



Greater Vancouver Regional District

Liquid Waste Management Plan Stage 2

Policies and Commitments

March 2000 Amended

Amendment

1. Policy P28 amended as follows:

Property owners in "isolated" locations without road access, should investigate **conventional** land-based options ~~excluding innovative technologies~~ and demonstrate that such land-based options are non-viable solutions prior to any consideration of **effective innovative technology** or sewage effluent discharge into an adjacent water body.

GREATER VANCOUVER REGIONAL DISTRICT
LIQUID WASTE MANAGEMENT PLAN - STAGE 2
POLICIES AND COMMITMENTS

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INTRODUCTION

The GVRD and its member municipalities have been undertaking detailed engineering and scientific investigations with the objective of completing a Stage 2 Liquid Waste Management Plan (LWMP) submission to the Ministry of Environment, Lands, and Parks. This effort has been ongoing since completion of Stage 1 of the Plan in 1989.

This document, “***Liquid Waste Management Plan - Stage 2 Policies and Commitments,***” summarizes the preferred approach of the GVRD and its member municipalities to address the liquid waste issues identified and considered by this Plan.

First, the regional context of the Plan is presented. A summary of the issues is re-stated and the range of options that have been considered for identified confirmed problems are summarized in Appendix A. The key strategies associated with the Plan are identified. A synopsis of the preferred approach is included. Finally a listing of the key policies and commitments associated with the preferred approach is presented.

This Plan presents a preferred approach that is based on a commitment to comprehensive environmental monitoring and assessments. Under this approach, the need for upgrading programs is based on scientific evaluation that identifies water use and water quality objectives and measures performance against those objectives.

The District acknowledges the effort of the numerous individuals that have contributed to the work program that was necessary to formulate this Plan. In particular, the effort of those individuals that contributed to the work undertaken by the technical committees and task groups and the input of individuals through the advisory committees is sincerely appreciated.

The Liquid Waste Management Plan is one more important link that will contribute to the sustainability and livability of the region.

Acknowledgements

ACKNOWLEDGEMENTS

The District gratefully acknowledges the many individuals who were involved in the development, review, and approval of the Liquid Waste Management Plan - Stage 2.

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Liquid Waste Management Plan - Stage 2

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Liquid Waste Management Plan - Stage 2

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REGIONAL CONTEXT

Geographic Area

This Liquid Waste Management Plan is specific to the geographic area of the Greater Vancouver Regional District (GVRD) as shown in Figure 1. The municipalities and electoral areas that comprise the GVRD geographic area include:

City of Burnaby	Corporation of Delta
City of Coquitlam	District of Langley
City of Langley	District of Maple Ridge
City of New Westminster	District of North Vancouver
City of North Vancouver	District of Pitt Meadows
City of Port Coquitlam	District of West Vancouver
City of Port Moody	Village of Anmore
City of Richmond	Village of Belcarra
City of Surrey	Village of Lions Bay
City of Vancouver	Bowen Island Municipality
City of White Rock	Electoral Area A (portion of)

Bold indicates municipalities that are members of the Greater Vancouver Sewerage and Drainage District (GVS&DD).

Greater Vancouver Sewerage and Drainage District

The issues and liquid waste management strategies addressed in this Plan apply to the 17 municipalities and one electoral area that comprise the Greater Vancouver Sewerage and Drainage District (GVS&DD) - hereafter referred to as the District.

The District is responsible for the large regional trunk sewers and interceptors and the five large regional wastewater treatment plants. Municipalities are responsible for the local sewerage collection systems. The District plays a minor role in drainage issues and the municipalities are responsible for stormwater management.

The District is comprised of four separate and distinct sewerage areas as indicated in Figure 2. The sewerage area boundaries define the limit of the sewered service areas. Development outside of the sewerage area boundary is primarily serviced by on-site disposal systems.

The District member municipalities will manage their liquid waste in accordance with this Liquid Waste Management Plan.

Villages, Bowen Island Municipality, and Electoral Area A

The three villages (Belcarra, Anmore, and Lions Bay), Bowen Island Municipality, and portions of Electoral Area A outside of the sewerage areas, which are within the GVRD geographic area, have not participated formally in the development of this Liquid Waste Management Plan. They have addressed their local liquid waste management issues individually according to their specific issues and needs. As such, this Liquid Waste Management Plan is only applicable in these jurisdictions to the extent of defining policies associated with non-point source pollution issues specifically being addressed by the Plan, namely pleasure craft sewage and on-site disposal systems. It will also be of use to the villages, Bowen Island Municipality, and portions of Electoral Area A to provide policy guidance and a framework for cooperation in development of liquid waste management strategies – in particular, with respect to stormwater management.

The Livable Region Strategic Plan

The GVRD will have 2 million residents by the end of 1999. Provincial forecasts suggest a continuing strong population growth for the region and it is likely that close to 2.75 million people will live in the GVRD by 2021.

This growth will be managed in accordance with *The Livable Region Strategic Plan* which is the official regional growth strategy for the GVRD. “*The Livable Region Strategic Plan*” contains the following four strategies for sound management of regional growth:

- protect a Green Zone that includes watersheds, forests, and agricultural lands;
- build complete communities;
- achieve a compact metropolitan region by setting growth management targets; and
- increase transportation choices.

In general, the time frame for the Liquid Waste Management Plan and the projection of facilities required to accommodate growth is consistent with the population projections identified by “*The Livable Region Strategic Plan*” to 2021. The Liquid Waste Management Plan is a long-term plan that looks forward at least 20 years for sewerage facilities and longer for some options such as the separation of combined sewer systems. For issues that are evolving, such as non-point source pollution and stormwater management, for which options have not been completely explored or the scientific knowledge base is changing rapidly, a shorter 5-year time frame is considered appropriate. Financial projections have as a basis the 10-year time frame used for the GVRD’s long-range financial plan.

LIQUID WASTE MANAGEMENT PLAN ISSUES AND OPTIONS

The District and its member municipalities are preparing a Liquid Waste Management Plan in accordance with the provincial Waste Management Act. The Liquid Waste Management Plan process, as defined in the Act, allows municipalities and regional districts to tailor plans for managing liquid waste to each area's unique economic, social, and environmental conditions.

In addition to the above requirements, the other key legislation that must also be considered when addressing the liquid waste issues identified in the Plan include:

Federal Legislation:

- The Canada Shipping Act;
- The Fisheries Act;
- The Canadian Environmental Protection Act;
- The Canada Marine Act;
- The Migratory Birds Convention Act

Provincial Legislation:

- The Health Act;
- The Water Act;
- The Fish Protection Act;
- The Municipal Act; and
- The Greater Vancouver Sewerage and Drainage District Act.

In preparing, adopting, and implementing the LWMP, the District's objective is to make all reasonable efforts to comply with all applicable legislation.

This Liquid Waste Management Plan addresses the following issues:

- wastewater treatment plant upgrading;
- combined sewer overflow management;
- sanitary sewer overflow management;
- infiltration and inflow management;
- emergency spill management;
- source control;
- residuals management;
- stormwater management; and
- non-point source pollution management (specifically, pleasure craft sewage, agricultural runoff, and on-site disposal systems).

The District has explored numerous options to address these issues and has undertaken detailed scientific and engineering investigations that form the basis of this Plan.

Liquid Waste Management Plan Issues and Options

- Appendix A**
(separate cover) Provides an overview of the key options examined for confirmed problems that have been identified.
- Appendix B**
(separate cover) Lists the scientific and engineering studies supporting the Plan including abstracts for several of the key environmental assessment studies.
- Appendix C**
(separate cover) *Discharge rating measures for liquid waste management plan discharges* is an initial screening of discharges relative to water quality objectives.
- Appendix D**
(separate cover) Summarizes the technical work and options investigated by the technical committees for each of the sewerage areas.
- Appendix E**
(separate cover) Copy of the LWMP Discussion Document - “*Caring For Our Waterways*,” used for a series of LWMP workshops held in May and June of 1999.
- Appendix F**
(separate cover) Summarizes the public consultation work and the input from the Public Advisory Committee on development of the Plan.
- Appendix G**
(separate cover) Summarizes the stormwater management planning work undertaken by the Stormwater Task Group.

LIQUID WASTE MANAGEMENT STRATEGY

Overall Objectives

To protect the region's outstanding livability and environmental quality, the GVRD Board adopted in 1990, and readopted in 1993 and 1996, "***Creating Our Future***," an agenda for regional and local action. Its vision is:

"Greater Vancouver can become the first urban region in the world to combine in one place the things to which humanity aspires on a global basis: a place where human activities enhance rather than degrade the natural environment, where the quality of the built environment approaches that of the natural setting, where the diversity of origins and religions is a source of strength rather than strife, where people control the destiny of their community, and where the basics of food, clothing, shelter, security and useful activity are accessible to all."

"***Creating Our Future***" also contains the following basic principle that is the foundation for liquid waste management in the region:

"The region will manage waste in a manner that enhances environmental quality."

Key Strategies

Within the overall objective, three key strategies form a framework for this Liquid Waste Management Plan - conserve resources, maintain infrastructure and stretch capacity, and focus effort to maximize environmental benefit per dollar spent.

Conserve Resources

Conservation of water resources involves three components:

Pollution Prevention

It is preferable to avoid the introduction of pollutants into water rather than to treat them after they are there. For example, the District's source control program identifies substances that may cause environmental or system damage and encourages the use of alternative substances or alternative means of disposal.

Water Conservation

Water conservation can provide savings for programs associated with water supply and wastewater treatment.

Liquid Waste Management Strategy

The Greater Vancouver Water District (GVWD) has undertaken water conservation measures such as lawn sprinkling restrictions.

The GVWD is in the process of developing a long-term water conservation strategy for the region, which will have the potential for reducing water consumption and dry-weather wastewater flow.

More positive benefit is likely associated with water supply programs. Benefits are not as significant for wastewater programs given the high volumes of flow associated with unwanted infiltration and inflow of rainwater and given the benefit provided by higher priority programs.

