

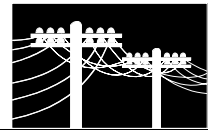
7.0 CITY INFRASTRUCTURE

Sewers
Irrigation & Drainage
Water Supply
Energy
Solid Waste & Recycling
Flood Protection
Road Construction
Street Lighting
Street Trees

City infrastructure or utilities are an integral part of urban development in Richmond. The City continues to demonstrate its commitment to good servicing by focusing development of its lands for urban uses in the western portion of Richmond and in the Hamilton community. Richmond has an overall policy of constantly maintaining and upgrading its public works infrastructure and services. The provision of utilities is expensive, and must be scheduled in a highly effective and efficient manner. The City's Capital Program is an ongoing planning and budgeting process for allocating City funds for construction and maintenance of these facilities, services, and requirements to meet the needs of future land uses. Since December 1967, the City, by policy, has required that developers of land provide and/or cost share for all associated public utilities necessary to support new development.

The challenges ahead include long-term replacement and rehabilitation of sewer, water, roads, and stormwater systems; cost-effective management of waste disposal, collection and recycling; and efficient water quality treatment and distribution. A growing population will require additional infrastructure improvements.

No comprehensive approach to public utility planning and construction can be effective unless there is close coordination with the provision of urban facilities and services. These utilities must be planned and programmed to support the level of land use activities proposed by the Official Community Plan (OCP).



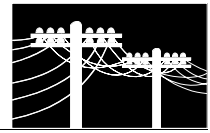
The provision of public utilities are guided by:

- *Orderly land development;*
- *Orderly service extension;*
- *Capital efficiency;*
- *Cost equity;*
- *Coordinated plan of civic actions;*
- *Annual Capital Program;*
- *Maintenance and replacement of existing infrastructure.*

Guiding Principles

Richmond's public utility objectives and policies are based on the following guiding principles:

- To ensure the optimum ratio of annual maintenance costs to physical infrastructure value is consistent with the City's aims of environmental stewardship, social equity, and economic development;
- To maintain the service reliability of the City's infrastructure;
- To ensure optimum efficiency in all areas of maintenance;
- To maximize the efficient use of resources by customers;
- To minimize the cost and public inconvenience of road and right-of-way trenching activities;
- To operate the City's public works infrastructure consistent with Richmond's and the GVRD's growth strategies;
- To coordinate City program expenditures with the provision of urban facilities and services;
- To maximize the benefit of public investment in infrastructure and services;
- To expand waste reduction and water conservation initiatives;
- To manage the fiscal impacts of future servicing needs;
- To ensure accessibility for all.



7.1 SEWERS



Lulu Island Sewage Treatment Plant

ISSUE:

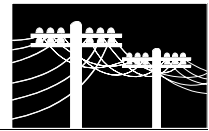
Richmond has primary responsibility for collecting and moving liquid waste from system users to the Lulu Island treatment facility (primary and secondary treatment). From a land management perspective, short- and long-term growth should be assessed against existing and projected sewage line and treatment capacity, and be located to make best use of existing servicing capacity, so as to minimize the need for building new sewer infrastructure. Therefore, new sewerage services should be budgeted and developed in areas targeted for redevelopment, and, where possible, funded as part of new development proposals.

OBJECTIVE 1:

Maintain an efficient, adequate, and self-supporting sewage and wastewater collection and disposal system which meet the needs of the public in an environmentally responsible manner, and expand new sewerage services to areas earmarked for new development.

