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IREI - Inter-Regional Education Initiative

Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Integrating the Site with the Watershed, Stream and Aquifer



January 2014

Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

About this Case Profile

The Coquitlam story is the second in a series of Watershed Blueprint Case Profiles. The Coquitlam story is important because the City has been evolving an effective and adaptable approach to development and implementation of Integrated Watershed Management Plans (IWMP) over the past decade.

*The Coquitlam experience demonstrates that four Ingredients will be in the mix when local governments undertake to develop **outcome-oriented plans**. The participants in the process 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*

The goal in producing Watershed Blueprint Case Profiles is to facilitate inter-regional collaboration, such that sharing and cross-fertilization of experience and understanding helps all local governments go farther, more efficiently and effectively.

By telling the stories of those who are spearheading changes in practice, this helps other local governments eliminate the “disconnect between information and implementation” that may otherwise hold them back.

We take this opportunity to recognize the City of Coquitlam's Melony Burton as Case Profile co-author. Melony's tireless efforts facilitated the interview process and ensured that lessons learned would be captured so that others may benefit from the Coquitlam experience.

The Table of Contents (opposite) presents a section-by-section synopsis of the Coquitlam storyline and is written for the busy reader. The storyline is structured in three parts that address What (Part A), So What (Part B) and Now What (Part C).



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Executive Director
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January 2014



Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

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Part A – The Story Behind the Coquitlam Story

From Awareness to Action

Experience shows that bridging the gap between awareness and action in local government requires that three critical success factors be in alignment: organizational/political **commitment**; internal **champions** who provide energy and leadership and stimulate willingness to change; and **trust** between individuals and departments.

Over a long period of time, and in fact dating back to the mid-1990s, all three factors have been in play in the City of Coquitlam.

Exhibit 1 on page 2 presents ten principles that distil the essence of the City of Coquitlam's story.

Balance Idealism with Pragmatism

"We have arrived at a good place, but the journey has not been easy. In fact, we had to work our way through some pretty contentious periods. We persevered, we adapted and we progressed," reflects Peter Steblin, City Manager. "We want other local governments to know about the good, the bad and the ugly of the Coquitlam story so that they may learn from our experience and know that it is okay to stumble."



"A decade ago, the City's approach to watershed-based community planning and rainwater management was quite idealistic. It was also prescriptive and impractical. As a result, the City could not implement what was proposed. This resulted in significant complaints from the development community which, in turn, culminated in Council-Staff conflict."

"With the advantage of hindsight, we now have an appreciation of the extent to which this conflict has defined the journey. There was a dark period yet that is what makes the Coquitlam story authentic and helped us to develop approaches which balance idealism with pragmatism."

Embrace Incrementalism

"Sometimes you can be so far ahead of others that it looks like you are behind," continues Raul Allueva, the City's Manager of Development Services.

"In 2003, the City was clearly visionary when it first embraced and then formalized a watershed-based approach as a foundation piece in the Official Community Plan. By the latter part of the decade, however, Coquitlam was viewed by others in the region as the example of what not do."



"Despite the setbacks, the City has never stopped progressing. We are guided by the '*principle of incrementalism*'. By this, we mean implementing change one step at a time and acknowledging that adjustments can be made along the way."

Collaborate for the Greater Good

"The issue has always been about HOW to implement practical measures that work," adds Jim McIntyre, General Manager for Planning and Development. "As the result of a very difficult process of learning while under fire, we have learned to find solutions that achieve multiple objectives."

"We communicate better. We cooperate better. We coordinate better. It is a good story!"

Understand Your Context

"Context is everything. Coquitlam was leading a movement at a time when there was little experience. Decisions were made with the best of intentions," summarizes Jason Cordoni, the City's Development Servicing Supervisor.

"We ended up taking two steps forward and one step back, yet still ended up progressive and visionary!"

Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part A – The Story Behind the Coquitlam Story

Exhibit 1 – Ten Principles for Watershed Planning and Rainwater Management in the City of Coquitlam

1.	Take action. Doing <i>something</i> imperfectly is better than doing <i>nothing</i> flawlessly.
2.	Use Council direction to endorse an overarching objective which requires inter-departmental collaboration, guides policy development, and gets watershed management into municipal processes.
3.	Develop a city-wide strategy which defines concrete goals, how you plan to achieve them, and who you need to do it.
4.	Appoint and support a champion within your organization to lead the movement.
5.	Start small. Build on successes as you go. Incremental improvement is easier to implement.
6.	Stay practical. Strive to turn idealistic, ambitious ideas into actions that are achievable.
7.	Expect and prepare for opposition. It is important to advance good policy regardless of resistance to change.
8.	Be flexible and acknowledge when you need to adjust course. Mistakes are lessons for moving forward.
9.	Take a holistic approach to watershed management which offsets impacts in some areas with meaningful gains in others.
10.	Balance environmental, economic and social considerations. Be sure you are developing a plan which considers a variety of sectors, rather than advancing the agenda of one group.

