

Convening for Action in British Columbia



Integrated Rainwater Management Planning: Apply Inexpensive Screening Tools and 'Do More with Less'

Beyond the Guidebook 2010: Implementing a New Culture for
Watershed Protection and Restoration in British Columbia

Convening for Action in BC: Visualize What We Want Our Regions to Look Like in 50 years

Create a Legacy: Settlement Change in Balance with Ecology

1. *Influence choices by individuals and organizations*
2. *Use the term "sustainability" as a lens for considering approaches that influence choices*

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Water Bucket Web Story #5 in the ISMP Course Correction Series

Preface

*This article is the fifth and last instalment in a series that is designed to inform local governments and others about the paradigm-shift to landscape-based 'RAINwater' from pipe-and-convey 'STORMwater', and what this means for **Integrated Stormwater Management Plans (ISMPs)**.*

*This series is adapted from case study experience presented in **Beyond the Guidebook 2010: Implementing a New Culture for Watershed Protection and Restoration in British Columbia**, released in June. This guidance document sets the stage for an "ISMP Course Correction".*

*The 'course correction' starts with characterizing truly integrated plans as 'IRMPs' (**Integrated RAINwater Management Plans**). A holistic IRMP is a potentially powerful tool to achieve a vision for 'green' infrastructure, one that protects stream health, fish habitat and fish; and anticipates climate change.*

This Story #5 is built around City of Surrey case study experience. Now in its fifth decade of continuous implementation experience, the City continues to evolve and adapt a watershed-based approach that incorporates lessons learned in getting green infrastructure right. The Surrey guiding philosophy is captured by these key messages:

- *Each watershed area is unique, and its needs are unique.*
- *Integrate drainage planning with land use, environment, parks, and other infrastructure/community needs.*
- *Model the drainage system after there is some concept of overall direction – do not model just to model.*
- *Have short, medium and long term goals / visions for the ISMP area with integration of opportunities.*

The notion of 'shared responsibility' is a foundation piece for collaboration, alignment and integration. When these are in place, innovation will follow. Shared responsibility is a unifying theme for two case studies described in this Story #5. They illustrate the value of looking outside the pipe.

Shared Responsibility



"Once we know what we want our watersheds and neighbourhoods to look like, the next step is to decide what the tools are that will get us there. All of us.... whether we are regulators, developers or designers.... need to understand and care about the goal if we are to create the future that we all want."

Vincent Lalonde, General Manager,
Engineering Division, City of Surrey
February 2009

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Shared Responsibility Context for an IRMP / ISMP

An increasing local government infrastructure deficit means that there will be even more competition for available funding. Thus, a driver for the *ISMP Course Correction* is to demonstrate how to 'do more with less' by placing emphasis on what really matters. This objective can be achieved through a front-end effort that connects with the community and gets the watershed vision right. Then create a blueprint to implement green infrastructure that truly restores the urban fabric. Recognize that implementation will be a multi-decade commitment.

What We Have Learned After a Decade

A decade ago, local governments were venturing into uncharted waters when undertaking ISMPs. The experience of the City of Surrey and other pioneer leaders serves as a guide for the *ISMP Course Correction*.

Key Message #1: Resist the temptation to launch directly into computer modeling and engineering analyses. Step back. Ask this question: *What do we want this watershed to look like in 50 years?*

A decade ago, we knew we had to do business differently in order to protect and/or restore watershed health. A decade later, we have the tools and experience to make a difference.

Key Message #2: Align efforts. Integrate with land use and development processes that drive the built form. A watershed vision is about the look-and-feel of the watershed landscape.

Remember: A decade ago, the genesis for ISMPs was a desire to integrate community, engineering, planning and environmental perspectives. Why: *To develop truly 'integrated' solutions.*

An IRMP / ISMP is a potentially powerful tool. It can influence the other processes for the better. It can provide the blueprint for integrated action.

Key Message #3: Everyone has a role to play. This goes to the heart of *Shared Responsibility*.

Shared Responsibility Matrix

The Matrix presented in Figure 1 was an outcome of the *2009 Metro Vancouver Water Balance Model Forum*. Hosted by the City of Surrey, the Forum was a first step in advancing a regional team approach that aligns municipal actions in the Metro Vancouver region with provincial green infrastructure goals.

Shared responsibility is a foundation piece for collaboration, alignment and integration. The Matrix was developed as an holistic way to encourage players with different perspectives to talk candidly with each other about implementation of green infrastructure goals.

