

A Developer's Guide: Watershed-Wise Development



Environmental Protection



What is a watershed?

It does not matter how far away you build from a creek, lake, or the ocean, you are in a watershed. Another word for watershed is “catchment” – a way to describe how rain falling onto the land makes its way downhill into a creek or river, or flows over land and eventually to the ocean.

Rain that runs off of roofs, roads, parking lots and other developed areas is collected and conveyed to nearby waterbodies via underground pipes and ditches. This runoff often contains pollutants and sediments that can harm watersheds and the downstream environment.

What is Watershed-Wise?

Watershed-wise development integrates green infrastructure and Low Impact Development into designs to improve water quality, reduce runoff volumes, and increase green space to create habitat and community amenities.

Why is watershed health important to developers?

The choices developers make can contribute to significant improvements in watershed health. Here are some steps developers can take:

- Talk to the right people early on to ensure no unnecessary delays
- Demonstrate leadership and take the responsibility for improving watershed health to help gain municipal and public support
- Use green infrastructure and Low Impact Development to reduce long-term operational costs and increase market values

This pamphlet is intended for general guidance only. Applicants should consult their respective municipal planning department for additional information and requirements.

Where Do I Start?

- Early in the planning and application process, contact your municipal planning department to ask about their initiatives for healthy watersheds
- Find out which watershed you are developing in
- Talk to local community associations and watershed groups about your potential project and your interest in healthy watersheds



Step 1 - Planning

Time and money can be saved with proper planning and consideration of the watershed and municipal Local Area Plans. Before spending any money or making any physical alterations to the site, consider the following:

- Check to see which **watershed principles** you can apply on-site and if you are close to a creek or waterbody.
- Contact the local municipal planning department to learn of any **site-specific requirements**.
- Conduct an **inventory and analysis** of your site to identify areas to be protected, such as trees, riparian areas, protected or endangered species and ecosystems, stream buffer areas, wetlands and permeable or erosive soils.
- Remember to check for **streamside setbacks** under the Riparian Areas Regulation or development permit areas.

Step 2 - Site Design

When developing a site design, it is important to **know the vision** of your municipal council for future developments before submitting your design for approval. Find out where it will pay to **go above and beyond** in your design.

- Consider integrating **green infrastructure, and LID techniques** (pages 6-7), which are used to manage rainwater where it falls. These methods store, infiltrate, detain and treat rainwater runoff allowing for full development of a site.
- Hire a landscape architect to help incorporate and design features into the site that **reduce the quantity and improve the quality of water** that ultimately enters the creek. This may require the input of a civil engineer and should be checked with your local government officials.
- Design for **projected climate impacts** of increased frequency and intensity of rainfall events – this will ensure that your project is successful in managing rainwater today and in the future.





Step 3 - Construction

During site construction, there are many things you can do to reduce potential impacts to watersheds and the marine receiving environment, while saving time and money:

