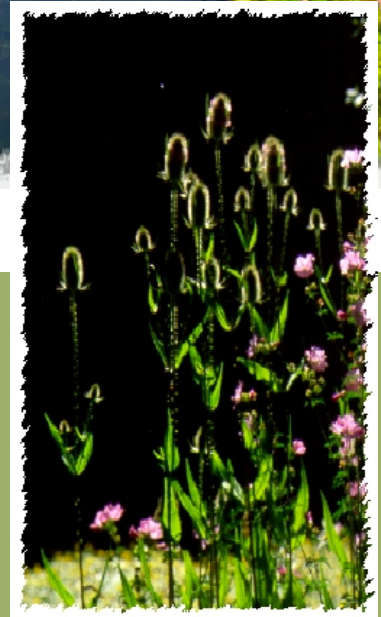




# State of the Environment Report

## Richmond, 1998



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# Introduction and Overview

This section covers three issues:

- Why a State of the Environment Report was written;
- How the report was written; and
- A summary of what we found.

## 1. Why the Report Was Written

Richmond has an attractive natural setting, surrounded by the sea, the Fraser River, and mountains. It includes some of Canada's most productive farmland and habitat for millions of migrating birds. Richmond also offers a high calibre of amenities for its human residents, including a quality network of parks and trails. Yet as more people settle in the Lower Mainland, our resources and quality of life could come under pressure —if we fail to change our consumption patterns. We need solutions to reduce this pressure and protect the things we value. *A State of the Environment Report can help us develop these solutions.*

Richmond City Council and the Advisory Committee on the Environment recognize the value of State of the Environment (SOE) reporting in monitoring Richmond's environmental health. They have provided the resources and time required to create this report. But this report is just the beginning —it forms part of a broader environmental management system that will be developed over time.

*As more people settle in the Lower Mainland, our resources and quality of life could come under pressure — if we fail to change our consumption patterns.*

## How the Report Fits Into the Environmental Management System

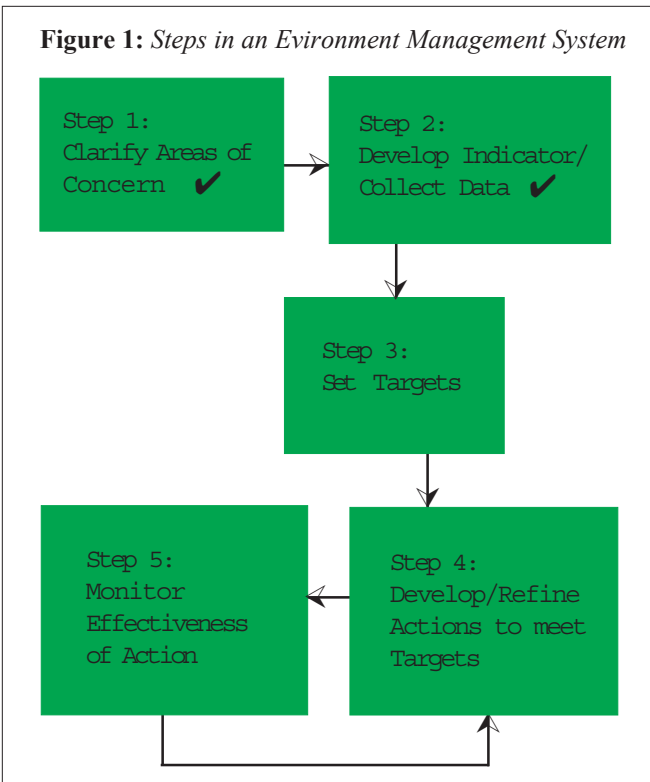
The first step in developing this system involves *clarifying our general priorities* for protecting those resources and reducing pressure on them. The second step is to *quantify the status of those resources and pressure points / stressors*. Both steps one and two were completed in creating this report (see Section 2 of this introduction for further detail).

The third step is to *set targets*, or describe an ideal scenario for our environment. The State of the

Environment Report prepares us for Step #3 by pointing out any targets we are already using, along with targets used in other cities. But more work is required to create a complete set of meaningful, achievable targets for Richmond. The fourth step involves *developing actions* to get us there. Some actions which will help us improve environmental management are already underway;

but once targets have been confirmed, new actions may be required to help us achieve them. The fifth step involves *monitoring the effectiveness of those actions*. If monitoring tells us the actions are working, we should continue them. But if the actions don't work, we can adjust them and then test them with further monitoring.

**Figure 1: Steps in an Environment Management System**



**How the Report Affects Richmond’s Official Community Plan**

Even before the complete monitoring system is in place, the SOE report will influence ongoing actions and policies in the City. Along with work on the SOE report, a process has been underway to update Richmond’s Official Community Plan (OCP). The OCP is a legal document which sets important land use, social and infrastructure policies for the City. The existing OCP affects natural areas; air quality; water quality; noise; and solid waste.