There are (integrated) solutions to be found if all parties in the community development process simply talk to each other about how they could all work together more effectively, using law reform or other process changes as tools.

Figure 1 uses on-site rainwater management to illustrate application of the Matrix.

Focus on Values and Actions

Experience has demonstrated that five ingredients will be in the mix when practitioners in a local government setting undertake to develop outcome-oriented plans. The participants will have to collaborate to:

1. Define the problem
2. Declare the community's values
3. Select and apply the right tools
4. Wrestle with the solutions
5. Monitor and adapt in the future

When the use of screening tools is coupled with the front-end effort to create a *Watershed Vision*, this stretches a local government dollar further, regardless of IRMP / ISMP scope.

The first step is always defining the vision for the future. Then there must be a balance in defining the components of that vision. Since ISMPs were intended as a vehicle to integrate community, engineering, planning and environmental perspectives, the integration process must provide a balanced effort in detailing each of these diverse components of the IRMP / ISMP when creating a vision for the future.

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Responsibility Matrix		
Goal	Party	Tool
<ul style="list-style-type: none"> ▪ Objectives ▪ Situations ▪ Responsibilities 	<ul style="list-style-type: none"> ▪ Regional staff and elected representatives ▪ Municipal staff and elected representatives ▪ Private actors (developers, builders, homeowners, stewardship groups, universities and colleges, etc.) 	<ul style="list-style-type: none"> ▪ Law ▪ Bylaw ▪ Policy ▪ Procedure ▪ Incentive ▪ Penalty ▪ Security ▪ Budget
Desired or Required Outcomes	Relevant Staff or Other Actors	Instruments for Action

Application of Responsibility Matrix		
Desired Outcome	Relevant Actors	Instruments for Action
Onsite Rainwater Management	<ol style="list-style-type: none"> 1. Regional Government 2. Municipal Government 3. Developer 4. Builder 	<ol style="list-style-type: none"> 1. Living Water Smart policy direction; Regional liquid resource management plan 2. Regional targets translated to site level action using Water Balance Mode tool and Land Use Planning, site standards; linkage made between watershed plan and development practices/neighbourhood plan; Official Community Plan direction; visible political leadership on issue 3. Bylaws require a) onsite rainwater management facilities b) security for performance c) regular inspection and reporting re: maintenance (e.g. on business license renewal); departments charged and funded to inspect 4. Communication, contractual provisions, occupancy permit

Figure 1 – Shared Responsibility Matrix

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Level-of-Service Case Study: Surrey's Bon Accord West Plan

The fourth instalment in this *ISMP Course Correction Series* introduced the level-of-service approach in the context of 'Sustainable Service Delivery'. To illustrate application of the approach, this page presents a City of Surrey case study, namely: *Bon Accord West Functional and Remediation Plan*, completed in 2002.



Context for Plan Development in 2002

Context for the Bon Accord West project is provided by the direction given by Surrey at the start of the study. The City identified a need to achieve a cost-effective drainage system – that is, one that addressed the needs of the existing community for flood protection and drainage while being fiscally responsible.

This is a situation that many municipalities face today: an existing system, some problem areas, and limited funding available for system upgrades. Hence, the City's approach to the engineering analysis is particularly relevant. This case study demonstrates an important aspect of how to 'do more with less' by taking a fresh look at the basis for accepted practice.

A Pragmatic Approach: A majority of the system had been operating without serious problems for many years. Furthermore, for the vast majority of the time, the system capacity is only partially utilized for conveyance. These two reality-checks provided the basis for advancing the following as guiding principles:

- When there is minimal risk of flooding, it is better to maintain the existing system than to construct a new system that will comply with the most recent drainage design criteria.

- Where a drainage system is in place, the design of additions or modifications must be tempered with pragmatism.

Application of these guiding principles led to this objective: *Provide a uniform Level-of-Service (LOS) for both drainage and flood prevention, one that is based on a uniform area discharge rate (i.e. in this case, 30 Lps per hectare).* This rule provided an equal level of service or access to the drainage system for all properties within the watershed. The level of service was shown to be adequate through the history of the watershed with some identified minor exceptions.

The fundamental question then became: "Do we accept this proven level of drainage service or do we upgrade the system to the latest drainage criteria?" In answering this question, due consideration was given to the associated costs and benefits.

