

# Building Construction

## Site Planning

Simple techniques can be applied to site planning to reduce the environmental impact and development costs.

- Locate building footprints and foundation elevations to avoid watercourses and limit site disturbance.
- Incorporate natural systems and retain existing vegetation within the site plan.
- Orient buildings to take advantage of Passive Solar Design opportunities. Consider solar heating.



- Incorporate low impact lighting solutions such as skylights and translucent panels.

## Building Materials

Consider building materials that use less, and require less energy to manufacture than traditional ones. By using 'green' building materials and techniques you can effectively reduce the environmental footprint of the structure and improve the long term health of building occupants and the greater region:

- Optimize energy performance by using energy efficient appliances and mechanical equipment.
- Consider renewable energy.
- Reduce CFC generated by air conditioning systems.
- Use locally available materials reduce fossil fuel consumption during transport.
- Use materials that are renewable in the short term.

- Reduce water use by installing low water use appliances and plumbing fixtures.
- Incorporate the storage and collection of recycled materials in the building design.
- Design the interior environment to reduce toxic emissions.
- Incorporate natural lighting and views from interior environment.
- Use natural materials for exterior finishes.
- Provide thermal efficiency through high quality insulation, energy efficient windows and doors, and roofing materials.



*Some features visible on this single family home include: natural lighting, natural and local building materials, and limited grade disturbance.*

For additional information on the topic areas overviewed here, please visit the following reference web links, or call the City of Parksville's Department of Community Planning at (250) 954-3066.

[GVRD Stormwater Reports](http://www.gvrd.bc.ca/sewerage/stormwater_reports.htm)  
[http://www.gvrd.bc.ca/sewerage/stormwater\\_reports.htm](http://www.gvrd.bc.ca/sewerage/stormwater_reports.htm)

[Canada Green Building Council \(LEED\)](http://www.cagbc.org/)  
<http://www.cagbc.org/>

[Canadian Mortgage and Housing Corporation \(CMHC\)](http://www.cmhc-schl.gc.ca/en/co/maho/la/)  
<http://www.cmhc-schl.gc.ca/en/co/maho/la/>

*This material is provided for your information only. Techniques and descriptions contained herein are conceptual. It is the responsibility of the property owner to consult the appropriate qualified design and/or engineering professional prior to installation. The design and installation of these methods and systems must comply with all applicable bylaws and regulations of the municipality.*

# Sustainable Building Techniques

## 'Green' Building

Sustainability is important in ensuring that the social, economic, and environmental systems that make up our seaside community are providing a healthy living experience for residents and visitors alike.

While sustainability is a broad concept, the purpose of this brochure is to educate the development community and the community-at-large regarding current sustainable building methods.

As a part of the development permit process the City's Planning Department has been providing applicants with a sustainability checklist, and is pro-actively commenting on development proposals within the sustainability context.

Often referred to as 'green' building techniques, the following examples refer to currently accepted alternative on-site development practices and material selections.

'Green' developments effectively reduce the negative impacts to the environment through emphasis on the sustainable use of building materials and by working with, and enhancing existing natural systems.

The physical design of developments should also promote social sustainability within the community. Designs should enhance social interaction and participation at the site and within the context of the surrounding community.

Consideration and expression of the local cultural and biological heritage as well as adequate provisions for affordable housing, should be forefront during the conceptual design process.



*Storm Water Detention Pond / Constructed Wetland  
Hawthorne Subdivision, City of Nanaimo*



*The physical design of developments should also promote social sustainability within the community*

Prepared by the Department of Community Planning.



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# Storm Water Source Controls

## Infiltration Trenches and Swales

Infiltration facilities are designed to capture on site storm water run-off in an effort to delay heavy 'first flush' events that can contribute to downstream erosion and sedimentation of watercourses.

Infiltration techniques are intended to capture, filter, and promote infiltration of surface run-off into site soils and existing aquifers.

