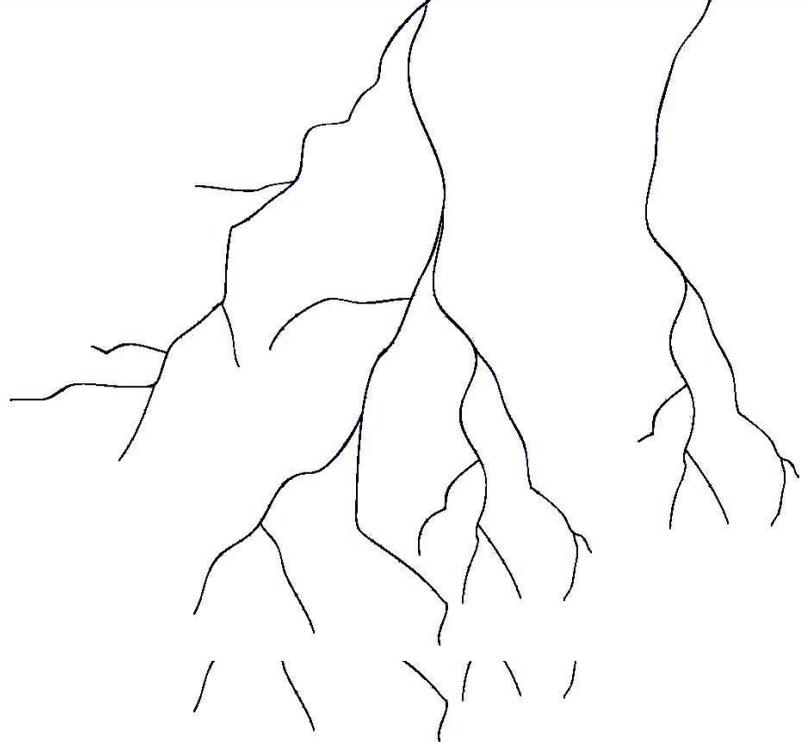


Policies for Integration of Land Use Planning and Stormwater Management



Chapter Four

4.1 Policy Tools for Implementing Integrating Stormwater Management Solutions

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4.1 Policy Tools for Implementing Integrated Stormwater Management Solutions

Achieving stormwater performance targets involves change, both at the land use level, and at the site design level.

Initiating change in stormwater management through land use or site design may involve two tools of local government: the *Official Community Plan* (OCP) and the *Liquid Waste Management Plan* (LWMP), and their related bylaw tools.

Official Community Plans tend to be led by planners, with input from engineers on infrastructure sections. Liquid Waste Management Plans tend to be led by engineers, with little or no input from planners. Both processes involve approval by a Local Council or a Regional Board.

Official Community Plans (OCPs)

Official Community Plans are statements of broad objective and policy to manage land use and growth in municipalities or in designated areas of regional districts. While these plans must designate land uses, they also may address social, environmental and sustainability issues at a broad level.

Related tools are Regional Growth Strategies, Neighbourhood Plans, Zoning Bylaws, Subdivision Bylaws and Development Permits, among others. While these tools are not centered on stormwater management, the provincial *Local Government Act* has expressly permitted local governments to use these tools to manage environmental impacts, runoff and impervious area.

Liquid Waste Management Plans (LWMPs)

Creating change in stormwater practices also may be triggered by a Liquid Waste Management Plan (LWMP). A Liquid Waste Management Plan charts a local government's proposed future course of action with respect to the management, collection, treatment and disposal of the sewage, stormwater and other wastewater effluents.

LWMPs are voluntary, and are created by local governments under a public process in co-operation with the Province. There are currently about 40 LWMPs adopted or in process in BC. Although the emphasis of most LWMPs has to date been on sanitary sewage, there will be an increasing emphasis on non-point-source pollution and stormwater in new LWMPs, or as existing LWMPs are updated or amended.

Case Study Applications

This chapter presents two case study applications that have developed content for the Guidebook:

- ❑ **Suburban Municipality** – the City of Chilliwack
- ❑ **Rural Regional District** – the Regional District of Nanaimo

These case studies have provided an opportunity to test and refine core concepts contained in this Guidebook with respect to integrating stormwater management with land use planning.

Integrating Stormwater and Land Use Strategies

Official Community Plans and Liquid Waste Management Plans, although often produced in isolation, are actually highly related exercises, as shown below:

Official Community Plan (OCP)	Liquid Waste Management Plan (LWMP)
Sets land use designations	Deals with sanitary sewage and stormwater consequences of land use designations
Adopted by Council/Board bylaw	Adopted by Council/Board bylaw
Involves public process	Involves public process
Updated periodically	Updated periodically
Planner-led	Engineer-led

Rather than view these as separate processes, it is useful to recognize the complementary and iterative nature of these two tools, as illustrated in Figure 4-1. Changes in land use policy create changes in liquid waste policy, and ecological or financial limitations on liquid waste systems may limit land use change.

