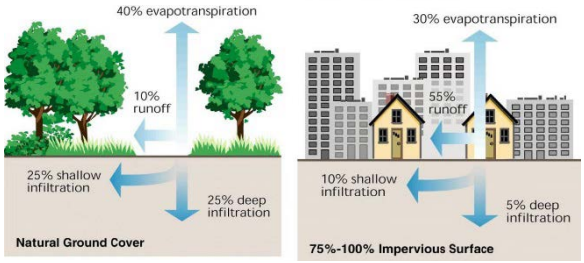
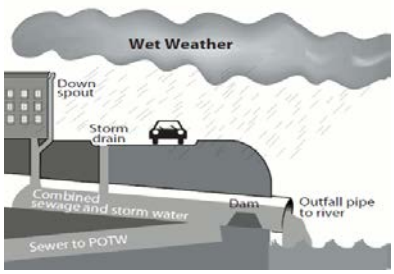
Green Street Opportunities in Gary, IN

Green Infrastructure (GI) mimics natural landscapes to allow households, neighborhoods, communities and cities to better manage runoff from rain events, which leads to improved water quality, more inviting landscapes, and greater resilience in the face of increasing climate and weather uncertainty. GI uses the natural processes of soils and plants to *soak up* stormwater to reduce stress on aging infrastructure. This factsheet will highlight the current challenges facing municipalities with *combined sewer systems* and review opportunities for the implementation of green infrastructure to mitigate the effects of stormwater runoff and revitalize the city through ***Green Streets***.

Cities like Toledo, OH (left) and Houston, TX (right) use green infrastructure along local streets to soak up stormwater.
Sources: Dan Christian, Tetra Tech (left); Anne Thomas, Tetra Tech (right)



Green infrastructure can help development mimic the natural landscape. Source: USEPA



Combined sewer system during a rainfall event. Source: USEPA

Lansing, MI roadside bioretention. Source: Robert Domm, Tetra Tech

Portland, OR roadside bioretention. Source: Martina Frey, Tetra Tech

Stormwater and Urban Landscapes

The ability of a community to effectively manage stormwater is heavily dependent on its land use. Roads, buildings and other hard surfaces increase stormwater runoff and do not allow water to soak into the ground. These impervious surfaces can create five times as much runoff as a natural landscape in the same area.

Woodlands, meadows, gardens and other forms of vegetated ground cover decrease stormwater runoff by promoting plant uptake and infiltration to the groundwater table. Plant roots and absorbent soils play a major role in this process. In urban areas, roads make up a majority of the impervious cover. Transforming roads into *Green Streets* can help manage stormwater, while simultaneously providing aesthetic and environmental benefits.

Current Infrastructure challenges

Combined Sewer Systems—These systems capture sanitary sewage and stormwater in the same pipe and convey this combined flow to the wastewater treatment plant. When these systems get overwhelmed during storm events, un-treated sanitary sewage and stormwater are discharged into nearby waterways, significantly increasing risk to human and ecological health. These flows also place a great burden on existing streams, leading to erosion and degradation. Basement backups can occur.

Separate Sewer Systems—Newer developments and cities use separate sewer systems and do not combine sanitary sewage and stormwater. Rather than sending all flows to be treated, only sanitary sewage is conveyed to the wastewater treatment plant. Stormwater is directly discharged to waterways, which can cause stream bank erosion and polluted waterways.

Portions of the City of Gary have combined sewers, and other areas have separate sewers. Green infrastructure can be used to safely and cost-effectively manage stormwater for either type of sewer system.

Changing the way we think

Historically, communities have built infrastructure to move stormwater away from roadways and other developed areas as quickly as possible. By using green infrastructure and managing rain as a resource rather than a burden, communities can obtain the following benefits:

- Reduce Street Flooding
- Reduce Sewage Overflows
- Reduce WWTP Costs
- Enhance Livability and Community Engagement
- Reduce Urban 'Heat Island' Effect
- Increase Public Awareness

Green Infrastructure Practices

Streets and roadways make up much of impervious surfaces in urban areas. The following green infrastructure practices represent just some of the many opportunities available to reduce stormwater runoff volume and pollutant discharges.