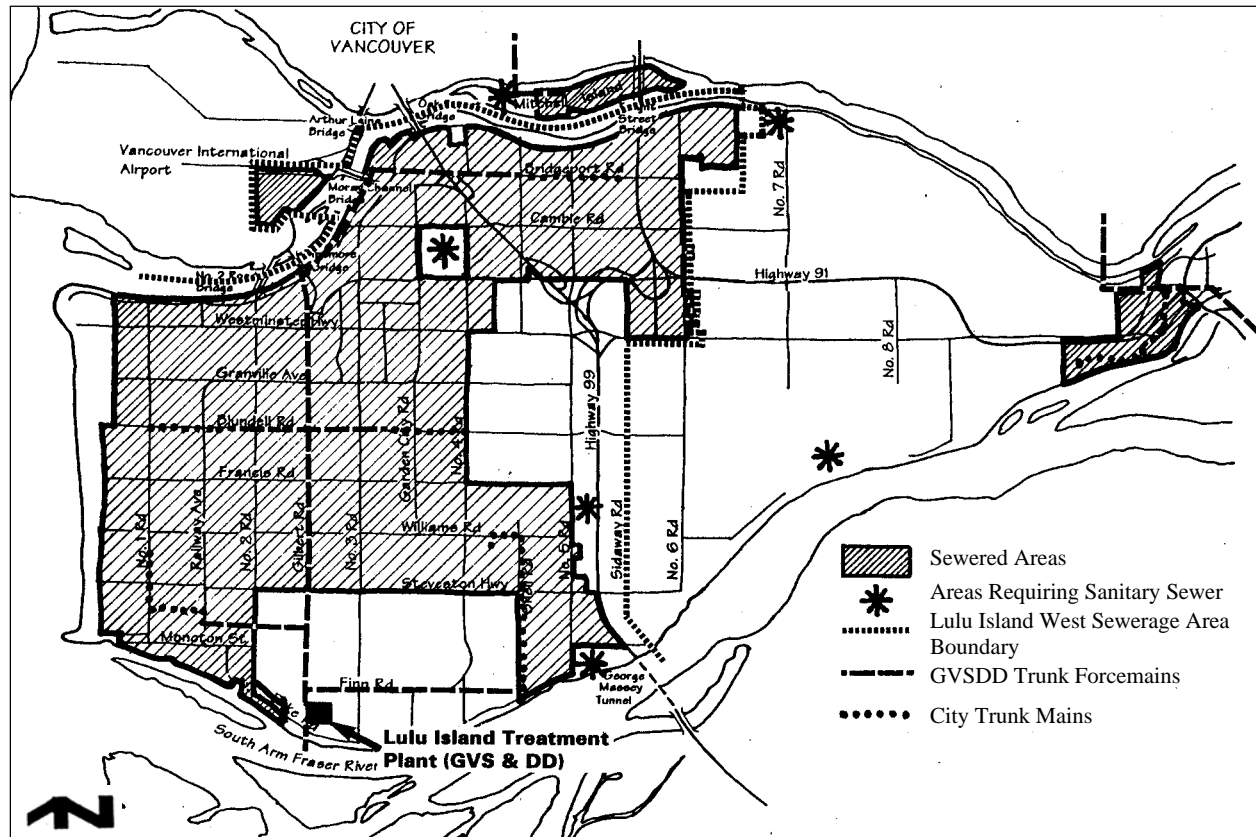
POLICIES:

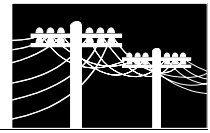
- a) Maintain and improve the existing sewer system through preventive maintenance and on-going appraisal, and replace aging sewer infrastructure through the City's Capital Plan process;
- b) Improve efficiency of the sewerage system by working with the GVRD to:
 - Reduce inflow and infiltration into sewer lines;
 - Reduce waste volume through water conservation;
 - Improve controls of contaminants entering the sewage system;
 - Pilot innovative water conservation and waste recycling and reuse methods;
 - Increase sewer treatment capacity at the Lulu Island treatment facility;
- c) Ensure that older areas of the city are supported by sewer utilities at service levels compatible with the needs of the present and future land uses;
- d) Require all new developments to be connected to sanitary sewers, except those that can be provided with acceptable on-site sewage disposal system, if a sewer is not available;



- e) Discourage the development of on-site sewage disposal systems on lots in the non-agricultural areas;
- f) In the development of new sewer systems, give priority to those unsewered areas developed at urban densities, where health hazard or demand exists;
- g) Encourage the establishment of waste traps in businesses to reduce the pumping and cleaning of sewer systems;
- h) Participate in the planning, development and implementation of the Regional Liquid Waste Management Plan.

Sanitary Sewer Distribution





7.2 IRRIGATION & DRAINAGE



Drainage and irrigation canal

ISSUE:

Richmond has approximately 49% of floodplain lands within the Agricultural Land Reserve. These lands are primarily located in East Richmond, McLennan, and Gilmore areas. An important objective of the City is to ensure drainage of the floodplain lands, while at the same time ensure proper irrigation to promote agricultural activities.

