play a strong, but equal, role in the redevelopment plans.

Step 2: Evaluating Environmental and Health Risks

If you are contracted by a land reuse site owner or a municipal agency, they may offer to manage the assessment and any associated cleanup of a land reuse site before you begin the redevelopment. Alternatively, this may be a part of your redevelopment plan and costs. In this case, you may need to contract an Environmental or Health Professional to conduct an Environmental Site Assessment (ESA) to determine what, if any, contaminants and liabilities are associated with the Land Reuse Site. An ESA typically has one or two phases.

- For an ESA I, the professional collects basic information — including inspecting the site, interviewing former owners, and reviewing local records.
- If there are concerns about possible contamination, an ESA II might be necessary. This means collecting and analyzing environmental samples (such as soil or water) to determine exact contaminant levels at, or from, the site. Environmental or Health Professionals can review those contaminants to determine possible harmful exposures and recommend protective actions.
- *NOTE:* ESA I or II is often referred to as a Phase 1 or Phase 2 Site Assessment.

Step 3: Communicating Environmental or Health Risks

After the ESA report is finalized, you can help communicate the findings to your community. You can call on the environmental health professionals in your Development Community to translate the technical findings of the ESA report into easy-to-understand language. They may even meet with the community to explain the findings.

Step 4: Redesigning with Health in Mind

Once the community understands the ESA findings, the site needs to be cleaned up before redevelopment begins. For example, the end result of a Healthfield redevelopment could include housing, produce markets, community gardens, health clinics, or parks.

Step 5: Measuring Success

It is important to measure and communicate any successes of the project to your community throughout redevelopment. Even small milestones show the community that the site is progressing in the right direction.

Keep reading to learn about each step of the Land Reuse Model and expected activities.

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Step One

Engaging with Your Community



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Understanding Community Needs

As a Developer, you serve as a necessary external partner to the project's Development Community. It's important to understand and listen to the community's health needs when planning a redevelopment project. Their needs may shape the planning and implementation of the project. For example, the community might not have access to fresh food, recreation, or a nearby health clinic. All of these factors must be taken into consideration when planning a project to provide the most strategic value.

The community can visualize their anticipated redevelopment and its benefits. While you won't be responsible for bringing the community together, you can help empower them to identify the future of the site by offering feasible suggestions for development.

Guiding Community Conversations



Image of Ken Meter. Source: Crossroads Resource Center, N.D.

According to Ken Meter, a BROWN member from Crossroads Resource Center, these three questions serve as great thought-starters, but also provide guidance to keep the community and facilitators grounded throughout the process

1. How do we create an inclusive process?
2. How can we set a galvanizing vision for sustainability for our community?
3. How do we measure progress toward that vision?

Access to healthy foods is a primary component for overall community health. If you're considering this option, a good resource for Developers is the [Crossroads Resource Center](#). It is a nonprofit organization that works with communities and their allies to foster self-determination. They specialize in creating new tools which communities can use to identify a healthy and sustainable future.

Developing Relationships and Partnerships

It is important to **look for strategic partnerships within the community who will advocate for you** and help you complete the project. Forming these relationships will simplify the logistics of your project and help you achieve community buy-in. Examples of strategic partnerships include local businesses and nonprofits, or regional companies that want to expand into a new community.

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Understanding Roles Throughout the Process

It's important to understand the process of redeveloping a Land Reuse Site holistically. The following chart details the primary types of personnel you can expect to work with during each stage of the project.

Roles	Who are they?	What's their role?	Who do they work with?	What key steps are they involved in?
 Community Champion	A person living in the community who is passionate about his or her community's health.	<ul style="list-style-type: none"> • Activate the community to make them aware of the site. • Convey all potential risks to the Community and convince them to invest time and resources into redevelopment. • Share all relevant information with the community. 	<ul style="list-style-type: none"> • Community Planners • Municipal Agencies • Environmental or Health Professionals 	<ul style="list-style-type: none"> • Engages the Community • Communicates Risks • Measures Success
 Community Planner	A person who plans the logistics of a redevelopment project.	<ul style="list-style-type: none"> • Engage community members to understand their needs for redevelopment. • Create project plans to ensure site assessment, remediation, and redevelopment are on time and on budget. 	The Community Planner works with everyone in the process.	Involved at all steps
 Municipal Agency	A person who works for a local municipality.	<ul style="list-style-type: none"> • Bridge the capabilities of local, state, and/or federal government to the community project. • Provide network of resources, including community outreach, grant writing, staffing, etc. 	The Municipal Agency works with everyone in the process.	Involved at all steps
 Environmental or Health Professional	A person who is qualified to provide environmental and health services for a community.	<ul style="list-style-type: none"> • Conduct site assessment. • Conduct environmental cleanup of site. • Conduct community health analysis. 	<ul style="list-style-type: none"> • Community Planners • Municipal Agency 	<ul style="list-style-type: none"> • Evaluates the Environmental and Health Risks • Communicates the Risks
 Developer	A person in charge of the development aspects of the project.	<ul style="list-style-type: none"> • Provide practical redevelopment options that address community needs. • Execute the redevelopment of land into functioning real estate. 	<ul style="list-style-type: none"> • Community Planners • Municipal Agency 	Involved at all steps but their primary role is redesign.

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Key Roles Within the Model

Steps	Roles	Activities
Step 1: Engaging with Your Community	 	Work with the Community Planner and Municipal Agency to gain contextual awareness of the community and their unique health needs.
Step 2: Evaluating Environmental and Health Risks	 	Work with the Municipal Agency and the Environmental or Health Professional who is conducting the site assessment and identifying contamination to understand the site assessment results and community health needs so you can plan a viable development project.
Step 3: Communicating Environmental and Health Risks		Work with the Environmental or Health Professional to translate the results into plain language so the community, and your company, understand the risks.
	 	Work with your Community Planner and Community Champion to share the results of the site assessment, and how that might impact any initial development plans.
Step 4: Redesigning with Health in Mind		Work with the Environmental or Health Professional to plan and execute a site cleanup.
	 	Work with the Municipal Agency and Community Planner to redevelop the site into viable real estate.
Step 5: Measuring Success		Work with the Environmental or Health Professional to quantify the health benefits from the healthy land reuse.
		Work with the Municipal Agency to quantify the economic benefits from the healthy land reuse.