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Part B – Implementing a Watershed-Based Approach to Community Planning

1. Regional Direction and Support for a Watershed-Based Approach to Community Planning

In 2001, Metro Vancouver and its member municipalities recognized the benefits of a watershed-based approach to integrating drainage, ecology and land use planning. The region made a commitment to the Province to have watershed-based plans in place by 2014. This commitment became a regulatory requirement pursuant to the region's *Liquid Waste Management Plan* (LWMP).

Requirement for Watershed Plans

The LWMP clause stated that municipalities would undertake integrated stormwater management planning at a watershed scale for all 'urban' watersheds, with urban being defined as those which are 20% or more developed.

As a result of the LWMP process, watersheds became recognized as a fundamental and natural management level for the protection and use of water. Stormwater was recognized as a resource, as was the need to protect small fish-bearing streams.

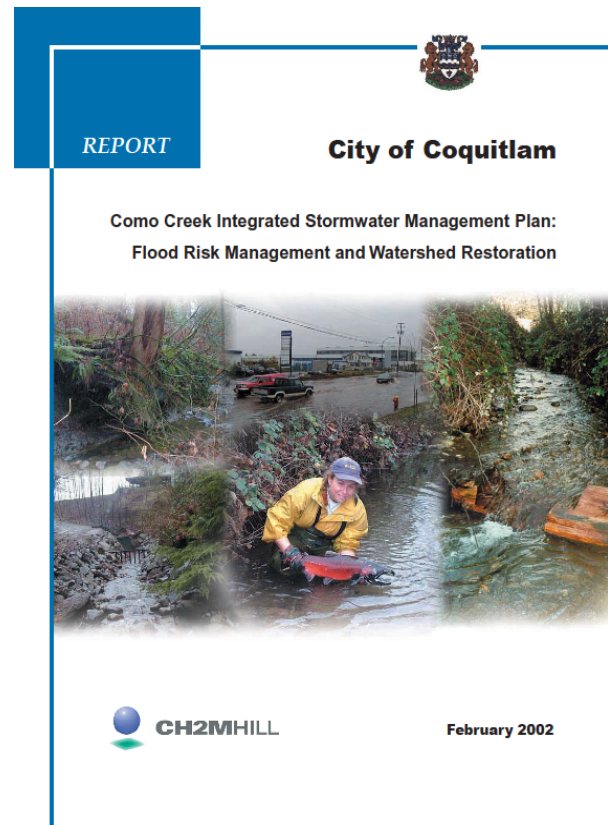
In order to protect waterways, it was recognized that government agencies at all levels and other stakeholders must plan and care for the water, land, human activities, aquatic life and resources, wildlife, habitat and the interactions between them all.

Metro Vancouver piloted two watershed studies which incorporated the guiding principle of planning at the watershed scale as well as developing a high level vision and objectives. The plans employed a new drainage planning philosophy, and were used as a model for other drainage systems in the region to advance integrated planning and stormwater management.

Early Application in Coquitlam

The City of Coquitlam was a participant in both regional pilot studies, and drew on that experience when developing their first municipal ISMP (Integrated Stormwater Management Plan) in 2002. The Como Creek ISMP incorporated the approaches to stormwater and watershed management developed by the region, but also built on the integration theme by involving a multi-disciplinary team of engineers, planners and environmental specialists.

The Como ISMP also introduced a water balance concept to stormwater management which considered rainfall capture and runoff control – ideas which were both circulating around the region and Province at that time.



Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part B – Implementing a Watershed-Based Approach to Community Planning

2. Introduction to Coquitlam Story & Time-Line

Historical Perspective

“An interesting aspect of Coquitlam’s story is that it demonstrates, on a local level, how attitudes and approaches in the Metro Vancouver region



have evolved with watershed management and the recognition of rainwater as a resource,” reports Melony Burton, the City’s Watershed and Drainage Coordinator. Since 2007, she has been the champion

tasked with drainage utility planning and driving the ISMP process.

Going back to the 1990s, and the start of watershed-based planning approaches, Coquitlam has been involved in pilot projects that put these theories to the test. Since then they have continued to take concepts introduced regionally, and implement them incrementally, each effort building on the successes or lessons of the last. In the process, Coquitlam has learned by doing.

“Changing the way we do things means taking on new challenges and not always getting it entirely right the first time,” adds Melony. “But all attempts generally have some salvageable elements to move forward on.”

Over the past decade, the City has built on pragmatic experience in first securing political support for a watershed-based approach to community planning; and then developing, implementing and refining practical rainwater management applications that mimic the natural Water Balance.

