

US EPA ARCHIVE DOCUMENT



# Managing Stormwater through Low Impact Development Techniques

## ***Sustainability Pilot Background***

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EPA's Brownfields Sustainability Pilots provide technical assistance to assist communities in achieving greener, more sustainable results when redeveloping brownfields. These pilots also provide models for other communities across the country.

EPA provided the developer of a 26 acre brownfield located along the Lehigh River and a few minutes from downtown Allentown, Pennsylvania with technical assistance. The technical assistance included analyzing and recommending a range of low impact development (LID) techniques and features for stormwater management. These techniques will protect the river and be integrated into the overall master redevelopment plan for the Waterfront area.



## ***The Waterfront Background***

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The historical use of the Waterfront site was predominantly industrial and included iron and steel manufacturing. As a result, contaminated soil and ground water are present at the site. In addition, the current site conditions prevent public access to the riverfront. The City of Allentown, the Lehigh Valley Economic Development Corporation, and the site developer want to transform the brownfield into mixed use development. Due to the proximity to the Lehigh River and a 100 year floodplain, stormwater management issues must be addressed to protect the river and the development.

## ***Project Highlights***

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EPA's technical assistance to the project focused on conceptual design drawings for the master redevelopment plan accounting for the site's location in a floodplain and recommendations for LID stormwater management practices. Using the master plan developed by the site developer, the conceptual design drawings were categorized into erosion and sediment control practices, riverfront features, and site redevelopment features.

### ***Erosion and Sediment Control***

For erosion and sediment control, EPA's technical assistance recommended green techniques such as silt fences, turbidity barriers, sedimentation basins and inlet protection for controlling sediment during construction. To prevent erosion at the site, an erosion control blanket and buffer zone with temporary seeding to reduce soil movement was recommended. These techniques will assist in protecting soil near the banks of the Lehigh River during both the construction phase and site reuse.

### ***Riverfront Features***

Protecting the river banks of the Lehigh River is essential in protecting the site from the risk of flood damage. EPA's technical assistance recommended the following LID features for the riverbank: soil bioengineering techniques to naturally reinforce bank slopes; a living wall system; naturalized detention areas with wetland vegetation; and a river walk with pervious pavement.

### ***Site Redevelopment Features***

EPA consultants recommended the following redevelopment features – pervious pavement, bioretention areas such as rain gardens, green roofs, cisterns, and rain barrels. These features all assist in controlling stormwater by collecting stormwater in a cistern or on the green roof. The collected water can be used for irrigation, flushing toilets and other nonpotable water uses.

## Challenges and Lessons Learned

### Existing Contamination

The existing ground water and soil contamination at the site limits potential LID stormwater systems. Project stakeholders can address this during the cleanup phase by removing contaminants, installing a cap or inserting clean soil into the current mix so that sustainable stormwater systems can be installed.

### Steep Riverbank

The existing riverbank is 15 feet wide, steep and narrow, which poses a challenge to developers. Work at the site, including the installation of stormwater management techniques, would potentially disrupt the equilibrium and endanger the stability of the shoreline. The riverbank is currently stable due to large trees and vegetation and the goal is to keep the riverbank stable during construction. EPA's technical assistance identified a series of options that construction crews can implement to maintain a steady riverbank.



Future Waterfront redevelopment site. Photo Source: Dunn Twigg LLC

### Site Development in a Floodplain

A portion of the Waterfront property is located in the 100 year floodplain zone. Therefore development plans must address high water level conditions and adhere to the State of Pennsylvania permitting requirements. For the future development of the stormwater management system, the site developer must obtain a permit from the Pennsylvania Department of Environmental Protection to build in the 100 year floodplain zone.

## Sources for Additional Information

For more information this project, please see the full Waterfront technical assistance report at: [http://epa.gov/brownfields/sustain\\_plts/factsheets/waterfront.pdf](http://epa.gov/brownfields/sustain_plts/factsheets/waterfront.pdf).

## Regional Contact Information

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