Get Started Now

If you have been included in this step, and you're ready to begin engaging with your community, contact ATSDR at:

 www.atsdr.cdc.gov/sites/brownfields

 ATSDR.LandReuse@cdc.gov

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Evaluating Environmental and Health Risks



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Executing an Environmental Site Assessment

An **Environmental Site Assessment** (ESA) is the process of identifying the presence or likely presence of hazardous materials on a property. This could include identifying a release or threatened release of hazardous materials into structures on the property, into air, or into soil and groundwater or surface water on or near the property. The ESA is sometimes referred to as “due diligence” or “all appropriate inquiry.”

A **qualified Environmental or Health Professional** will conduct the ESA to help determine the potential for, or the extent of, negative impacts to the project area from hazardous substances. The two primary phases of this process are designed to increase the level of understanding of a site’s condition.

1. ESA Phase I identifies potential environmental concerns by conducting:
 - Historic record searches
 - Interviews with property owners
 - Reviews of local, state, and federal databases
 - A site visit
2. ESA Phase II identifies actual contaminants through laboratory testing of samples, including:
 - Soil samples
 - Groundwater samples
 - Ambient air samples
 - Asbestos-containing material
 - Lead-based paint samples

The Environmental Protection Agency (EPA) has established standards for conducting all appropriate inquiry— the requirements for assessing the environmental conditions of a property prior to its acquisition. For properties purchased after May 31, 1997, the law requires the use of procedures developed by the American Society for Testing Materials (ASTM), as they meet the “all appropriate inquiry” requirement for site characterizations and assessments.⁶



Image of a Brownfield. Source: Lloyd DeGrane, 2014.

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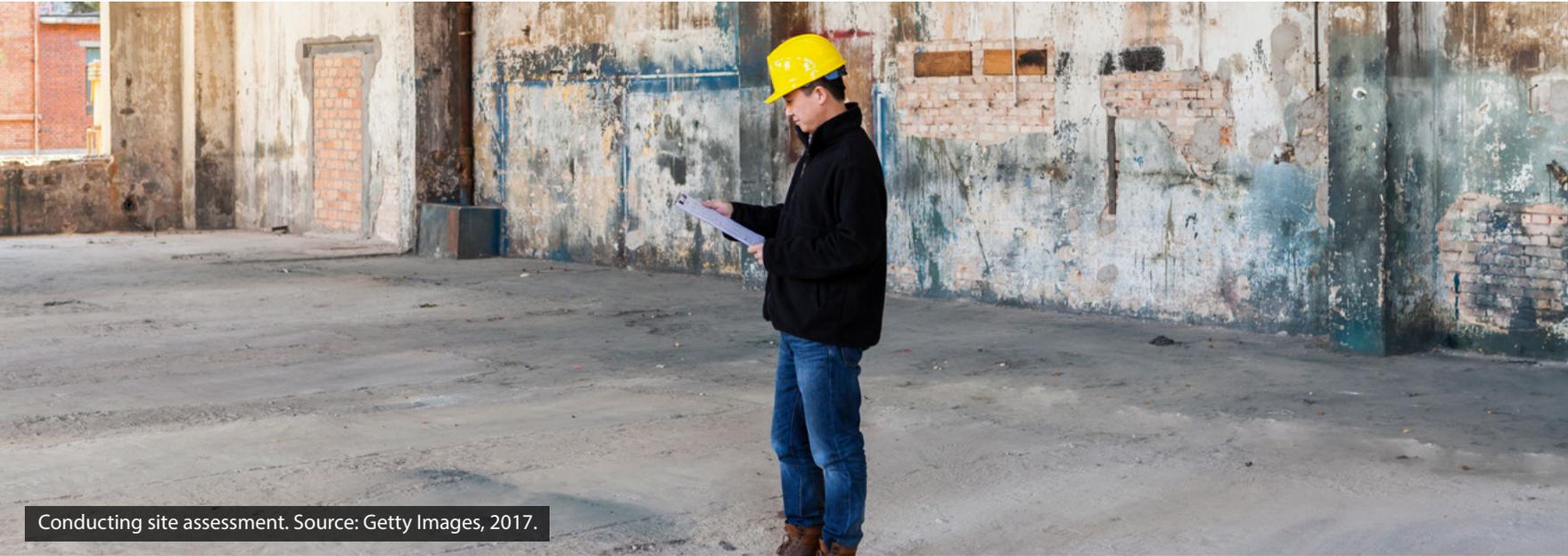
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Conducting Site and Health Assessments

The **American Society for Testing and Materials (ASTM)** International is a worldwide standards organization, which has strict [guidelines for both ESA I and II](#). Specifically, Phase I must adhere to E 1527-13 and E 2247-08 guidelines, while Phase II must follow E 1903-11 guidelines. These guidelines provide instructions to conduct standard practices for Environmental Site Assessments.

Phase II of the ESA can be very technical, but there are plenty of environmental and health resources to assist you. Besides the aforementioned ATSDR and EPA, there are [state, tribal, and even local environmental and health agencies](#) that can also provide support. For additional information, please refer to pages 22 - 25 of the Environmental or Health Professional Toolkit.



Conducting site assessment. Source: Getty Images, 2017.

Get Started Now

Want to obtain your ESA or have questions about the process? Are you concerned about a potentially contaminated or hazardous site and threats to your community's health? Contact ATSDR to learn how Environmental or Health Professionals can assist.



www.atsdr.cdc.gov/sites/brownfields



ATSDR.LandReuse@cdc.gov

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Image of a Brownfield. Source: Lloyd DeGrane, 2014.

Understanding the Environmental Site Assessment Report

It can be difficult to understand and communicate the environmental and health risks of a contaminated site — whether you're relaying information to the community, their stakeholders or the company you are building on behalf of. The reports are very technical in nature, and have the potential to return more than 250 toxicological results – or environmental contaminations – between ESA I and II.