The Advisory Committee on the Environment and lead staff working on the SOE Report have also been part of the OCP process. Many OCP policies will build on and, in turn, improve future SOE results.

**Existing State of the Environment Reports**

Several other communities have already created their own SOE reports, and are using them in many ways. Before this project began, the team made a wide survey of these reports to learn as much as possible from them. A listing of SOE reports consulted for this project has been provided in Attachment 3.2.

**2. How the Report was Written**

*(Steps 1 & 2 in Environmental Management System Development)*

**How General Priorities / Topics of Concern Were Clarified (Step 1)**

The current OCP for Richmond includes the broad goal of balancing the natural environment and urban development within the City. Residents have recently confirmed this goal. More specifically, they have identified eight priority environmental issues or topics. This list of topics came from the following input:

- Council priorities, as determined from approved departmental work programs;
- A random sample telephone survey on environmental issues (January 1997);
- Written surveys submitted for the review of the Official Community Plan (OCP) (June 1997);
- Public discussion groups for the OCP review (September / October 1997); and
- A random sample telephone survey for the OCP review (September 1997).

To assess our environmental resources and stressors, we need measurements that say something meaningful about each topic. These measurements, or indicators, tell us about current conditions, and highlight trends to show whether things are: getting better; worsening; or staying the same. In turn they tell us whether the City’s planning processes and strategies are leading toward desired goals. (Environmental indicators are like economic indicators, such as unemployment rates, average house prices, and the gross domestic product, in this respect.)

**How the Indicators Were Created (Step 2)**

Richmond’s environmental indicators were identified through extensive discussions with staff from a variety of City departments, and with the Advisory Committee on the Environment. To be included in the report, indicators had to:

- Relate directly to Richmond’s environmental priorities;



- Be able to measure environmental change, and / or tell us something about how local programs are affecting the environment;
- Have reliable data available; and
- Be repeatable in future years.

### How the Indicators Will Lead Us to Action

Most of the indicators provided in this report are potentially influenced by City action. In some cases an indicator may already be influenced to varying degrees by a City action and, where this is occurring, it is spelled out in the report. Actions which the average citizen can take to improve indicator performance are also suggested.

Yet given that resources are increasingly limited, we need ways to set priorities for action. To enhance general priority-setting, the indicators for each topic have been rated according to public importance and the extent to which the City can reasonably influence the indicator (shown in Fig.4). More specific priority setting will occur once targets have been developed .

### 3. What We Found (Summary of Results)

The topics assessed consist of two general categories:

- **Environmental Assets** (our “Natural Capital”) including clean air and water; productive land; plant and animal life; and other renewable resources that help us survive and prosper; and
- **Environmental Stressors**, or pressures on those assets. Direct City actions on these topics will ultimately improve the status of our assets as well.

Our study shows that our *environmental assets* are in *good shape* —for now.

But these assets are coming under *increasing pressure* from *specific environmental stressors*.

Some City efforts are already reducing the impacts of stressors, such as recycling. But there are other areas of increasing concern which are still moving in the wrong direction. As a result, the overall picture for

environmental stressors is a mix of good and bad news (see chart below). With transportation, for example, some good news has resulted from City efforts. But we need to rely on other levels of government to have full effect on this topic, and there are some shortcomings in this area. *To ensure our assets remain healthy we must ensure the City continues to do its part in improving our performance on environmental stressors.*

The following is a summary of findings under each topic and indicator. Figure 2 below identifies whether results show predominantly good or bad news for the topic. *Good news* indicates positive trends for the natural environment or significant progress in recent years. *Bad news* indicates worrying trends for the natural environment. Some results are a mix of good and bad news.

**Figure 2 Summary of Results**

<b>A. Greenspace</b>	<i>Good News</i>
<b>B. Water Quality</b>	<i>Good News</i>
<b>C. Air Quality</b>	<i>Good News</i>
<b>D. Land Use</b>	<i>No Indicator</i>
<b>E. Transportation</b>	<i>Mixed Results</i>
<b>F. Resource Consumption/ Waste Generation</b>	<i>Mixed Results</i>
<b>G. City Environmental Practices</b>	<i>No Indicator</i>
<b>H. Noise</b>	<i>No Indicator</i>

## Summary

### GREENSPACE

#### Agricultural Land

*GOOD NEWS*

Despite an almost doubling of Richmond’s population since the early 1970s, the Agricultural Land Reserve (ALR) in Richmond is largely intact. 91% of the ALR designated in 1974 has remained in the ALR. Since 1989, only 4 hectares of land were taken from the ALR.



#### Parks and Protected Areas

*GOOD NEWS*

The size of parks and protected areas has increased rapidly over the past decade. The total area of City-owned parkland has grown by 40% since 1986. As land prices rise, park acquisition becomes more expensive, so these trends have been very encouraging. In 1997 8.5% of the Richmond land base was in parks or protected areas.

