

Stormwater Runoff

Chelsea is a highly urban area with a lot of impervious cover (pavement, rooftops, sidewalks) and few natural areas that can readily absorb rainfall. Consequently, rainfall is quickly converted into surface runoff that is conveyed via drains and pipes to:

- The combined sanitary sewer system (where stormwater and sewage flow share the same pipes);
- The separate storm drain system; and
- The receiving waterways.

Impacts on Waterways

Stormwater runoff carries sediments, oil/grease, nutrients, bacteria and other pollutants that result in water pollution to the Chelsea River, Mystic River, Island End River, and Mill Creek.

Excess runoff can overwhelm the combined sewer system and result in raw sewage flowing into the rivers and contributing to contamination of Chelsea's waterways.

Impacts on the Chelsea Community

Stormwater runoff sometimes overwhelms the drainage system resulting in local flooding of streets and basements. Flooding can cause damage to homes, businesses, and property.

More runoff volume into the combined sewer system means unnecessary wastewater treatment at Deer Island. More pollution in Chelsea's waterways means more stormwater management is required to meet state and federal permit limits designed to promote cleaner rivers.

The outcome of these stormwater impacts is more indirect costs to Chelsea residents and businesses.

Contacts

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Visualization of Proposed Green Infrastructure Project on Crescent Ave, Chelsea (image from CRWA)



More Information

water.epa.gov/infrastructure/greeninfrastructure

www.esf.edu/outreach/gi

www.greeninfrastructure.net

www.cwp.org/your-watershed-101/stormwater-management.html



Using Green Infrastructure in the City of Chelsea



What is Green Infrastructure

Green infrastructure is an approach to managing the urban landscape so that it mimics nature and controls stormwater runoff as close to its source as possible. Green infrastructure practices are designed to conserve rainwater for re-use and/or direct rainfall to infiltrate (move into the soil) instead of running off the land surface.

These practices often employ soils, shallow depressions, and vegetation to minimize the negative impacts of stormwater runoff to more closely reflect natural conditions. Even in dense urban environments, the effects of years of urbanization can be partially reversed using green infrastructure practices. Green infrastructure can keep Chelsea's water and air cleaner, reduce flooding during heavy rainfall, reduce street temperatures during the summer, and save money. Green infrastructure can be designed and implemented for:

- Highly urban areas, even where little open space exists;
- Difficult sites with many constraints (such as shallow bedrock or high groundwater); and
- A range of rainfall amounts from very small storms to heavy downpours.

Practices Suitable for Chelsea

Chelsea has significant physical constraints that will govern which green infrastructure practices can be used for different situations. Infiltration practices, in particular, require soils with good infiltration capacity (ability for water to move into them), larger depth to groundwater or bedrock, and soils free of contamination. In Chelsea, infiltration practices will be limited, but might still work on some projects.

Listed below, in order of approximate cost, are green infrastructure practices that will be most suitable for Chelsea. The first three practices are the most suitable for homeowners.

Green Infrastructure Practice	Control of Flooding	Clean Water	Infiltration	Filtering	Storage	More Green Space	Water Re-use
Native Landscaping	Y	Y	Y	Y	N	Y	N
Rainwater Harvesting (cisterns)	Y	Y	N	N	Y	N	Y
Rain Gardens	N	Y	Y	Y	N	Y	N
Infiltration Practices	Y	Y	Y	Y	Y	Y	N
Bioretention	N	Y	N	Y	N	Y	N
Swales	N	Y	Y	Y	N	Y	N
Rainwater Planters/ Tree Filters	N	Y	N	Y	N	Y	Y
Pervious Pavement / Pavers	Y	Y	Y	Y	Y	N	N
Green Roofs	Y	Y	N	Y	Y	Y	Y



Rain Garden



Tree Filter



Building Planter



Sidewalk Planter



Swale



Green Roof



Bioretention



Porous Asphalt



Cistern



Permeable concrete



Infiltration Chambers



Infiltration Trench

Maintenance

All stormwater practices require maintenance and green infrastructure is no exception. However, most green infrastructure practices are landscape-based and therefore require a somewhat different approach. Typical tasks include:

- Mowing and weeding;
- Replanting and pruning of vegetation;
- Removal of accumulated sediment and trash;
- Repair of minor erosion gullies/channels; and
- Routine sweeping or vacuuming of pervious pavements/pavers.

How Green Infrastructure Fits into Project Planning

The multiple benefits of green infrastructure can be achieved by incorporating it into new development and redevelopment projects. During the initial project planning stage the most important questions to ask are:

- How can I reduce existing impervious cover?
- How can I limit new impervious cover?
- How can I reduce the direct connection of impervious cover to storm drains?
- What kind of green infrastructure practices might work for my site?

Design and Permitting

Contact the Inspector of Buildings, Planning Department, and the Department of Public Works and you will be advised on the City's permitting procedures. In general, a permit application should have documentation of the following items:

- A site plan or plot plan of your proposed project;
- Existing and proposed impervious cover and where it drains (combined sewer or separate storm drain system);
- Expected stormwater improvements from your proposed project;
- How the stormwater will be treated;
- How the runoff will be reduced;
- Will any rainfall be infiltrated; and
- Design plans / details of proposed controls.