The District's water conservation program is focused on the reduction in demand for water and also explores augmenting potable water supply with non-potable water sources. The feasibility and cost-effectiveness of developing non-potable water sources to augment potable supplies will be explored. This includes the feasibility of wastewater treatment plant effluent reclamation and reuse. The key investigations that have been undertaken in the recent past or are currently in progress include:

1. Seasonal Water Rate Study, May 1998
2. Residential Water Metering Seasonal Pricing and An Enhanced Water Conservation Program: Cost and Feasibility Study, November 1999
3. An Enhanced Water Conservation Program: Cost and Feasibility Study, November 1999
4. Region-wide Residential Water Metering: Cost and Feasibility Study, November 1999
5. Wastewater Treatment Plant Effluent Reclamation and Reuse Study, In Progress (April 2000 completion target)

Stormwater as a Resource

Stormwater flows are essential to the health of the smaller fish-bearing streams remaining in the region, to the restoration of "lost" streams, to maintain or create open channel amenities that enhance livability, and to the recharge of groundwater. These flows should be managed so that stormwater is available with adequate quality and quantity to serve these purposes where appropriate and feasible.

The conservation of financial capacity requires careful planning of capital and operating expenditure strategies to provide the maximum benefit within the overall framework of the region's ability to pay.

Resource conservation also implies that by-products be recycled or reused. A primary by-product of liquid waste treatment is biosolids, which are now beneficially recycled

through application in land maintenance and restoration rather than disposed at sea or through incineration as in the past.

Maintain Infrastructure and Stretch Capacity

The present sewerage infrastructure within the region (District, municipal, and private) has a replacement value in the order of \$12 billion. It is a critical asset that must be maintained so that it can provide adequate service, minimize risk of spills and avoid expensive future expenditures resulting from deferred maintenance and repairs.

The sanitary sewer system currently experiences a fairly high level of wet-weather inflow and infiltration of rainwater because of system deterioration. This results in the overloading of existing trunk sewers and treatment plants with capacity being reached well in advance of what the need would be if their use were confined to sanitary sewage. Consistent and prudent investment in maintenance and rehabilitation can stretch system capacity, thereby delaying expensive capital expenditure, and reducing the frequency of emergency spills and overflows.

Capacity can also be stretched by demand management programs that encourage households, businesses and industries to conserve water and reduce wastewater flows and loads discharged to the sewer system, thus postponing the need for costly capital investments. Examples include industrial pre-treatment, best management practices, codes of practice and public education programs.

Focus Effort to Maximize Environmental Benefit Per Dollar Spent

Priority should be given to initiatives and projects that will provide the maximum cost-benefit for the human and natural environment. These must be considered within the affordability framework in relation to alternative investments in transportation, drinking water, solid waste and other fields that will produce environmental and human health benefits. Only after these aspects have been fully considered should attention shift to which entity of local government has the jurisdictional responsibility for implementing and paying for projects and programs.

Management and Implementation Strategy

The Liquid Waste Management Plan will provide the framework for an ongoing process of research, monitoring, assessment and forecasting, tactical and operational planning, and implementation that must continue to involve all levels of government working in partnership. It is intended to build upon the positive results of the Agreements signed to implement the Burrard Inlet Environmental Action Program (BIEAP) and the Fraser River Estuary Management Program (FREMP). Upon approval of the Plan by the Provincial Minister of Environment, Lands and Parks in accordance with the Waste Management Act, an agreement will be signed by representatives of the pertinent

Liquid Waste Management Strategy

federal and provincial agencies and of the District whereby the BIEAP/FREMP Management Committee will act as a senior level clearing house for much of the policy matters and assessment of the scientific work upon which the LWMP is based and it will become an important focal point for the management of the Plan. In particular, the inter-agency committee will provide a forum for the resolution, by mutual agreement, of any disputes that may arise among parties with respect to the LWMP.

Research, monitoring and planning activities that will be required on an ongoing basis to support Liquid Waste Management Plan implementation include the following:

- continuous monitoring and assessment of the receiving environment to measure the Plan's performance;
- intergovernmental agreement on the uses of specific waterbodies and establishment of appropriate physical, chemical and biological water quality objectives;
- establishment of effluent discharge criteria to measure attainment of water quality objectives at the edge of an initial dilution zone and to ensure impacts within this zone does not present public health or significant environmental problems;
- fate and effect studies to measure the impact of a particular discharge on the ecosystem in relation to water quality objectives;
- assessment of the pace of Plan implementation, through biennial reporting, in relation to established objectives and the overall affordability context; and
- focused, ongoing dialogue with the public and stakeholders on environmental stewardship, on the attainment of the Plan's objectives, and the issues related thereto.
- a review of the performance of the plan 5 years after adoption, and on a five-year basis thereafter, to determine if the Policies and Commitments need to be updated or revised. This work will be conducted in consultation with the Ministry of Environment, Lands and Parks, Environment Canada, and the public.

Taken together, these actions will ensure that liquid waste management is a continuous process capable of measuring progress towards clear goals by developing and using the best available information on the environmental, financial and political context in which the Plan must operate.

LIQUID WASTE MANAGEMENT – PREFERRED APPROACH

The District and its member municipalities have, as part of the Liquid Waste Management Plan - Stage 2 planning process, undertaken numerous scientific investigations and monitoring programs to determine the fate and effect of wastewater and stormwater discharges on the receiving waterways.

The importance of investment in the maintenance of sewerage infrastructure has been identified as a key strategy that is required to avoid degradation of the collection systems and the deferral to future generations of expensive sewer rehabilitation work. Collection system maintenance is also based on the principle of replacement of combined systems with separate sanitary and storm sewers that will eventually lead to the elimination of combined sewer overflows in the District. The replacement of combined sewers with separate sewers will not only eliminate CSO's, but will also reduce wet weather flows to the treatment plants.

Based on the evidence gained from these investigations, the preferred approach to liquid waste management by the District and its member municipalities is based on:

- the development of collection system maintenance programs that ensure the long term sustainability of the collection system without deferral of maintenance and rehabilitation to future generations;
- the development and acceptance of designated water uses and water quality objectives for the waterways throughout the GVRD;
- a comprehensive monitoring, assessment, and forecasting program to determine the impact of discharges on the waterways; and
- upgrading plans and action based on the assessment of cost and environmental benefit in full consideration of a regional affordability context.

The following outlines this approach relative to the issues being considered by this Plan.

Wastewater Treatment Plant Upgrading

Five regional wastewater treatment plants currently provide treatment for the majority of wastewater collected from within the boundaries of the four sewerage areas. The effluent from the plants is discharged to large receiving waterways where the effect of discharges will have the least impact.

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The District, through its ongoing environmental monitoring and assessment work, has not found evidence that the treatment plant discharges are having a negative effect on fish and other aquatic life in the receiving waterways. Current levels of treatment provide adequate protection of the designated water uses identified by the Ministry of Environment, Lands and Parks. With the exception of copper contributions from the Lions Gate Treatment Plant to Burrard Inlet, the treatment plant discharges are not affecting far-field water quality objectives in the waterways. A source control approach to reduce levels of copper is proposed.

A comprehensive program of environmental monitoring and investigation is proposed to continue to monitor the waterways and impacts of plant discharges. Through this program, the need for plant upgrading will be established based on forecasts, risk assessments, and environmental benefits that will be achieved. A formal process based on accepted designated water uses and water quality objectives will establish the need for plant upgrading.

Within the urban core area defined by the sewerage area boundaries, treatment plants will be expanded to accommodate growth. The sizing of plant process components will be based on projected flows and loads and plant performance will be measured against design capacity. Diversions between treatment plants, or the proposed siting of new plants, will be investigated if there are potential environmental or economic benefits.

Combined Sewer Overflow Management

There are 50 combined sewer outfall pipes discharging at 42 combined sewer overflow locations within the District that discharge overflows from the combined sewer systems in Vancouver, Burnaby, and New Westminster.

Through operational improvements, source control initiatives to reduce stormwater flows, and sewer separation programs, the volumes of combined sewer overflows have been, and will continue to be, reduced. Environmental monitoring and investigation has been undertaken in the vicinity of the larger outfalls for each of the waterways that receive combined sewer overflows. This work has determined that only at the Clark Drive outfall into Burrard Inlet are there measurable near-field impacts.

Sewer separation programs, through the replacement of aging infrastructure, or upgrades when sewer capacity is not adequate, are proposed to gradually reduce and eventually eliminate these older combined sewer systems with the long-term result that there will be no combined sewer overflows within the GVRD geographic area. Operational improvements will continue to be made as the separated sewer systems evolve to minimize the discharge of sanitary sewage.

Sanitary Sewer Overflow, Infiltration and Inflow, and Emergency Spill Management

In the separated sewer systems, wet weather can result in overloaded sewers and sanitary sewer overflows. This is due to large volumes of infiltration and inflow of rainwater to the sanitary sewer system through failing joints and cracks and is a symptom of aging sewer infrastructure.

The preferred approach is to address this issue at its source through sewer system evaluation surveys and repair and replacement programs that manage the entire sewer infrastructure, including District sewers, municipal sewers, and private service laterals.

The long-term objective is to eliminate sanitary sewer overflows caused by storms that have less than a five-year return period. The design allowance for infiltration and inflow will remain at the historical level of 11,200 litres per hectare per day and investments will be made to return aging systems to a rehabilitated condition that meets this design objective. District facilities will not be expanded to accommodate excessive wet weather flows. A targeted approach will concentrate the effort on the leakiest catchments first. For municipalities that have both combined and separate sewer systems, greater priority should be placed on combined sewer replacement than on sanitary sewer overflow reduction. The elimination of combined sewers provides the greater return on investment with respect to infiltration and inflow reduction and system capacity upgrade.

In areas where chronic sanitary sewer overflows are occurring, and where there are significant health and environmental concerns, interim storage facilities will be constructed to reduce sanitary sewer overflows.

Emergency spill locations will be established and contingency plans prepared that result in the least severe consequence when unavoidable sanitary sewer overflows occur. Unavoidable sanitary sewer overflows can occur due to extreme weather conditions, system failures, or unusual events.

Source Control

The District's Source Control Program has now been in place for approximately 10 years. The program will continue its administrative function of the District's source control by-law. New areas of focus will include:

- a review of the source control bylaw;

Liquid Waste Management - Preferred Approach

- the identification of loading reductions or demand management, at source, to stretch capacity of existing facilities;
 - pollution prevention efforts to reduce or eliminate any materials that bioaccumulate and are of concern in the receiving waterways;
 - reduction, and eventual elimination, of stormwater discharges to sanitary sewers; and
 - the development of codes of practice for commercial sectors.
-

Residuals Management

Since 1991, the District has had a residuals management strategy based on the principle of recycling and the beneficial use of wastewater treatment plant biosolids. This program will continue with new efforts placed on local recycling of biosolids. The District proposes to produce and freely distribute biosolids growing medium meeting standards set out in the draft provincial *Organic Matter Recycling Regulation - Draft 2.0*. This regulation would allow distribution with no limit on quantity and without the need to obtain permits or approvals from the Ministry of Environment, Lands and Parks.