#### Environmentally Sensitive Areas

*GOOD NEWS and BAD NEWS*

In 1997, 13.5% of Richmond was identified as an Environmentally Sensitive Area (ESA). Data are not available to show the change in size of ESAs over time, but development trends suggest that ESAs are becoming increasingly pressured by development. Recent park and protected area acquisitions, however, have meant that about 43% of Richmond’s ESAs are now formally protected.

#### Street Trees

*GOOD NEWS*

Since 1994, the City has ensured that street trees are planted whenever roads are built or renovated. A total of 3,127 trees have been planted since 1994. Readers should note, however, that the indicator only measures new street trees, not whether the **total number** of trees in the City has increased.

### WATER QUALITY

#### Fraser River Water Quality

*GOOD NEWS AND BAD NEWS*

Available information paints just a partial picture of Fraser River water quality, which is highly affected by many cities and levels of government. From 1993 to 1997 fecal coliform concentrations often failed GVRD objectives. This situation should improve once planned upgrades to nearby GVRD sewage treatment plants are completed. During the same period, dissolved oxygen concentrations (which benefit marine life) have consistently passed or improved on GVRD objectives.

#### Drinking Water Quality

*GOOD NEWS*

Richmond’s water is safe to drink and will continue to benefit from planned water supply improvements. The natural pH balance of our regional water supply has previously been a concern –causing water pipes in our homes to corrode and leave metal stains on bathtubs and sinks. However, steps to neutralize the water have already been taken by the GVWD to address the issue. Richmond’s local water distribution network is in good shape, and regularly cleaned to prevent bacteria regrowth and remove sediment from water mains.



## AIR QUALITY

### Air Quality Index

*GOOD NEWS*

The GVRD Air Quality Index has consistently measured air quality as “good” in the City over the past decade. Every year, some hours fail the standards for good air quality and are categorized as “fair “ or “poor”. While the trend for air quality reads as though things have worsened, this is due to a newly adopted, more rigorous monitoring approach. (See details under the full write-up for this indicator.) This still yields good news because, for the vast majority of hours, the Index measures “good” air quality.

## LAND USE AND HUMAN SETTLEMENT

### NO INDICATORS

Land use and settlement patterns are a key factor in environmental health, and a topic which local government has great potential to influence. The next edition of the SOE Report will include indicators reflecting the goals and objectives developed in the 1998 version of the Richmond Official Community Plan.

## TRANSPORTATION

### Transportation Choice - Mode Share

*BAD NEWS*

Cars are a major source of air pollution in the city. Infrastructure for the car (roads, parking lots, etc.) also consume large areas of land. A growing population may mean more cars and thus more pressure on environmental assets. This indicator showed that most trips taken by Richmond residents are still by car (79%), as opposed to cycling and walking (15%) or transit (6%).

### Vehicle Ownership

*BAD NEWS*

In 1996, Richmond residents owned on average 1.91 cars per household. This ratio has stayed constant over the past decade. Population growth, however, has meant a 20% increase in total cars on the road since 1989.

### Pedestrian Friendly Streets

*GOOD NEWS*

In 1997, 61% of Richmond’s major roads had a sidewalk on at least one side (the minimum standard for being “pedestrian friendly”). Of all streets, 3.3% met the new standard for “pedestrian friendly streets” (containing both a sidewalk and a boulevard strip separating the sidewalk from the road). These proportions are low but represent a major gain since 1990. All new roads will be built to the new standard for pedestrian friendly streets, so over time the proportion will increase.

### Cycling Lanes

*GOOD NEWS*

Richmond’s network of cycling lanes is among the best in the region. There are 15 km of cycling lanes in the City, accounting for 10% of all major roads. Since 1993, the total length of cycling lanes in the City has tripled, through new City cycling programs recommended by the Richmond Cycling Committee.



## RESOURCE CONSUMPTION AND WASTE GENERATION

### Water Consumption

*BAD NEWS*

Water consumption per person has decreased only slightly in the City since 1985. Population growth, however has meant a 33% increase in total water consumption in the City. Pressures on water supply are particularly strong in the summer, when residents use 20-25% more water per day than in winter.

### Solid Waste Generation

*GOOD NEWS and BAD NEWS*

Solid waste managers encourage people to reduce, reuse, recycle. Since 1990, Richmond residents have had limited success reducing or reusing resources. We produced the same amount of solid waste per person in 1997 as in 1990. But recycling programs have been a big success, leading to a 46% drop in total waste sent to landfills.

## CITY ENVIRONMENTAL PRACTICES NO INDICATORS

The City can help promote environmental stewardship by setting a good example and using best environmental practices. These practices may also save money and reduce liability. Considerable work is required however, to define good environmental practices for the municipality and a short list of indicators that *best* measure Richmond's environmental stewardship. Resources did not permit this topic to be reviewed in 1998, but future reports should include new indicators.

## NOISE NO INDICATORS

Noise has less of a direct, impact on the natural environment than other topics in this report. But it has significant impacts on human health and city livability. Noise is a complex topic, and the City is still working to develop a definition of healthy noise levels for Richmond. Once these levels are defined, noise indicators will be included in future reports.