Lesson Learned

A lesson learned was that the *Level-of-Service (LOS)* approach serves as an inexpensive screening tool. It provides relevant information for capital planning; and it does this without the need for detailed and expensive computer simulation of the drainage system. The process establishes existing system capacity and then identifies those parts that do not meet this standard. These are prioritized and entered into the municipality's capital plan.

The Bon Accord West case study developed a cost comparison to demonstrate the benefits of a pragmatic approach that strives to 'do more with less':

System Upgrade Cost Comparison	
Upgrade Level-of-Service to:	Total Cost
Reduce Immediate Flooding Risks	\$0.8M
Provide System Capacity = 30 Lps/ha	\$1.4M
Provide System Capacity = 5-yr rating	\$2.2M
Provide System Capacity = 100-yr rating	\$5.0M

By basing key infrastructure upgrades on this approach, the City determined that it could then look at upgrading other components on a normal asset renewal basis.

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Outcome-Oriented Terms of Reference for an IRMP / ISMP

Figure 2 below is brought forward from **Stormwater Planning: A Guidebook for British Columbia**. The purpose is to draw attention to the distinction between *outcome-oriented* and *output-oriented*. This distinction is material and goes to the heart of 'do more with less'.

Vision First, Engineering Second

An *outcome-oriented* IRMP can provide a clear picture of how local governments can apply land use planning tools to create a future watershed condition desired by all. This approach contrasts with an *output-oriented* approach where the primary emphasis is on data collection, computer modeling and pipe analyses; and results in a 'glorified' Master Drainage Plan.

Figure 2 illustrates the stepping stones along a pathway to reach consensus on a shared watershed vision (i.e. 'this is what we all want'). On page 9-9 of the Guidebook, it cautions that:

"All too often, technical people go directly to Step #4 (Collect Data) without first asking what they are trying to accomplish, and why. As a result, they solve the wrong problem, and then wonder why elected officials and/or the public take issue with the proposed solution."



Figure 2

Seven Step Process for Developing & Implementing an ISMP

Example of An Holistic Approach

Table 1 is adapted from recent City of Surrey experience in commissioning seven ISMPs. The Surrey philosophy is captured colloquially by the four bullets listed below. This mind-map establishes expectations:

- Put on your boots and go for a walkabout
- After that, integrate stakeholder views
- Think through what you are proposing
- Then, and only then, do your modeling

Table 1 reinforces the 'vision first, engineering second' mantra. It also provides a starting point for those who wish to undertake an holistic and balanced IRMP / ISMP.

Four-Stage Process: Surrey has evolved a four-stage process for ISMP development. These stages correspond to:

1. What do we have?
2. What do we want?
3. How do we get there?
4. Prove it.

Throughout the ISMP process there is an emphasis on the balance between the needs and costs associated with the engineering, the environment, the planning and the public parts of the ISMP process..

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Table 1 – City of Surrey Framework for an Holistic and Balanced ISMP

<h2 style="text-align: center;">The Process</h2> <p style="text-align: center;">Stage 1 – “What Do We Have?” Stage 2 – “What Do We Want?” Stage 3 – “How Do We Put This Into Action?” Stage 4 – “How Do We Stay On Target?”</p>
<h2 style="text-align: center;">Balanced Goals</h2> <p>As part of defining “what we want”, the City identified these balanced goals:</p> <ul style="list-style-type: none">▪ Protect and enhance the overall health and natural resources of the watershed;▪ Promote participation from all stakeholders to achieve a common future vision of the watershed;▪ Minimize risk of life and property damages associated with flooding and provide strategies to attenuate peak flows;▪ Protect and enhance watercourses and aquatic life;▪ Prevent pollution and maintain / improve water quality;▪ Prepare an inventory of watercourses and wildlife for the watershed;▪ Protect the environment, wildlife, and habitat corridors;▪ Identify areas of existing and future agricultural, residential, commercial, and recreational land uses;▪ Develop a cost effective and enforceable implementation plan; and,▪ Establish a monitoring and assessment strategy to ensure goals are achieved, maintained, and enforced.
<h2 style="text-align: center;">Scope of the Four Stages</h2> <p style="text-align: center;">Stage 1: "What Do We Have?" Review Existing Information and Data Collection</p> <ol style="list-style-type: none">1. A review of existing information;2. Watershed field reconnaissance and data collection;3. Definition of hydrologic and hydraulic conditions; and4. A public open house to begin dialogue on community objectives.