Structuring the Coquitlam Storyline

To tell the Coquitlam story in a seamless way, the steps along the way are grouped under these seven themes that serve as section headings:

- **OCP Amendments Provide Foundation for a Watershed Based Community Planning** - 2003 was a defining year because new policies required that watershed needs be reflected in the land use planning process by requiring watershed studies before Neighbourhood Plans.
- **Source Control Implementation Challenges Led to a Refined Strategy** – this covers the period 2004 through April 2007 when challenges with the implementation of source controls triggered the need for a refined approach.
- **Rainwater Management Guidelines Represent a New Beginning** – this covers the period May 2007 through June 2009 when the City underwent a renewal process that revised its approach to rainwater management and reaffirmed its commitment to watershed planning.
- **Partington Creek IMWP: Putting It All Together** – adopted in July 2011, the Partington Watershed Plan was the culmination of efforts over the years to achieve true integration of drainage, ecology and land use planning.
- **Coquitlam on Track for Completion of Watershed Plans** – the City is nearing completion of watershed plans for all urban areas and moving forward with implementation through an array of projects.
- **Looking Beyond 2014: Adaptive Management using Monitoring that Informs** – the City is a member of the regional working group that has developed a monitoring program that can be used to select actions for continuous improvements in watershed health.

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Part B – Implementing a Watershed-Based Approach to Community Planning

3. OCP Amendments Provide Foundation for Watershed-Based Community Planning

In 2002, Metro Vancouver and local governments had generally embraced the concept of watershed-based community planning, but none had yet developed a solid mechanism for rolling out watershed-based approaches and processes.

City-wide Strategy

A report to Council highlighted the need for the City to identify watershed boundaries, to prioritize watersheds for study, and to determine a method for preparing and incorporating plans into municipal processes.

Council directed staff to develop a city-wide watershed management planning strategy and accompanying action plan.

In May 2003, Council amended the City's Official Community Plan (OCP) as detailed in Exhibit 2 (on page 6).

OCP amendments provided support and direction for turning ideas into action



- City-wide watershed management strategy
- Action plan with schedule and budget
- Support for rainwater management strategies

Turning Ideas into Action

The OCP amendments in May 2003 addressed the needs concerning city-wide watershed planning and integration with neighbourhood planning processes. The new policies required that Neighbourhood Plans be completed after applicable watershed studies and that land use plans take into account watershed conditions and needs.

Integrated Watershed Management Plans:

This OCP direction allowed for IWMP objectives to be realized through Neighbourhood Plan policies.

"A decade ago, the new language and direction in the OCP provided City staff with the mandate to turn ideas into action," says Dana Soong, Utility Programs Manager.



"First and foremost, we were able to include the development of Integrated Watershed Management Plans (IWMPs) in the City's Financial Plan. This funding assurance meant we could complete all IWMPs by 2014 as per the legislative direction."

"Secondly, linking the IWMP and neighbourhood planning processes gave our Planning and Development Department and other departments a vested interest in the outcome of watershed plans and a reason to become active participants in the process."

"Thirdly, the OCP supported new approaches to rainwater management in order to mitigate the impacts of land development. This laid the foundation for source controls in the Hyde Creek IMWP and later on for the city-wide *Rainwater Management Design Requirements and Guidelines* we use today."

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Part B – Implementing a Watershed-Based Approach to Community Planning

Exhibit 2 – 2003 OCP Amendments

From Section 3: A Healthy Environment, Policy Objective 3 (amended May 5, 2003 – Bylaw 3530)

OBJECTIVE 3

To provide for effective and prudent management of Coquitlam's watercourses through sustainable land use and development and other comprehensive watershed and stormwater management approaches.

POLICIES

a) Create a strategy for integrated stormwater management planning.

Build this strategy incrementally through watershed studies, and aim to eventually cover the whole of the City. Such studies should:

- ▶ *Follow a consistent standard, with variation as appropriate to local conditions;*
- ▶ *Enable the City to meet its commitments under the Regional Liquid Waste Management Plan; and*
- ▶ *Consider inputs from those affected.*

b) Reflect watershed conditions and needs in the neighbourhood planning process, by:

- ▶ *Ensuring that new neighbourhood plans are completed after applicable watershed studies;*
- ▶ *Responding to watershed study results with appropriate land use and Development Permit Area designations in neighbourhood plans, as critical for environmental or hazard protection reasons, or as potentially required for communal stormwater management purposes; and*
- ▶ *Requiring that each new neighbourhood plan include a stormwater management component.*

c) Adopt and implement the City's Stormwater Policy and Design Manual, including appropriate consideration in capital planning for infrastructure. Implementation should also entail:

- ▶ *Updating of application submission requirements and reviewing related procedures, security provisions and agreements, fee structures and construction specifications, in order to operationalize the stormwater management manual; and*
- ▶ *Servicing standards for streets and lanes in the Subdivision and Servicing Bylaw which promote infiltration opportunities and additional pervious cover including appropriate vegetation, together with criteria for the Approving Officer to deal with environmental concerns and the modified application of the new standards within areas of existing development.*

d) Ensure appropriate interim approaches to watercourse management. Investigate and apply site-specific, best management measures for mitigating the impacts of stormwater runoff through the development process (e.g. oil-water separators, sediment control and other technologies). Maximize the environmental benefit of new technologies by recommending appropriate performance criteria.

e) Continue to work in partnership with senior government agencies in providing for appropriate approaches to streamside habitat protection for new developments. This includes continued partnership with FREMP in monitoring and regulating shoreline development along the Fraser River.