## Immediate Next Steps

As an immediate next step, we need to gather missing information on stressor topics that will complete our overall picture of Richmond's environmental indicators.

Other follow-up work will involve target setting and the development of action plans for ensuring targets are met. Richmond Council, staff and the Advisory Committee on the Environment will play important roles in determining how ambitious the City should be in setting environmental targets. As a starting point, the City may wish to consider using some of the targets chosen by other cities which have been given as examples in this report. Alternatively, technical specialists in the topics under study could also be consulted to determine attainable and environmentally significant targets.

Continued monitoring will ensure that the City makes good progress in meeting its targets. To ensure that we stay on track, the indicators monitored in this edition should be re-assessed in three years time. New indicators may also be developed in the interim to help broaden our understanding of our environmental health - particularly for those topics where indicators have not yet been identified.

What follows in the remainder of this document is a detailed discussion of findings for each topic and indicator.

## Figure 3 Complete List of Topics and Indicators

### ENVIRONMENTAL ASSETS

- A GREENSPACE - THE GARDEN CITY
  - A1 Agricultural Land
  - A2 Parks and Protected Areas
  - A3 Environmentally Sensitive Areas
  - A4 Street Trees Planted by the City
  - A5 Trees Lost and Gained Through Multi-Family Development
  
- B WATER QUALITY
  - B1 Fraser River Water Quality
  - B2 Drinking Water Quality
  
- C AIR QUALITY
  - C1 Mean Annual Air Quality Index in Richmond

### ENVIRONMENTAL STRESSORS

- D LAND USE AND HUMAN SETTLEMENT
  - No indicators in 1998
  
- E TRANSPORTATION
  - E1 Transportation Choice
  - E2 Vehicle Ownership
  - E3 Pedestrian Friendly Streets
  - E4 Cycling Lanes
  
- F RESOURCE CONSUMPTION AND WASTE GENERATION
  - F1 Water Consumption
  - F2 Solid Waste Generation
  
- G CITY ENVIRONMENTAL PRACTICES
  - No indicators in 1998
  
- H NOISE
  - No indicators in 1998

## Figure 4

# Understanding the Rankings

The following chart rates topics and indicators (High, Medium, or Low) according to public importance and the extent to which the City can reasonably influence the indicator.

### Explanation of Rankings - Public Importance

Indicators with a “High” public importance ranking met two or more of these criteria:

- An issue directly monitored by that indicator was identified (in the January, 1997 environmental issues telephone survey) as a concern or high priority for action;
- An issue directly relating to that indicator received high priority in the Official Community Plan telephone survey;
- The issue has had local media attention in the last two years; and
- The issue is a City Council priority (eg: recently adopted policies, approved work programs, highlighted in the Mayor’s address).

Indicators with a “Medium” ranking only met one of the above criteria. Those receiving a “Low” ranking did not meet any of the above criteria, but were included due to a strong connection to another indicator of medium or high priority.

### Explanation of Rankings - City Influence

#### 1. High Ranking

For these topics / indicators, the City has primary jurisdiction or influence through:

- a) Exerting a strong degree of control over indicator performance, or
- b) Providing services, fees or approvals which will very likely influence individual behaviours that affect an item.

#### 2. Medium Ranking

For these topics or indicators the City still has influence, but moderated by other factors:

- a) Other government agencies have a major interest in the area, but still work in partnership with Richmond through joint funding, or extensive consultation (eg: transit planning, ensuring drinking water quality); or
- b) Individual choices. For this type of indicator, the City can still play a role, but it is limited to providing outreach and other programs designed to influence individuals.

#### 3. Low Ranking:

For these topics or indicators, the City has minimal influence due to either:

- a) The strong influence of personal choices on performance or the jurisdiction of a senior government; or
- b) The complex nature of the topic (eg: air quality), which is influenced not just by other levels of government but global factors as well.