Each local government will have a different Official Community Plan, Liquid Waste Management Plan, and other bylaws. As almost every bylaw comes up for review periodically, changing stormwater management policies is an opportunistic process; change will be made when the opportunity exists to make change.

Complementary and Iterative Tools

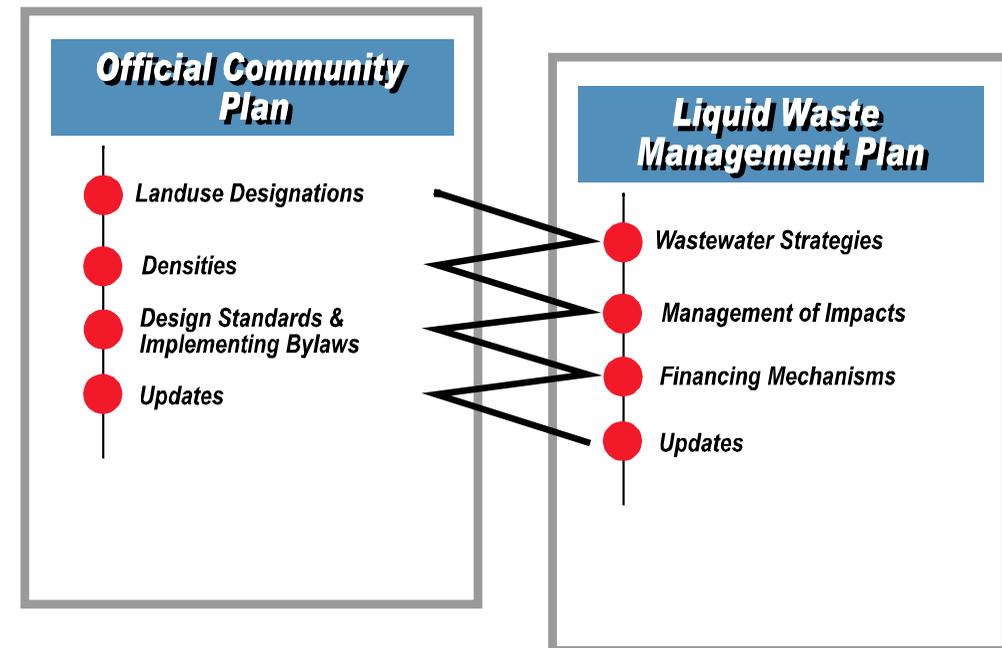


Figure 4-1

4.2 Liquid Waste Management Plans

The provincial *Waste Management Act* allows a municipality or regional district to develop an LWMP for approval by the Minister of Water, Land and Air Protection. The Minister can also order a local government to develop or revise an LWMP.

When the Guidelines for developing an LWMP were first published in 1992, urban stormwater runoff was included because the Ministry considered stormwater to be a resource to be protected. The 1992 Guidelines outlined a 3-stage process for developing an LWMP, and listed the various waste streams to be addressed, including non-point source pollution in stormwater runoff. The three stages are:

- ❑ Stage 1 - Identify Options
- ❑ Stage 2 - Evaluate Options
- ❑ Stage 3 – Prepare and Adopt Plan

Public participation is an integral component of each stage. This requirement provides an opportunity for a feedback loop that should also help broaden community support for the related but separate ISMP process for the stormwater component of an LWMP. A methodology to involve stakeholders in ISMP development is explained in Part C.

The Minister must be satisfied that there has been adequate public review and consultation with respect to the development, amendment and final content of the LWMP before providing sign-off. When approved, the LWMP authorizes disposal or re-use of municipal liquid waste. The local government then has the authority to spend the allocated public funds on the identified works and projects contained within the plan. Ideally, the LWMP should use a 20 to 40-year planning horizon.

The 1998 NPS Action Plan, introduced in Chapter 1, also identifies an LWMP as a tool to deal with pollution from stormwater runoff.

Stormwater Management Role of Regional Districts

To the date of writing, stormwater management in British Columbia has been focused on municipalities, not regional districts. The only regional districts that are highly active in stormwater management are the Greater Vancouver Regional District (GVRD) and the Capital Regional District (CRD). Within these two relatively urbanized regional districts, most of the land area falls within municipal boundaries. Therefore in the GVRD and the CRD, the regional district role is as a coordinator and economy of scale service provider, with the primary stormwater management role being provided by the member municipalities.

Outside of these two metropolitan regions and other municipalities, the great majority of the land area in British Columbia is administered as electoral areas within regional districts. Stormwater management in these relatively rural regional districts has been limited to date. In many cases, there is little active stormwater planning, other than that provided for drainage of roads administered by the provincial Ministry of Transportation and Highways.