East Lansing, MI
Source: Amy Murdick, Tetra Tech

Bioretention installations help manage local storm events by collecting overland flow (*runoff*) from streets, sidewalks, driveways, and other impervious surfaces and allowing it to slowly infiltrate into the soil.

Bioretention can be used within the road right-of-way or as part of site development.

Permeable pavements are designed to allow water to pass through, effectively reducing runoff and directing stormwater into the subsoil. There are a variety of permeable pavements, including concrete pavers, paving grids, pervious concrete, porous asphalt, porous rubberized asphalt, and glass porous paving.

Permeable pavement can be used in parking lots, low-volume roads, alleys, sidewalks, plazas, and street parking lanes.

Lansing, MI
Source: Amy Murdick, Tetra Tech

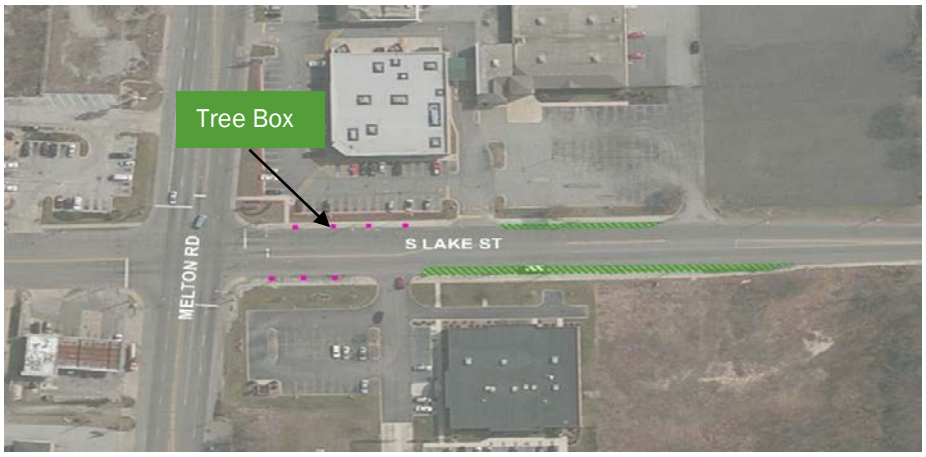
Saint, Paul, MN
Source: Amy Murdick, Tetra Tech

Tree boxes allow trees and other plants to receive and retain stormwater through curb cuts or permeable pavement. Tree box design is conducive to construction within constrained urban settings and increases stormwater capture while providing growing space for healthy mature trees. Structural soil or structural cells can be used below paved surfaces to protect root growth.

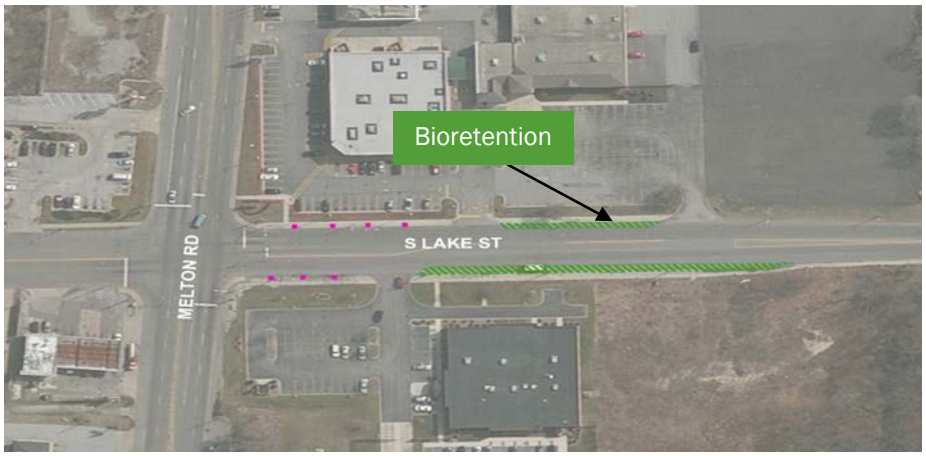
What would Green Infrastructure in Gary look like?

Many tools, including Geographic Information Systems (GIS) and graphic design programs, are used to bring green infrastructure opportunities to life. After investigating green infrastructure opportunities in Gary, the graphics below were chosen to illustrate what green infrastructure practices could look like when implemented along Aetna Street and Lake Street.