This section of the Toolkit provides resources to help you comprehend and translate results into plain language for your community. There are also strategies for distributing this information, so individuals can fully grasp the findings and what they mean to the community's overall well-being.

You may want to conduct Internet searches to familiarize yourself with a sample ESA I or ESA II report. Expect the community to **lean on the Environmental or Health Professional** involved in the redevelopment for this part of the process. You're the subject matter expert and you have probably been in similar situations before. They'll also rely on state or local health agency partners, or [APPLETREE](#) partners.

Several organizations offer free technical assistance to communities and other stakeholders conducting a Land Reuse Site redevelopment. Examples include ATSDR and the EPA-funded Technical Assistance to Brownfields (TAB) programs. There are three TAB centers, each of which serves several states:

- Kansas State University's [TAB Program](#)
- New Jersey Institute of Technology's (NJIT) [TAB Program](#)
- Center for Creative Land Recycling [resources](#)

Once you understand all potential risks, you may be able to help clearly communicate them to your community. There may already be several established lines of communication, but make sure to convey these findings on a platform that supports a two-way conversation. People will have questions, concerns, and thoughts, so be prepared to participate in an open forum. Bring in Environmental or Health Professionals from your Development Community to help you discuss risks with your community.



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Communicating Results and Risks

You may need to work with your Environmental or Health Professional to help them explain to your community any risks associated with contamination at land reuse sites. **Risk communication** is the process of informing people about potential hazards to their person, property, or community.⁷

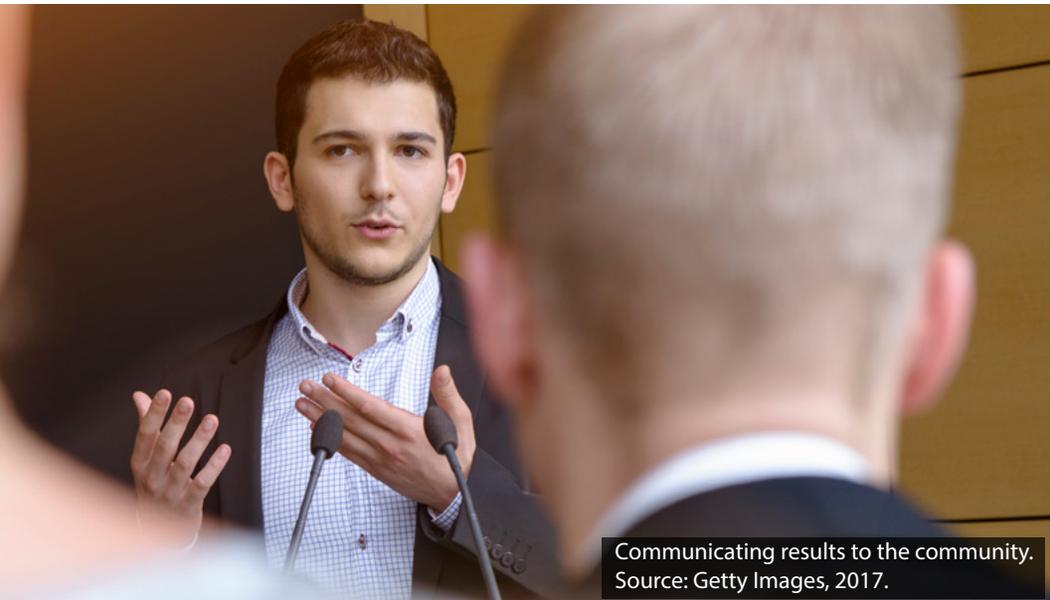
The EPA originally developed the **Seven Cardinal Rules of Risk Communication** in 1988, which have been [adapted and updated](#) to evolve with our times. However, the rules themselves are the same — and what's presented below will help you, with the support of your Environmental or Health Professionals, communicate any risks your community may face.

1. Accept and involve the public as a legitimate partner.
2. Listen to the audience.
3. Be honest, frank, and open.
4. Coordinate and collaborate with other credible sources.
5. Meet the needs of the media.
6. Speak clearly and with compassion.
7. Plan carefully and evaluate performance.

It is important to understand that people may perceive risk on a scale of “outrage”. In the 1980s, risk communication expert Peter Sandman, coined the term “[outrage factors](#)”, such as trust, control, or dread, to describe how people perceive risk. The EPA can provide [more information on risk communication](#) along with best practices and strategies for communicating with your audience.

In this role, you can help shape messages that your Environmental or Health Professional may suggest for communicating hazards or risks to your community. The actual messages, whether written or verbal, can be structured in a way that resonates with your audience. The EPA suggests using a **Message Map** to assist with your communication. The following examples of message mapping and best practices draw on real-life examples from previous Brownfield redevelopment projects.

A **Message Map** is a detailed, visual description of organized answers to anticipated questions and concerns from key community stakeholders.



Communicating results to the community.
Source: Getty Images, 2017.

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My School Daycare: Avoiding Arsenic Exposure

Background: Sinco, Inc., a former plastic safety net manufacturing facility based in Connecticut, was redeveloped into a daycare center. The site's soil has historically contained high levels of [arsenic](#), a naturally occurring element that is used primarily in wood preservation or pesticides, as well as other contaminants.

Risk(s): Although much of the site had been cleaned up, the soil in the playground was never sampled to determine whether it contained harmful levels of arsenic to children who attended the daycare.

Outcome: In February 2008, the Connecticut State Department of Public Health worked with the daycare property owner to successfully test the soil. It was determined that while the playground surface and subsurface soil was contaminated with arsenic, a remedial plan was possible to prevent exposure.

Results: The state worked with the property owner to ensure arsenic in the soil would be covered with wood chips to prevent exposure. The state developed a fact sheet and held a public meeting to address parent and community concerns. During the meeting, the state confirmed that children had likely not been exposed prior to the cleanup and were not at risk of direct contact in the future.

