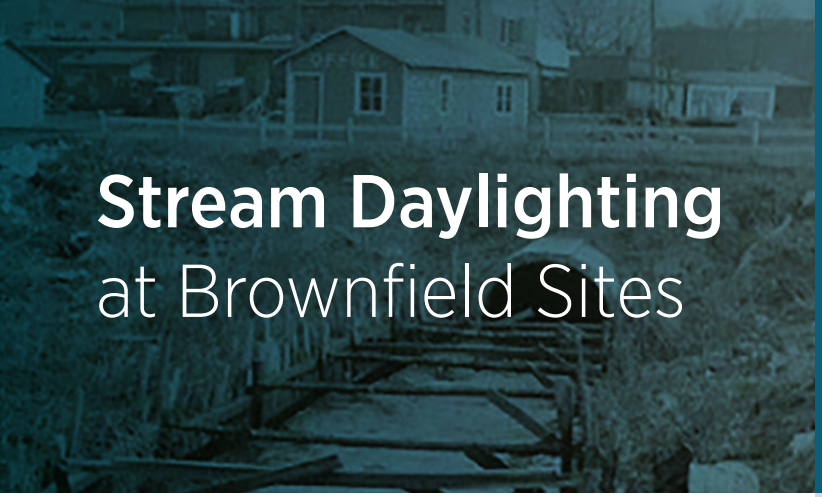

Stream Daylighting at Brownfield Sites

This fact sheet explains stream daylighting, identifies benefits and challenges of daylighting a stream when addressing brownfield and other contaminated areas, and describes the information and key decisions needed to determine whether daylighting is right for your community.

What Is Stream Daylighting?

Stream daylighting happens when above-ground water flow is restored to a stream that in the past was diverted below ground, often to facilitate development of an area. A stream with newly visible, above-ground water flow is the result of daylighting.

What Are the Potential Benefits of Daylighting?

Environmental benefits

- Restoring natural water flow
- Restoring aquatic and riparian habitats
- Reducing stormwater runoff
- Improving climate resilience
- Improving flood and water management during extreme weather events
- Improving water quality

Community amenity benefits

- Improving aesthetics
- Providing public greenspace
- Providing educational opportunities

Steps for Assessing the Viability of a Daylighting Project at a Brownfields Site

AGENCY COORDINATION AND COMMUNITY INVOLVEMENT

Site Assessment

Topography	Soils	Contaminants	Hydrology/ Hydraulics

Project Planning

Goals & Objectives	Regulatory Agency Coordination	Alternatives Development & Evaluation	Conceptual Design

Project Design

30% Preliminary Plans	60% Draft Plans & Specifications	90% Draft Plans & Specifications	100% Draft Plans & Specifications

Environmental & Regulatory Compliance

Clean Water Act	National Environmental Policy Act	Endangered Species Act	State Environmental Policy Act

Project Implementation

Bidding & Contractor Selection	Project Construction	As-Built/Record Drawings

Maintenance & Monitoring

Site Maintenance	Monitoring & Reporting	Adaptive Management

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Key Considerations for a Daylighting Project at a Brownfields Site

Technical Considerations

Will there be sufficient flow rate, water depth and flow variation? Consider:

- The stream's water source
- Water sufficiency to maintain constant flow
- Ability of the stream channel to handle the water without flooding
- Location of the stream's flood plain
- The effect that the seasons and precipitation events have on stream flow

Can the channel cross-section and gradient support a daylighted stream? Consider:

- Location of the water table with respect to the stream elevation
- Inflow and outflow through the channel sides and bottom (water gain and loss)
- Stability of the stream banks (i.e., sloughing, sliding failures, crest stability)
- Likelihood of bank erosion as a result of channel flow or runoff down the slope
- Integration of the stream with upstream and downstream connections

Regulatory and Administrative Considerations

How will the daylit stream meet regulatory and administrative requirements? Will it be compatible with existing plans? Consider:

- Regulatory coordination among stakeholders
- Coordination of regulatory compliance and approvals
- Compatibility with adjacent land uses and/or landscaping
- Impacts of the open channel blocking the passage of people
- Compatibility with existing or planned public features
- Public access to newly developed greenspace
- Approval from public boards
- Support from the community
- Cost and financing options

Environmental Considerations

How will daylighting the stream impact habitats or existing contamination? Consider:

- Vegetation and fauna restoration (or disturbance to existing vegetation and fauna)
- Animal passage affected by open channel
- Integration into area stormwater management system and overall watershed
- Potential disturbance of contaminated soil and sediment
- Potential degradation of water quality because of contaminated groundwater release
- Changes in groundwater contamination because of water gain and loss at contaminated sites

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Case Studies

East Riverfront Development Framework for Wausau, WI

Case Study #1: Wisconsin River Stream, Wausau, WI

The City of Wausau, WI, wanted to daylight a previously navigable stream that was covered and used as a storm sewer. The stream was restored with an arched bridge and lighted waterfall feature built over it. The new riverfront design includes an accessible boat and fishing wharf, a kayak launch, a multi-use trail system, riverbank restoration, landscaping amenities, lighting, and site furnishings. Restoration also allows for the recirculation of fresh water from the Wisconsin River into the stream during low-flow periods in the summer. An EPA brownfields area-wide planning grant, two EPA clean-up grants, and numerous public and private grants contributed to this project.