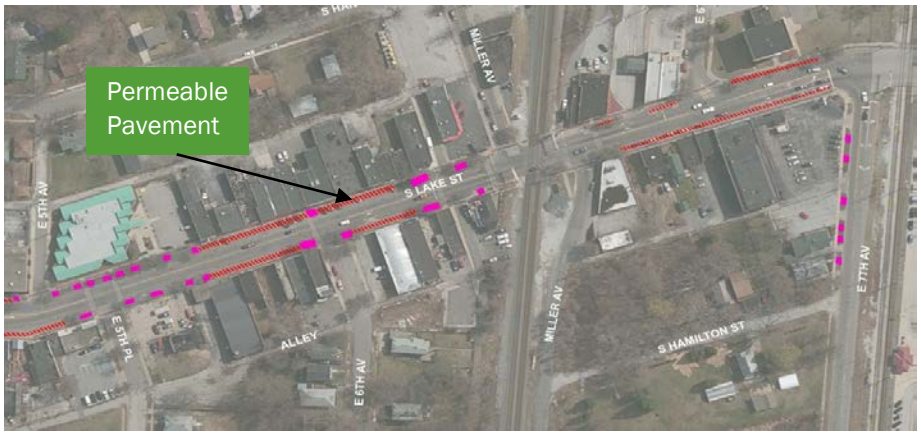
Lake Street – Gary, IN



Tree Boxes in sidewalk
Source: Suzy Cho, LID Center



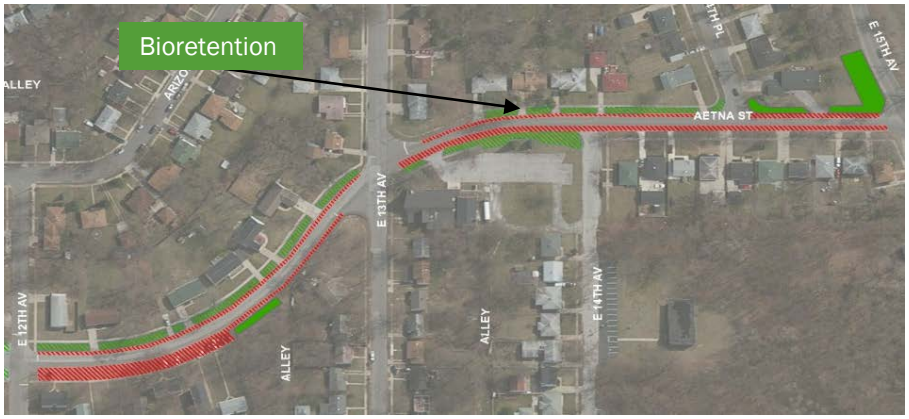
Bioretention along road
Source: Suzy Cho, LID Center



Permeable Pavement in parking area
Source: Suzy Cho, LID Center

Aetna Street – Gary, IN

Permeable Pavement in parking area
Source: Suzy Cho, LID Center



Bioretention along road
Source: Suzy Cho, LID Center

The GI installations along Lake Street will retain an estimated 10.6 million gallons (mg) of stormwater annually with an estimated conceptual capital cost of $2.5M. Similarly, GI installations along Aetna Street will retain an estimated 5.5 mg of stormwater annually with a conceptual capital cost of $2.9M.

Additional Resources

US EPA Green Infrastructure
www.epa.gov/greeninfrastructure

US EPA Economic Benefits of GI: Case Study
http://water.epa.gov/infrastructure/greeninfrastructure/upload/CNT-Lancaster-Report-508.pdf

City of Indianapolis—SustainIndy Initiative
http://www.indy.gov/eGov/City/DPW/SustainIndy

Cleveland Botanical Garden: Vacant to Vibrant
http://www.cbgarden.org/lets-learn/research/vacant2vibrant.aspx

Great Lakes Green Streets Guidebook
http://merrillville.in.gov/document_center/Great_Lakes_Green_Streets_Guidebook___August__2013.pdf

SEMCOG Green Streets Manual
http://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=GreatLakesGreenStreetsGuidebookSeptember2013.pdf

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