Stormwater Management

The viability of streams, their recreational and aesthetic value, and their value as fish and wildlife habitat has identified the need to address stormwater management in this Plan. In many areas of the region, current approaches to stormwater management and land development do not adequately protect the environment of small streams.

The preferred approach is for each municipality to adopt an integrated planning approach to stormwater management whereby watershed, catchment, master drainage, and stormwater plans are integrated into relevant planning processes such as Official Community Plans, Neighbourhood Concept Plans, Recreation and Parks master plans, and Strategic Transportation plans. This process is intended to proactively address issues on a long-term basis, at a watershed scale, and in a manner that incorporates the input of senior government agencies and community values.

Non-point Source Pollution Management

Management of non-point source pollution requires the combined effort of all levels of government as well as numerous stakeholders.

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Pleasure craft sewage discharges will be regulated through the designation of no-discharge zones if there is environmental evidence that these discharges are contributing to the failure to meet water quality objectives. The District and its member municipalities will plan to increase the pump-out facilities in the GVRD available for use by pleasure craft.

On-site disposal systems will continue to be approved by the Ministry of Health with the benefit of future density projections based on watershed mapping and land use and the assessment of overall impact of on-site systems on the environment. Sewers will not be extended beyond the sewerage area boundaries without a full assessment of local servicing and alternate innovative treatment systems. No innovative treatment systems will be allowed unless assurance plans are in place to provide for proper maintenance and performance of these systems.

The Ministry of Agriculture, Fisheries, and Food will continue to work with the farming community on best management practices related to stormwater runoff from agricultural land. Municipalities will include agricultural stormwater runoff issues in their integrated stormwater planning work. The District will include monitoring and environmental assessment work for agricultural watersheds in its comprehensive monitoring program for the region's waterways.

POLICIES AND COMMITMENTS

Receiving Environment

Background

The District has conducted an extensive environmental assessment program to understand the effects of wastewater and stormwater discharges in receiving waters and guide the development of a Stage 2 plan. Program work has been overseen by the “Environmental Assessments Task Group”, comprised of representatives from municipalities, senior government agencies, universities, and the public. Studies included analyses of chemical contaminants in discharged effluents and stormwater as well as assessments of potential toxicity using laboratory tests. Studies conducted in the receiving environment surrounding major discharges determined the fate of discharges, measured contaminant levels in water and sediments, and assessed biological resources in the vicinity of the discharges. Over 70 detailed reports document the findings of the environmental assessment studies conducted.

The key environmental issues, numbered below, have been identified based on an analysis of each of the District’s and other assessment programs. The first three issues below address areas where *confirmed* impacts caused by wastewater or stormwater discharges have been measured or observed. The final three issues below address those areas where wastewater and/or stormwater discharges have *potentially* affected receiving water quality. Appendix “A” summarizes the options that have been investigated to address these confirmed problems.

1. **Clark Drive CSO**
Adverse effects on a community of sediment organisms have been observed in a relatively confined area near this discharge.
2. **Urban Stormwater Discharges to Small Streams**
Contributes to reduced ecological diversity within many stream systems. The most severe effects resulting from stormwater are often attributable to increased stream peak flow rates, associated habitat destruction, and spills.
3. **Sanitary Sewer Overflow Impacts**
Chronic sanitary sewer overflows from the District’s interceptors at two locations , the Cloverdale Trunk Sewer and the Maillardville Trunk sewer are causing local impacts with public health and environmental concerns.

4. **PAH Levels in Burrard Inlet Sediments**
Provincial objectives associated with a group of organic contaminants (Polycyclic Aromatic Hydrocarbons) are often exceeded within Burrard Inlet sediments. The levels of these compounds in sediments have been linked to sub-lethal effects in some Burrard Inlet fish. Stormwater and CSO discharges are significant sources (originating primarily from petroleum-based transportation activities) of this group of contaminants in the inlet.
5. **Copper Levels in Burrard Inlet**
Copper levels in sediments throughout many areas of Burrard Inlet exceed long-term provincial objectives. Also, some liquid waste discharges, including the Lions Gate wastewater treatment plant, intermittently exceed long-term copper objectives set for the water column. High copper levels in Burrard Inlet water and sediments have not been shown to cause adverse biological effects. The leaching of copper from household plumbing is a significant source of this contaminant in wastewater and the pH adjustment program, proposed to be completed by the Greater Vancouver Water District (GVWD), will significantly reduce copper levels.
6. **Bacteriological Quality of the Fraser River Estuary**
The quality of the Fraser River estuary might not meet new, more stringent Ministry of Environment, Lands and Parks (MELP) bacteriological water quality objectives to protect irrigation water uses. The risk associated with the use of Fraser River water for irrigation is currently unclear.

The importance of wastewater characterization and receiving environment monitoring has been recognized for its role in guiding long-term wastewater and stormwater management. Associated with the collection and analysis of this information is a need to ensure that appropriate water uses for each of the region's major waterbodies are designated and protected. The following policies and commitments address the role that environmental assessment information will play in future wastewater and stormwater planning.

Policies

- P1. **Designated Water Uses will be Protected**
The District and member municipalities will manage wastewater and stormwater to protect receiving water uses which have been designated by the Ministry of Environment, Lands and Parks (MELP).

Receiving Environment

- P2.** Upgraded Service Levels will be Determined Based on Environmental Need, Cost and Benefit, and Regional Priorities
Commitments included in this plan address infrastructure management needs and confirmed public health and environmental issues. Upgraded service levels will be provided in the future where an environmental need has been forecasted or demonstrated, with consideration to cost and benefit and regional priorities. The following process and “triggering” mechanisms (Figure 3) will be used to determine environmental need.

Environmental monitoring conducted by the District and member municipalities will determine if, and where, wastewater or stormwater discharges are contributing to exceedances of water quality objectives. The Environmental Monitoring Committee (see Commitment C2 – Establishment of an Environmental Monitoring Committee) will assess the monitoring results and, where warranted, “trigger” an environmental risk assessment of the particular discharge(s). The assessment may involve more comprehensive receiving environment and laboratory analysis, modelling, and forecasting, to determine the degree of environmental risk. Options for managing the defined risks will be developed by the District and member municipalities and assessed according to cost and environmental benefit criteria. The Environmental Monitoring Committee will be responsible for guiding the risk assessment process and determining the environmental benefits of options.

When risks, options, costs and benefits have been adequately assessed the District Board, with consideration of costs and benefits and regional priorities, will select the appropriate response and actions. In their consideration the Board will consult with the Ministry of Environment, Lands and Parks and Environment Canada.

Environmental monitoring will be conducted following implementation of any option to determine the need for additional risk mitigation measures.

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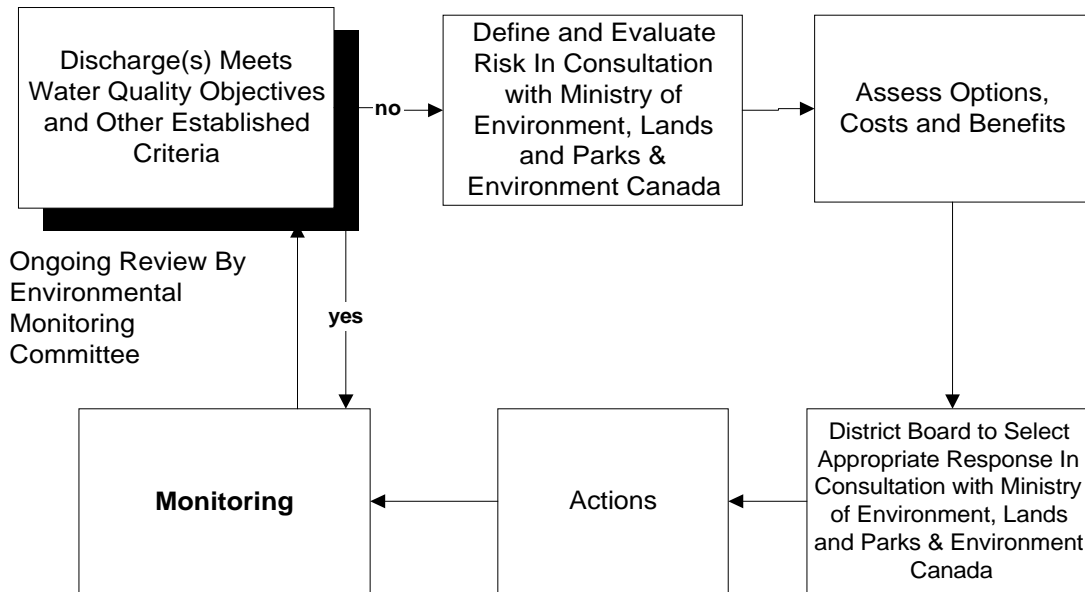


Figure 3 - Upgrading “trigger” mechanism

Commitments

C1. Official Designation for Water Uses

The District and municipalities will take an active role in providing information to the Ministry of Environment, Lands and Parks (MELP) so that appropriate water uses receive official designation from MELP through a consultative process for each of the major waterbodies within the region. A review of a designated water use may be initiated by the District or a member municipality. The consultative process will follow *Track 1 – Setting Guidelines from Principles* as documented in the Ministry of Environment, Lands and Parks *Guidelines and Standards Procedure*, dated October 7, 1997. The process as outlined in Track 1 requires the preparation of a draft report by the Ministry.

The following process will apply to local government participation during the preparation of the draft report to be prepared by the Ministry under the *Guidelines and Standards Procedure*:

1. The Ministry will advise the District and its member municipalities, in writing, when a water use or water quality objective initiative is commenced.
2. The Ministry will develop the scope of work for their draft report in consultation with the Environmental Monitoring Committee. The Ministry will review the draft report work progress with the

Receiving Environment

Environmental Monitoring Committee on a regular basis. The Environmental Monitoring Committee will play an active role in the development of the report and cost implications to the District and member municipalities will be provided for inclusion in the report.