## Indicator Significance

**Figure 4**

Topics & Indicators	Public Priority	Level of Direct City Influence	Non-City Influence	Related Topics
<b>Environmental Assets:</b>				
<b>Greenspace / Garden City</b>				
Agricultural Land	H	M	Private & Senior Gov't	Air Quality; Water Quality Land Use & Settlement Patterns
Parks & Protected Area	H	H	Senior Gov't	
Environmentally Sensitive Areas	H	M	Private & Prov. Gov't	
City Trees Planted	H	H		
Trees Lost & Gained Through Multi-Family Development	H	M	Private Sector	
<b>Water Quality</b>				Land Use & Settlement Patterns; Greenspace/Garden City; Transportation; and Resource Consumption & Waste Generation
Fraser River Water Quality	H	L	Private Sector, Senior Gov't & Individuals	
Drinking Water Quality	H	M	Regional Gov't, Private Sector Individuals	
<b>Air Quality</b>				Land Use & Settlement Patterns; Greenspace/Garden City; Resource Consumption; & City Hall Environmental Practices
Annual Air Quality Index for Richmond	H	L	Private Sector, Senior Gov't, Individuals & Global Factors	
<b>Environmental Stressors:</b>				
<b>Land Use &amp; Settlement Patterns</b>	H	H	Private Sector & Senior Gov't	Greenspace/Garden City; Air Quality; Water Quality Noise & Transportation
(There are no indicators for this topic in 1998)				
<b>Transportation</b>				Land Use & Human Settlement; Greenspace/ Garden City; Air Quality; Noise & Resource Consumption & Waste Management
Transportation Choices/ Mode of Travel	M	L M	Prov. Gov't, GVRD & Individuals	
Vehicle Ownership	M	L	Individuals	
Pedestrian Friendly Streets	H	H	Private Sector	
Cycling Lanes	M	H	Province, Airport	
<b>Resource Consumption &amp; Waste Generation</b>				Air Quality & Water Quality
Water Consumption	H	M	Private Sector & Individuals	
Solid Waste Generation	H	M	Private Sector & Individuals	
<b>City Hall Environmental Practices</b>	M	H		Potentially all Topics
(There are no indicators for this topic in 1998)				
<b>Noise</b>	M H	M	Airport & Individuals	Air Quality; Water Quality; and Resource Consumption & Management
(There are no indicators fo this topic in1998)				

**H** = High Influence or Priority

**M** = Medium Influence or Priority

**L** = Low Influence or Priority





# Environmental Assets

- A            GREENSPACE - THE GARDEN CITY**
- B            WATER QUALITY**
- C            AIR QUALITY**



## TOPIC A: GREENSPACE - THE GARDEN CITY

Over the past century, Richmond has been called the Garden City, because of its large areas of greenspace, including extensive agricultural land. Greenspace today in the City of Richmond includes remnant natural habitats (marshes, sloughs, bogs, grasslands, shrublands and forest), parks, and agricultural lands. Directly related to greenspace is the issue of vegetation.

Greenspace and vegetation provide the following benefits:

- **Habitat.** Natural areas provide habitat for a wide variety of life: birds, fish, reptiles, amphibians, insects, and wildlife. But native vegetation has been removed from some greenspace (e.g., farmlands and playfields) greatly reducing their habitat value.
- **Limits to urban sprawl.** Greenspace provides a buffer to the city, limiting its outward spread.
- **Groundwater recharge and flood protection.** Greenspace provides land for rainwater to percolate into the ground, reducing flooding by absorbing overflow. Even on small patches of land, tree roots also absorb water overflow.
- **Oxygen and air purification.** Whether on a large area of land or on a narrow boulevard strip, trees and shrubs absorb carbon dioxide and other air pollutants, while releasing oxygen.

Greenspace also adds to residents' quality of life by providing aesthetic benefits, opportunities for outdoor recreation, and jobs through the agricultural economy.

This section of the report examines the following indicators:

1. Net Change in the Agricultural Land Reserve (ALR)
2. Size of Parks and Protected areas
3. Size of Environmentally Sensitive Areas (ESAs) and the proportion in protected areas
4. Trees planted by the City
5. Net Trees Lost and Gained through Multi-Family Redevelopment



# INDICATOR A1: AGRICULTURAL LAND

City Influence: **Medium**

Public Priority: **High**

## Introduction

### Why We Should Measure This Indicator

Agriculture is a source of both jobs and aesthetic benefits to local residents. Richmond contains some of the most fertile agricultural lands in Canada. Preserving agricultural lands may also result in environmental benefits to the City, including: acting as a buffer to urban sprawl, providing wildlife habitat (e.g., hedgerows for songbirds), and allowing for groundwater recharge.<sup>1</sup>

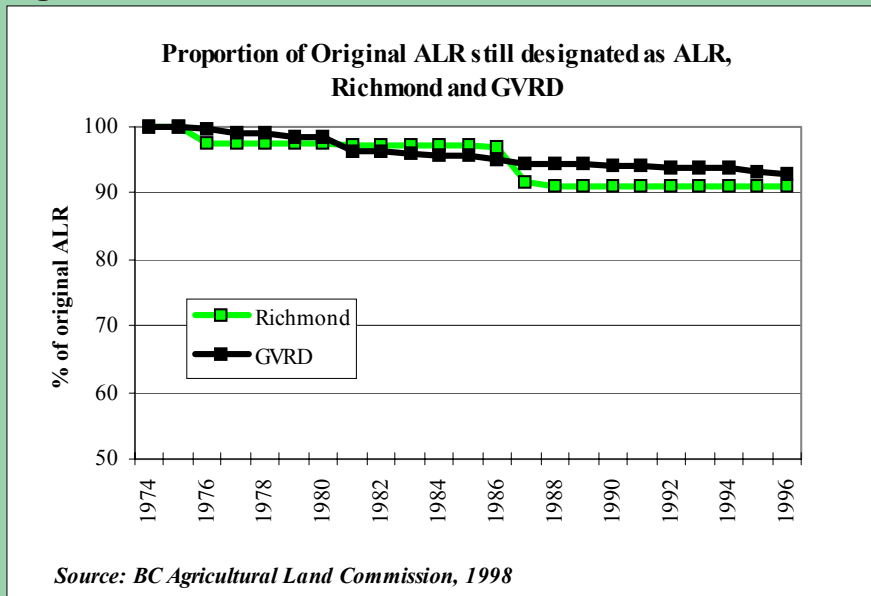
Greater Vancouver expands, these same lands are facing pressure to be converted into urban uses.