Relationship between LWMP and ISMP Processes

There are two ways that the LWMP process potentially dovetails with stormwater management planning:

- ❑ **Regional Scale** – This is a macro view where a comprehensive approach is adopted; ISMPs are also part of the stormwater component of an overall LWMP.
- ❑ **Watershed Scale** – This is a micro view where the ISMP itself becomes the stormwater component of the LWMP; the ISMP delves into watershed-specific details

ISMP Technical Products

Looking ahead to Part C, an ISMP comprises three core technical products:

- ❑ ISMP Technical Product 1 - **Inventories** of the physical and biological systems
- ❑ ISMP Technical Product 2 - **Component plans** to protect the resources, resolve identified problems and accommodate land development and growth
- ❑ ISMP Technical Product 3 - An **implementation program** comprised of six elements:

✓ <i>Administration</i>	✓ <i>Community Education</i>
✓ <i>Projects, Phasing and Budgets</i>	✓ <i>Maintenance</i>
✓ <i>Financing Mechanism</i>	✓ <i>Performance Monitoring</i>

These three technical products generally parallel the three LWMP stages. The distribution of effort among the three products should be balanced. Often effort is concentrated on the inventory phase, and not enough effort is invested in the elements of an implementation program. The best plan, without a sound implementation strategy, can result in watershed conditions getting worse with time rather than better.

Input to Stormwater Component of Stage 1 LWMP

This is the stage where background information is gathered and the various options for resolving problems are explored. This includes identification of at-risk drainage catchments (refer to Chapter 4). The ISMP Technical Product 1 would be undertaken at this stage.

Input to Stormwater Component of Stage 2 LWMP

This is the stage at which a guiding philosophy for stormwater management is crystallized, policies are adopted and commitments are made to achieving performance targets (refer to Chapter 5) through integration with land use planning. Section 4.4 presents the elements of a policy framework to achieve integration.

This is also the stage at which options and/or approaches to stormwater management are studied in more detail in terms of cost and feasibility. This evaluation process should result in a final (one or two) best option(s) to advance to Stage 3. In short, ISMP Technical Product 2 could be a Draft Stormwater Plan within the overall LWMP.

Input to Stormwater Component of Stage 3 LWMP

This is the stage at which the stormwater component, as well as the overall LWMP itself, is finalized and adopted. The main focus is on developing an adaptive program that will enable local government to move from planning to action in an affordable manner (refer to Part C).

4.3 Relationship Between OCPs and LWMPs

There is a clear link between land use planning required of local governments in the *Local Government Act* (sections 944, 945) and waste management planning described in the *Waste Management Act* (part 1, section 16).

An OCP provides a clear statement to the public and the province about a local government's growth management objectives and provides the rationale for subsequent land use regulations.

An OCP Provides the Foundation for an LWMP

In most cases where OCPs are in place, the local government planning statement (bylaw) will form the basis of waste management plans. The purpose of an LWMP is to minimize the adverse environmental impact of the OCP and to ensure that development is consistent with Ministry of Water, Land and Air Protection objectives.

Local government land use planning is essentially a process of anticipating changes in land use and determining how to manage or influence these changes for the benefit of the community or region. In OCPs, local governments attempt to:

- Identify rural and urban development areas
- Assess the suitability of different areas for development
- Identify the expected sequence of urban and rural land development, including the proposed timing, location and phasing of sanitary and stormwater infrastructure

Where OCPs have been completed and adopted by bylaw, they should be used as a foundation for an LWMP.

LWMPs should be incorporated in total or in part as a schedule to an OCP. This will help to prevent land use decisions that eliminate or pre-empt future options for environmental management.

Take Whatever Step Comes First

In some cases, an LWMP process may be a trigger that focuses attention on stormwater management. Public concern related to flooding or habitat loss may be the trigger. Alternatively, an OCP public process may communicate public interest in raising local environmental and habitat protection standards.

Whatever the initial driver, at the end of the process a local government's Official Community Plan should include goals and objectives for stormwater management. These goals and objectives, or a variant of them, might first reside in a LWMP, and then be adapted to the OCP in the next review process. Or they may originate in the OCP process, and then be detailed through an LWMP. Either way is entirely acceptable.

The stormwater goals and objectives should be integrated into land use and growth management decisions that are embodied in the Official Community Plan, Regional Growth Management Strategy, and other local government bylaws.

The Link Between Land Development and Stream Protection

Local governments may consider directing growth away from sensitive areas, or zoning for land use that is compatible with stream protection. However, it is recognized that land use decisions are based on a broad range of considerations, among which stormwater is only one factor.

Where pre-existing land uses, or new designations, potentially impact sensitive watercourses, there will be a need to manage the development or re-development to meet a local government's goals and objectives for environmental protection and restoration.

The key to making land development compatible with stream protection is to apply appropriate stormwater source control strategies to reduce runoff volume and rate, as discussed in Chapter 7.

4.4 Stormwater Management Goals, Objectives and Policies

As discussed in Part A of the Guidebook, stormwater management and land use need to be integrated to address the source of stormwater-related problems. A critical step is to merge appropriate stormwater management goals, objectives and policies into a local government's OCP.