3. The cost and benefit of designated water uses, or proposed changes to designated water uses, and their associated water quality objectives will be fully documented in the draft report and the GVRD Board and municipal councils will have the opportunity to review and comment on the draft report.

C2. Establishment of an Environmental Monitoring Committee

The District will establish an Environmental Monitoring Committee comprised of members from the District, municipalities, B.C. Ministry of Environment, Lands, and Parks, Environment Canada, Fisheries and Oceans Canada, research institutions, and public (dependent on interest). The committee will be responsible for reviewing the scope and design of monitoring programs, review of monitoring results, predictive modelling, and risk assessments of waste discharges. The committee's recommendations with respect to upgraded service levels will be considered by the District and member municipalities during an options assessment process.

C3. Development Of Discharge Indicators

The District will continue to develop and refine indicators of environmental effects related to wastewater discharges and stormwater runoff within the region. These indicators will be used to guide the collection and interpretation of environmental information by the District and municipalities. The District report, "Discharge Rating Measures for LWMP Discharges", included in Appendix C, will form an initial basis for this work.

C4. Monitoring Programs

The District and member municipalities will undertake monitoring, assessment and forecasting to evaluate the effects of wastewater and stormwater discharges to receiving environments. Specific monitoring programs that will be undertaken include:

- Effluent quality monitoring at all treatment plants for selected physico-chemical and biological characteristics (e.g., BOD, TSS, ammonia, and trace metals as well as appropriate bioassays and fecal coliform). Detailed effluent characterization of trace organic contaminants will be conducted periodically at the recommendation of the Environmental Monitoring Committee.

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- Routine monitoring of bacteriological water quality of beach areas within Burrard Inlet, Sturgeon Banks, Roberts Bank, and Boundary Bay. Sampling sites and frequency will be modified to provide a better understanding of point and non-point contaminant sources.
- Ambient receiving environment monitoring in areas where water quality (as indicated by water quality objective criteria) is potentially affected by wastewater and/or stormwater. The Iona Island deep-sea outfall receiving environment program will be maintained. The need for, and details associated with, additional programs will be determined in consultation with the Environmental Monitoring Committee.
- Occurrence and duration monitoring of CSO events at all District owned outfalls. Detailed effluent characterization of trace contaminants at a limited number of outfalls will be conducted periodically at the recommendation of the Environmental Monitoring Committee.
- Monitoring and assessment of sensitive receiving environments following the discharge of SSOs.

C5. Risk Assessment for Fraser River Irrigation Water Use

The District will undertake an analysis of risks associated with the use of Fraser River water for agricultural irrigation within the GVRD area. Options for managing the defined risks will be developed and assessed.

C6. Harmonization with Federal Legislation

The District will work with Environment Canada to harmonize approaches regarding municipal discharges. If requested, the District will assist in the development of a national municipal effluent strategy which is being developed by Environment Canada.

C7. Data Sharing and Communication

The District will share environmental information and knowledge with member municipalities, other agencies, and the public in an open and timely fashion. Moreover, the District will proactively seek out venues, technologies, and media through which to efficiently communicate environmental information to the public.

Treatment Plants

Background

The District operates five treatment plants that serve the core urban area defined by the sewerage area boundaries. The effluent from these plants discharge to large receiving waterways that include the Fraser River, Georgia Strait, and English Bay/Burrard Inlet. The plants discharging to the Fraser River, (Annacis Island, Lulu Island, and Northwest Langley) have recently been upgraded to provide secondary treatment. The two plants discharging to the marine environment (Iona Island and Lions Gate) provide primary treatment.

Since construction of a deep sea outfall to discharge effluent from the Iona Island plant to Georgia Strait, the District has undertaken a comprehensive monitoring and environmental assessment program to determine the impacts of discharging primary treated effluent to the marine environment. This program has not found any evidence that discharges from the Iona Island plant are contributing to degradation of the sediments or the water column. No detrimental effects on marine organisms have been measured, and the infaunal and benthic community structures both appear to be normal.

Copper levels in the sediment that exceed provincial objectives have been identified throughout Burrard Inlet. The Lions Gate wastewater treatment plant effluent is one source that contributes copper to Burrard Inlet. The drinking water pH adjustment program, proposed to be completed by the Greater Vancouver Water District (GVWD), will significantly reduce copper levels in the wastewater effluent.

All plant effluent is routinely monitored for toxicity by the use of a standard laboratory test. A consistent pass of this test is precluded by the levels of ammonia in all treatment plant effluent, including secondary treatment effluent. The test is often used to establish proof of a “deleterious substance” as defined by federal legislation. The District, through its ongoing environmental monitoring and assessment work, has not found evidence that the treatment plant discharges are having a negative effect on fish and other aquatic life in the receiving waterways.

Detailed environmental monitoring has been undertaken in the receiving waterways to assess the impact of treatment plant discharges. As well, conceptual engineering investigations have been completed to determine a range of treatment options, should future environmental assessments identify the need for upgrading, for all plants that includes secondary treatment and advanced treatment at the Annacis Island and Lulu Island plants.

Policies

P3. Treatment Plant Operations and Maintenance

The District will operate and maintain the regional treatment plants to minimize risks to public health and the environment.

P4. Base Levels of Treatment at District Plants

The District will size plant process components on the basis of established historical flows and loads and projected future changes in accordance with good engineering practice and treatment plant design standards that are periodically approved by the District Board. Plant performance will be measured against authorised levels for flow, concentrations, and loads established in the operating certificates. Maximum daily (flow proportioned 24-hour composite sample) concentration levels are:

	BOD (mg/l)	TSS (mg/l)
Iona Island	130	100
Lions Gate	130	130
Annacis Island	45	45
Lulu Island	45	45
Northwest Langley	45	45

If these maximum daily concentration levels are exceeded on an operational basis then:

- the District will investigate the cause and an incident report to determine the significance and probable cause will be prepared.
- the District will evaluate the significance against its treatment plant design guideline to determine if plant expansion, upgrading, or additional source control initiatives are justified. The determination of environmental significance will be undertaken in consultation with the Environmental Monitoring Committee.

Treatment Plants

Annual effluent loads will not exceed the following maximum annual loading levels:

	BOD (t/year)	TSS (t/year)
Iona Island	72, 600	55, 850
Lions Gate	5, 770	5, 770
Annacis Island	no limit	no limit
Lulu Island	no limit	no limit
Northwest Langley	no limit	no limit

At the Annacis Island, Lulu Island, and Northwest Langley Wastewater Treatment Plants the District will provide secondary treatment for flows up to two times measured dry weather sanitary flow. Wet weather management plans to manage infiltration and inflow and stormwater will be developed for flows in excess of secondary treatment capacity.

At the Lions Gate Treatment Plant the District will provide primary treatment for flows up to two times measured dry weather sanitary flow. Wet weather management plans to manage infiltration and inflow and stormwater will be developed for flows in excess of primary treatment capacity.

For the Iona Island Treatment Plant the District will provide primary treatment for flows up to a maximum of 17 cubic metres per second. This plant capacity will be reviewed every 5 years based on flow determinations arising out of progress in the combined sewer separation programs.

P5. Upgrading from Base Levels of Treatment

The District will upgrade the level of treatment, or initiate source control measures, if the base level of treatment is not adequate to protect the aquatic environment as defined by Policy P2 and determined by the receiving water environmental objectives and performance measures.

Commitments

C8. Upgrading of Iona Island and Lions Gate Treatment Plants

The District will upgrade the Iona Island and Lions Gate treatment plants by adding facilities for chemical addition (enhanced primary treatment) if necessary to maintain the

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established base level of treatment as defined by Policy P4. The District will construct facilities for biological treatment in the following circumstances:

- if necessary to address environmental concerns in accordance with Policy P2.
- to maintain effluent concentration and loading levels which are beyond the capability of enhanced primary treatment.

C9. Treatment Plant Upgrading Projections

The District will monitor plant influent and effluent to determine plant performance and trends and maintain a minimum 10-year future projection to determine the adequacy of plant process components and to establish process component design capacities for operating certificates.

C10 Secondary Effluent Disinfection

The District will complete, by 2001, the engineering investigations examining the potential for effluent disinfection using ultraviolet light as an alternative to the use of chlorine at its Northwest Langley, Annacis Island, and Lulu Island wastewater treatment plants.

C11 Treatment Plant Effluent Toxicity Assessment

For treatment plant effluent the District will undertake toxicity assessments to determine the probable cause of effluent toxicity and its significance relative to the receiving environment as described by Policy P2.

The District will conduct monthly 96-hour acute bioassays on full strength effluent at each of the five wastewater treatment plants and review the results with the Environmental Monitoring Committee.

The District will examine the results of the bioassay tests at Lions Gate and Iona Island treatment plants to determine the cause of effluent toxicity by March 31, 2001. Within the limitations of the existing liquid waste management treatment process and infrastructure, the District will evaluate options for improving the results of the bioassay tests. The selection of any option by the District will be made in consultation with the Environmental Monitoring Committee.

Combined Sewer Systems

Background

Prior to the 1950's, combined sewers were constructed in the older parts of the region including large portions of Vancouver, New Westminster and parts of Burnaby. Combined sewers currently comprise approximately 15 percent of the sewered service area in the GVRD. There are 50 combined sewer overflow pipes discharging at 42 locations within the GVRD. Combined sewer discharges are intermittent and only occur as a result of rainfall events. The District has continuously monitored overflow occurrences from six of its largest outfalls since 1996.

Commencing in the early 1970's, the City of Vancouver has been replacing the aging combined sewer infrastructure with separate sanitary and storm sewers. Significant operational improvements were also implemented in the Vancouver Sewerage Area (VSA) in 1996, resulting in a reduction of CSO discharge volume by 30 percent in an average year. In particular, Clark Drive CSO volumes were reduced by about 40 percent. Further volume reductions and eventual elimination of CSO's will occur as the sewer separation program proceeds. Several options for more immediate CSO reductions at Clark Drive and other VSA outfalls have also been identified and these will be investigated further.

In Burnaby, aging combined sewers are being replaced with separated sewers. Comprehensive sewer separation studies have also been initiated to develop overall strategies and policy on combined sewer elimination in the city.