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Part B – Implementing a Watershed-Based Approach to Community Planning

4. Source Control Implementation Challenges Led to a Refined Strategy

To accommodate the projected addition of 25,000 people over the next 20 years in NE Coquitlam, the City applied the OCP amended watershed-based approach to community planning. In 2002, the Hyde Creek watershed was a rural residential, greenfield area in Coquitlam featuring fish bearing creeks, prime salmon spawning habitats and forested steep slopes.

The IWMP was initiated to provide for the cost-effective development of the watershed while protecting environmental and community values.

With the adoption of the *Hyde Creek Integrated Watershed Management Plan* (IWMP), the City embraced a terminology change to 'watershed' plan from 'stormwater' plan. This change recognized that the components of a truly integrated plan extend far beyond drainage planning.



Hyde Creek IWMP Recommended Rainwater Management

Drainage criteria recommendations from the IWMP incorporated a new drainage planning philosophy to address peak flows, water quality and manage everyday rainfall events in a way that mimics the natural, pre-developed condition.

The *Hyde Creek Integrated Watershed Management Plan* called for site level rainwater source control measures and established an infiltration target for rainwater capture on individual properties. A *Low Impact Development Manual* (LID) was developed to provide developers with direction as to how to achieve this target.

At the time, LID measures were only being implemented on a limited scale by a number of jurisdictions, mostly in the United States. Standard specifications and design details were not generally available, although the Greater Vancouver Regional District had developed design guidance for some LID measures for use by local municipalities.

Those documents and others were used to develop the specifications and drawings for LID measures to fulfil the recommendations of the Hyde Creek IWMP. The LID Manual was developed through a series of workshops involving consultants, developers, builders, City staff and other stakeholders.

Low Impact Development (LID) Implementation

The City's *Low Impact Development Manual* used a prescriptive approach which included specifications and detailed drawings for absorbent landscaping, structural soils, street trees, on-lot infiltration trenches and vegetated swales.

Implementation of the works required changes to the development application process at both the subdivision approval and building permit levels.

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Regulatory Changes: Construction was to be designed and completed to the satisfaction of a professional engineer and landscape architect. The manual also proposed security deposits for construction and maintenance and suggested that an agreement for completion of the works should be registered on the property title.

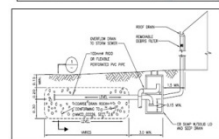
New approaches for inspection during construction by City staff were also required. Approval for drainage works on individual building lots were now subject to the same level of control as subdivision approvals, with completion deadlines triggered by the building permit process, rather than registration of a plan of subdivision.

Adopted in December 2004, the Manual set in motion a prescriptive process for implementing rainwater capture on individual building lots

1. Legislative Framework



2. Changes to Approval Process



3. Source Control Specifications



4. Construction and Inspection

Need to Revisit the Strategy

“Developers and builders had difficulties implementing the LID requirements,” states Jim McIntyre, General Manager for Planning and Development. “Questions were also raised about the effectiveness and longevity of essentially private, onsite works,” he adds.



Unintended Consequences of Implementation: Concerns about LIDs were heard regarding:

- complex procedures
- reliance on professionals
- onerous requirements
- high costs; and
- uncertainty regarding infiltration effectiveness in glacial till soils, steep terrain, and a wet climate.

“The requirements for restrictive covenants, securities and professional oversight for design and installation proved to be particularly difficult for single family home builders and home owners,” says Jason Cordoni, the City’s Development Servicing Supervisor.



“The requirement for an additional regulatory process and inspection at the building permit level also proved to be challenging for the City to implement.”

In April 2007, Council put a hold on the full implementation of LID measures until the City could demonstrate, through analysis and testing, that the implementation of the measures met benchmark standards for their function.

Staff were also directed to undertake an analysis of the costs involved with constructing and maintaining the systems.

Lastly, Council instructed staff to update and revise the Low Impact Development Manual.

“While interim measures such as roadside infiltration, absorbent topsoil and rain barrels were still being incorporated into the subdivision and building designs, further analysis and study were required to justify the use of more complex applications such as the on-lot infiltration systems at the single family home level.” Jason explains.

Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part B – Implementing a Watershed-Based Approach to Community Planning

5. Rainwater Management Requirements Represent a New Beginning

During the next couple of years, the City underwent a renewal process that took a critical look at its rainwater management requirements and reaffirmed commitment to the watershed-based approach to community planning. The process culminated in the development and adoption of the *Rainwater Management Design Requirements and Guidelines* (March 2009).