OCPs, and related Neighbourhood Plans, commonly set out broad goals, objectives and policies that guide implementation actions by local governments. Although OCPs do not bind a local government to a specific action, they prohibit the local government from acting contrary to the stated policies.

Establishing the right stormwater management policy framework and merging this framework with the OCP will ensure that land development decisions (at the planning and site design levels) address stormwater management objectives.

Case Study Example: Customizing a Framework

The City of Chilliwack's *Policy and Design Criteria Manual for Surface Water Management* (2002) includes stormwater management goals, objectives and policies that were developed through an inter-departmental and inter-agency process, which involved:

- City staff from both planning and engineering departments
- Representatives of senior government agencies (federal fisheries, provincial environment and agriculture ministries)

This process consisted of five working sessions where the core concepts of this Guidebook were presented to City staff and agency representatives. To provide context and relevance for participants, and to test the Guidebook concepts, local development projects were used as case study applications.

Outcome of Working Sessions

These sessions created a broad understanding of integrated stormwater management, which was the key to agreeing on:

- A stormwater management goal and a set of five related objectives
- A set of supporting policy statements to translate the goal and the objectives into action at three scales: the watershed, the neighbourhood and the site

The over-arching philosophy of the policy framework is that stormwater management and land use planning must be fully integrated to ensure complete solutions to stormwater-related problems.

This over-arching philosophy was endorsed through a series of working sessions with stakeholder focus groups, including:

- The Development Process Advisory Committee (representing the development community)
- The Agricultural Commission (representing the agricultural community)
- A Public Forum (representing the broader community)

Chilliwack's resulting stormwater management goals, objectives and policies are presented on the following pages. The detailed wording was refined through an iterative and interactive process with City staff and agency representatives.

Customizing Policies for the Local Situation

The goals, objectives and policies established through the Chilliwack process provide an example of what an appropriate policy framework could look like. However, each local government should adopt policies that reflect their individual situation, and that also reflect a long-term vision that is shared by all stakeholders (as discussed in Chapter 10).

Stormwater Management Goal (for all watersheds in Chilliwack)

Implement integrated stormwater management that maintains or restores the Water Balance and water quality characteristics of a healthy watershed, manages flooding and geotechnical risks to protect life and property, and improves fish habitat values over time.

Stormwater Management Objectives

- 1. To manage development to maintain stormwater characteristics that emulate the pre-development natural watershed.*
- 2. To predict the cumulative stormwater impacts of development and to integrate this information with other economic, land use and sustainability objectives and policies when considering land use change.*
- 3. To regulate watershed-specific performance targets for rainfall capture, runoff control, and flood risk management during development, and to refine these targets over time through an adaptive management program.*
- 4. To identify, by example and pilot studies, means of meeting the performance targets by application of best management practices, and to remove barriers to use of these practices.*
- 5. To support innovation that leads to affordable, practical stormwater solutions and to increased awareness and application of these solutions.*

These goals and objectives reflect the need for flexibility to account for variability in local conditions, and emphasize the importance of demonstration projects to prove the effectiveness of new approaches.

Each of these stormwater management objectives is supported by a set of policies. These are presented on the following pages.

Stormwater Management Objective #1

To manage development to maintain stormwater characteristics that emulate the pre-development natural watershed.

Supporting Discussion

Streams that are stable in their natural condition tend to become unstable after unmitigated urban development in the watershed, and become subject to instream erosion and sedimentation which impacts both flood risk and fish habitat.

These risks are often most pronounced in small catchments, which tend to be first order streams. This is because land use change may cause a high percentage change in impervious area in proportion to the size of a small catchment. This change results in a large change to flows in the stream, creating an unstable condition.

To avoid these impacts, it is necessary to mimic the characteristics of the pre-development hydrograph, including total flow volume, peak flows and hydrograph shape. Reaching this objective requires an integrated stormwater strategy that includes rainfall capture to reduce stormwater volume.

Changes in stream flow due to urbanization have greater impacts than changes in water quality, however, many of the best management practices (BMPs) that will provide rainfall capture and detention will also contribute to maintaining water quality.

Supporting Policies

1. Integrated stormwater management planning (ISMP) processes shall be undertaken to develop integrated master drainage plans (MDPs), first for the Chilliwack Creek Watershed, followed by the Hope River Watershed, and then the Sumas/Collinson Watershed.
2. Each master drainage plan shall develop a practical and affordable action plan for minimizing runoff volume, reducing both the rates and duration of peak flows, and sustaining baseflows.
3. Each action plan will integrate a practical and affordable strategy for protecting and/or improving water quality, and minimizing non-point sources of sediment and pollutant loading.
4. Within each watershed planning process, priority effort shall be focused in at-risk catchments, defined based on the risks of land use change in relation to the fisheries values and potential for flooding within the catchments.
5. For designated at-risk catchments, the City shall set stormwater performance targets and site design criteria based on site-specific rainfall and soils data.
6. Each master drainage plan shall include an adaptive management program to test and refine the stormwater performance targets and site design criteria over time, based on more detailed data collection, modeling, monitoring and analysis.