The City of New Westminster is committed to Combined Sewer Overflow (CSO) reduction and long-term elimination by means of sewer separation as well as by other means (e.g. detention, source controls, etc.) Operational improvements to reduce total volumes of sanitary sewage discharged through combined sewer outfalls or sanitary sewer emergency outfalls have been conceptually investigated in the Fraser Sewerage Area (FSA) but need to move to the preliminary design and implementation phase. Since the FSA is served primarily by separated sewer systems, with only about 4 percent of the sewered area served by combined sewers, the interaction between the combined and separate systems must be fully considered when implementing operational improvements.

At a representative sample of outfalls, the District has undertaken detailed fate and effect environmental assessment studies to determine the impact of combined sewer overflows on the receiving environment. These studies have confirmed that, with the exception of the largest outfall at the foot of Clark Drive in Vancouver, there are no confirmed near-field environmental impacts in the vicinity of the outfalls.

Policies

P6. Combined Sewer Overflows

No new combined sewers will be constructed in the GVRD geographic area. Existing combined sewers will be replaced by separate sanitary and storm sewers through infrastructure replacement and sewer capacity upgrading programs. Private combined sewer service connections will be replaced with separate sanitary and storm sewer connections when a property is redeveloped or when substantive building or site renovations are undertaken.

The policy of the District is to eliminate all combined sewer overflows from its facilities. Priority will be given to reducing or eliminating those combined sewer overflows identified by the Environmental Monitoring Committee as having significant environmental impact.

P7. Combined Sewer Overflow Monitoring

Combined sewer overflow volumes will be monitored and trended at all outfalls under the District's jurisdiction to measure the effect and progress of combined sewer replacement programs. Environmental monitoring and assessment will determine risks and the need for any additional interim measures at combined sewer outfalls.

District Commitment

C12. CSO Monitoring

The District will install monitors, by 2001, at all 15 CSO outfall sites under its jurisdiction to determine depth and duration of combined sewer overflows and an estimate of volume.

C13. Operational Improvement Investigations

Between 2001 and 2004, the District will complete feasibility studies and detailed cost-benefit analysis for the following projects that offer potential operational benefits, overflow frequency or loading reductions, or receiving environment improvements:

- Glenbrook Trunk Sewer separation;
- New Westminster Interceptor West Branch sewer separation;

Combined Sewer Systems

- Clark Drive outfall containment facility;
- Vernon Relief Drain CSO storage;
- English Bay Outfall and Alma-Discovery Outfall storage and disconnection of storm inflow to Alma-Discovery outfall;
- Cambie Pump station and outfall improvements;
- 1st and Boundary pump station realignment;
- Redirection of Columbia Pump Station discharges to downstream of Yukon Gate;
- Jervis and Chilco Pump Stations forcemain and control improvements;
- Operational Improvements – Fraser River North Arm;
- Operational Improvements – New Westminster Area;
- Operational Improvements – Westridge Area; and
- Source control initiatives targeting mercury and silver reductions.

Based on environmental data, which indicates that there are measurable near-field impacts at the Clark Drive outfall into Burrard Inlet, the District will undertake further environmental assessments at Clark Drive between 2000 and 2005. This work will be conducted under the supervision of the Environmental Monitoring Committee (see Commitment C2). The municipalities of Vancouver and Burnaby and the District will also undertake a review of combined sewer separation and system upgrade schedules necessary to fast-track the elimination of Clark Drive CSOs earlier than 2050.

In addition to the ongoing monitoring program at the Glenbrook Outfall, the District and the City of New Westminster will undertake assessment of all other CSOs on the New Westminster waterfront for quality and environmental impact on a 5-year frequency, commencing in 2000, and thereafter as part of the 5-year plan review process, in order to evaluate program progress and effectiveness and determine the need for further action by New Westminster in accordance with Policy P2.

- C14. Biennial Liquid Waste Management Plan Progress Report**
The District will summarize the CSO monitoring results, CSO environmental monitoring and assessment results, sewerage and drainage expenditures for CSO projects, and results of CSO operational improvement investigations and implementation in a Liquid Waste Management Plan biennial progress report. The biennial reporting period will end on December 31st of every second calendar year and the report will be due by the end of March (90 days to compile). The first reporting period will end in

the second whole year (not less than 24 months and not more than 36 months) following the year a LWMP is approved. An interim annual report will be submitted in March and will summarize the key achievements that occurred in the previous year.

Municipal Commitments

C15. Combined Sewer Overflow Elimination

The cities of Vancouver, Burnaby, and New Westminster will implement combined sewer separation programs that will replace aging combined sewers with separate sanitary and storm sewers and lead to the elimination of combined sewer overflows based on the following targets:

1. The City of Vancouver will continue with the present combined sewer system separation program at approximately 1 percent of the system per year to target elimination of combined sewer overflows in the Vancouver Sewerage Area by 2050.
2. The City of Burnaby will implement a combined sewer separation program that proceeds on an annual basis, at a uniform rate, and that targets elimination of combined sewer overflows in the Vancouver Sewerage Area by 2050 and in the Fraser Sewerage Area by 2075.

The City of New Westminster is committed to implementation of Combined Sewer Overflow (CSO) reduction measures which meet or exceed 1% per year, resulting in long-term CSO elimination by means of sewer separation as well as by other means (e.g. detention storage, source controls, etc.). The city will complete the installation of storm sewers within 22 percent of the combined sewer area by 2012. This effort will focus on the lower Columbia catchment. Opportunistic sewer separation will also occur in other areas where capacity is an issue with existing combined sewers. The entire sewer system will be video inspected by 2012 and infiltration and inflow reduction achieved through sewer rehabilitation. In addition, source control projects (such as removal of rainwater roof leaders from direct connection to the sewer system) will be implemented, and the effectiveness of these methods will be evaluated. Overall, this program will produce CSO reductions at a rate in excess of 1% per year.

Combined Sewer Systems

C16. Operational Improvement Investigations

Between 2001 and 2004, municipalities will complete feasibility studies and detailed cost-benefit analysis for the following projects that offer potential operational benefits, overflow frequency or loading reductions, or receiving environment improvements:

- Cambie Pump station and outfall improvements (Vancouver);
- 1st and Boundary pump station realignment (Vancouver and Burnaby); and
- Stormwater redirection to Grandview Cut (Vancouver).

C17. Best Management Practices

The Cities of Vancouver, Burnaby, and New Westminster will continue with best management practices such as catch basin cleaning that reduce loads to combined sewers at source and rain barrel, impervious area reduction, or on-site storage that reduces peak flows or volumes of stormwater runoff to sewers.

C18. Biennial Liquid Waste Management Plan Progress Report

Every two years municipalities with combined sewers will summarize and forward to the District for inclusion in a biennial Liquid Waste Management Plan progress report the following information:

- Sewer system mapping that indicates the overall extent of combined, sanitary, and storm sewers, the extent of combined sewers replaced by separate sewers in the past two years, the location of new storm outfalls, and the extent of private property combined service connections replaced by separate service connections.
- A summary of sewerage and drainage system expenditures for the past two years.

The biennial reporting period will end on December 31st of every second calendar year and the report will be due by the end of March (90 days to compile). The first reporting period will end in the second whole year (not less than 24 months and not more than 36 months) following the year a LWMP is approved. An interim annual report will be submitted in March and will summarize the key achievements that occurred in the previous year.

Separate Sanitary Sewer Systems

Background

The District keeps accurate records of sanitary sewer overflows that occur from the trunk sewers and interceptors under its jurisdiction. These overflows primarily happen during wet weather and are reported to the province when they occur. Wet weather sanitary sewer overflows are caused by excessive amounts of infiltration and inflow of rainwater to the sanitary sewer system. Infiltration and inflow occurs through defective joints and cracks and cross connections from the storm sewer system. This problem has been quantified by the District and its member municipalities through sewer system monitoring and modelling efforts. As well, the collective knowledge from many other jurisdictions throughout North America that are also addressing this issue has been researched and documented.

Sanitary sewer overflows and unwanted infiltration and inflow are symptoms of an aging sewer infrastructure. The design allowances for infiltration and inflow are now exceeded in many of the older catchments throughout the region. Attempting to solve the sanitary sewer overflow issue through the construction of expensive storage, interceptor expansion or treatment schemes requires high capital cost that is better spent on managing the cause of the problem. Sewer system management efforts need to be targeted at all components of the system – the regional interceptors (5% of the system), the municipal sewers (45% of the system), and private property service laterals (50% of the system).

Notwithstanding the best management practices, some sanitary sewer overflows can be considered unavoidable. They can be caused by extreme wet weather events, system failures, or unusual events. To manage sanitary sewer overflows, contingency and response plans have been put in place. Emergency spill points exist at key locations throughout the collection system that discharge overflows to large waterways where their impact is benign, as opposed to having high consequence system backups occur that can impact public health and cause property or environmental damage. Some additional overflow locations have been identified in this Plan by the District to reduce the impact of unavoidable overflows.

Policies

- P8. Infrastructure Management**
The District and its member municipalities will establish sewer system infrastructure management programs that will maintain the regional trunks and interceptors, the municipal collection system, and the private service laterals in a state of good repair. The objective will be to ensure the sustainability of the collection system so that expensive repair and rehabilitation is not deferred to future generations and that the average daily infiltration and inflow will not exceed 11,200 litres per hectare per day as a result of a storm with less than a five year return period.
- P9. Basic Sanitary Sewer Service Capacity**
The District will establish a basic level of service capacity for all District sanitary sewers that provides for the conveyance of measured dry weather flows plus a wet weather allowance for infiltration and inflow of 11,200 litres per hectare per day, such that the hydraulic grade lines do not exceed established safe operating levels.
- P10. Sanitary Sewer Overflow Documentation And Targets**
The District will document all sanitary sewer overflows from the collection system under its jurisdictions and determine the cause of overflow. The District and its member municipalities will establish targets for sanitary sewer overflow reduction as part of their sewer system infrastructure management programs to target reduction and long term elimination of wet weather sanitary sewer overflows caused by storms of less than a five year return period. Areas experiencing high growth and chronic sanitary sewer overflows with associated health or environmental risks will receive the highest priority for elimination of sanitary sewer overflows.
- P11. Sanitary Sewer and Combined Sewer Interaction**
In parts of the collection system where both sanitary and combined sewer overflows are occurring due to the interaction of these sewer systems, and operational improvements are being considered to minimize overflows, the objective will be to minimize the total volume of sanitary sewage (contained in combined and sanitary sewer overflows as a component together with stormwater) that is discharging to the receiving waterways.