In 1973 the B.C. Agricultural Land Reserve (ALR) was established to protect and maintain the agricultural land base in BC. Lands in the ALR cannot be subdivided or changed to non-farm use without the permission of the provincial Agricultural Land Commission. This indicator tracks whether the ALR has successfully protected Richmond's agricultural lands from development. While there are some lands outside the ALR which are still zoned for agricultural use, these are generally being held in reserve for a non-agricultural purpose, and have been designated in the Official Community Plan for another use.

*Results show that the ALR has been fairly successful in protecting farmland, especially since the late 1980s.*

A century ago, much of Richmond's lands were drained and cleared for farming. As

**Figure 5a**



<sup>1</sup> NB Agricultural land use can have harmful effects, such as destruction of native habitats; and pesticide, fertilizer and livestock waste runoff into waterbodies. This edition of the SOE report does not track the latter.

## What is Being Measured

This indicator tracks:

- The annual hectares lost from the ALR (inclusions minus exclusions); and
- The proportion of the original ALR still intact.

## Results

Since 1974, the size of the ALR in Richmond has decreased by 489 hectares. Ninety-one percent of the ALR designated in 1974 has remained in the ALR (Figure 5). Exclusions from the ALR have occurred as large parcels in specific years (Figure 6). Since 1989, only 4 hectares of land have been lost from the ALR.

## Discussion

### What is Happening

Since the early 1970s Richmond’s population has almost doubled. As the City’s population has increased and land prices risen, so have pressures to convert farmland to urban uses. There are additional pressures on farming arising from conflicts with adjacent residential areas as well as riverfront habitat. Indicator results show that the ALR has been fairly well maintained, especially since the late 1980s.

Map 1 shows the 1997 location of ALR farmland in the City. The main agricultural areas in the City are in the South and East. These large farm holdings are in the ALR and have been protected for agriculture. Loss of agricultural land has predominantly occurred in the West of the City, where small farm lots have become surrounded by urban development, lessening the viability of the land for farming. Most of these lands were not designated in the ALR. The major rezoning from the ALR in 1987 was, however, located in this western area at Terra Nova.

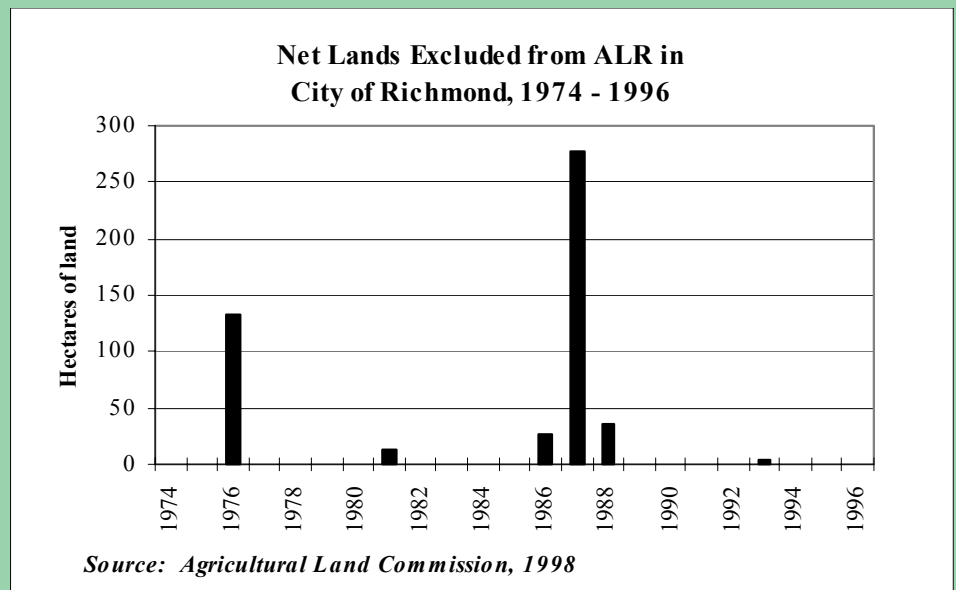
### Existing City Programs

The City strongly supports the ALR through its OCP. Farming close to urban areas can be challenging with urban neighbours complaining about normal farm



**Figure 5b**

*Exclusions from the ALR have typically involved large parcels in specific years. Since 1989, only 4 hectares of land have been lost from the ALR.*



practices such as crop-spraying, animal noise and smells, and farm traffic. Both the City and the Provincial Government have also been working on positive actions to enhance agricultural activities (e.g., the new Provincial Farm Practices Protection Act). The City has worked with the Ministry of Highways and power companies to ensure that roads and powerlines do not compromise farmers' access to their land.