Daycare Center Message Map

<p>Key Message Connecticut Department of Public Health has worked with the owner and operator to ensure arsenic in the soil will be covered with wood chips to prevent exposures</p>	<p>Key Message Children attending the daycare will not have direct contact with the residual arsenic contamination in the soil</p>	<p>Key Message Children were not likely exposed as the daycare center has been open less than a year and during winter children were not using the playground</p>
<p>Supporting information 1-1 Limited soil removal will take place in areas with highest arsenic levels</p>	<p>Supporting information 2-1 The playground has a layer of woodchips covering the soil</p>	<p>Supporting information 3-1 A child would need to play directly in the soil on a daily basis, for several years to be harmed by arsenic</p>
<p>Supporting information 1-2 Cleanup plan will likely include placing additional layers across the entire playground</p>	<p>Supporting information 2-2 Owner plans to add additional layers of covering such as heavy landscaping fabric, crushed limestone, and woodchips</p>	<p>Supporting information 3-2</p>
<p>Supporting information 1-3 After additional layers added, children will not be able to come into contact with the soil</p>	<p>Supporting information 2-3 One would need to play directly in the soil on a daily basis, for several years to be harmed by arsenic</p>	<p>Supporting information 3-3</p>

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ABC Asbestos Mine: Contaminated Streams and Potential Health Risks

Background: During most of the 1900s, a region of the U.S. was home to an active asbestos mine (“ABC Mine”, for this case study). During operation, millions of tons of [asbestos](#) ore were excavated, generating tons of waste rock and mine tailings.

Risk(s): People skied and hiked on old asbestos mine tailing piles. Runoff from the site, white with asbestos fibers, entered a local stream — contaminating the water and sediments and extending downstream to wetland areas. Environmental health professionals were concerned about the presence of airborne asbestos fibers. If inhaled, the fibers can remain inside a person’s lungs forever, causing lung disease, lung cancer, and in some cases, death.

Outcome: Environmental health professionals evaluated the site to determine the route, frequency, and duration of exposures for people who worked or recreated at the site. Based on these results, they recommended restricting access to the mine property, preventing the reuse of any of its materials, and prohibiting access to the affected downstream areas.

Results: Once access was restricted, federal and state agencies enacted a public awareness campaign to educate residents about asbestos and ways to minimize their exposure. Ultimately, the site was identified and acknowledged as a hazardous place where recreation can be dangerous to people’s health.

Asbestos Mine Message Map

<p>Key Message Being exposed to asbestos does not mean you will develop health problems</p>	<p>Key Message Health status can exacerbate and accelerate exposure risk</p>	<p>Key Message You can minimize your own exposure</p>
<p>Supporting information 1-1 Asbestos-related illness depends on duration and frequency of exposure</p>	<p>Supporting information 2-1 Cigarette smoking with asbestos exposure increases your chances of getting lung cancer</p>	<p>Supporting information 3-1 Stay off mine property</p>
<p>Supporting information 1-2 Asbestos-related illness depends on how much you were exposed to</p>	<p>Supporting information 2-2</p>	<p>Supporting information 3-2 Do not use wetlands up to a mile downstream for camping or other activities</p>
<p>Supporting information 1-3 Harm depends on size and type of asbestos you were exposed to</p>	<p>Supporting information 2-3</p>	<p>Supporting information 3-3</p>

ATSDR has communication and messaging information, as well as a [message map template](#) that can be used to structure your communication.

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How to use Environmental Site Assessment Report and Results

If you know your site is contaminated, what can you do to clean it up? Use the results from your ESA Phase I and II to proceed.

It might be possible or necessary to:

- Require the current landowner to cleanup the property prior to the sale.
- Adhere to state and local disclosure regulations for due diligence purposes.
- Pursue acquisition and cleanup alternatives that help control your environmental liability for the property.

How Clean is “Clean”?

Keep this question in mind when you have discussions with your Environmental or Health Professional and community stakeholders. You can help establish the cleanup standards based on the mandated regulations and your development needs. Also, be aware that based on the ESAs, your initial development plans might have to shift to accommodate specific contaminants or risks associated with the site.

The Certified Environmental or Health Professional who performed the ESAs can help you by proposing the most current cleanup methods and providing reasonable cost estimates. You can include all details about criteria for cleanup and who pays cleanup costs in your final contract with the seller. Funds for assessing and removing contaminants may be available through a state or federal Brownfield grants program.

For more information, the Wisconsin Small Business Environmental Assistance Program explains [how to use the results](#) from your ESA.

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Get Started Now

Need to communicate ESA results to your company, but not sure how to translate or understand them? ATSDR can help you identify resources and personnel.

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Step Four

Redesigning with Health in Mind

Reviewing blueprints of a redevelopment project. Source: Getty Images, 2017.

Assessing Unique Challenges and Opportunities

Once all parties understand the ESA I and II results and how those might impact redevelopment options, you might need to reassess the project approach. Each project presents unique challenges, and in turn, unique opportunities. By rigorously weighing and assessing these factors, you will be able to understand the limitations of the project — and where you can make the biggest impact.

Funding Vehicles

It's no secret that money is the most crucial resource of all. Without funding for the actual redevelopment, it's nearly impossible to execute these projects. Therefore, it's critical to understand the grants that might be available to the community you're serving.

The municipality may offer incentives from **Tax Increment Financing (TIF)** to subsidize redevelopment. According to the [Lincoln Institute of Land Policy](#), TIF allows municipalities to promote economic development by earmarking property tax revenue from increases in assessed values within an established TIF district. Other incentives may be available through [Tax Allocation Districts](#), geographic districts established to catalyze investment by using public dollars to finance some redevelopment activities in underdeveloped or blighted areas. Here are some helpful resources for getting started:

- Learn about [site eligibility for funding](#) opportunities from the Environmental Protection Agency (EPA) for assessment, cleanup, and other redevelopment activities.
- While not currently an actively funded program, ATSDR highlights their past [funding opportunities](#) for health education, community engagement, and planning, specific to Brownfield or Land Reuse Site development. The information and summaries of these projects may provide guidance for other communities.
- A much more robust resource, [Grants.gov](#) can help you learn about and search for grants and allows you to apply on their site.
- The University of North Carolina's Environmental Finance Center provides a great [tool for grant writing tips and obtaining grants](#), featuring Grants.gov.
- Finally, eCivis has worked with various states and major cities across the country on [best practices](#) to be "grant-ready".