Back to the Drawing Board

Throughout 2008 and 2009 the City conducted a survey of municipalities to find out what source controls were being used and how they were performing.

Under direction from Peter Steblin, Coquitlam City Manager, a series of workshops was held with developers, consultants, engineers and stormwater experts from across Canada to work through the issues. The information gleaned from the workshops and survey was used to rework the LID manual into the Rainwater Management policy used today.



Systems Approach & Net Environmental Benefit

“The City renewed their commitment to watershed-based planning. This reflected the experience and work to date with Integrated Watershed Management Plans, in addition to knowledge gained from the source control workshops and survey,” reflects Bill Susak, retired General Manager of Engineering and Public Works.



“Council endorsed a new ‘systems approach’ philosophy which aims to offset impacts in one area of a watershed with gains in another for a ‘net environmental benefit,’” Bill continues. “The objective was to meet or exceed the standard of no net loss (of fish habitat) used by the Department of Fisheries and Oceans.”

“Recognizing the limitations of source control application on single family lots required that watershed plans deliver a strategy to augment rainfall capture shortfalls with works in other areas in order to achieve a net overall benefit,” adds Jason Cordoni.

Rainwater Management Design Requirements and Guidelines

As a result of reworking the LID manual and policies, a new approach to source controls was developed. Refer to Exhibit 3 (on page 10)

It features practical, performance-based requirements which apply to all subdivision and building permit applications in watersheds with an IWMP.

The rainfall capture criteria are tailored to each watershed and specified within each IWMP.



Survey of
Municipalities



Consultation
Workshops



Analysis and
Revision

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Part B – Implementing a Watershed-Based Approach to Community Planning

Implementation: The new requirements remove the burden of formal permitting, security or inspection for single family building permits. Larger developments are required to have professionals undertake and oversee the requirements with drainage works being regulated within the existing subdivision approval process.

All applications are required to preserve the natural hydrologic regime to the greatest extent possible, but flexibility is built in for the City to accept equivalent or innovative measures.



Exhibit 3: Summary of Rainwater Source Controls by Land Use Type

	<table> <tr> <th>Land Use</th><th>Source Control</th></tr> <tr> <td>All single-family lots</td><td> <ul style="list-style-type: none"> • 300 mm topsoil in landscaped areas • Hard surfaces graded to landscape areas • Encourage the use of permeable paving material and rain barrels </td></tr> <tr> <td>Multi-family, housing choices commercial, institutional, industrial</td><td> <ul style="list-style-type: none"> • All of the above • On-site infiltration/retention trench or alternative measures • Designed to maximize stormwater volume reduction targets in applicable IWMP's </td></tr> <tr> <td>City roadways in urban residential areas</td><td> <ul style="list-style-type: none"> • 300 mm of topsoil in landscaped areas • Roadside surface swales in unobstructed boulevards, adjacent to parks and open spaces • Below grade retention trench in all other locations </td></tr> </table>	Land Use	Source Control	All single-family lots	<ul style="list-style-type: none"> • 300 mm topsoil in landscaped areas • Hard surfaces graded to landscape areas • Encourage the use of permeable paving material and rain barrels 	Multi-family, housing choices commercial, institutional, industrial	<ul style="list-style-type: none"> • All of the above • On-site infiltration/retention trench or alternative measures • Designed to maximize stormwater volume reduction targets in applicable IWMP's 	City roadways in urban residential areas	<ul style="list-style-type: none"> • 300 mm of topsoil in landscaped areas • Roadside surface swales in unobstructed boulevards, adjacent to parks and open spaces • Below grade retention trench in all other locations
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Part B – Implementing a Watershed-Based Approach to Community Planning

Assessment of Source Controls

To address the concerns addressed earlier about the performance of source control facilities in sloped areas with bedrock and saturated conditions, the City used a \$10,000 Provincial Infrastructure Grant in 2011 to test the performance of on-site infiltration trenches.

“We set up flow monitors at two identical townhome sites which have their roof and on-site drainage directed to infiltration trenches. We plugged the trench on the control site and left the other one active and then measured the flow downstream of both for one year,” explains Melony Burton.



Runoff Volume Reduced: “The flow monitoring data results clearly demonstrated the effectiveness of an infiltration trench, even with the apparent constraints noted for the site.”

Annual runoff from the site with an infiltration trench was less than 10% of the annual rainfall (90% infiltration), which meets both volume reduction and water quality treatment criteria set by Fisheries and Oceans Canada. Peak runoff rates from the treated site were also a fraction of that from the untreated catchment.

“With the relatively continuous rainfall we get in the winter months a source control facility can remain full between rain events, with the overflow heading directly to the drainage system,” says Melony. “But although this condition may occasionally occur, it did not negate the benefit of the facility and its overall performance and benefit on an annual basis. And consistently, even throughout the wet months, the infiltration site outperformed the site with no trench,” she adds.