Infiltration swales are often located adjacent to or within impervious paving areas, such as parking lots and patios. These facilities are effectively shallow ditches surfaced with grass over absorbent soils and a sand base. Some techniques use an additional drain rock reservoir beneath to increase storage capacity and allow for infiltration over a longer period of time.

## Pervious Paving

Pervious paving is intended to allow rainwater infiltration through surface materials, bedding aggregates and into substrate materials. This strategy is effective in reducing the amount of site run-off from hard surfacing.

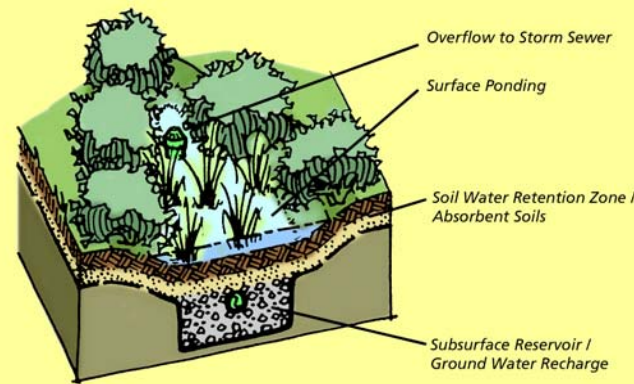
Pervious unit paving, reinforced grass cell paving, porous asphalt and porous concrete are typically used in low traffic volume areas. Parking areas, patios, fire lanes and walkways are commonly surfaced with pervious paving.



Combination infiltration swale and rain garden project during construction (City of Nanaimo, B.C.).

## Rain Gardens

Rain gardens function as a combination of conventional surface detention ponds and infiltration galleries. These facilities offer additional detention of water at the surface with a pond like appearance. Appropriate plantings are included to resemble a planting bed through the use of plants that are tolerant of fluctuating water tables.



Rainwater run-off from impervious site elements such as roofs and paved areas is directed into deep absorptive soils and subsurface reservoirs.

Surface reservoirs should be designed to hold water for no longer than 24 hours, due to potential mosquito breeding. Ponding depths in excess of 0.75m will require a 1.5m barrier fence.

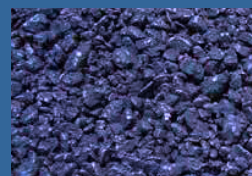
Underground reservoirs are often designed to hold and slowly release stored water into an adjacent watercourse or storm sewer system.



Pervious Unit Paving



Gravel Cell Paving



Porous Asphalt Paving



Grass Cell Paving

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# Efficient use of Water

## Roof Leader Disconnect

Roof leader disconnect is a method used to intercept rainwater from impervious roofs and direct it into soak-away pits, rain barrels, swales or detention facilities.

Overflow structures to conventional storm water connections must remain as required by current City Engineering standards.

Stored rainwater can be used to water vegetable gardens and planters, in place of domestic sources.



## Drought Tolerant Native Plants

Use plants that are well suited to the local climate and hydrology. Landscaping is designed to require little or no supplemental irrigation once established.

## Automated Irrigation Systems

Underground irrigation systems have proven to be more efficient than hose-and-sprinkler methods. To maximize the efficiency of your system consider the following:

- Use an automatic controller (timer).
- Incorporate rain sensors, soil moisture sensors and evapotranspiration data.
- Use low volume drip irrigation.
- Establish a watering budget and schedule.
- Have the system designed and audited by a certified professional.



A combination of native plantings, and reuse of on-site blast rock (City of Nanaimo, B.C.).

## Absorbent Landscaping

Simple techniques can be applied to site landscaping that will store water for uptake by plants and infiltration into underlying native soils:

- Increase growing medium soil depths and add organic matter and/or compost to the soil mix to increase water retention.
- Add a 75 - 100mm depth of mulch or compost over planter areas to keep down weed species and reduce evapotranspiration.
- Dish rather than crown planter areas to collect and hold rain water.
- Planting should include layered plantings of shrubs, groundcover and extensive trees for crown intercept and ground shading.



Poor quality design and installation is the most common factor in inefficient irrigation systems

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