

Convening for Action on Vancouver Island  
Leadership in Water Sustainability



## Comox Valley Local Governments Showcase “A Regional Response to Infrastructure Liability”

Understanding what ‘Infrastructure Liability’ means in the Comox Valley:  
Brooklyn Creek case study illustrates that a drainage system is more than just pipes

**Convening for Action in the Comox Valley:**  
**Visualize What We Want Our Region to Look Like in 50 years**

**Create a Legacy:**  
**Settlement Change in Balance with Ecology**

- Influence choices by individuals and organizations*
- Use the term “sustainability” as a lens for considering approaches that influence choices*

## 2011 Comox Valley Learning Lunch Seminar Series

### A Regional Response to 'Infrastructure Liability'

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Brooklyn Creek case study illustrates that a drainage system is more than just pipes

## Preface

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*The initial capital cost of infrastructure is about 20% of the life-cycle cost; the other 80% largely represents a future unfunded liability. Each year, the shortfall grows.*

*In addition, local governments bear the entire financial burden to stabilize and restore watercourses impacted by the cumulative impacts of increased rainwater runoff volume after land is initially developed or redeveloped to a higher density.*

*Through a program of professional development, the four Comox Valley local governments are striving for a consistent regional approach to **Sustainable Service Delivery**. The focus of the 2011 Seminar Series is on how all those involved in land development have a role to play in integration of land use planning and infrastructure asset management.*

*This article foreshadows what Glenn Westendorp, Chair of the 2011 Series, will say at Seminar #2 when he introduces the Brooklyn Creek case study. This sets the scene for the "course within a seminar" by Jim Dumont.*

*The scope of the 2011 Series is encapsulated in the image opposite. The Agenda for Seminar #2 follows on the next page.*

*Kim A. Stephens, MEng, PEng, Executive Director  
Partnership for Water Sustainability in British Columbia  
May 2011*



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The Best Place on Earth

### So What is Sustainable Service Delivery?

- It integrates all the principles of Asset Management
- It understands the value of land-use planning
  - And it understands the impacts land-use planning has on service delivery
- It integrates the 'Design with Nature' philosophy
  - Nature is a valuable asset that must be 'maintained' in order to 'operate' effectively
  - Nature's assets often appreciate rather than depreciate – What can we do to leverage this?
  - Nature provides multiple 'services' – some similar to traditional community services – i.e. Rainwater Management
  - Nature, and many of the resources it provides, are finite

**2011 Comox Valley Learning Lunch Seminar Series**  
A Regional Response to 'Infrastructure Liability'

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**2011 Comox Valley Learning Lunch Seminar Series:  
A Regional Response to Infrastructure Liability**

*Water is finite. People are not.*

**Seminar #1**

*("Managing Water = Managing Growth = Managing Infrastructure")*

Understand Consequences of 'Infrastructure Liability'

Strive for 'Sustainable Service Delivery'

Recognize Benefits of 'Green Infrastructure'

*Regional Collaboration* 🏡

**Seminar #2**

*("Too Little Water")*

Climate Change = Droughts  
So, Design with Nature  
Make Level of Service Choices

*Adaptation* 🏡

**Seminar #3**

*("Too Much Water")*

Climate Change = Floods  
So, Respect Power of Nature  
Make Level of Service Choices

*Risk Management* 🏡



**Green infrastructure  
will make a difference over time!**

**2011 Comox Valley Learning Lunch Seminar Series**  
A Regional Response to 'Infrastructure Liability'

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Agenda for Seminar #2 on May 19  
Adaptation – 'Design with Nature' to Achieve Rainfall Capture  
and Water Conservation Goals