While grant funding is very helpful, the investment in redevelopment can be 100 times the amount (or more) of an average assessment or cleanup grant. As a Developer, you are an expert in financing development. You may choose to take advantage of municipal incentives or partner with an investment group to launch the redevelopment.



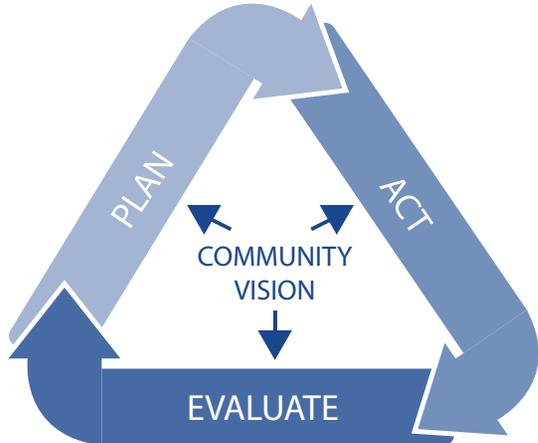
Assessing a redevelopment site.
Source: Getty Images, 2017.

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Planning and Funding Options

Emphasizing Health with Redevelopment

The Land Reuse Site in your city can be transformed to benefit the health of your citizens. That’s why it’s important to establish a community vision at the start of the project in Step 1 (Engaging with Your Community). This vision may guide all the decisions for the future site. If the project lacks a vision for a healthier community, it may never happen. As a Developer, when you propose ideas to develop the land, **understand the community’s needs and integrate those into the central design of the site.**



When planning to create a health-focused land reuse project, there are a few critical questions to keep in mind:

- Does this project keep the health of the community in mind?
- Will there be a measurable health impact based on this project?
- Will there be a significant return on investment?
- What health needs specifically will your real estate project address?

Planning for Profit

Naturally, as the Developer, you want to show a profit and own a plot of land that can be monetized. The following questions can help guide your planning process.

- Does the redevelopment site have a unique and strategic advantage to run as a sustainable business or organization?
- Is there a consistent revenue stream associated with the redesign? Can it address the community’s health needs and be manageable for the community?
- Is the cleanup cost a manageable expense to undertake?
- Are there outstanding liabilities which will impact your ability to monetize the site?

Planning for Sustainability

The end development goal must be a redevelopment that enhances the community’s economy and environment in a sustainable way.

- Does the redevelopment create sustainable jobs?
- Will the redevelopment have a measurable impact on the community’s economy?
- Will the redevelopment have a measurable impact on the community’s environment?
- Can strategic partners or other resources manage and facilitate development after you have moved onto the next project?

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Developer Resources for Brownfield Sites

The U.S. Economic Development Administration (EDA) [resource directory](#) is a great tool, providing critical resources, from the local to regional level, identified by state. Additionally, a few Developer-specific tools exist for redevelopment of Land Reuse Sites.

- For developers diving into the world of Brownfield redevelopment, [Brownfield Listings](#) is a great resource. You'll find a redevelopment marketplace for redevelopment projects of transitioning or challenged real estate properties.
- Transforming land into renewable energy is gaining popularity, and is a strong choice for sustainability. The National Association of Local Government Environmental Professionals published a [Nuts and Bolts Primer](#) on how to cultivate green energy on Brownfields.
- The American Planning Association's [Policy Guide on Smart Growth](#) can help you incorporate best practices during the planning process.

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Step Five

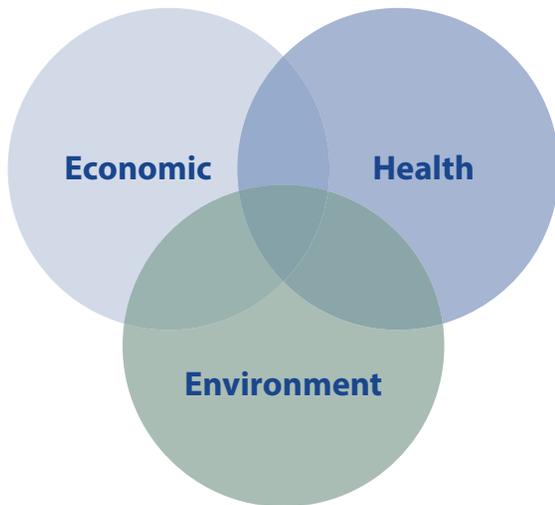
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The Importance of Measurement

It's critical to track the progress of a Land Reuse Site so that all stakeholders can quantitatively understand the project's impacts. With this data, you can also prove that the project is having positive health impacts on your community and was a good investment by your company.

There are three overarching categories you can measure during your redevelopment project:



Communicating Progress

When you work with a community, their members tend to appreciate consistent contact and new information. This can help the community stakeholders trust you, and be able to see the progress you're making. This is especially important for individuals who struggle to see progress in a Land Reuse Site; it shows that there are steps being taken to turn it into a site that will benefit their community.

Measuring Development Impact

We recommend Developers track the projected economic impact of the project. If your work will help create jobs and bring more capital to the area, it is important that you record these measures — and communicate them to community stakeholders.

Using the Power of Before-and-After Pictures

As a Developer, you can measure change using a simple and powerful technique: Before-and-after pictures. They provide a visceral way to communicate change. The first, easiest thing you can do is to take pictures of the site and show them to stakeholders, so they can see the negative visual aspects of the site. This helps raise awareness of the problem. Often, this inspires a community to take action of some sort.

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Reviewing project progress. Source: Getty Images, 2017.





BEFORE

Image of a former field house ATSDR Case Study, 2017.



AFTER

Rendering of redeveloped site. ATSDR Case Study, 2017.



Map of Piqua site. ATSDR Case Study, 2017.