Stormwater

Stormwater is water that flows across the land. The source is not limited to rainfall, but may also come from agricultural runoff, commercial and household activities, and other related sources. This water flows across the land and streets carrying them via Richmond's stormwater system, a combination of closed pipe systems, box culverts, open ditches, sloughs, floodboxes, and pump stations. It finally ends up in the Fraser River.

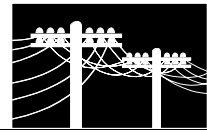
Storm drainage efficiency in Richmond is closely monitored and is upgraded through annual maintenance programs and through new construction and improvements. The primary focus of stormwater management has been on flood control. The challenge for Richmond is to balance flood control, agricultural drainage, urban development needs, and water quality improvements, which may be proposed or legislated as the City's growth increases.

OBJECTIVE 1:

Maintain and improve the quality of drainage and irrigation systems to promote the management of floodplain lands and agricultural operations.

POLICIES:

- a) Enhance the drainage network by improving pump station function and efficiency to improve drainage and irrigation for operating farms;
- b) Encourage construction of new drainage works in designated agricultural areas as part of the approval of adjacent industrial developments;
- c) Ensure that the location and construction of new roads and utilities will have a minimal impact on agricultural lands, farm holdings and operating activities;



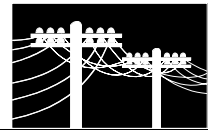
- d) Help to facilitate the improvement of agricultural infrastructure, e.g. irrigation, drainage, dyking works, and other services that support the agricultural sector.

OBJECTIVE 2:

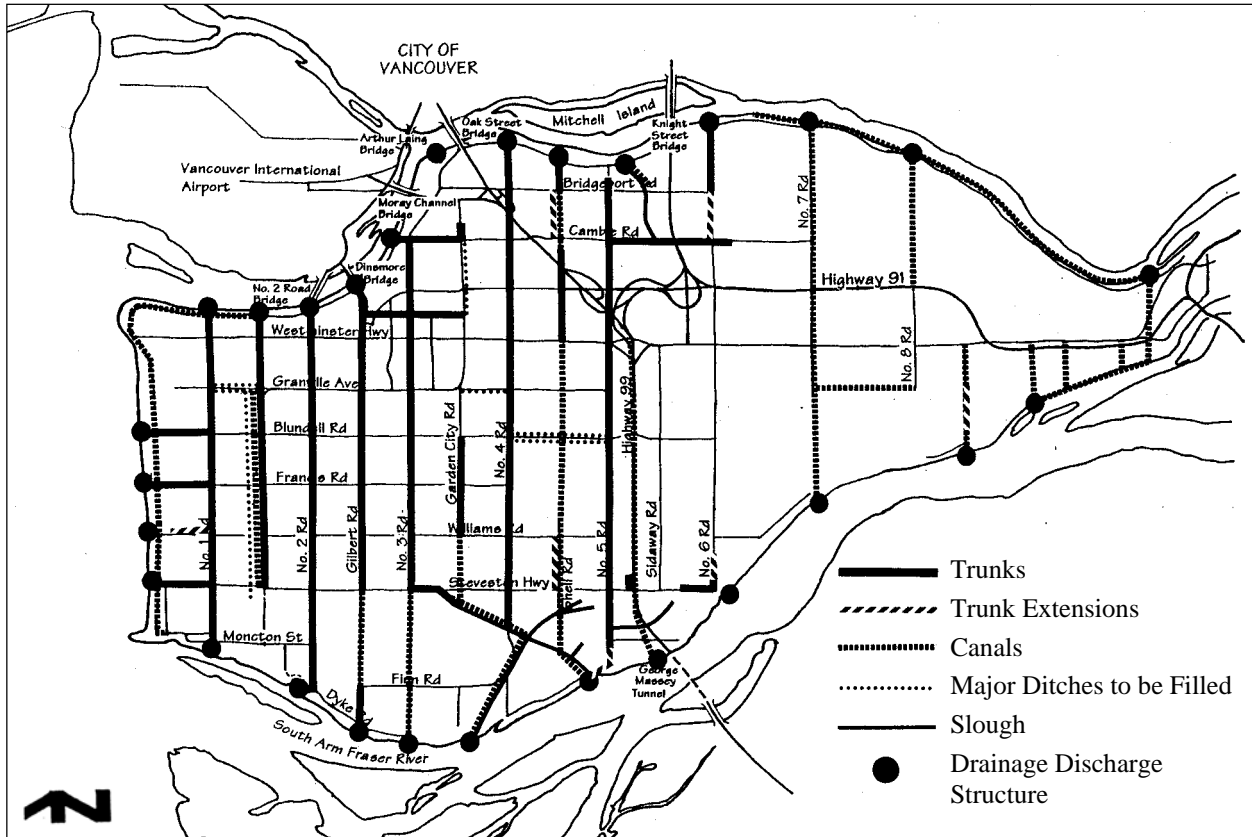
Ensure an efficient and self-supporting stormwater and wastewater collection and disposal system, which meets the needs of the public and regional clean water requirements.