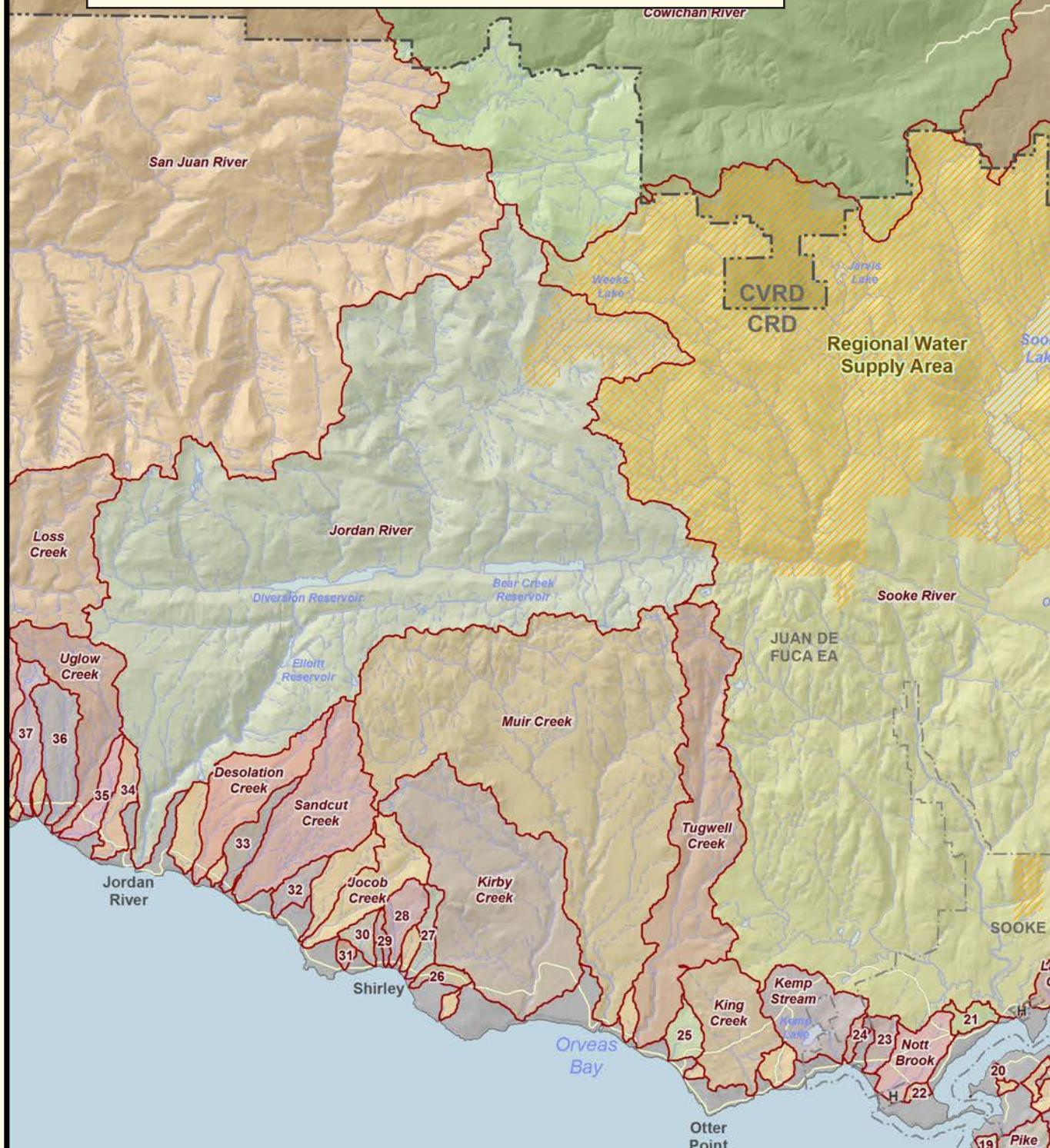
- When construction begins, many new people may be involved in the site development. **Communicate environmental initiatives** to the construction team, and include any environmental specifications in your contracts.
- Implement an **Erosion and Sediment Control Plan** to ensure that you prevent sediments from entering storm drains and waterways, preserve valuable soils, and are better prepared for more intense storms
- Minimize **clearing and grading** to reduce soil disturbance.
- Inspect and maintain** your best management practices to ensure they are functioning properly, especially during rainfall events.
- Reduce **soil compaction** on site to help maintain soil permeability and increase rainwater infiltration.
- Control and manage **construction wastes** to prevent water quality impacts.
- Conserve site soil and **apply a sufficient layer of topsoil** (20-30 cm) to provide additional water storage capacity in your landscaping, and help reduce irrigation needs.

Step 4 - Maintenance

Using watershed-wise development practices will often prove less costly and require less maintenance in the long run. Consider the following for optimal function and long-term success:

- In the **landscape maintenance plan** for the site, take into account municipal pesticide bylaws, the CRD Cross Connection Bylaw, and the CRD Water Conservation Bylaw. Incorporate sustainable landscaping practices such as the use of **compost and mulch** rather than chemical fertilizers, to reduce potential nutrient inputs into creeks and streams.
- When installing an irrigation system, have it done by a **certified irrigation professional (CIP)**. CIPs have specialized training to ensure systems are optimized for water conservation and plant health and survival.
- When installing green infrastructure and Low Impact Development best management practices, provide **operation and maintenance plans** with the design and pass them on to the future owners.
- Communicate the sustainable, watershed-wise features of the site, and **educate purchasers and tenants**. People are proud that the places they live or do business in are making efforts to protect and enhance their community.