Water Quality Improved: At the same time, water quality was being monitored in a newly installed bioswale median on Lougheed Highway.

The median used an engineered soil and special filter media to remove pollutants from the road runoff.

“Those results were also positive,” Melony comments, “showing an 80-90% reduction in contaminants like nitrate, zinc, copper and total suspended solids.”



Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part B – Implementing a Watershed-Based Approach to Community Planning

6. Partington Creek IWMP: Putting It All Together

Adopted by Council in July 2011, the *Partington Creek Integrated Watershed Management Plan* showcases a culmination of efforts over the years to make the switch from traditional land development to a new approach where watershed health is considered as important as development. It features the solutions worked out during the Hyde Creek watershed development process where new source control requirements faced some challenges come implementation time.

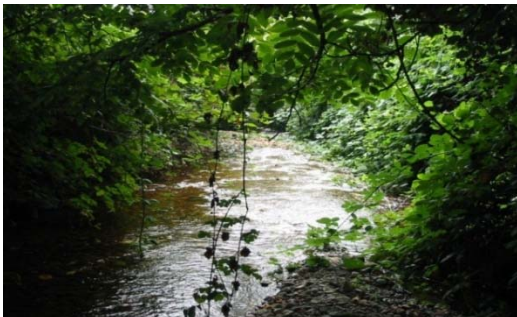
Partington Creek itself is one of the last ecologically healthy streams in Metro Vancouver and boasts a salmon spawning return in the thousands. The watershed has several other fish-bearing creeks with forested headwaters.

The watershed is planned to support the addition of 10-15,000 people and feature a new village centre.



"The Partington process ran generalized land use planning, watershed planning and financial modelling processes concurrently," says Perry Staniscia, Lands and Properties Manager. "The proposed land

use pattern evolved, through an iterative process, to maximize environmental protection and rainwater management outcomes, while still meeting the financial objectives of the development."



Implementation

The Partington Creek IWMP recommendations are fully funded through development cost charges and include:

- Enhancing 1.4 km of important fish habitat through floodplain creation, riparian restoration and instream complexing;
- Maximizing source controls to intercept rainwater and infiltrate it into the ground;
- Supplementing with regional facilities where source controls can only be partially implemented; and
- Using baseflow augmentation facilities and diversions with flow splitters to mimic natural creek flows.

Recognition

Kerr Wood Leidal, the consultant retained to undertake the watershed plan, and the City of Coquitlam shared the Consulting Engineers of BC (CEBC) Award of Excellence in March 2012 for the Partington Creek IWMP.

"The Partington Creek IWMP is a significant achievement and is expected to be instrumental in ensuring that future development activity in the watershed is congruent with the fish habitat values that currently exist in the watershed," says Diana Trager, Area Director for Fisheries and Oceans Canada.

Exhibit 4 encapsulates the story of the Partington Creek Integrated Watershed Management Plan.

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Part B – Implementing a Watershed-Based Approach to Community Planning

Partington Creek: A New Watershed Development Planning Process
Where Watershed Health is as Important as Development Needs

Awards 2012
cebc
Consulting Engineers
of British Columbia

CEBC Award of Excellence 2012 WINNER

Partington Creek is one of the last ecologically healthy streams in Metro Vancouver, a prolific salmon spawning stream with thousands of chum returning annually. The lower third of the watershed is planned for a \$1.5 billion greenfield development. Over the next 20 years, what is now forested land will become a new town centre, home to about 12,000 people.

Kerr Wood Leidal developed an Integrated Watershed Management Plan (IWMP) for the City of Coquitlam, which charts a new and better way to plan sustainable communities. The \$30 million IWMP is fully funded through development cost charges. It includes:

- Enhancing 1.4 km of important fish habitat on Partington Creek through floodplain creation, riparian restoration, and instream complexing.
- Maximizing source controls to intercept rainwater where it falls and infiltrate it into the ground.
- Implementing a new and innovative concept of baseflow augmentation facilities and diversions with flow splitters to mimic natural creek flows.

The above was accomplished without reducing the development's population, livability, or financial pro forma.

"The [Partington Creek] IWMP is a significant achievement and is expected to be instrumental in ensuring that future development activity in the watershed is congruent with the fish habitat values that currently exist in the Partington Creek watershed."

Ms Diane Trager, Area Director, Fisheries and Oceans Canada

The Problem:
The common approach to land development is to first create land use plans and then engage civil engineers to lessen the negative impacts of development. This reactive approach limits the opportunities and solutions available. The result has been inadequate and costly mitigation plans, and urban developments that harm adjacent watercourses and their aquatic life.

The Solution:
The land use planning, watershed planning, and financial modelling processes must be done **concurrently**, not sequentially. The Partington Creek process accomplished this. The land use was changed, in an iterative process, to maximize environmental protection and rainwater management, and to meet the financial objectives of the development.