Piqua, Ohio, is a small Midwestern city with a population of 21,000 people in Western Ohio, about 25 miles north of Dayton.

What were the contaminants and risks?

From the late 1800s through the 1900s, Piqua was a booming industrial town, flush with apparel and textile manufacturers, aviation equipment manufactures, and several other industries. Many of these manufacturers are no longer in existence, leaving vacant, underused and potentially contaminated properties in or near residential neighborhoods. Many properties were deteriorated and presented health and safety risks. They were also associated with increased crime. The City was concerned about potential exposure to numerous chemical contaminants that were left behind in some of these properties, including particulates, chlorinated compounds, lead-based paint, asbestos, metals, petroleum products, and volatile compounds.

What did the Development Community do?

The City was awarded \$300,000 from ATSDR and leveraged part of those funds to partner with the National Brownfields Association (NBA) and an engineering and architectural firm to work with a team of experts to create a redevelopment Master Plan for East Piqua. The team was a “STAMP” Team: Site Technical Assistance for a Municipal Project. This team

was comprised of private-sector Developers, Environmental or Health Professionals, and community residents. ATSDR and the local health agency provided free environmental and public health expertise throughout the two-year project.

Residents of Piqua had specifically asked for increased access to recreation, medical services, and childcare. The STAMP Team created the redevelopment Master Plan based on community input and identified needs, highlighting economic development potential and the creation of a recreation center that would serve the city and surrounding communities. The City moved forward on the vision of the Master Plan, sharing it with the Development Community to launch redevelopment. The City used ATSDR funding to finalize the Master Plan and to identify sites for reuse and redevelopment. The City used EPA funding to complete lead-based paint and asbestos assessments in older commercial structures, and to conduct environmental site assessments on a former meat packing plant in the redevelopment area.

The City used \$420,000 in federal funding for these activities, and they expect a return of \$50 million in private investment. By the spring of 2017, the first three redevelopments were launched or scheduled. These include a senior housing facility on the site of a former field house, an early childhood learning center, and a medical office building. Each of these projects is a \$10 million private investment.

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STEP	KEY DATE	ACTIVITY	ACCOMPLISHMENT
Step 1: Engaging with the Community	June 2013 to Present	Communicated environmental findings and redevelopment concerns to local residents, potential developers, and local, state, and federal agency partners	Developed the Historic East Piqua (HEP) Master Plan, highlighting health and wellness, recreation, and infill development opportunities and strategies
Step 2: Evaluating Environmental and Health Risks	2015 to 2016	Completed community health survey in the historic East Piqua neighborhood and an environmental assessment on a former meat packing plant	Received a 20% survey response rate and completed the Phase I and II ESAs on the plant, which was identified as an "Opportunity Site" in the HEP Master Plan
Step 3: Communicating Environmental and Health Risks	June 2015 to Present	Held public meetings with local stakeholders on how to accomplish the objectives outlined in the HEP Master Plan	Informed local residents, potential developers, and local, state and federal agency partners of the results of the HEP Master Plan
Step 4: Redesigning with Health in Mind	2016 to 2017	Developed the Piqua Community Center Campus Plan, which builds on the HEP Master Plan	Community Center Campus Plan goals: <ol style="list-style-type: none"> 1. Create a healthier neighborhood 2. Generate economic development 3. Create a strong gateway into downtown Piqua 4. Create an activity center 5. Strengthen the identity of the historic East Piqua neighborhood
Step 5: Measuring Success	2017 to Present	Presented the Piqua Community Center Campus Plan to the public and various potential developers	Finalized three new redevelopment projects: senior living facility, early childhood learning center, and a medical office building, resulting in \$30 million in private investment, leveraged \$420,000 in federal funding into \$30 million in private investment

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Image of a Brownfield. Source: Lloyd DeGrane, 2014.

List of Impacts and Return on Investment:

OUTCOMES

The Historic East Piqua Master Plan and the Piqua Community Center Campus Plan gave the City of Piqua a strategic plan for properly redeveloping a neighborhood which is one of the more prominent gateways into the City of Piqua.

IMPACTS

The creation of a common campus for important community institutions, including the Miami County YMCA, Ohio National Guard, Piqua City Schools, Edison Community College, the City of Piqua, project collaborators, and potential private and public investment entities, led to \$30 million in private investment. An additional \$20 million in private investment is anticipated.

Community Center Campus will become a reality and offer a vibrant gathering place that connects residents, investment, and activities, along the Great Miami River.