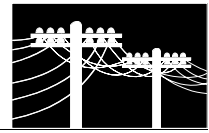
POLICIES:

- a) Maintain and improve the existing stormwater systems through an annual program of preventive maintenance and on-going appraisal;
- b) Integrate master planning for stormwater management with other city initiatives to achieve adequate drainage and to minimize pollution and erosion problems;
- c) Where necessary, limit the increase of impervious surfaces to reduce water run-off through zoning and development regulations;
- d) Work towards developing alternative strategies to deal with on-site rainfall runoff and/or detention to achieve cost effectiveness and environmental benefit;
- e) Test stormwater quality and in-pipe monitoring stations and review results with the intention of reducing sources of contaminants;
- f) Coordinate with other agencies to develop a public information and education program on stormwater pollution;
- g) Upgrade stormwater systems in established neighbourhoods through local initiative funding and/or redevelopment initiatives;
- h) Ensure proper standards for ditch crossings and culverts, and the placement of fill, concrete, or other materials or structures, in order not to block rights-of-way or impede the flow characteristics of drainage ditches and other components of the stormwater network.

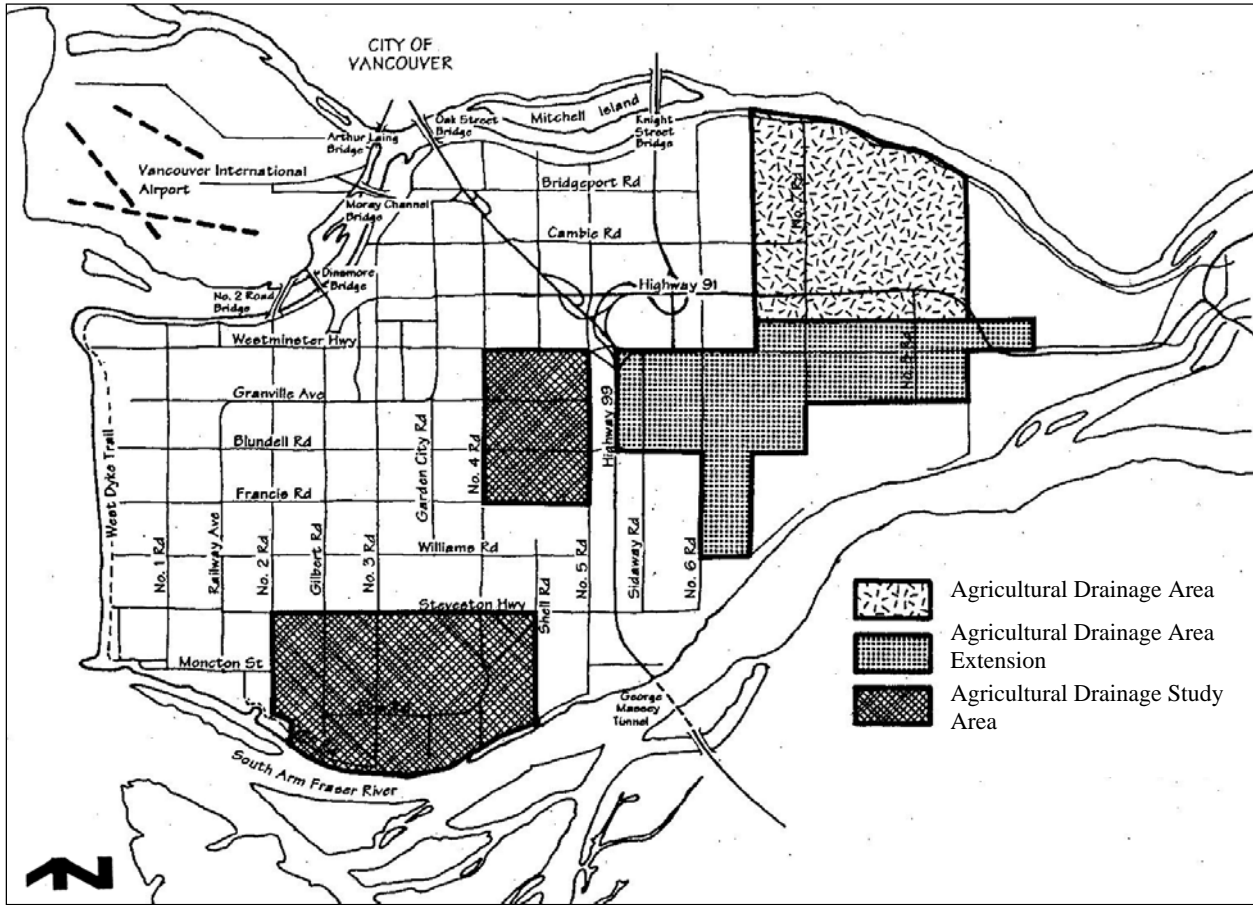


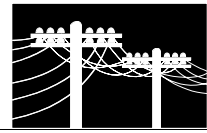
Storm Drainage





Agricultural Drainage





7.3 WATER SUPPLY

ISSUE:

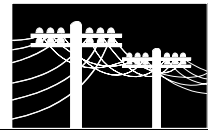
Greater Vancouver Water District supplies Richmond through three major watermain crossings. Upgrading and replacement of older watermains are being undertaken on an annual basis. Smaller pipes are being upgraded to provide adequate fire protection and serve areas experiencing higher-density development. With increasing demands for water, the City needs to undertake water conservation initiatives.

OBJECTIVE 1:

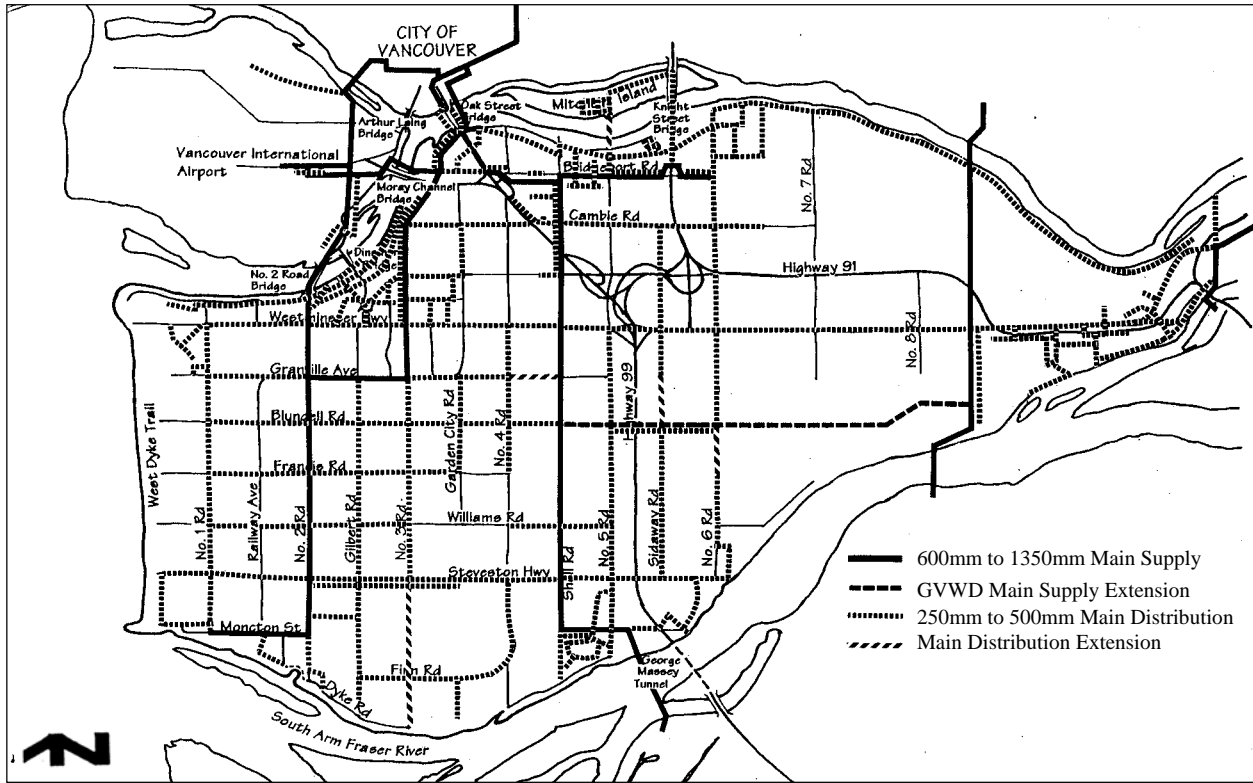
Ensure that reliable and adequate water supply and delivery systems are available to provide sufficient quantities of high-quality water at adequate pressure to meet the existing and future needs of the community.

