

add water slowly

STORMWATER MANAGEMENT

The vital connection between the City of Burlington and Lake Champlain relies on the thoughtful management of stormwater, and reducing our impact on the Lake is among our highest priorities as a community. An urban industrial landscape where 'things are made' necessitates infrastructure for transportation and storage of cars and freight—e.g., surface parking lots and large building footprints—which typically involves a lot of pavement. These paved areas, however, generate stormwater runoff that follows several different paths to the Lake:

- Collected in underground combined sewer pipes that drain to the wastewater treatment plant,
- Drains into Englesby Brook (which is currently "impaired" due to stormwater flow),
- Directly into the Lake via the Barge Canal, or
- Directly into the Lake at Blanchard Beach.

The primary stormwater issues that impact the receiving waters are the **amount** of runoff and the water **quality** of the runoff. The aim of a sustainable stormwater management system is to first reduce the total amount of runoff, then slow it down, and finally provide treatment of the water before it enters Englesby Brook and Lake Champlain.

Lake Champlain is considered an "impaired" water due to excessive phosphorous levels, which will require the City to substantially reduce the phosphorous entering Burlington Bay (by as much as 25%). To meet this ambitious target, the City will need to seek out any and all opportunities to reduce and clean stormwater, ranging from retrofits to existing systems, to implementing the most effective and innovative systems in new public and private projects. The planBTV South End Stormwater management strategy begins with commitment to:

- Minimize paved areas—the primary sources of runoff
- Slow the flow of stormwater
- Treat stormwater to remove pollutants before water reaches the Lake
- Advance storm restoration for Englesby Brook
- Deploy a district approach to managing stormwater

These efforts are integral to advancing climate change resiliency and managing extreme weather events.

Bring the Green Machine to the South End!
There are a number of ways to sustainably slow down, store, and clean stormwater that are described and illustrated in detail in PlanBTV's Green Machine. Many of those strategies can also be applied to the South End, and are discussed within this section.

"Englesby Brook needs to be highlighted and nurtured as a stormwater collector and central water artery of the South End."

Community comment from the webtool

Strategies

Minimized paved areas, which are the primary source of runoff. In the spirit of "an ounce of prevention is worth a pound of cure" every square foot of pavement or roof area should be evaluated for its necessity. For example, parking areas should be sized for average use, not peak needs, and alternatives to driving and parking at high demand times. Driveway widths and streets should be just wide enough to accommodate the largest vehicles that typically come and go, and not necessarily the largest trucks that may ever show up. Multi-story buildings should be encouraged over single story spaces so that the "per person" or "per job" roof area is reduced.



Revise land development regulations to encourage or require minimization of parking lot sizes, street widths and roof surfaces, and to require use of pervious pavements and/or green roofs.



Department of Planning & Zoning,
Department of Public Works

Slow the water down with measures that will disperse runoff rather than concentrate the flows. New developments, road projects, and parks can accomplish this quite easily by design, with stormwater being dispersed to multiple points and travel over planted areas before entering the city's network of stormwater pipes. Existing systems can be retrofitted, where "green pockets"

are inserted between the paved area and the collection systems for stormwater dispersal or filtration into the ground. Parking areas can be surfaced with permeable asphalt or paver systems that absorb or even store some stormwater.

Identify the "low hanging fruit" for reducing flows into the systems for retrofits of existing infrastructure.

Department of Public Works

Treat the water to remove phosphorus and other pollutants before it heads to the lake. Because the soil types and water table in the South End are less well suited to infiltration practices than other parts of the city, underdrains will be needed in most stormwater treatment projects. Bioretention cells or raingardens and sand filters are nothing more than landscaped pockets of soil and gravel of various shapes and sizes, which provide a place for stormwater to soak in and give life to plants and be cleaned in the process. Street trees can be planted in SilvaCell™ stormwater planters, which take in water from the street, clean and filter it with the soil, and then allow the water to be taken up by the tree while also providing adequate soil volume for tree survival.

These types of features should be used routinely in public and private development projects in favor of the conventional "collect and send into

"Stormwater management should provide multiple benefits, like pedestrian safety and greener streets."

Comment from Community Workshop

the lake" systems. In addition, retrofits of existing systems will be needed to meet the City's goals, which can be spurred on by pilot demonstration projects in the South End. Three possible ideas are:

- **Plant more trees** along the Champlain Parkway or Pine Street with SilvaCell System that stores and filters runoff.
- **Green bus bulbs.** The planned curb extensions in the Champlain Parkway project can be "upgraded" to also serve a stormwater management function by becoming mini-bioretention cells. Public art can further be incorporated to make these distinctive, attractive places.
- **Living Bioswales.** Within the South End and particularly along Pine Street, linear Stormwater Planters can be introduced to provide both reduction and treatment of runoff.

Identify opportunities for applying the City's College Street stormwater toolkit into new projects, and to existing infrastructure in areas where change is not expected.

Department of Public Works

Stream Restoration. The capability and functioning of our natural waterways, particularly Englesby Brook, can be enhanced by restoring or expanding the riparian zone along the brook's edge. This

means installing and maintaining plants and trees along its banks to hold in the soil, and provide treatment and filtering of rainwater before it enters the brook.

Engage the Champlain School and Neighborhood Association for interest, and apply for an Ecosystem Restoration Grant to fund riparian enhancement.

Department of Public Works

Plan it as a system. With the ever increasing focus on cleaning up Lake Champlain, both the City and private developers will be asked to do more to slow down and clean runoff from their property. An eco-district approach can be used in the South End so that the most effective stormwater solutions can be put to work in the right places. The concept of a district system or stormwater utility should be explored and would encourage using the public right-of-way for bioswales, retention pockets, tree wells, and other techniques to "bank" stormwater credits, giving more flexibility for future projects.

Explore the feasibility and alternatives for establishing a stormwater management district or utility

Department of Public Works, Department of Planning & Zoning, City Economic Development Office

Tools for Stormwater Management



Gaps in the curb allow water to go from the street into the soil, where it is taken up by trees and plants.

Porous parking areas can absorb or even store some stormwater.

Some communities integrate the arts into stormwater management practices.

Bioswales between the street and the sidewalk can be used to reduce and treat stormwater.

Parks and parklets within the South End should double as stormwater management elements.

Umbrella Park
Portland, OR