The Iterative Watershed Development Planning Process

- 1 Source Controls**
Maximize On-site Rainwater Capture. Determine Land Uses that cannot Fit Source Controls.
- 2 Regional Rainwater Controls**
Supplement with Regional Facilities where Source Controls can only be Partially Implemented.
- 3 Land Use Changes**
Change Land Use to Preserve Watercourses and Expand Source Controls. Check Financial Pro Forma and Adjust Land Use, as Required. Repeat.
- 4 Environmental Enhancements**
Identify Enhancement and Restoration Opportunities such as the Creation of 4.5 ha of New Fish and Wildlife Habitat.
- 5 The Outcome**
A Livable Community with Protected Environmental Values.
Artist concept only subject to public input

kwl KERR WOOD LEIDAL consulting engineers **Coquitlam**

Other Consultants:
Raincoast Applied Ecology (environmental assessment)
HB Lanarc Consultants Ltd. (land use planning)
Garther Lee Ltd. (hydrogeological assessment)

Exhibit 4

Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part B – Implementing a Watershed-Based Approach to Community Planning

7. Coquitlam on Track for Completion of Watershed Plans

Coquitlam is on schedule to complete watershed plans for all urban areas by the end of 2014 in order to meet the regulatory commitment required of municipalities in the Metro Vancouver region. At present, six plans are completed and being implemented and six others are in development.

New Projects Added to Financial Plan

Since starting the IWMPs back in 2002, the City has completed many of the large capital projects coming out of the recommendations for improving watershed health such as diversion pipes, erosion stabilization works, sediment traps, base flow retrofits, water quality ponds, source controls, and fish accessibility improvements.

New projects from the IWMP's are added to the City's Financial Plan every year.

"The cost of projects to remediate streams and watersheds after damage from land use development is substantial," says Melony Burton. "Cost aside, there are often other significant obstacles to rehabilitative construction projects such as difficult access, property impacts or lack of space. The reduced cost and increased benefit of avoiding impacts upfront is a solid argument for being proactive rather than reactive in our approaches to responsible land development."



"The IWMP's have been useful resources in day to day operations, particularly with development applications," adds Hagen Hohndorf, with the City's Environmental Services division.

"Watercourse inventory and classification assists in determining appropriate riparian setbacks and protection. The plans also identify opportunities for improvements which can be used by the City or developers looking for compensation or by streamkeepers with access to grant funding."

Coquitlam River Watershed – A Different Kind of Plan

According to the 2002 LWMP, non-urban watersheds, those with 80% or more green space, are not required to develop watershed plans. But a plan of some kind was definitely needed for the Coquitlam River Watershed with its many stakeholders, vast headwater wilderness including Coquitlam Lake reservoir and dam, and thirty watercourses draining into the Fraser River.

Watershed Roundtable: To meet that need, the Coquitlam River Watershed Roundtable was formed in 2011 as a unique organization focused on advancing the health and sustainability of the watershed.

The Roundtable emphasizes collaboration and cooperation between a diverse and broad group of stakeholders including: regional, provincial and federal government agencies, the aggregate industry, utilities, and groups representing outdoor recreation, fishing, hunting and stewardship.

"The mandate of the group is to provide support to those with legislative authority so that they can make informed decisions about activities in the watershed," explains Margaret Birch, Environmental Services Coordinator.



The initial goals of the Roundtable include creation of a website and resource database, water quality monitoring on the river from dam to mouth, and the development of a watershed plan tailored to meet the needs of this large and varied watershed.

More information is available at:
www.coquitlamriverwatershed.ca

Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part B – Implementing a Watershed-Based Approach to Community Planning

Green Lane Standards

In June 2011, the City developed a standard design for green lanes which features infiltration for rainwater management. It is being applied on a trial basis in lanes in areas of redevelopment, where ditch removals are necessary to accommodate wider, primary access lanes and denser housing options such as carriage homes, triplexes, and quadruplexes.

In taking a watershed approach versus a lot-by-lot solution, ditch inventories are conducted on a watershed-wide scale and classifications of red, yellow and green watercourses are established which reflect fish presence and habitat value.

“In the case of a green-coded ditch, an infiltration trench is an agreeable replacement as it will retain the hydrological function necessary to support creek health,” says Hagen Hohndorf. “For the removal of yellow or red ditches, a large compensation project with significant benefits is used to offset the loss of ditch riparian and aquatic habitat.”

Rainwater Management for Housing Choices

In June 2012, the *Nelson Creek Integrated Watershed Plan* introduced the requirement for single family lots redeveloping to the City’s *Neighbourhood Attached Residential* designation to also meet the Rainwater Management Requirements.

Now, lots which redevelop from a single home to a triplex, quadruplex or include a carriage home will be considered a multi-family development which means they must implement source controls to meet the full rainwater capture criteria. This is enabling the City to counteract the impacts from increases in impervious area that result from this type of infill development.