P12. Consideration of Consequence

When addressing sanitary sewer overflow issues, the District and its member municipalities will prioritize efforts and consider emergency spill locations to mitigate the consequence of overflows in the following priority:

1. Discharges that compromise public health;
2. Discharges that compromise public and private property damage; and
3. Discharges that have confirmed near-field environmental impacts.

P13. Emergency Overflow Locations For Unavoidable Sanitary Sewer Overflows

The District and its member municipalities will maintain a system of emergency overflow locations and prepare emergency spill contingency plans to minimize the consequence of unavoidable sanitary sewer overflows caused by extreme wet weather, system failures, and unusual events.

Commitments

C19. Infrastructure Management

The District and its member municipalities will establish ongoing sanitary sewer system evaluation programs to determine the condition of the regional trunk sewerage system, the municipal sewerage system, and private property service laterals. As required, legislative and legal authority will be sought to address infiltration and inflow originating from private property service laterals. These evaluation programs will be ongoing and determine the condition of the entire sewer system over a 20 year time cycle. The District and its member municipalities will develop and apply a consistent approach to sewer system evaluation surveys.

Repair and replacement programs will be established based on targets set for sanitary sewer overflow reduction and the severity of infiltration and inflow relative to the design allowance of 11,200 litres per hectare per day.

Separate Sanitary Sewer Systems

C20. New Construction Objectives

The District and its member municipalities will review engineering standards and guidelines for new sewer construction with the objective of ensuring a high standard for new construction to minimize future infiltration and inflow problems.

C21. Wet Weather Facilities

The District, by 2001, will complete the conceptual designs and feasibility studies for the following wet weather facilities to reduce chronic sanitary sewer overflows:

Cloverdale storage and operational improvements; and
Maillardville sanitary sewer increased conveyance (growth pre-build).

C22. Flow Monitoring

The District will maintain a network of flow monitors that will continually monitor sewer flows and will determine the daily average flow by specific catchments, or by municipality where the flow monitoring configuration is appropriate.

C23. Biennial Liquid Waste Management Plan Progress Report

Every two years, municipalities will summarize and forward to the District for inclusion in a biennial Liquid Waste Management Plan progress report, the following information:

Sewer system mapping that indicates the overall extent of the current cycle of the sanitary sewer system evaluation program and the condition of sewerage infrastructure.

The extent of new sewer construction and sewer repair and replacement work over the past two years.

A summary of the results of all flow monitoring work undertaken as part of the sewer system evaluation program.

The location and frequency of sanitary sewer overflows occurring from the municipal collection system.

A summary of sewerage system expenditures for sewer system evaluation work, and repair and replacement work.

The biennial reporting period will end on December 31st of every second calendar year and the report will be due by the end of

Liquid Waste Management Plan – Stage 2

March (90 days to compile). The first reporting period will end in the second whole year (not less than 24 months and not more than 36 months) following the year a LWMP is approved. An interim annual report will be submitted in March and will summarize the key achievements that occurred in the previous year.

Source Control and Demand Management

Background

Source Control

The Source Control Program prevents contaminants from entering the sanitary sewer system by controlling discharges at source. The main objectives of the program are:

- protection of the public, sewer workers, municipal and District infrastructure, and wastewater treatment processes, and
- protection of the environment by improving the quality of biosolids and wastewater treatment plant effluents.

The main regulatory tool used by the program is the Regional Sewer Use Bylaw. The Bylaw deals with contaminants by prohibiting disposal of certain types of waste into the sewer system and by restricting contaminant levels to maximum allowed concentrations. The District has the powers to restrict additional contaminants not covered by the Bylaw.

The scientific knowledge base from the past decade has both clarified and identified concerns about the fate of man-made chemicals in the environment and their short and long-term impacts. In recent years, environmental protection agencies have become more cautious about the use and release of chemicals into the environment. The Canadian Environmental Protection Act includes a list of toxic substances, and its approach is to either minimize the use or production of these substances or completely eliminate them. The District is being encouraged to take a leading role in protecting the environment by reducing the presence of potentially harmful chemicals in the wastes discharged into its sewer system.

Demand Management

Population growth in the Region is the main driver for sewer and treatment plant expansions. In addition, peak daily loadings from industry exercise a heavy demand for service and compete for treatment capacity with the residential and commercial users. However, accommodating population growth and industrial usage does not automatically mean upgrading of facilities, since it is possible to control flows and loads through demand management. Since 1993, the District has embarked on policies that recognize the need to manage demand for services in all areas.

Capacity can be stretched by a full spectrum of demand-side management programs ranging from voluntary initiatives, to pricing strategies and mandatory requirements. The most notable programs that the District has already implemented are the pricing strategies for Trucked Liquid Waste and BOD/TSS discharges from industry.

Policies

- P14. Control of Toxic Substances Discharged to Sewer**
The District's Source Control Program will be consistent with the Canadian Environmental Protection Act (CEPA) control options for toxic substances. This will be in addition to the list of prohibited and restricted substances included in the Regional Sewer Use Bylaw.
- P15. Promotion of Pollution Prevention**
Control of the quality and quantity of discharges to sewer by applying the principles of pollution prevention will be emphasized and promoted in all sewer permits, codes of practices, waste management practices and education programs that are issued, developed and implemented by the District.
- P16. Best Available Technology**
Where pollution prevention fails to eliminate contaminants from discharges, the District will recommend Best Available Technology, which is proven and economically feasible, to be applied to remove contaminants of concern prior to discharge to sewer.
- P17. Control of Peak Daily Demand from Industry**
The District will control the peak daily demand from industry through a system of flow and load limits and fees.
- P18. Usage of Capacity by the Users of the Sewer System**
Any trend or projected demand that would affect the historical proportions of usage of system capacity (conveyance and treatment) will be brought to the attention of the District Board and its impact considered. The policy of business casing any new industrial demand for more than 3% of the system capacity will be continued.
- P19. Promotion of Water Conservation**
The District will encourage water conservation initiatives by recognizing reductions in water usage and wastewater generation.

Source Control and Demand Management

P20. Elimination of Stormwater Discharges into Sanitary Sewers

The District will not permit new stormwater sources to be connected to its sanitary sewer system and will continue its current policy of eliminating stormwater discharges currently authorized by Authorizations and Permits. Any exception to this policy will be evaluated and considered in consultation with the affected discharger, host municipality, and representatives of the senior level of governments in charge of environmental protection.

The District, in addition to not issuing new authorizations for discharges of stormwater into sanitary sewers, will continue the program of eliminating all stormwater contributions allowed under the existing industrial permits. Each industrial operation will be required to develop and implement a plan for removal of the stormwater components from their sanitary sewer discharge.

Commitments

C24. Reduction of Copper

The District will recommend that the Greater Vancouver Water District (GVWD) consider the benefit of copper reduction in wastewater effluent and biosolids and meet the current implementation schedule for construction of facilities for pH adjustment of drinking water.

C25. Sewer Use Bylaw Review

The District will update the Regional Sewer Use Bylaw by the end of 2001 to reflect the most recent scientific and technical knowledge about the impact of substances discharged to sewer on human health and safety, performance of collection and treatment systems, and the receiving environment.

C26. Development of Peak Discharge Limits and Fees for Industry

The District will develop, in co-operation with identified stakeholders, a system of limits and fees to be implemented across the District by year 2002. Maximum daily loadings (limits) will be assigned to industrial operations that are discharging more than an established percentage of the annual loadings received by the wastewater treatment plant servicing the particular industry. Limits will be accompanied by a system of fees that will include additional charges for the difference between the average and maximum daily loadings and charges based on marginal costs for treating the loadings exceeding the assigned (authorized) maximum daily loadings.

- C27. Criteria for New Industrial Demand for More than 3% of Capacity**
The District will develop criteria to be used in development of a business case if a single industrial user proposes to exceed more than 3% of the system capacity.
- C28. Reduction of Demand for Treatment Capacity**
The District will investigate initiatives that have the potential to reduce the per capita demand for treatment from the 1998 levels. Demand management for all sewer user sectors (residential, industrial, and commercial/institutional) will be examined and considered through business case development.
- C29. Education Program**
The District will develop and implement an educational program for the residential, commercial, and institutional use targeting specific practices that have pollution prevention or demand management benefits. An education program on the use of food grinders will be developed by 2001.
- C30. Sewer Use Charges for Commercial and Institutional Sector**
The District will assist member municipalities in reviewing sewer charges for the commercial and institutional sector, given that user-pay charges are instrumental in cutting demand for service.
- C31. Evaluation of Current Industrial Pricing Strategy**
The District will evaluate the efficiency of the current BOD/TSS Industrial Pricing Strategy in reducing demand for treatment capacity.
- C32. Recognition for Water Conservation**
The District, in conjunction with the Greater Vancouver Water District (GVWD), will evaluate implementation of a recognition program that acknowledges reductions in water usage and wastewater generation.

The District will consider loading-based permit limits, in addition to the existing concentration-based permit limits, for operations that can demonstrate consistent reductions of more than 10% in their water consumption (expressed as volume of water per unit of production).
- C33. Notification to Environment Canada**
If, through environmental monitoring and assessment, a substance is identified as a potential concern in the aquatic environment but is not listed in the Canadian Environmental Protection Act, the District will notify Environment Canada and request that they commence a substance review in accordance with current process for such reviews.

Residuals Management

Background

The District's five wastewater treatment plants produce three types of residuals: grit, screenings, and biosolids. Until the early 1990s, biosolids from Lions Gate were discharged to the ocean, while biosolids from Annacis Island and Iona Island were stored in lagoons and then dried and stored on land. This practice continues at Iona Island. Until late in 1998, biosolids from Lulu Island were incinerated. Biosolids from Northwest Langley are also stored in lagoons and dried on land; they are recycled as the lagoons are cleaned.

In March 1991, to make way for secondary treatment at the Annacis Island treatment plant and to comply with the Federal Ocean Dumping Act, the Board adopted a policy of beneficial biosolids recycling to land. This Policy led to completion of the *Residuals Management Plan*, which provided the Program with a framework under which to operate.

Since 1991, the District has successfully recycled more than 550,000 tonnes of biosolids in a variety of innovative, low cost and environmentally friendly ways. In 1999, the District will recycle all biosolids produced by the Lions Gate, Lulu Island, and Annacis Island plants (approximately 56,000 bulk tonnes). Recycling projects are carried out under permits or approvals issued by the Ministry of Environment, Land and Parks under the Waste Management Act. Recycling projects, both within and outside of the region, include mine reclamation, landfill and gravel pit rehabilitation, rangeland fertilization, silviculture enhancement, and soil product development.