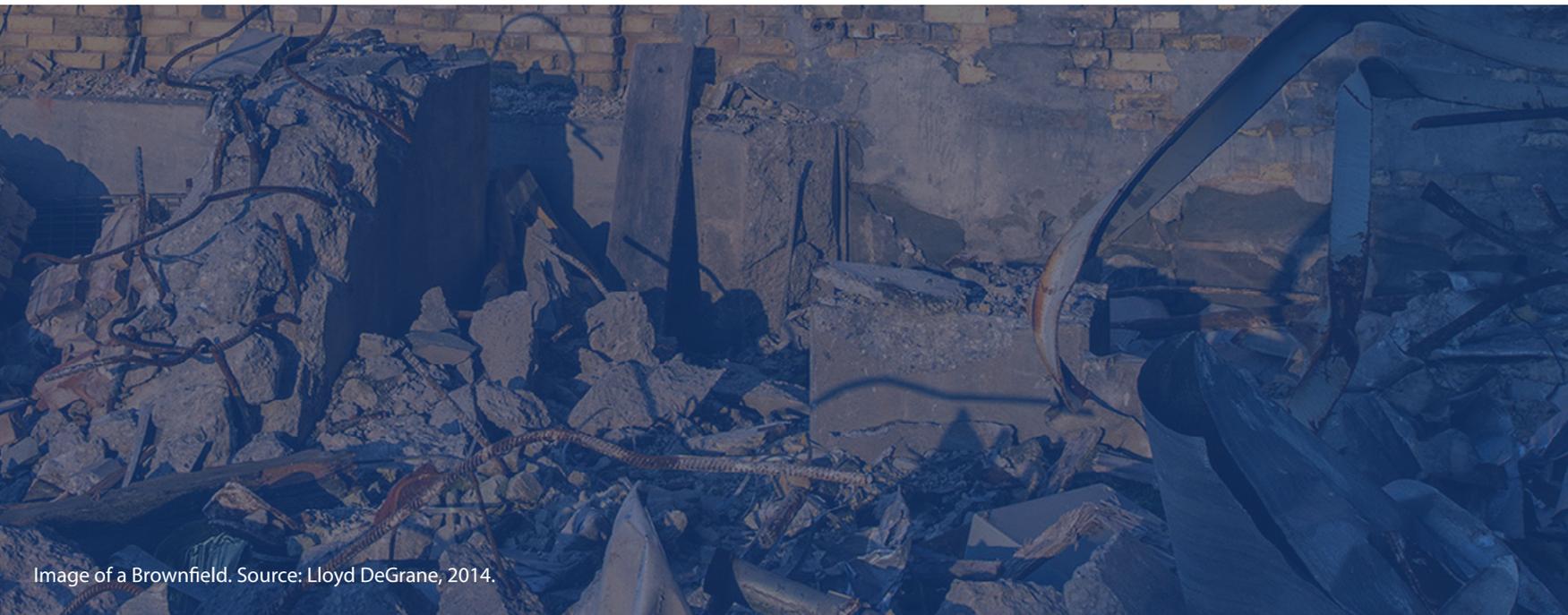


Image of a Brownfield. Source: Lloyd DeGrane, 2014.

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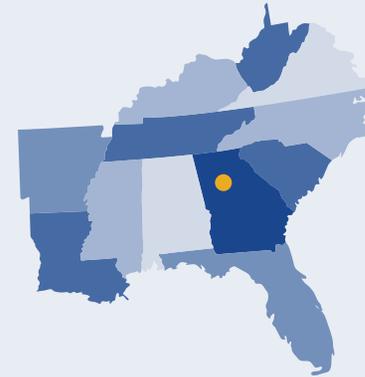
BEFORE

Image of brownfield. Source: beltline.org



AFTER

Image of BeltLine, post-development. Source: beltline.org



Historic Fourth Ward Park is located in the Old Fourth Ward neighborhood of metro Atlanta and is built on the location of an old amusement park.

What were the contaminants and risks?

The previous industries (and their disappearance) had left cracked asphalt, trash-strewn fields, stormwater runoff, abandoned warehouses and parking lots. Additionally, the central stream of the old Fourth Ward was known for flooding, especially around the huge Sears warehouse — the basement of which had been plagued with moisture since it was constructed in 1926.

What did the Development Community do?

After calculating the amount of stormwater that needed to be rerouted, the amount of space that would be required, and the cost of assembling land in various communities, an engineer proposed a storage pond and park in an abandoned industrial strip just upstream from the Sears warehouse. However, his idea didn't gain traction until local architect Markham Smith heard about it.

The Development team found a milk storage warehouse right in the epicenter of the drainage, obtained a quote for the land, and went to The Trust for Public Land (TPL). The TPL

liked the concept and, taking an enormous risk, bought the property. It would be the first purchase of the Atlanta Beltline redevelopment project.

Phase I of the park was the 5-acre storage pond, set deeply into a bowl below the water table. Then Phase II began, adding a world-class skatepark, an athletic field, and another playground to the park. Even though the park's primary function was to alleviate flooding issues, the space has jumpstarted private development in the area.

Historic Fourth Ward Skatepark gained instant traction and even hosted a grand opening celebration with an appearance by legendary skateboarder Tony Hawk. His foundation took a keen interest in the project because the local skateboard community was highly involved in the design process.

Sustainable features of the park include solar photovoltaic panels, offsetting roughly 50 percent of the park's energy costs, and an underground cistern from which all non-potable water is drawn so as not to strain the city's water resources. The use of native plants helps reduce the cost of maintaining the park, and organic land-care with dynamic soil biology helps reduce the need for irrigation, minimize storm water runoff, and curtail the likelihood of disease.

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The [Tax Allocation District](#) established to fund the BeltLine is expected to raise \$1.7 billion over the next 25 years, while increasing the overall tax base by \$20 billion within the same period.⁸

In 2005, Development Community members from the Georgia Institute of Technology's Center for Quality Growth and Regional Development, with funding from the Robert Wood Johnson Foundation and technical assistance from the Centers for Disease Control and Prevention (CDC), implemented a year-long [Health Impact Assessment](#) (HIA) within a half-mile buffer around the BeltLine Tax Allocation District. To assess equity related to proximity to Brownfields, the HIA team assessed demographics for all people in the study area living near a Brownfield. One of the key findings indicated a correlation between living near a Brownfield site and being non-white, with a lower per-capita income. Ultimately, the HIA team reported on more than 50 recommendations for improving the health of people along the BeltLine.



Image of a Brownfield. Source: Lloyd DeGrane, 2014.