Stormwater Management Objective #2

To predict the cumulative stormwater impacts of development and to integrate this information with other economic, land use and sustainability objectives and policies when considering land use change.

Supporting Discussion

The stormwater impacts of land use change are incremental and cumulative. Land use decisions must be made with full awareness of both the incremental impacts of individual development projects and the cumulative impacts of building out existing zoning.

The guiding principles for integrated stormwater management should influence the details of land use and site planning.

Stormwater is one of many factors to be considered in land use decisions, but stormwater objectives will often be compatible with other development objectives.

Supporting Policies

1. When considering changes to its OCP or zoning bylaws, the City shall assess the cumulative impact of proposed development on stormwater flows and fish habitat and the potential for mitigation of these impacts through establishment of performance targets and application of best management practices.
2. The City will consider use of density bonus provisions to encourage more green space for developments in designated at-risk catchments.
3. For areas where the City has not yet established stormwater performance targets, applications for significant changes to OCP land use designations or zoning shall be required to include a stormwater management strategy with:
 - (a) a statement of cumulative impacts of stormwater on the receiving watershed and sub-catchment
 - (b) application of science-based performance targets for rainfall capture, runoff control and flood risk management

Stormwater Management Objective #3

To regulate catchment-specific performance targets for rainfall capture, runoff control, flood risk management, and water quality protection during development, and to refine these targets over time through an adaptive management program.

Supporting Discussion

Chapter 5 provides background information on the need for, role and basis for performance targets, and shows how to:

- (a) set preliminary performance targets for rainfall capture, runoff control, flood risk management
- (b) set up an adaptive management program for improving these preliminary targets over time.

Performance targets should be customized to each drainage catchment because the conditions, constraints, problems and opportunities will vary from one catchment to another (e.g. different rainfall characteristics, pattern of streams and lakes, drainage infrastructure, soil characteristics and development patterns). Appropriate strategies for meeting rainfall capture and runoff control targets will depend on local conditions, as illustrated by the following examples:

Example 1: Where there are few constraints to infiltration, and little space for community detention, both rainfall capture and runoff control may be handled by small-scale storage and infiltration systems on individual development parcels.

Example 2: Where infiltration opportunities are limited, more rainfall capture may be achieved by water re-use combined with some on-site infiltration. Runoff control would be then provided by community detention facilities, rather than on-parcel.

(Chapter 7 provides guidance for selecting stormwater source control practices are most appropriate for different land use types, soil conditions and rainfall characteristics).

Supporting Policies

1. Rainfall capture facilities that meet the rainfall capture performance targets must be provided for all new developments in designated catchments. Preference shall be given to water re-use and/or infiltration systems, backed up by small-scale storage facilities as required to support the re-use or infiltration rate of the site soils, where feasible.
2. Where site infiltration rates allow, runoff control performance targets may be met by increasing the storage capacity of rainfall capture facilities. In cases where on-site soils are not suitable, constructed wetlands (for drainage areas over 10 acres) or detention ponds (for smaller drainage areas) shall be provided to meet the runoff control performance targets.
3. In cases of new development, adequate conveyance routes for major storms shall be provided to meet the flood risk management performance targets.
4. For each designated catchment, as affordable, the hydrologic and water quality performance of representative rainfall capture and runoff control facilities shall be monitored, and the performance targets shall be adjusted for future development based on the monitoring results.
5. For each designated catchment, as affordable, early warning indicators shall be monitored to determine how well site level actions are maintaining or restoring a healthy catchment.

Stormwater Management Objective #4

To identify, through demonstration projects, means of meeting the performance targets by application of best management practices, and to remove barriers to use of these practices.

Supporting Discussion

The performance targets are intended to set minimum requirements, while allowing flexibility for applicants to be innovative and cost-effective in meeting the target.

The flexibility of this approach will be attractive for projects with sophisticated design teams.

However, during the learning curve associated with the performance standards, and for small projects, or those that do not normally involve a design team (e.g. a single family dwelling), there is a need for a set of examples that show how the performance targets can be met in a practical and affordable way.

Supporting Policies

1. The City will devise and maintain a manual of best management practices that illustrate how performance targets may be achieved.
2. Local demonstration projects will be encouraged on City land and private land to increase public and developer understanding of the best management practices, and to test their performance.
3. The City will review its existing bylaws to identify and remove clauses that would act as a barrier to the proposed best management practices. Refer to Part A for more detail.

Stormwater Management Objective #5

To support innovation that leads to affordable, practical stormwater solutions and to increased awareness and application of these solutions.

Supporting Discussion

New best management practices, and variations to existing practices, are constantly being developed. There is a need for a system that can adapt to this constant change.

There will also be a need for technical training of staff and the development community. This training will need to be updated and repeated to reflect new information and new participants.

Supporting Policies

1. Applicants shall be encouraged to propose alternative solutions to meet the performance targets, subject to the approval of City staff.
2. Educational events and training media shall be supported in co-operation with senior governments and other local governments.