Refer to Exhibit 5 on page 15.

New Stream and Drainage System Protection Bylaw

In September 2013 the City overhauled its *Stream and Drainage System Protection Bylaw*. In addition to general prohibitions regarding the City’s waterways and drainage system, the new Bylaw also regulates erosion and sediment control issues related to construction sites in Coquitlam.

“The changes provide for better accountability by developers and a broader range of enforcement tools for City staff,” explains Steffanie Warriner, Manager of Environmental Services.

“The new strategy promotes a practical and proactive approach to erosion and sediment control that includes updated discharge criteria, clear roles and responsibilities, and mandatory best management practices. These changes were necessary to counter the erosion and sediment issues we were experiencing, especially in sensitive areas with substantial construction,” she adds.

New Environmental Bylaw Officer positions have been added to work with developers and builders in achieving compliance.



Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part B – Implementing a Watershed-Based Approach to Community Planning



Exhibit 5: Rainwater Management for Housing Choices

Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part B – Implementing a Watershed-Based Approach to Community Planning

8. Looking Beyond 2014: Adaptive Management Using Monitoring that Informs

A condition of the BC Minister of Environment's approval of the *2010 Integrated Liquid Waste and Resource Management Plan* requires that municipalities, with the coordination of Metro Vancouver, develop a program for assessing watershed health and the effectiveness of ISMPs.

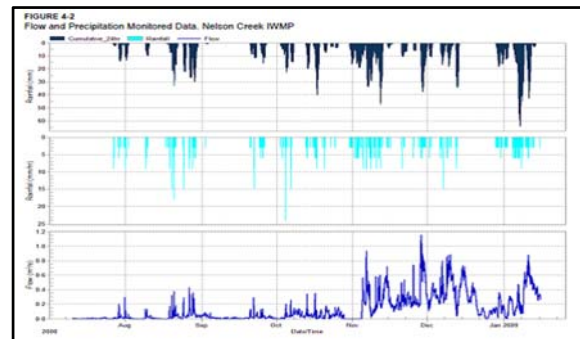


To meet this requirement, Metro Vancouver formed a technical working group composed of members of the Stormwater Interagency Liaison Group (SILG), the Environmental Monitoring Committee (EMC) and Ministry of Environment.

The group has produced a draft **Monitoring and Adaptive Management Framework (AMF)** which provides an approach for:

- tracking ISMP implementation;
- monitoring watershed health in a cost-effective, consistent, and meaningful way;
- using monitoring results to identify impacts
- analyzing and prioritizing those impacts to select the most effective adaptive management practices to bring about improvements; and
- reporting out to Ministry of Environment on all the components above.

The draft AMF report was released in October 2013. It is anticipated that, after review and consideration, the AMF would be adopted by municipalities as a guide to monitoring watershed health and assessing ISMP effectiveness in order to satisfy the Minister's condition.



Coquitlam has been implementing the draft Monitoring and Adaptive Management Framework as it is being developed. This year's results will pilot the use of the framework while helping the City to fulfil the environmental monitoring recommendations of completed watershed plans.



Watershed Planning and Rainwater Management: Creating the Future in the City of Coquitlam

Part C – Inter-Regional Collaboration & Watershed-Based Approach to Planning

Towards a Watershed Health Legacy

Watershed health is a priority for local governments on both sides of the Salish Sea. A group of champions representing five geographic regions has emerged as an inter-regional leadership team. Coquitlam and Surrey represent the Metro Vancouver working group on this team which includes provincial ministries.

Since the late 1990s, all levels of governments have recognized the need to restore and protect watershed health. Yet all regions have struggled with the question of how best to monitor watershed health. Inter-regional collaboration will help each region understand what the other regions are doing, what works and what does not.

Affordable and Effective Practices

The collaborating regions view the Watershed Health issue through complementary lenses that together form a complete picture. Each region has something unique to contribute to the mix:

- Metro Vancouver – IWMP effectiveness
- Capital Region – water quality assessment
- Nanaimo Region – partnerships
- Cowichan Valley – climate change
- Comox Valley – sustainable service delivery

To be completed by late 2014, the inter-regional deliverable is a workbook on the ***Elements of an Adaptive Management Framework for a Watershed Health Legacy***. The vision is that collaboration will result in consistent application of evolving standards of practice that are affordable and effective in maintaining healthy streams.

Inter-Regional Collaboration in the Georgia Basin

*“Through sharing & learning, ensure that
where we are going is indeed the right way”*



VISION:

Move beyond the rhetoric and into the substance of watershed health and how to effectively monitor it

DELIVERABLE:

“Towards a Watershed Health Legacy: Elements of An Adaptive Management Framework”

TURNING VISION INTO ACTION:

Community development activities and alteration of the Built Environment will result in cumulative benefits, not impacts