The purpose of the District's biosolids recycling program is to support the provincial goal to recycle 85% of the province's biosolids by beneficially recycling biosolids in a cost effective, environmentally sound and reliable manner on behalf of member municipalities.

The biosolids quality will be improved by minimizing contaminants entering the wastewater. This can be accomplished through appropriate source control measures. The proposed pH adjustment of drinking water, by the Greater Vancouver water District (GVWD), will reduce leaching of metals from piping and will ensure copper levels in the biosolids are maintained below limits set by accepted standards.

Policies

- P21. Cost Effectiveness and Recycling**
The District will manage its residuals in a cost-effective, environmentally sound, and reliable manner.
- The District will manage its biosolids based on the principle of recycling, but will continue to evaluate cost-effective, non-recycling options.
- P22. Grit and Screenings Disposal**
Grit and screenings will continue to be sent to disposal facilities (landfill or incineration), both within the GVRD solid waste system and, when necessary, to other facilities within B.C. or outside of the province.
- P23. Recycling Program Cost Allocation**
It is intended that the District's Biosolids Recycling Program will continue to be funded annually as a regional program. Direct costs (those directly attributable to recycling projects) will be allocated to the four sewerage areas at the end of each year based on the tonnes of biosolids recycled for each sewerage area in that year. Indirect costs will be allocated to the four sewerage areas at the end of each year based on the tonnes of biosolids produced by each sewerage area during that year.
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Commitments

- C34. Iona Island Treatment Plant Biosolids**
At the Iona Island Wastewater Treatment Plant site, the District commits, as a minimum, to recycling or disposing of ongoing biosolids production once the land area and lagoons are full.
- C35. Biosolids Growing Medium**
The District commits to produce and distribute biosolids growing medium which meet standards set out in the *Organic Matter Recycling Regulation* Draft 2.0, dated July 1999. As currently drafted this regulation would allow distribution of Class A biosolids growing medium with no limit on quantity and without the need to obtain permits or approvals from the Ministry of Environment, Lands and Parks. Prior to the proposed regulation being passed the District will work with the Ministry of Environment, Lands and Parks to include the requirements for the distribution of biosolids in the operating certificates for the District's facilities

Stormwater Management

Background

The entire community (senior and local governments, developers, industry, farmers, and the public) needs to contribute, and work together, for effective stormwater management and environmental protection to be achieved. This Liquid Waste Management Plan affords an opportunity for local governments to improve those aspects of stormwater management and land development over which they have jurisdiction or significant influence.

During the Liquid Waste Management Plan process, the District and its member municipalities have been working:

- with stakeholders on stormwater issues of joint interest and influence; and
- on implementing programs to address aspects of stormwater management over which they have jurisdiction.

A survey of local governments showed that \$33 million was spent on stormwater management in 1996 in areas serviced by separated stormwater systems.

Studies indicate that, in general:

- current stormwater programs provide adequate protection of life and property;
- the impacts of existing stormwater discharges on the biological communities in large waterbodies such as the Fraser River and Marine waters are relatively minor; but
- in many areas of the region, current approaches to stormwater management and land development do not adequately protect the environment of small streams.

During the first seven months of 1999, municipalities were presented with two options for improving their contribution to better stormwater management. One option involves continuing with the existing regulatory approach to stormwater management. Increasingly this approach is becoming inefficient and ineffective as public and regulatory expectations change. A preferred second option that commits to an integrated planning approach to stormwater management, as described below, is recommended.

Policies

P24. Five Year Time-Frame

The stormwater management policies and commitments will apply to all District municipalities, and as appropriate the District, for a period of five years after approval of the Liquid Waste Management Plan, at which time they will be reviewed and updated.

P25. Integrated Planning Approach

The member municipalities, in consultation with the District where appropriate, will undertake a proactive integrated planning approach to municipal stormwater management, in areas serviced by separated stormwater systems, thereby improving the efficiencies and effectiveness of regulatory approvals. This integrated planning approach will integrate watershed, catchment, master drainage plans, and stormwater plans into relevant municipal planning processes such as Official Community or Neighbourhood Concept plans, Recreation and Parks Master plans, Strategic Transportation plans, etc., in order to address the impacts of stormwater management on relevant community values. These values include recreation, agriculture, fisheries, greenways, heritage, archaeology, safety, transportation, economics, property values, flood protection, affordability, the environment, and related issues.

Stormwater management planning would strive to be consistent with the stormwater management guiding principles as referenced in Table 13-1 of the Liquid Waste Management Plan Discussion Document. One of the guiding principles is to strive to plan at a watershed scale even in non-urban (greater than 80% of watershed area is Green Zone as defined in the 1996 Livable Region Strategic Plan) watersheds where municipalities may have limited infrastructure.

Commitments

C36. Interagency Liaison Group

Stormwater management planning will build on the improved information on stormwater problems and solutions developed during the Liquid Waste Management Plan process. To facilitate the ongoing exchange of information on stormwater issues, and implementation of the Liquid Waste Management Plan,

Stormwater Management

municipalities and the District will participate in an interagency liaison group similar to the existing Stormwater Management Task Group. The group will provide advice to the District about stormwater issues.

C37. Stakeholder Participation

The community, senior and local government agencies, and other stakeholders will be invited to participate in the integrated planning process intended to proactively address issues on a long-term basis.

C38. Policies and Bylaws

Municipalities, in consultation with the District where appropriate, and the Stormwater Interagency Liaison Group, commit to adopting or updating, policies or bylaws related to improving stormwater management for at least two stormwater issues over the five year period of the stormwater plan. Issues to be considered may include, source control, flood protection, sediment and erosion control, soil conservation and topsoil removal, impervious area, and protection of riparian areas.

C39. Rate of Watershed-scale Stormwater Planning Work

Municipalities commit to undertake (or review) integrated stormwater management planning at a watershed scale for urban (less than 80% of watershed area is in the Green Zone as defined in the 1996 Livable Region Strategic Plan) watersheds at an annual rate such that each watershed is reviewed every 12 years. The District will participate in watershed management plans as appropriate and where watersheds include two or more municipalities, a coordinated approach will be undertaken.

Commitments

- C43. On-site Disposal Mapping**
The District and its member municipalities will complete, by 2001, an inventory map of areas containing on-site disposal systems on a watershed basis. The District and its member municipalities will also prepare mapping, by 2001, indicating projected on-site system densities to 2021.
- C44. Performance to be Considered by Ministry of Health**
The Ministry of Health will be requested to consider the performance of existing systems, known pollution issues, and projected on-site system densities in the watershed when approving new systems.
- C45. Performance to be Considered by Ministry of Environment, Lands and Parks**
The Ministry of Environment, Lands and Parks will be requested to consider the performance of existing systems and the projected density of on-site systems when assessing nitrate contamination levels in groundwater aquifers.
- C46. Environmental Monitoring and Assessment**
The District will undertake environmental monitoring and assessments in the region's waterways to identify and determine if on-site disposal systems are contributing to waterway degradation.
-

Agricultural Runoff

Background

In rural watersheds within the GVRD, there is a need to determine the impact of runoff from agricultural lands on streams and receiving waterways. Agricultural areas are identified in Official Community Plans and largely lie within the Green Zone, as indicated in The Livable Region Strategic Plan.

The Ministry of Agriculture, Fisheries, and Food, through regulation and best management codes of practice, oversee much of the activity associated with farming activities in the region.

Non-Point Source Pollution Management

To resolve non-point source pollution issues requires the co-operative effort of all levels of government and numerous stakeholders. This Plan addresses three non-point source issues that have been identified as requiring management attention in the region - pleasure craft sewage, on-site disposal systems, and agricultural runoff.

Pleasure Craft Sewage

Background

Sewage discharges from pleasure craft have been implicated in some investigations into the reasons for high bacterial levels at specific locations. As well, there is some concern that best management practices should be evolving in this area so that in the long term the practice of discharging sewage from pleasure craft into the waterways in the region is greatly reduced or eliminated. (This requires regulation that prohibits discharges, the availability of pump-out facilities for use by boaters, and education of boaters with regards to this issue.)

Policies

- P26. Designation of No-Discharge Zones**
Where investigations have shown that discharges from pleasure craft is leading to waterway degradation or high bacterial levels, the District will request the province to nominate the waterway, or portion thereof, for designation as a no-discharge zone under the federal Pleasure Craft Sewage Prevention Regulation.

Commitments

- C40. Pump-Out Facility Inventory**
The District will complete an inventory of all available pump-out facilities in the region by 2001.
- C41. New Marinas and Major Renovations**
Municipalities will modify or adopt bylaws that require all new marinas, or marinas undergoing renovations that exceed 50 percent of their assessed value, to install pump-out facilities for access by pleasure craft. As appropriate, these facilities should be connected to the municipal sewer system or designed for handling by trucked liquid waste.

Non-Point Source Pollution Management

C42. Existing Marinas

The District, in consultation with municipalities, marina operators, boaters, and senior government agencies, will undertake a feasibility study to determine how existing marinas can accommodate pump-out facilities, the cost to install such facilities, and how they would be financed, maintained, and operated.

On-Site Sewage Disposal Systems

Background

On-site disposal systems are in use in the GVRD, primarily outside of the sewerage area boundaries, where connection to a municipal sewer system is not cost effective. These systems are primarily septic tanks, although advanced package treatment systems also exist. The Ministry of Health approves on-site systems in accordance with the Sewage Disposal Regulation under the Health Act. Operation and maintenance of on-site systems is the responsibility of individual property owners. The forecasted extent and density of on-site systems in the region, and potential pollution issues have not been determined.

Policies

P27. Sewer Extensions and the Green Zone

Prior to extending sewers into the Green Zone, as defined by The Livable Region Strategic Plan, the District will request municipalities to examine local servicing and alternate advanced treatment systems.

P28. On-site systems and disposal to waterways

The following guidelines should apply regarding discharges from on-site disposal systems to adjacent waterways. Where there is a conflict between these guidelines and Provincial regulations, the regulations will apply:

- Property owners with BC Hydro service and road access should investigate all land based options including approved innovative technologies and demonstrate that such land based options are non-viable solutions prior to any consideration of sewage effluent discharge into an adjacent water body.