4.5 Policy Transition in a Rural Regional District

Case Study Example: A Five-Year Stormwater Management Program

The Regional District of Nanaimo is entering a transition from having no role in stormwater management to playing a more active role, by creating a five-year Stormwater Action Plan.

This case study illustrates how a rural regional district is making the policy transition to such an active role.

Enhancing the Stormwater Component of an LWMP

The Regional District of Nanaimo (RDN) created a voluntary LWMP in 1997. The focus of the Plan was on wastewater treatment. The Plan was approved by the (then) Minister of Environment, Lands and Parks.

With the written encouragement of the Minister, the RDN proceeded to upgrade the stormwater management components of its Phase 3 LWMP in 2001.

To accomplish this task, the RDN partnered with the (current) Ministry of Water, Land and Air Protection and the Georgia Basin Ecosystem Initiative to develop a five-year Stormwater Action Plan.

The Need for Stormwater Management in Rural Regional Districts

To date the emphasis of stormwater planning in the RDN has been within the member municipalities of Nanaimo, Parksville and Qualicum Beach. While most of the RDN is resource land in forestry uses, there are extensive areas at lower elevations in the electoral areas that are developed. This development has created changes in stormwater flows and water quality, when compared to natural forested watersheds. Common changes resulting in altered flows and water quality are listed in Table 4-1.

Many of the land use changes identified in Table 4-1 do not create significant stormwater problems if the amount of change is small. However, the impacts are cumulative; as more land use change and densification occurs, stormwater impacts become more significant if they are not mitigated.

Table 4-1: Land Use Changes with Potential to Affect Stormwater Quantity and Quality	Agriculture and Acreage	Single and Multi Family Residential	Industrial, Commercial and Institutional
Removal of forest cover	X	X	X
Installation of open ditches or underdrainage	X	X	X
Removal of seasonal or permanent wetlands	X	X	X
Soil erosion during construction	X	X	X
Soil erosion from fields (if winter cover crops are not used)	X		
Introduction of chemical nutrients and pesticides	X	X	X
Application of manure	X		
Removal or compaction of absorbent soils in landscape areas		X	X
Paving of roads, streets, driveways, parking and yard areas and patios	X	X	X
Roof area drainage	X	X	X
Introduction of chemical pollutants, either as non-point-source runoff, or as point source pollution such as spills, accidents, and outflows	X	X	X

Stormwater Role for RDN

The RDN had a variety of reasons for deciding to take on a more active stormwater planning role, including:

1. Stormwater impacts will increase unless mitigated.

As land development in the electoral areas increases, stormwater impacts and related risks of flooding, property damage and degradation of aquatic ecosystems will increase.

2. Fish, shellfish and clean water are a part of the RDN's heritage and economic resources.

The RDN is bestowed with many productive salmon bearing streams and shellfish beaches. The lifestyle of its residents and the reputation of the region are enriched by these resources. Managing stormwater is a part of maintaining quality of life and attractiveness as a place for tourists and new residents.

3. Stormwater planning in electoral areas is not being done.

In many cases, stormwater planning can not be done efficiently for individual developments, since both the stormwater impacts and solutions involve large areas outside an individual site. Stormwater planning by the RDN can provide economy of scale. In addition, there is no other agency that provides watershed-scale stormwater planning in electoral areas. The stormwater activities of the provincial Ministry of Transportation and Highways are limited to drainage associated with roadways.

4. Many stormwater impacts can be avoided.

With proper stormwater planning and land development practices, mitigation of many stormwater impacts can be achieved. Since the RDN manages land use (other than agriculture and forestry), it has better tools than other agencies to address stormwater planning associated with land use development.

5. Stormwater planning now can avoid future public expense.

Unmanaged stormwater often leads, eventually, to major public expense in infrastructure to solve flooding or erosion problems, sometimes driven by litigation. Planning ahead can find less expensive solutions, minimize public expense by solving stormwater problems at the source – the development - and provide for financial mechanisms to fund stormwater infrastructure where it is necessary.

6. Stormwater flows across jurisdictions and land uses.

There are several cases in BC where successful litigation has been brought by farmers with flooded fields due to unmitigated upstream urban development. And there are cases like Walkerton, Ontario, where farm drainage has had a drastic impact on drinking water supply and human health. As municipalities in the Regional District of Nanaimo undertake stormwater management and drinking water projects, there is both an opportunity and a need for the RDN to plan co-operatively, especially where watersheds cross jurisdictional boundaries.

The promise of stormwater planning is that mitigation of many stormwater impacts can be achieved by management of the way that land is developed.

Focusing Rural Stormwater Planning Efforts

The proposed RDN Stormwater Action Plan will focus on stormwater education and co-ordination throughout the region, and stormwater planning in electoral areas. Emphasis will be on managing urban development to mitigate stormwater quantity problems, and on managing related non-point source pollution.