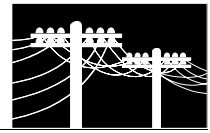
POLICIES:

- a) Maintain distribution facilities to protect water quality, ensure a reliable supply, assure adequate flow for all user needs, and minimize water loss;
- b) Provide priority for the replacement of the existing water systems, particularly in areas that are serviced by pre-1970 water systems (asbestos cement pipes), and those areas targeted for increases in development densities;
- c) Maintain adequate flow to serve the fire protection needs of City residents and businesses;
- d) Pursue system improvements, as well as efficiencies in operation and maintenance of facilities, to reduce and conserve water, e.g. water metering;
- e) Continue City participation in the Regional Drinking Water Treatment Program;
- f) Continue to raise public awareness of the need to conserve water;
- g) Manage local water quality by means of permanent sampling stations.



Water Supply





7.4 ENERGY

ISSUE:

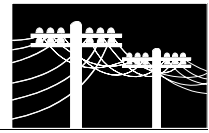
Cities are heavy energy users, but many opportunities exist for savings. Cities can reduce energy costs without affecting the services they provide for citizens. Richmond has won the Municipal Power Smart Award several years in a row because of its outstanding efforts to maintain energy efficiency standards in the community. If this direction is to continue, the City has to pursue a lead role to develop new energy-saving programs, and to assist the community with energy programs and services.

OBJECTIVE 1:

Promote a sustainable energy future by increasing energy efficiency in all sectors of the City.

POLICIES:

- a) Recognize that efficient use of energy has a positive effect on the well-being of the community, through decreased energy costs, improved environmental quality, and more efficient urban land utilization;
- b) Modify traditional methods of development, construction and transportation, where appropriate, to achieve energy-efficiency objectives;
- c) Support utility companies' regulatory changes to encourage more utility investments in energy efficiency;
- d) Support aggressive energy conservation awareness and education programs for the general public;
- e) Continue to pursue alternative energy source systems to heat and cool buildings, e.g. Ground-Source Heat Pump at the Thompson Community Centre;
- f) Establish a municipal energy policy to improve energy efficiency in municipal and residential buildings, and in commercial and industrial facilities; and to promote increased recycling, decreased waste, and the development of telecommunication as an energy-efficiency strategy;
- g) Improve power safety and avoid service disruption by undergrounding wires, particularly in areas of intense development activity.



7.5 SOLID WASTE & RECYCLING



Curb side Blue Box Recycling Program

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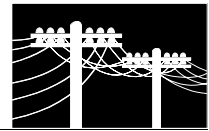
As a member of the GVRD, the City is committed to playing its part in reducing per capita garbage disposal in the region, and to manage solid waste disposal. The City provides for a full range of recycling and waste reduction programs under the regional integrated solid waste management plan. Recycling collection services includes the 'Blue Box' system for single- and multi-family dwellings, yard waste collection, and back yard composting. The City will continue to support provincial initiatives relating to household hazardous products disposal, and drop-off recycling services to the City's Recycling Depot. The City continues to pursue initiatives to reduce waste generation and its impacts on limited resources, finances, and the environment. It is acknowledged that the responsibility for waste management lies with all of us as waste generators.