Watersheds of the Capital Region



Kilometres

0 1 2 4

Projection: UTM ZONE 10N NAD 83

Important: This map is for general information purposes only. The Capital Regional District (CRD) makes no representations or warranties regarding the accuracy or completeness of this map or the suitability of the map for any purpose. This map is not for navigation. The CRD will not be liable for any damage, loss or injury resulting from the use of the map or information on the map and the map may be changed by the CRD at any time.

Watershed Boundaries

Unnamed Watersheds

Areas Draining to Ocean

Regional Water Supply Area

River/Stream - Permanent

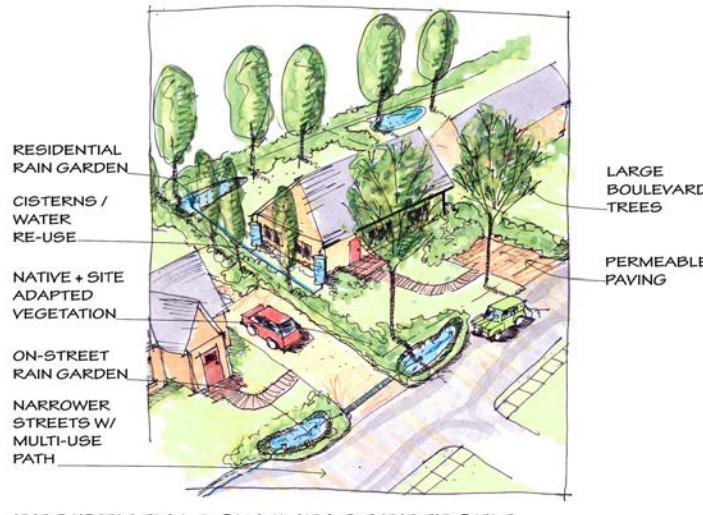
River/Stream - Intermittent

Municipal Boundaries

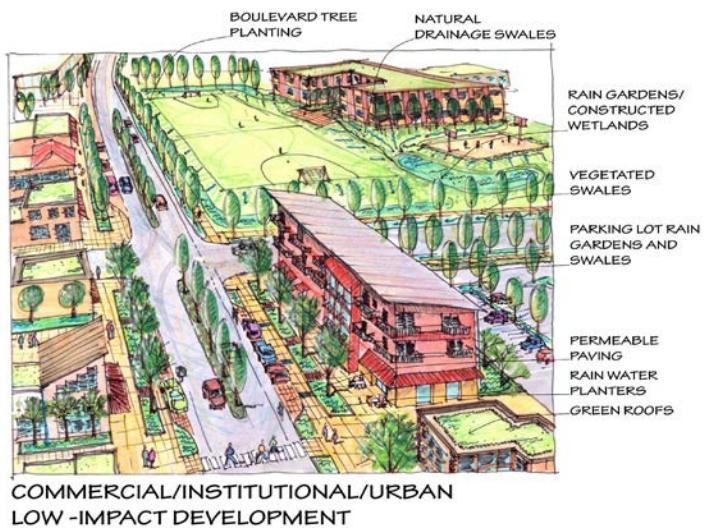
CRD Boundary

Major Roads





RESIDENTIAL LOW-IMPACT RETROFIT



COMMERCIAL/INSTITUTIONAL/URBAN LOW -IMPACT DEVELOPMENT

Why Use Green Infrastructure and Low Impact Development (LID)?

As our region becomes increasingly covered by **impervious surfaces** like roads, parking lots and rooftops, rain is prevented from soaking into the ground. As rainwater runoff travels over these impervious surfaces, it can become polluted. This contaminated stormwater enters local waterways, which lead to "flashy" creeks during heavy rains, where the creeks rise very quickly, causing erosion, flooding and damage to property and the natural habitat.

Green infrastructure and LID imitates the natural hydrology (or movement of water) of the site by managing rainfall where it falls, and uses design techniques that allow infiltration, and that filter, store, evaporate, and detain runoff close to its source. Using these techniques will help to protect and restore creeks, and create a more livable community.