There will be continued pressure on Richmond's agricultural lands as Greater Vancouver's population grows. Pressure will also come as many of the City's farmers approach retirement age and seek to sell their lands at a good market price. As part of the new Official Community Plan, new policies will be developed to address farm viability issues while continuing to protect Richmond's farm land.

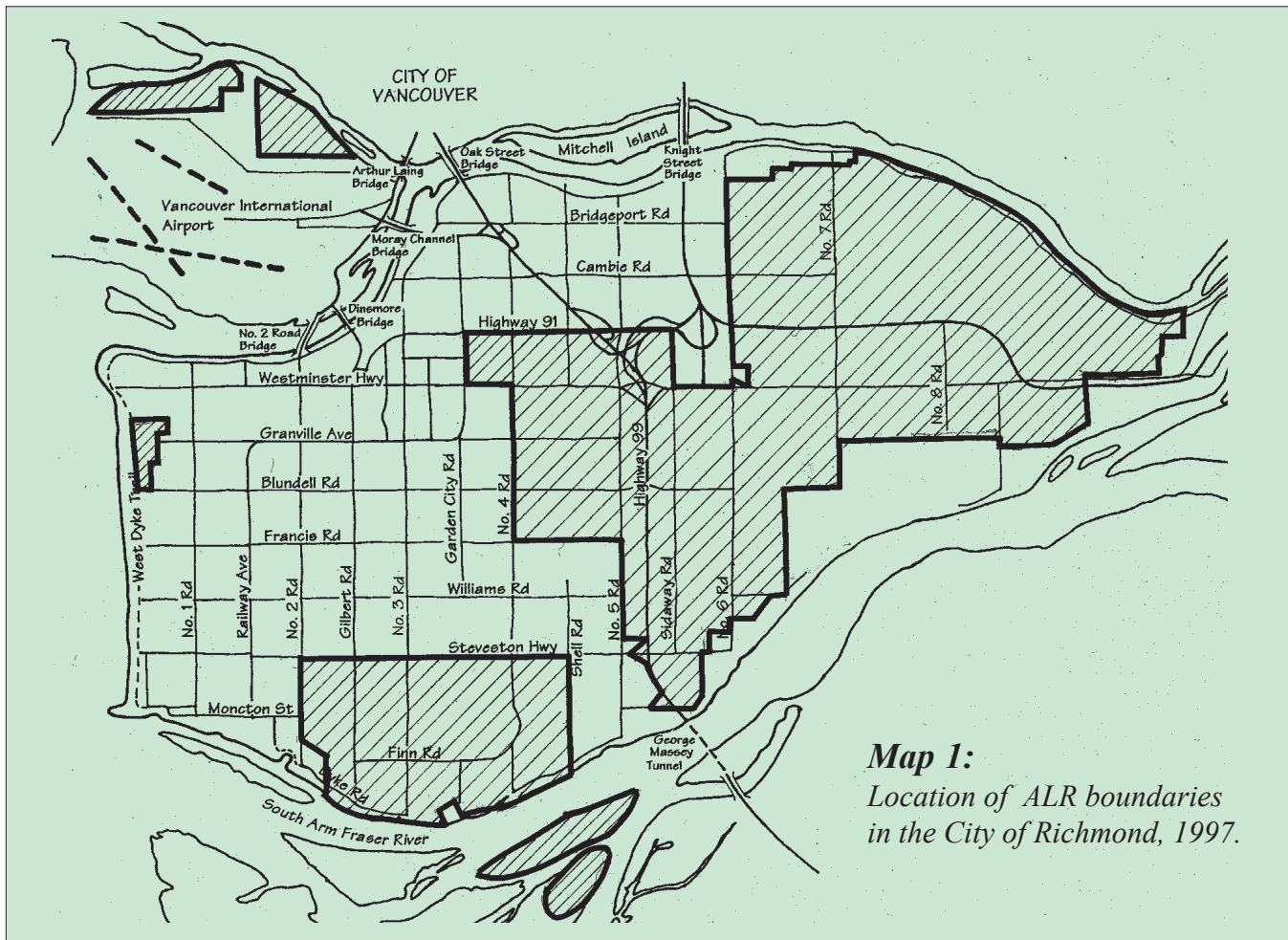
## Richmond and the Region

Ninety-three percent of the original ALR in the GVRD remains in the ALR today. This is only slightly higher than Richmond. Decreases in the size of the total ALR in the region have occurred gradually over time.