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- Property owners in “isolated” locations without road access, should investigate conventional land-based options and demonstrate that such land-based options are non-viable solutions prior to any consideration of effective innovative technology or sewage effluent discharge into an adjacent water body.
- The minimum acceptable level of treatment for properties in “isolated” locations having neither BC Hydro service or road access, should be a properly designed septic tank that provides treatment of domestic sewage prior to effluent discharge required to be in accordance with standards stipulated in the new Waste Management Act Municipal Sewage Regulation.
- There should be no discharge of untreated domestic sewage to the marine/aquatic environment under any circumstances.
- Property owners discharging to the marine/aquatic environment should obtain discharge permits from the appropriate jurisdiction.
- Property owners discharging or proposing to discharge effluent into an adjacent water body should obtain a “water body” easement for the placement and maintenance of a discharge outfall pipe, from the appropriate jurisdiction.
- Where the authority having jurisdiction for sewage discharge or sewage disposal is other than the local government, and where the bylaws or policies of the local government stipulate standards or requirements higher than those of the authority having jurisdiction, then the authority having jurisdiction should make best efforts to issue approvals which comply with requirements of the local government.

P29.

Assurance Plans

No innovative treatment systems will be installed in the GVRD unless an assurance plan is in place for the proper operation, maintenance, and performance of the facility. The assurance plan will be developed in accordance with guidelines being prepared under the Ministry of Environment, Lands and Parks Municipal Sewage Regulation.

Commitments

- C43. On-site Disposal Mapping**
The District and its member municipalities will complete, by 2001, an inventory map of areas containing on-site disposal systems on a watershed basis. The District and its member municipalities will also prepare mapping, by 2001, indicating projected on-site system densities to 2021.
- C44. Performance to be Considered by Ministry of Health**
The Ministry of Health will be requested to consider the performance of existing systems, known pollution issues, and projected on-site system densities in the watershed when approving new systems.
- C45. Performance to be Considered by Ministry of Environment, Lands and Parks**
The Ministry of Environment, Lands and Parks will be requested to consider the performance of existing systems and the projected density of on-site systems when assessing nitrate contamination levels in groundwater aquifers.
- C46. Environmental Monitoring and Assessment**
The District will undertake environmental monitoring and assessments in the region's waterways to identify and determine if on-site disposal systems are contributing to waterway degradation.

Agricultural Runoff

Background

In rural watersheds within the GVRD, there is a need to determine the impact of runoff from agricultural lands on streams and receiving waterways. Agricultural areas are identified in Official Community Plans and largely lie within the Green Zone, as indicated in The Livable Region Strategic Plan.

The Ministry of Agriculture, Fisheries, and Food, through regulation and best management codes of practice, oversee much of the activity associated with farming activities in the region.

The Fraser River Action Plan program, administered by the federal government, undertook a comprehensive investigation of agricultural nutrient balance in the lower mainland.

Policies

- P30. Stormwater Consideration by Municipalities**
Municipalities will consider stormwater runoff from agricultural lands when undertaking integrated stormwater management planning for their municipality.

Commitments

- C47. Compilation of Agricultural Watershed Water Quality Data**
The District will compile the monitoring information and findings from past scientific studies to determine the current base-line data associated with water quality in agricultural watersheds and in receiving waterways.
- C48. Environmental Monitoring and Assessment**
The District will include waterways in agricultural areas and the associated receiving waterways in its comprehensive water quality monitoring and environmental assessment program.
- C49. Identification of Water Uses and Water Quality Objectives**
Through their integrated stormwater management programs, municipalities will identify water uses and water quality objectives for waterways, or confirm the applicability of existing uses and objectives.

Finance

Background

Wastewater collection and treatment is supplied to property owners in the District through a partnership between the District and its member municipalities. The District manages the large trunk sewers, interceptors, and major treatment plants and the municipalities manage the local collection systems. The District does not collect sewer user fees directly from property owners but levies the municipalities for the cost to manage the regional system. Individual municipalities combine their cost and the District levy and collect revenue from property owners, either through property taxation or utility billing.

The District and member municipalities have reviewed the allocation of District costs in recent years and have adopted a user pay system based on measured sewage flows to distribute costs between sewerage areas, or between individual municipalities within sewerage areas. Each sewerage area is autonomous with respect to most costs, with the exception of some costs, including capital programs which enhance the level of service beyond primary treatment, that are distributed regionally. The District and member municipalities have also recently initiated a pricing strategy that distributes cost to permitted industries on the basis of their use of treatment plant flow and load capacity. A user pay system is in place to fully recover the costs associated with handling trucked liquid waste. In addition, costs associated with District projects that are required to service growth are now funded by a regional development cost charge that is collected by the individual municipalities.

Stormwater management is the responsibility of the individual municipalities, and, with the exception of some minor drainage responsibilities undertaken by the District, all costs are included in municipal budgets.

The District maintains a 10 year long range plan that identifies programs to be implemented and forecasts District expenditures. The District's annual expenditure has increased from approximately \$40 million per year in 1989, to \$120 million per year in 1999. This increase has occurred to implement programs to address growth, needed repairs, replacements and upgrades, and the construction of secondary treatment at the Annacis Island and Lulu Island treatment plants. With the addition of new programs under the preferred approach as identified by the Liquid Waste Management Plan, the District's expenditure is forecast to increase to approximately \$160 to \$170 million (1999 dollars) by 2008 (see Figure 4).

In addition to costs incurred by the District, the preferred plan requires increased expenditures by individual municipalities in the areas of sewer infrastructure maintenance, combined sewer overflow management, and stormwater management.

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The requirements for these programs must be assessed by the individual municipalities based on their particular situations.

In accordance with Policy P2, upgraded service levels will be provided in the future where an environmental need has been forecasted or demonstrated, with consideration to cost and benefit and regional priorities. Figure 4 shows the probable range in future annual District expenditure. The upper range represents annual expenditures if additional secondary treatment plant upgrading projects are required at Lions Gate and Iona, in accordance with demonstrated need, and they are constructed over a 10 year period commencing after 2005. The lower range represents annual District expenditures assuming no secondary treatment upgrading projects are required at Lions Gate and Iona and that the water quality objectives and other established criteria continue to be met.

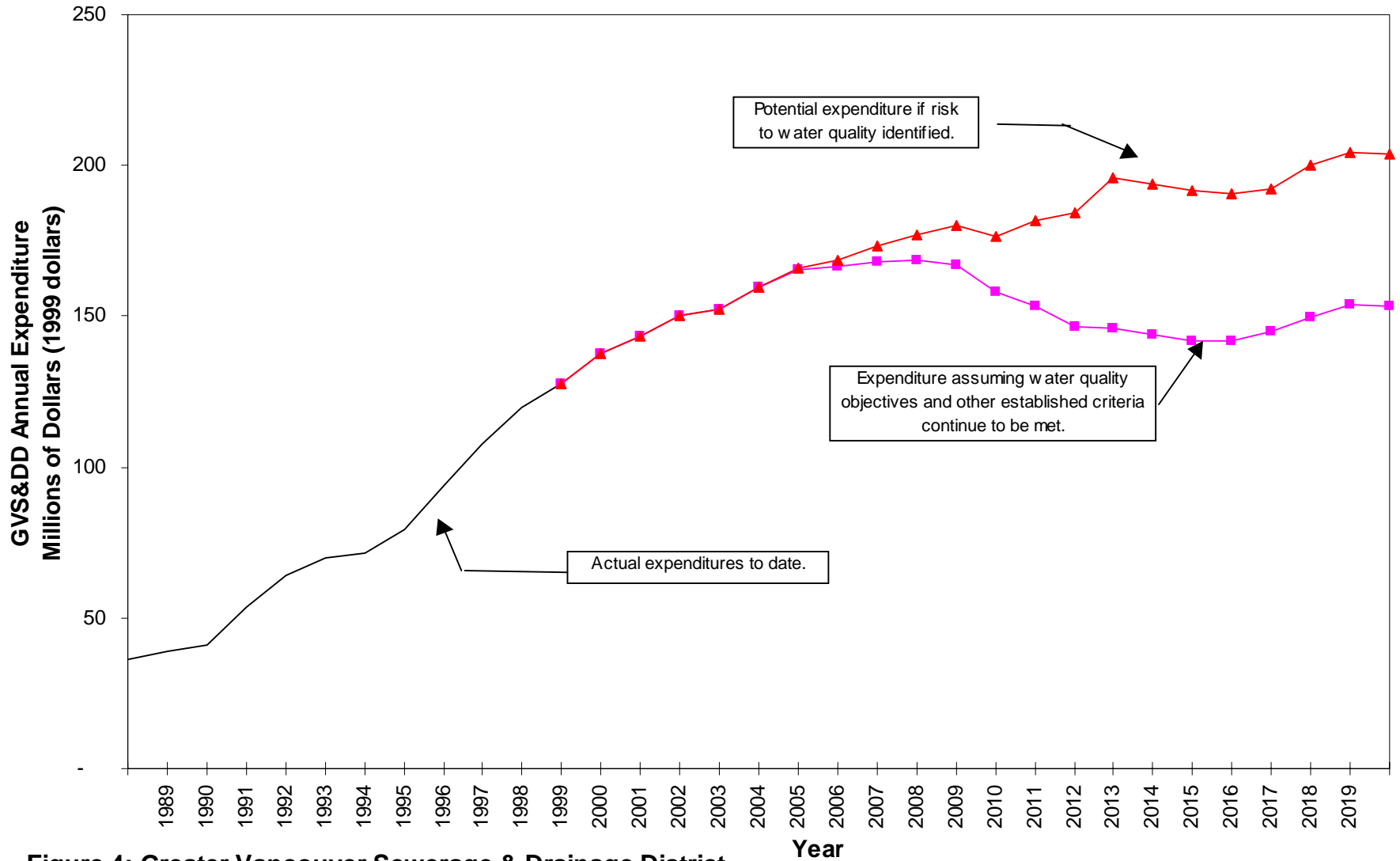
Policies

P31. Funding Future Projects

In its 10-year financial plan the District will include future projects for upgraded service levels that have been determined to be needed in accordance with Policy P2.

Commitments

No commitments are identified at this time.



**Figure 4: Greater Vancouver Sewerage & Drainage District
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Potential GVS&DD Expenditure Envelope**