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Stage 2: "What Do We Want?" Vision for Future Development

To achieve the goals, the requirements for developing a vision encompass:

7. Innovative Low Impact Development (LID) techniques and stormwater Best Management Practices (BMP) to mitigate against impacts to the lowland areas, reduce runoff volume through source controls, decrease stream velocity, protect water quality, provide erosion protection, and maintain baseflows to streams;
8. Sound, proven numerical hydrologic and hydraulic modelling techniques;
9. Hydrogeological assessments;
10. Environmental assessments for habitat protection and enhancement;
11. Land use plans which will be developed to identify future land use types, stream setbacks, wildlife corridors, potential pond locations and any other opportunities or constraints for development; and
12. Stakeholder involvement through a public open house meeting.

Stage 3: "How do we put this into action?" Implementation Plan, Funding Strategies, and Enforcement Strategies

13. A long-range capital works plan;
14. Cost analysis;
15. A review of the existing Design Criteria to assess which are appropriate for this ISMP and what should be added or modified;
16. A project approvals procedure;
17. A funding strategy;
18. A by-law enforcement strategy which identifies existing and missing bylaws; and
19. A list of action items with time scales.

Stage 4: "How do we stay on target?" Monitoring and Assessment Plan

20. Creation of a strategic plan for monitoring and assessing that includes an explanation of why data needs to be collected and assessed in a monitoring program and how to interpret the collected data.
21. Provision of a summary of key performance indicators (KPIs), both qualitative and quantitative with a sensitivity analysis to indicate the relative magnitude of flexibility that resides in each identified KPI.
22. Summary of the type, duration, and frequency of monitoring associated with each KPI.

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A Closing Perspective on the 'ISMP Course Correction'

Looking back, the primary driver for the ISMP approach was the 'salmon crisis' of the 1990s. This crisis focussed attention on the relationship between land development practices and stream degradation. When Richard Horner and Chris May published their landmark Puget Sound research findings in 1997, they triggered a paradigm-shift that influenced the British Columbia vision for interdisciplinary ISMPs.

This historical context is important to understand. It provides a basis for assessing an ISMP: *Does it create a vision of a future watershed complete with intact environmental values, healthy streams and abundant fishery resources?*

Although it is not characterized as an ISMP, the outcome-oriented *Bowker Creek Blueprint* in the Capital Region has established a benchmark for judging whether an ISMP meets the above test.

Landscape-Based Approach

A decade ago, a Metro Vancouver working group and provincial staff collaborated to produce a discussion paper titled *A Watershed/Landscape-Based Approach to Community Planning*, released in 2002. This document was the genesis for 'water-centric planning'; and served as a blueprint for integration of the engineering, planning and environmental perspectives to achieve a truly interdisciplinary ISMP approach and outcome.



"The premise underpinning the landscape-based approach is that resource, land use and community design decisions will be made with an eye towards their potential impact on watershed health," stated Erik Karlsen, the principal author.

Hence, a purpose of this *ISMP Course Correction Series* is to remind and/or inform those in the local government setting as to WHY local governments originally committed to an ISMP journey. Then attention can shift to HOW to achieve the vision.

How to Achieve a Watershed Vision

Collaboration is the key to achieving a shared vision. The Guidebook includes a brief history of how modern stormwater management in British Columbia has evolved. Regarding collaboration, Page 1-12 concludes with this observation: "*Local governments in British Columbia are changing. Those that are changing are providing models for others to adapt and further evolve.*"

As the stories in **Beyond the Guidebook 2010** demonstrate, there are many champions in local government who are providing leadership and making a difference to achieve a watershed vision. The City of Surrey and the Capital Region stand out because of their sustained commitment. Their accomplishments serve as models. This is the reason both are featured in the *ISMP Course Correction Series*.

Much like the Bowker Creek Blueprint, ISMP success in Surrey relies in large part on the strength of the relationship between City staff and community advocates. One cannot delegate creation of a vision. Furthermore, it takes a process to reach consensus on the actions that will protect watershed health.

An IRMP / ISMP is a potentially powerful tool because it does enable a local government to address HOW to achieve a watershed vision. The process can achieve integration of perspectives. The IRMP / ISMP process will then influence the land use and development processes that drive the look-and-feel of the watershed landscape.