Green Infrastructure and LID helps:

- **Create areas for infiltration.** Rain is able to soak into the ground; soil and plants remove pollutants. Stormwater infrastructure is less burdened, flooding is reduced and creeks have more consistent volume and speed of flow year round.
- **Protect the environment.** LID techniques help to remove pollutants from stormwater, reduce the overall volume of stormwater, manage high storm flows and help protect water quality in creeks and the ocean.
- **Reduce flooding and protect property.** Reducing impervious surfaces, increasing vegetation, and dispersing and infiltrating rainwater results in less runoff, reducing the likelihood of flooding from storms.
- **Help the economy.** Developers and builders can also save money because LID projects in many cases are less expensive to build, saving money on overall development costs and protecting your property.
- **Provide cost-effective alternatives to system upgrades.** Land developed prior to the 1990s usually provides little, if any, stormwater treatment. In many cases, LID systems, such as bioretention, are much less expensive to use than costly stormwater vaults or land-consuming stormwater ponds.
- **Create greener communities.** LID projects leave more trees and plants and have less impervious surfaces, which makes for greener developments and communities.
- **Increase public safety.** One of the hallmarks of LID is "green streets". Studies show that when vehicle traffic is slowed, there are fewer pedestrian accidents and fatalities.

Images credit: Murdoch de Greeff Inc.
Infrastructure problems with stormwater.



Innovative Trent Street
raingarden solution.



Where To Use Green Infrastructure and LID

Appropriate rainwater and stormwater management features for different land uses are identified in this chart.

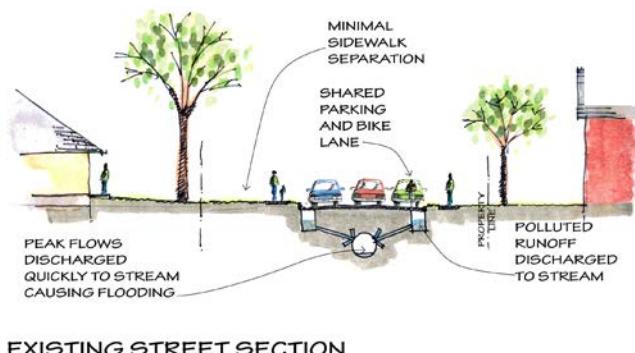
Green Features	Land Use					
	Institutional	Urban	Residential	Park/ Open Space	Boulevard	Road
Downspout Disconnect	✓	✓	✓			
Harvesting Rainwater	✓	✓	✓			
Rain Gardens	✓	✓	✓	✓	✓	✓
Infiltration Basins	✓	✓			✓	
Tree Wells	✓	✓		✓	✓	✓
Pervious Pavement	✓	✓	✓	✓	✓	✓
Green Roofs	✓	✓	✓			
Tree Planting	✓	✓	✓	✓	✓	
Prevent Soil Compaction	✓	✓	✓	✓	✓	
Minimum Top Soil Requirement(30cm+)	✓	✓	✓	✓	✓	
Swales					✓	✓
Minimize Road Width	✓	✓	✓	✓		✓

*Adapted from
the Bowker Creek
Blueprint (2010)

Green Streets

Green streets combine LID and urban form to:

- Contribute to traffic calming
- Improve pedestrian and bicycle safety
- Reduce demand on the city's stormwater infrastructure
- Reduce impervious surfaces, allowing rainwater to infiltrate
- Recharge groundwater
- Deliver cleaner water to nearby waterways
- Increase green space
- Enhance community and neighbourhood livability



Drawings courtesy of:



Principles for a Healthy Watershed for Builders & Developers

As a developer, each of your projects can contribute to a healthy watershed by following these principles:

- Keep up to date and ensure your development incorporates municipal community plans, greenways plans and environmental requirements – this will help your project avoid delays
- Use watershed-wise management approaches at all stages of your development (see inside for tips)
- Reduce effective impervious area
- Construct water infiltration and retention features on your site and partner with municipalities within boulevards
- Plant trees and shrubs and protect existing trees on site
- Include climate change adaptation and mitigation in your planning and design
- Communicate your environmental goals to municipal councils, the community, clients and buyers; this will help “sell” your project

Resources

- CRD Stormwater, Harbours and Watersheds Program www.crd.bc.ca/watersheds
- The Water Bucket www.waterbucket.ca
- The Water Balance Model waterbalance.ca