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STEP	KEY DATE	ACTIVITY	ACCOMPLISHMENT
Step 1: Engaging with the Community	1999	Ryan Gravel, at the time a graduate student of Georgia Tech, presented his thesis project; BeltLine – Atlanta: Design of Infrastructure as a Reflection of Public Policy. It focused on redeveloping this old land into a park with urban pathways to connect spread-out neighborhoods in metro Atlanta.	Although he never intended his idea to gain as much traction, and as quickly, as it did, Gravel was able to raise awareness. Not only was the old land visually unappealing and harmful to residents, it was also the subject of his vision for a sustainable, healthy redevelopment.
Step 2: Evaluating Environmental and Health Risks	1999	The Clear Creek basin area, directly south of the Sears Building, was identified as a Brownfield of abandoned warehouses and parking lots, which flooded with increasing regularity, as did buildings to the north of the basin area.	During the Beltline redevelopment, the City of Atlanta agreed to a federal consent decree to fix its chronic sewer overflows and other waste treatment problems. The city proposed a 15-year, \$3 billion overhaul of the city’s sewer systems. While this was not a result of the Beltline redevelopment, the consent order helped motivate city wide changes, and the Beltline project was a beneficiary of these changes.
Step 3: Communicating Environmental and Health Risks	2003	Bill Eisenhauer, a stormwater activist, convened a group to discuss storm water issues in Old Fourth Ward, particularly in the Clear Creek basin.	The group developed a concept plan, showing a 35-acre park with a sustainable stormwater detention pond as its central amenity.
Step 4: Redesigning with Health in Mind	2005	The Trust for Public Land secured ten acres of land and began working on another seven. The purchases are the first acquisitions made for the Atlanta BeltLine project.	Mayor Shirley Franklin formed the BeltLine Coalition, and the Tax Allocation District funding for the BeltLine was passed at year’s end. This enabled the as-yet-unnamed Park to be slated as the first new Atlanta BeltLine park.
	2009	CDC completed a year-long HIA to assess the proximity of sensitive populations living near a Brownfield. The Atlanta BeltLine, Inc., began construction of Phase I of the park, which included the 2.5 acre Clear Creek Basin and amphitheater.	The study correlated living near a Brownfield site with being non-white and having a lower per-capita income. Ultimately, the HIA team reported on more than 50 recommendations for improving the health of people along the BeltLine. In 2011, Phase I was completed and opened to the public. Construction began on Phase II, which includes a skatepark. In 2012, Phase II was completed.
Step 5: Measuring Success	2016	With businesses and residential properties quickly developing, it was critical to begin measuring the economic impact.	The first seven years of the program generated roughly a 3-to-1 return on investment, with more than \$1 billion in private redevelopment spurred by roughly \$350 million of investment.

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List of Impacts and Return on Investment:

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The lake provides not only an arresting visual and natural gathering place, but also serves in a functional capacity as a storm water detention basin. In this role, the lake increases the sewer capacity, reduces the burden on aging city infrastructure, and minimizes downstream flooding and property damage.

IMPACTS

It ultimately saved the City more than \$15 million versus a traditional storm water tunnel system, and is one of the many sustainable features of the park.



Image of a Brownfield. Source: Lloyd DeGrane, 2014.

Get Started Now

Want to make sure you'll be able to showcase the benefits and ROI of a project? Curious about the best metrics by which to measure success? Contact ATSDR:



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Appendix A: Bibliography

1. "What is a Brownfield or Land Reuse Site?" The Agency for Toxic Substances & Disease Registry. N.p., Web. <<https://www.atsdr.cdc.gov/sites/brownfields/overview.html>>.
2. "Brownfield Overview and Definition." The Environmental Protection Agency. N.p., Web. <<https://www.epa.gov/brownfields/brownfield-overview-and-definition>>.
3. "Types of Contaminated Sites." United States Environmental Protection Agency. N.p., n.d. Web. <<https://www.epa.gov/enforcement/types-contaminated-sites/>>
4. "Landfills" United States Environmental Protection Agency. N.p., n.d. Web. <<https://www.epa.gov/landfills/>>.
5. "Healthfields: Creating healthy communities and improving neighborhoods at the same time." Smart Growth America. N.p., Web. <<https://smartgrowthamerica.org/healthfields-creating-healthy-communities-and-improving-neighborhoods-at-the-same-time/>>.
6. "All Appropriate Inquiry." United States Environmental Protection Agency. N.p., Web. <<https://www.epa.gov/sites/production/files/2014-08/documents/aaifs.pdf>>.
7. "Risk Communication." United States Environmental Protection Agency. N.p., n.d. Web. <<https://www.epa.gov/risk/risk-communication>>.
8. Atlanta BeltLine Eastside Trail. <https://beltline.org/>

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ATSDR	Introduction	ATSDR regional offices map
interactive map	Introduction	EPA's 'Cleanups In My Community' interactive map
BROWN	Introduction	Information about the Brownfields & Reuse Opportunity Working Network (BROWN)
Crossroads Resource Center	Step 1	Information about the Crossroads Resource Center
guidelines for both ESA I and II	Step 2	The American Society for Testing and Materials (ASTM) International
state, tribal, and even local environmental and health agencies	Step 2	Health and Environmental Agencies of U.S. States and Territories
APPLETREE	Step 3	Information on APPLETREE state cooperative program
TAB program	Step 3	TAB program at Kansas State University website
TAB program	Step 3	TAB program at New Jersey Institute of Technology website
resources	Step 3	TAB program at Center for Creative Land Recycling website
adapted and updated	Step 3	EPA's Seven Cardinal Rules of Risk Communication
outrage factors	Step 3	Dr. Peter M. Sandman on Outrage Management
more information on risk communication	Step 3	Information about risk communication via EPA
arsenic	Step 3	Information about arsenic via ATSDR's Toxic Substance Portal
asbestos	Step 3	Information about asbestos' impact on your health via ATSDR
message map template	Step 3	ATSDR's Message Mapping Template, Worksheet, and Checklist
how to use the results	Step 3	A How-To for Phase I and Phase II environmental site assessments
Lincoln Institute of Land Policy	Step 4	Information about Tax Increment Financing (TIF)
Tax Allocation Districts	Step 4	FAQs on Tax Allocation Districts
site eligibility for funding	Step 4	EPA's list of Types of Brownfields Grant Funding
funding opportunities	Step 4	ATSDR Brownfield/Land Reuse Health Program Funding Opportunities
Grants.gov	Step 4	Grants.gov website
tool for grant writing tips and obtaining grants	Step 4	Presentation on how to write a grant application via UNC.edu
best practices	Step 4	Best Practices to Be Grant-Ready

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Appendix B: Resource Matrix

Link	Section	Description
resource directory	Step 4	EPA Economic Development Directory
Brownfield Listings	Step 4	Brownfields Listings website
Nuts and Bolts Primer	Step 4	A Nuts and Bolts Primer on how to cultivate green energy on Brownfields
Policy Guide on Smart Growth	Step 4	The American Planning Association's Policy Guide on Smart Growth
Tax Allocation District	Step 5	The Atlanta BeltLine TAD
Health Impact Assessment	Step 5	Information on health impact assessments

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