Information from https://www.stantec.com/en/projects/united-states-projects/c/city-of-wausau-riverfront-brownfield-redevelopment

Case Study #2: Saw Mill River, Yonkers, NY

Saw Mill River was buried in the 1920s for flood mitigation and to protect people from the polluted waterway. To restore the river, the Saw Mill River Coalition used a three-pronged approach:

1. Clean up selected areas along the river, and conduct an outreach campaign to reduce dumping and increase awareness of the importance of the Saw Mill's restoration
2. Restore critical watershed and riverbank areas to ensure uninterrupted river flow and flood prevention
3. Address ongoing development pressures by helping municipalities incorporate river protection into their decision-making processes

An EPA Targeted Watershed grant of nearly $1 million is helping this daylighting effort as part of a multi-billion-dollar, area-wide revitalization project.

Information from www.epa.gov/brownfields/brownfields-uncovering-long-buried-prize-downtown-yonkers-daylighting-saw-mill-river

A glimpse of the long-covered Saw Mill River, visible between two buildings

Case Study #3: Assunpink Greenway Park, Trenton, NJ

The Assunpink Greenway Park is a 99-acre linear park straddling the Assunpink Creek. This park was a critical development project that can profoundly catalyze growth in the surrounding neighborhood. The City of Trenton wants to daylight Assunpink Creek to fix an eyesore in the middle of downtown. The goal of the project is to benefit the surrounding community by improving environmental conditions as well as providing access to the restored waterfront. After 19 years of obstacles in design, permitting, funding and threatened litigation, this project is finally funded and is being implemented. EPA provided technical assistance to the City of Trenton to create a conceptual design of a new park.

Information from https://www.trentonnj.org/DocumentCenter/View/221/2018-Brownfields-Action-Plan-PDF

Rendering of the completed Assunpink Daylighting Project

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How Much Does a Daylighting Project Cost?

Stream daylighting costs can vary widely depending on several factors, including the size and scope of the project (e.g., channel length, width, depth; earthmoving volume; area restored), contamination-related costs, urban demolition and infrastructure relocation costs, volunteered services, and other unique qualities of the project. This table illustrates the approximate costs associated with several example projects.

Project Name and Location, Year Completed	Daylighted Stream Length (feet)	Actual or Estimated Project Cost (in 2020 $)	Daylighted Cost per Foot (in 2020 $)
Arcadia Creek Kalamazoo, MI 1995	1,550	$16,700,000	$10,800
Valley Creek Port Angeles, WA 1997	490	$2,100,000	$4,300
Little River Walk Hopkinsville, KY 2005	7,900	$1,300,000	$200
Saw Mill River Yonkers, NY 2011	550	$23,800,000	$43,200
Kid's Creek Traverse City, MI 2013	4,500	$3,000,000	$700
Bee Creek Restoration Dubuque, IA 2014	4,500	$81,200,000	$18,000

Daylighting Resources

American Rivers (2014). *Daylighting Streams: Breathing Life into Urban Streams and Communities.* https://americanrivers.org/wp-content/uploads/2016/05/AmericanRivers_daylighting-streams-report.pdf

Hoobyar, P. (2002). *Daylighting and Restoring Streams in Rural Community City Centers: Case Studies.* Seattle, WA: National Park Service. http://npshistory.com/publications/rtca/nri/daylighting.pdf

Pinkham, R. (2000). *Daylighting: New Life for Buried Streams. Old Snowmass, CO: Rocky Mountain Institute.* https://d231jw5ce53gcq.cloudfront.net/wp-content/uploads/2017/05/RMI_Document_Repository_Public-Reprts_W00-32_Daylighting.pdf

Wild, T. C., et al. (2011). *Deculverting: reviewing the evidence on the 'daylighting' and restoration of culverted rivers.* Water and Environment Journal, 25(3): 412-421. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1747-6593.2010.00236.x

EPA Resources for Contaminated Properties

EPA Brownfields Technical Assistance, Training and Research
https://www.epa.gov/brownfields/brownfields-technical-assistance-training-and-research

EPA OBLR's Land Revitalization Toolkit
https://www.epa.gov/land-revitalization/land-revitalization-toolkit

Search for Superfund Sites Where You Live
https://www.epa.gov/superfund/search-superfund-sites-where-you-live

Cleanups in My Community
https://www.epa.gov/cleanups/cleanups-my-community

LEARN MORE
EPA Office of Brownfields and Land Revitalization
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