The need for stormwater management will vary within different areas of the RDN. For example, areas of the region that are not yet developed will not have urban stormwater concerns, and timber harvesting areas of the region are administered by the Province.

Two Levels of Effort

The RDN stormwater management program will have two levels of effort:

❑ **Integrated Stormwater Management for At-Risk Catchments:**

The focus of stormwater management in the RDN will tend to be rapidly developing areas. A pilot study has identified at-risk drainage catchments (catchments where conditions combine existing and/or pending urban development with high risks of either drainage problems and/or environmental impacts). These at-risk catchments will be an opportunity for the RDN to test integrated stormwater management approaches.

Integrated stormwater management means planning that recognizes the relationships between land use planning, stormwater quantity and quality, and environmental factors, creating a plan that balances all three for optimum results.

It is possible that stormwater solutions in at-risk drainage catchments will require investment in public stormwater facilities.

❑ **Basic Stormwater Management for Other Developments and Agricultural Areas:**

Outside of the at-risk catchments that require intensive planning, the RDN will take a proactive approach to basic stormwater management throughout its jurisdiction to avoid future public costs due to cumulative impacts of development. Basic stormwater BMPs and performance targets will be applied in all land uses and densities.

For example:

- ❑ Poorly designed developments may create unnecessary increases in runoff, resulting in flooding and downstream impacts and creating new at-risk drainage catchments over time with resulting taxpayer expense.
- ❑ Water quality issues, like lack of erosion control during the construction period, are issues throughout the RDN.
- ❑ Agricultural areas of the RDN may also have a need for basic stormwater management. Although agricultural areas are generally administered by the Province, there are potential stormwater impacts from agricultural drainage on downstream urban or fishery areas. Unmitigated urban development can also have dramatic flooding impacts on downstream agriculture.

The basic stormwater management program will create public education programs, as well as broadly applicable regulations that will influence the way that private land is developed, with the intent to minimize the need for public investment in stormwater facilities.

Management Arrangements

Management arrangements in the RDN's stormwater management program include:

- ❑ Management of potential pollutants near drinking water sources should be the subject of a separate program.
- ❑ Regulation of forestry and agricultural practices is under the jurisdiction of the Province of British Columbia. The RDN will be cognizant of resource and stormwater planning by related Provincial agencies.
- ❑ The RDN will co-operate with its member municipalities to offer economy of scale in provision of stormwater information, and will support joint planning when stormwater issues cross electoral area or municipal boundaries.
- ❑ Drainage catchments that may already be impacted as the result of existing development may be the subject of stewardship and restoration efforts, often in co-operation with non-government organizations.

An Action Plan for the Transition to Stormwater Management

The RDN has opted for a gradual entry into an active stormwater management role. It will take several years to increase public awareness of stormwater issues and solutions and to determine an appropriate role and funding mechanism for stormwater management on lands within its jurisdiction.

While being methodical about entering stormwater management, it is also important that the RDN put stormwater management tools in place as soon as possible, so that further land development without stormwater mitigation does not occur at a large scale.

A five-year Stormwater Action Plan is proposed to allow the RDN to carefully plan its role in stormwater management. Table 4-2 provides an outline of the Plan.

Each Year will have a Focus

Implementing the Action Plan will be subject to approval of general stormwater program funding. Once started, each year in the Stormwater Action Plan has a focus:

Year One Focus: Getting Started

Year Two Focus: Revise Infrastructure Standards

Year Three Focus: Develop Training and Public Awareness Programs

Year Four Focus: Implement Actions

Year Five Focus: Review and Adjust Action Plan

The Action Plan allows for effective public consultation, outreach and training for the development community, demonstration projects, incentives, and co-operation with other levels of government and the private sector.

Regulatory Change

Careful consideration will be given to regulatory change – first, to remove barriers in existing regulations to better stormwater management, and second, to consider to what extent existing regulations should be refined (e.g. zoning and subdivision bylaws).

It is also envisioned that stormwater issues and policies would be considered as each Official Community Plan undergoes a regular review.

Transfer of Approval Powers from the Ministry of Transportation and Highways

The potential transfer of subdivision approval powers from the provincial Ministry of Transportation and Highways to rural regional districts may also provide a trigger for implementing stormwater management in the RDN. In the meantime, the Ministry is open to encouraging better stormwater performance in development applications, provided that the approach does not increase the costs to the Province of BC.

Updating of Action Plan

Adopting the Action Plan does not commit the Region to ongoing funding mechanisms. These will be considered as a part of the Action Plan process, with the intent that the RDN designs a practical and affordable system to address stormwater issues.

At the end of the five-year Action Plan, the RDN will have developed a clear understanding of appropriate stormwater management approaches that are customized to the local environment and acceptable to the development community.

It is envisioned that in the fifth year of the Action Plan, a new plan will be created for the following five year period or longer, based on the needs, opportunities and priorities that are apparent at the time. The Stormwater Action Plan is intended to be updated every five years as the program moves ahead.