OBJECTIVE 1:

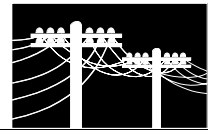
Meet the community's basic needs for solid waste collection and disposal, while providing residents with incentives and opportunities to practice the "three Rs – Reduce, Re-use and Recycle."

POLICIES:

- a) Aim to increase the public's participation in reduction, re-use and recycling by continuing to:
 - Review the fee structure for solid waste collection so that it provides residents with an acceptable basic level of service at reasonable cost while encouraging users to reduce unnecessary waste generation;
 - Improve access to recycling and re-use opportunities;
 - Support public education on the benefits of the "three Rs";
- b) Provide incentives for users to seek alternatives to waste disposal that pursue the "three Rs", and focus on cost-effective programs that have the greatest potential for materials diversion from disposal;
- c) Continue to monitor the per capita rate of waste disposal and recycling as the primary means of measuring achievement of waste reduction objectives;



- d) Support regional initiatives to develop alternative programs to reduce waste and pollution, for example, waste audits on construction sites, processes for tracking construction waste, developing alternatives to traditional building material, recycling programs, alternative stormwater management techniques, and innovative building design options;
- e) Continue to set an example of waste reduction in the City's procurement practice by emphasizing reusable packaged products, minimizing the procurement of over-packaged products and products that do not contain recycled materials, and ensuring responsible management of residential waste;
- f) Encourage additional opportunities for safe and convenient disposal of household hazardous wastes;
- g) Promote voluntary recycling of major glass, metal, heritage materials, and wood products at construction and demolition sites.



7.6 FLOOD PROTECTION



Richmond's dyke system provides floodproofing protection

ISSUE:

A perimeter dyke system designed to withstand a 1-in-200-year flood event has been constructed around Lulu Island, protecting most of Richmond from all but extraordinary flooding. The airport on Sea Island is also protected by a perimeter dyke. Parts of Sea Island, Mitchell Island, and the peripheral unsettled islands remain unprotected from significant flood hazards. It is also noted that portions of the dyke shoreline have fish and fish habitat values.

A study undertaken by the City and the Ministry of the Environment (Hay Report) identified the need for internal dykes to compartmentalize any flood hazard on Lulu Island. The report also suggested minimum building elevations which would further reduce the flood hazard. Much of the historic urban settlement on Lulu Island is below these suggested minimum building elevations, but raising sites on a piecemeal basis is an ineffective solution. Richmond needs to ensure ongoing appraisal, maintenance, and upgrading of its dyke system to minimize property damage and human suffering.

OBJECTIVE 1:

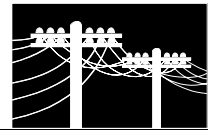
Improve flood protection measures in the portions of Richmond susceptible to flood damage.

POLICIES:

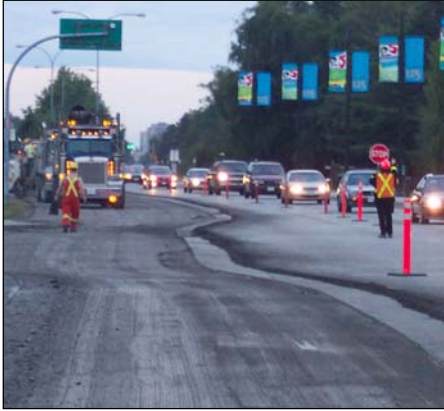
- a) Maintain and upgrade the perimeter dyke systems on Lulu and Sea Islands;
- b) Construct the internal dyke system identified in the Hay and Company Report;
- c) Explore senior government funding opportunities to maintain and upgrade Richmond's dyke system;
- d) Work with the Ministry of Environment in resolving improved flood protection measures for the historic settlement areas;
- e) Work with the provincial and federal governments on an approach to implement a revised set of Environmental Guidelines for Dyke Maintenance appropriate to Richmond's situation.