1000 - 1215	<p align="center"><b>Establishing Expectations – This is what we want our valley to look like!</b></p>
	<p><b>1. Look Beyond Our Municipal Boundaries</b></p> <p><b>(a) Regional Response to Infrastructure Liability: What We Learned At Seminar #1</b> <i>(Glenn Westendorp &amp; Kim Stephens) (15 minutes)</i></p> <p>Explain the three dimensions to the unfunded 'infrastructure liability'</p> <p><b>(b) Nature Without Borders: Align Efforts at a Watershed Scale</b> <i>(Jack Minard &amp; Kevin Lorette) (15 minutes)</i></p> <p>Introduce the Tsolum River case study</p> <p><b>2. Rainwater Management in a Watershed Context: 'Do More With Less &amp; Achieve Stream Health Benefits'</b> <i>(Jim Dumont) (~1¼ hours)</i></p> <p>Explain how watershed targets can be met at the development and site scales</p>
LUNCH	<p align="center"><b>Take an extended break and continue the conversation! (60 minutes)</b></p>
1315 - 1500	<p align="center"><b>Delivering on Expectations – This is how we can/will get there!</b></p>
	<p><b>3. Look Within Our Municipal Boundaries</b></p> <p><b>(a) Changes to the Built Environment in the Comox Valley: Understanding Where Northeast Comox Fits Into the Big Picture</b> <i>(Tim Pringle) (15 minutes)</i></p> <p>Examine NE Comox through the lens of the <i>Comparative Land Use Typologies &amp; Matrix</i></p> <p><b>(b) Rainwater Management in Northeast Comox: Vision for Green Infrastructure</b> <i>(Glenn Westendorp) (15 minutes)</i></p> <p>What we want to achieve through green infrastructure – "maintain the water balance"</p> <p><b>(c) Town-Hall Sharing Session: Rainwater Management in Northeast Comox: Implementation of Green Infrastructure to Use Less Water and Prevent Runoff</b> <i>(facilitated by Kim Stephens) (70 minutes)</i></p> <p>Explore how the Town could establish and implement rainfall capture and runoff control targets</p> <p><b>4. A Look Ahead to Seminar #3</b> <i>(Glenn Westendorp) (5 minutes)</i></p>

# 2011 Comox Valley Learning Lunch Seminar Series

## A Regional Response to 'Infrastructure Liability'

Brooklyn Creek case study illustrates that a drainage system is more than just pipes

### Sustainable Service Delivery

The initial capital cost of infrastructure is about 20% of the life-cycle cost; the other 80% largely represents a future unfunded liability. Each year, the shortfall grows.

Sustainable Service Delivery is the Province's term of choice for an holistic approach to resolve the infrastructure liability issue. This approach involves a life-cycle way of thinking and connects the dots to protection of a community's natural resources.

### Policy Implications and Objectives

Near the conclusion of the first seminar in the 2011 Comox Valley Series, there was an 'Ah-Ha' moment. "As we listened to what was being said in the final town-hall sharing and learning segment, we realized that we should re-frame the infrastructure liability issue in terms of three dimensions or categories. The re-framing starts with the distinction between roads/water/sewer infrastructure and drainage infrastructure. They have different policy implications," states Glenn Westendorp, Public Works Superintendent with the Town of Comox. He is Chair of the 2011 Series.



As an outcome of this 'Ah-Ha' moment, key objectives for a Sustainable Service Delivery approach are synthesized as follows:

1. Pay down the legacy cost of existing hard infrastructure (water & sewer).
2. Reduce the life-cycle cost of new hard infrastructure.
3. Shift from gray to green to protect downstream values (i.e. environmental and/or agricultural).

Dimension #3 takes on particular significance when considering the ecological and financial consequences of NOT protecting the integrity of an area's natural hydrology.

### Brooklyn Creek Case Study

Brooklyn Creek lies in East Courtenay, North Comox and part of the Comox Valley Regional District. Two major developments are located in the Brooklyn Creek headwaters: Home Depot, and the Crown Isle residential and golf course community. The latter incorporates detention facilities as part of the golf course facilities. These ponds restrict flows leaving the site.

In 1999, the Town of Comox commissioned a report on drainage and flooding problems that were being experienced in the Comox portion of the creek.