Table 4-2: Regional District of Nanaimo Stormwater Action Plan

Priority	Projects	Lead Role	RDN Budget	Potential Additional Funding
1	YEAR ONE FOCUS: GETTING STARTED			
	Adopt the Stormwater Action Plan			
	Create introductory information and public outreach materials			
	Identify priorities and budget for RDN stormwater management planning in at-risk drainage basins, in consultation with member municipalities			
	Design and adopt stormwater funding and administrative mechanisms (e.g. region-wide service area for research, coordination, planning and public awareness; specific local service areas for capital and operating projects as required)			
2	YEAR TWO FOCUS: REVISE INFRASTRUCTURE STANDARDS			
	Participate with others (e.g. member municipalities) to create technical information materials on low impact stormwater standards and BMPs – print / web / video			
	Review existing bylaws and remove barriers to low impact standards and BMPs for better stormwater management			
3	YEAR THREE FOCUS: DEVELOP TRAINING AND PUBLIC AWARENESS PROGRAMS			
	In partnership with member municipalities, train staff, developers, builders, NGOs and the public on low impact stormwater standards and BMPs			
	Consider need for, and design draft stormwater clauses including performance targets and example details as potential amendments to RDN bylaws in co-operation with appropriate provincial and federal agencies			
	Consider stormwater impacts as a factor in regular Official Community Plan or zoning reviews and amendments			
4	YEAR FOUR FOCUS: IMPLEMENT ACTIONS			
	If applicable, amend bylaws to include new stormwater clauses			
	In co-operation with member municipalities, senior governments and the private sector, complete demonstration BMP installation projects			
	For an at-risk watershed, complete an Integrated Stormwater Management Plan as a pilot project towards the creation of a stormwater local service area			
5	YEAR FIVE FOCUS: REVIEW & ADJUST ACTION PLAN			
	If appropriate, proceed to implement stormwater local service area			
	Create an awards program that recognizes excellence in stormwater management			
	Review the status and success of the Action Plan			
	Prepare an updated five-year Action Plan			

Administering the RDN Stormwater Management Program

The RDN is considering the funding of stormwater management at three levels:

Level One - Stormwater Public Facility Construction and Maintenance

for at-risk catchments could be funded by a local service area approach. This would fund the capital and operating costs of public facilities related to the benefiting taxpayers. A local service area is established by a bylaw that describes the service, identifies the boundaries of the service area along with the municipalities and electoral areas that include participating areas, and sets out the costs and means of cost recovery for the service. If the local service area requires borrowing, the bylaw must receive the approval of affected voters.

Level Two - Basic Stormwater Planning and Public Awareness for the entire RDN would be funded through a region-wide service area or a stormwater utility. A relatively low investment per taxpayer could provide funding for the shared aspects of basic stormwater management. Shared aspects could include dissemination of public information, monitoring of risks, stormwater research and planning and regulation.

The basic stormwater management funding program may include identification of integrated stormwater planning for at-risk drainage catchments. By having this planning funding provided by the region-wide service area, sufficient information will be available for voters to consider specific capital and maintenance works to be funded through specific local service area initiatives.

Subject to legal review, a region-wide service area for stormwater management may be established through either the LWMP process or by the assent of the electors by either vote or counter petition opportunity.

As an option, a stormwater utility could also fund stormwater planning, works and services by fees and charges established under S. 363 of the *Local Government Act*. The Board may base the fee or charge on any factor specified in the bylaw, including by establishing different rates or levels of fees in relation to different factors such as parcel imperviousness.

Level Three - Regulation of Land Development provides a third form of funding for stormwater management. It is standard practice that rezoning or subdivision applications above a certain minimum size are required to provide stormwater works and services, since mitigation of stormwater impacts is a legitimate cost of development. This source of funding works well for larger, new developments, especially in greenfield situations.

Stormwater improvements may be paid for directly by the developer, or may be funded by development cost charges which pool funds for public projects that are made necessary by the development. The requirements for this type of developer-funded stormwater planning and stormwater works should be included in regional district bylaws.

Requirements may be added to regional district bylaws and administered in tandem with the Provincial Approving Officer of the Ministry of Transportation and Highways, or could be applied directly by the regional district if the subdivision approving function were held at the regional district level. However, in cases where substantial development or development approvals already exist, and the new development is small-scale densification or infill, there will be a need for stormwater planning to be funded by the regional district.

Partnerships for the RDN Stormwater Management Program

There are several agencies that could partner with the Regional District of Nanaimo to support implementation of the basic stormwater planning program:

- ❑ Member municipalities, for economy of scale in producing public outreach and technical information materials
- ❑ The provincial Ministry of Community, Aboriginal and Women's Services, through planning grants for planning and bylaw changes
- ❑ The Canada-BC Infrastructure Program, for design and capital assistance
- ❑ The Georgia Basin Ecosystem Initiative, for ongoing support of pilot and implementation programs
- ❑ The Federation of Canadian Municipalities Green Municipal Enabling Fund and related funds