Drainage pumphouse



7.7 ROAD CONSTRUCTION



Road under construction

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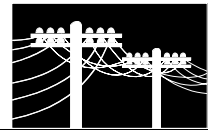
The biggest demand for road infrastructure and services, e.g. curbs, gutters, asphalt, and sidewalks, is to support cars, trucks, cyclists, and pedestrian activities. City streets are our main public places. Approximately 20% of the developed land base of Richmond is committed to these activities. To meet the demands of growth, new road and sidewalk construction or upgrading must be planned and built, but in ways that minimize social and environmental effects. To make a difference, new road development and improvements needs to make the best use of the City's limited street capacity, and seek a balance between competing demands and interests.

OBJECTIVE 1:

Protect the City's capital investment in roads and public rights-of-way through continuing high-quality maintenance and improvement programs, and carry out road improvements in accordance with identified needs, balancing limited resources among residences, businesses and industry.

POLICIES:

- a) Provide high priority for the maintenance of the existing road system, and those streets that function as transit corridors;
- b) Give high priority to road and sidewalk network improvements that service higher-density areas and link higher-density commercial and residential areas;
- c) Ensure that street designs promote efficient vehicle and pedestrian movements and do not compromise a safe, convenient, and aesthetically pleasing environment for pedestrians, cyclists, and transit-users;
- d) Design and construct new streets of high-quality structural materials to minimize future maintenance costs;
- e) Construct local streets in accordance with existing and planned land use patterns and accepted engineering standards, including the provision of sidewalks on most streets;
- f) Investigate the development of alternative street standards that will result in greater environmental benefits.



7.8 STREET LIGHTING



Distinctive City Centre street lights

ISSUE:

Almost all streets in Richmond's urban areas are lit. Street lighting is designed to provide light on roadways, laneways, and walkways. Although those lighting systems may differ in structure, equipment, and method of control, they all are economically justified, and are required to reduce night accidents and crime, and to improve the public environment on City streets.

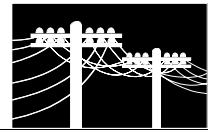
Current standards call for high-pressure sodium in residential, commercial and industrial areas, and metal halide (white light) for the City centre areas. On streets with overhead power lines, BC Hydro provides and maintains the lighting at City costs. In new residential development, innovative street lighting is considered. Private development, such as commercial areas and shopping areas, are encouraged to enhance their areas with innovative lighting environments.

OBJECTIVE 1:

Maintain a system of street lighting to ensure improved safety and visibility on the City's urban streets.

POLICIES:

- a) Ensure and maintain standardized illumination levels and uniform lighting distribution along major roads, and in residential, commercial and industrial areas;
- b) Work with the utility company to place underground lighting and other utilities (e.g. telephone) in major commercial areas, and areas undergoing major redevelopment change;
- c) Investigate street lighting and pole designs to assist in enhancing distinctive area characters;
- d) Pursue initiatives to install, replace, and maintain street lighting on city streets;
- e) Promote the use and design of energy-efficient street-lighting systems, and continue to convert streetlights to be more energy-efficient.



7.9 STREET TREES



Tree-lined street

ISSUE:

Richmond has a street-tree program, which includes tree planting, and pruning, and removal of dangerous or damaged trees, on the street rights-of-way. The planting of a variety of native street trees along streets promotes nature within the City. Trees connect people to nature in the midst of today's urbanized environment. Trees also provide shade, and contribute to fresh air by absorbing carbon dioxide and releasing oxygen. Trees block winds, and provide visual and sound barriers. As the City develops, there needs to be a framework and a program to manage planting, maintenance, and removal and replacement of trees on city streets.

OBJECTIVE 1:

Promote the planting and preservation of trees along city streets and on private lands to promote community health, aesthetics, and well-being.

POLICIES:

- a) Encourage the preservation of trees on City property and private lands wherever possible, including rights-of-way and highways;
- b) Ensure that tree removal requests are decided individually based on disease, damage, new construction works, hazardous situations, damaging of private property, or having heritage, environmental, or other community value;
- c) Establish a tree management plan that:
 - Prioritizes streets for tree plantings, planting specifications, and location standards;
 - Identifies tree species for planting, recycling, removal, and replacement;
 - Inventories location, type, condition, and life expectancy of trees;
 - Provides a systematic program for the scheduling of street-tree maintenance on a regular basis;
- d) Protect and retain existing street trees as part of road improvements and upgrading.