"The report estimated that the cost to stabilize and restore the lower part of the creek would be in the order of \$1.8 million. This was well beyond the financial capacity of the Town of Comox. In addition, traditional engineering solutions would have resulted in a near total loss of habitat, and would have significantly impacted on private property," states Glenn Westendorp.

"Our Brooklyn Creek experience provides a graphic illustration of an infrastructure liability that is the consequence of NOT designing with nature. The \$1.8 million price tag became the driver for doing business differently. All jurisdictions committed to holding the line, with an emphasis on capturing rain where it falls."



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### Design with Nature to Protect Stream Health

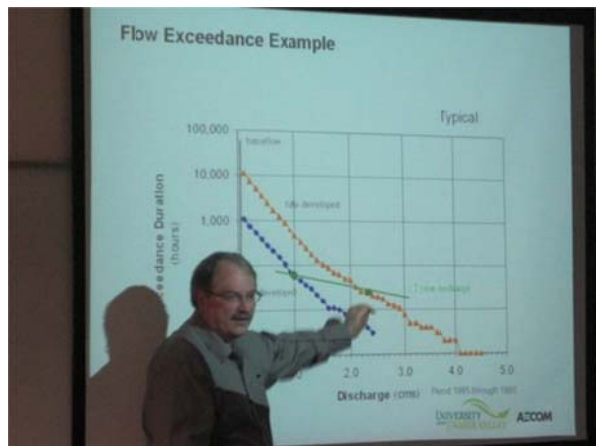
"The Brooklyn Creek experience epitomizes how stripping away the water storage capacity of the watershed landscape impacts on stream health in two ways: loss of baseflow...that is, too little water in dry weather; and channel instability and erosion...that is, too much water for too long during wet weather," observes Jack Minard, Executive Director of the Comox Valley Land Trust.



### More Than Just Pipes

"A drainage system is more than just storm sewer pipes in roadways and culvert pipes at creek crossings. It also includes the Major Drainage system, ditches, volume control systems, and the receiving streams all the way to something that will not be affected by the discharge," continues Jim Dumont, Engineering Applications Authority for the Water Balance Model Partnership. He is the featured presenter at the second seminar in the 2011 Comox Valley Series and will be delivering a "course within a seminar".

"As a profession, we engineers have been very good at generating plans to install pipes and build ponds. But we have overlooked the stream. As the Brooklyn Creek experience shows, this is the unforeseen cost that shows up years later. It is the unfunded infrastructure liability."



### Rainwater Management

"The term 'rainwater management' has been coined to differentiate the past practices that concentrated upon the drainage system response to storms.....and the needs of the aquatic environment. The foundation upon which the 'rainwater management' concept is built is the estimation of the amount of water in the stream over a long period of time," explains Jim Dumont.

"This relationship provides the linkage between the needs of the aquatic environment and the potential to physically alter the stream with increased erosion induced by urban development. The rainwater management approach allows one to directly connect the impacts to a stream with the causes in the urban landscape.....and the mitigation methods needed to restore the natural water balance in the stream."

**Stream Health Methodology:** "It should be readily apparent that streams are not static; in fact they experience constant change. While a natural stream will undergo a regular and reasonably predictable change, it will maintain its basic characteristics."

"A stream that is affected by urban development will change dramatically and will continue to alter its characteristics until they become stable in response to the new hydrology of the watershed."

"This path to stream stability can take several decades to reach equilibrium and while that form may be more stable it will be different than the original, and may have different habitat values. The generally accepted view is that the altered stream will have habitat of a lower aquatic value."

"Such adverse changes can be anticipated with our current scientific knowledge and we can quantify some of the driving forces and we can develop mitigation methods that can be evaluated using quantifiable methodologies."

At Seminar #2, Jim Dumont will elaborate on these methodologies, in particular the *Stream Health Methodology* that is incorporated in the **Water Balance Model**. He will explain how to establish performance targets for rainfall capture and runoff control so that green infrastructure achieves 'design with nature' outcomes.