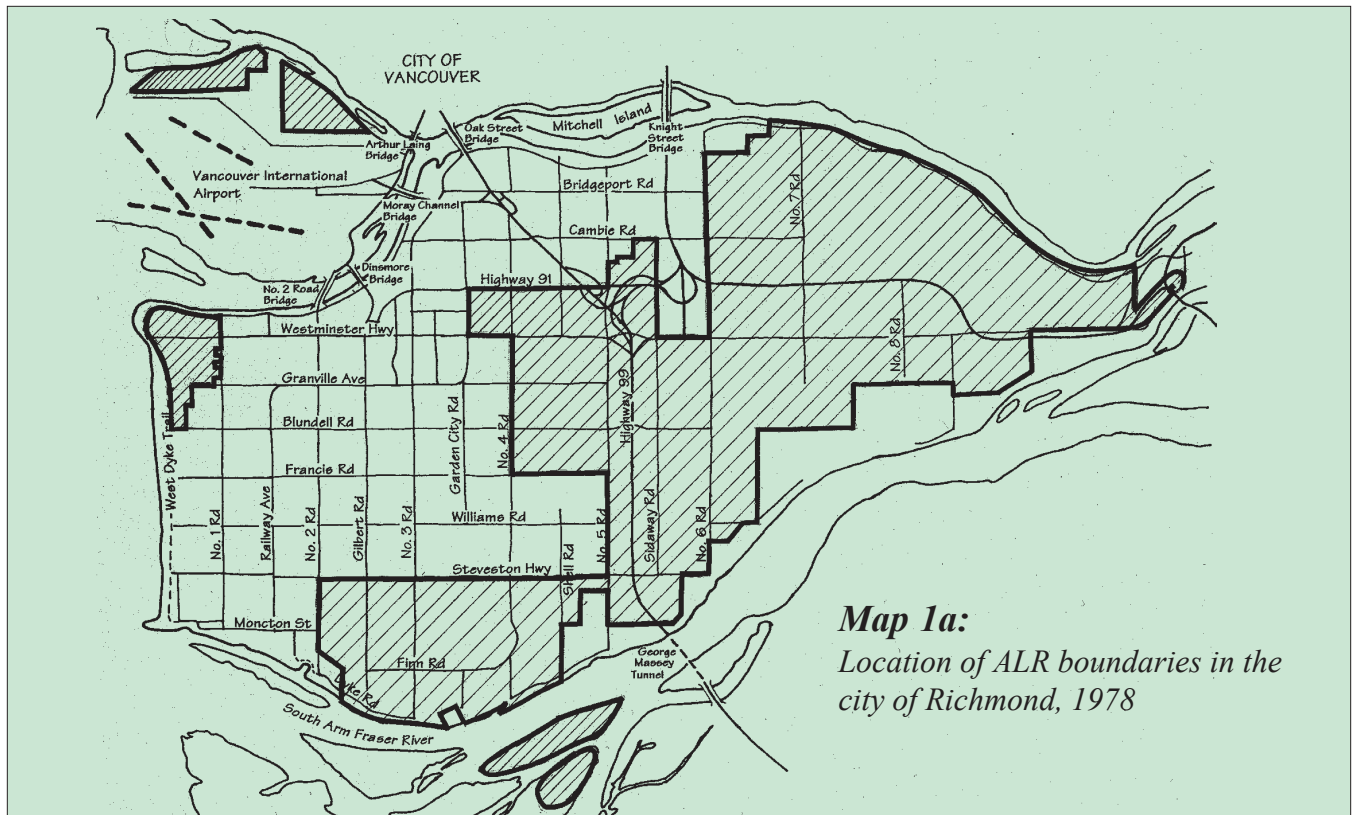
## The Future

### Targets and Influences

The Agricultural Land Commission has a goal to protect all lands in the ALR. As the current Richmond OCP has a policy to protect agricultural land in the ALR, the City has a *de facto* target of retaining today's amount of ALR land.



**Map 1:**  
Location of ALR boundaries  
in the City of Richmond, 1997.



### What Citizens Can Do

- Buy local produce;
- Consider participating in a community-sustained agriculture program, where city-dwellers buy advance shares in an upcoming harvest, and are paid in produce throughout the summer;
- Consult Farm Folk - City Folk, a non-profit organization dedicated to improving local agriculture.
- Learn about the importance of agricultural and farm viability issues;
- Recognize farmers' right-to-farm if they are following normal farm practices.

### Related Topics:

Air Quality  
Water Quality  
Land Use & Settlement  
Resource Consumption

### Related Indicators:

Parks and Protected Areas

## INDICATOR A2: PARKS AND PROTECTED AREAS (OWNED BY CITY AND OTHERS)

City Influence: **High**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator

Parks offer long-term protection of greenspace in the City. Specific ecological benefits depend on individual parks' vegetation coverage; permeable area; use; and management. While some City parks emphasize wildlife habitat (nature parks), others are developed for formal recreational with grass, parking lots and sports facilities. A third type of park can include both grassed play areas and vegetated lands for walking trails and passive recreation such as walking, bird-watching, and photography.

In addition to their ecological function, parks provide aesthetic and recreational benefits to residents, which make an important contribution to human health.

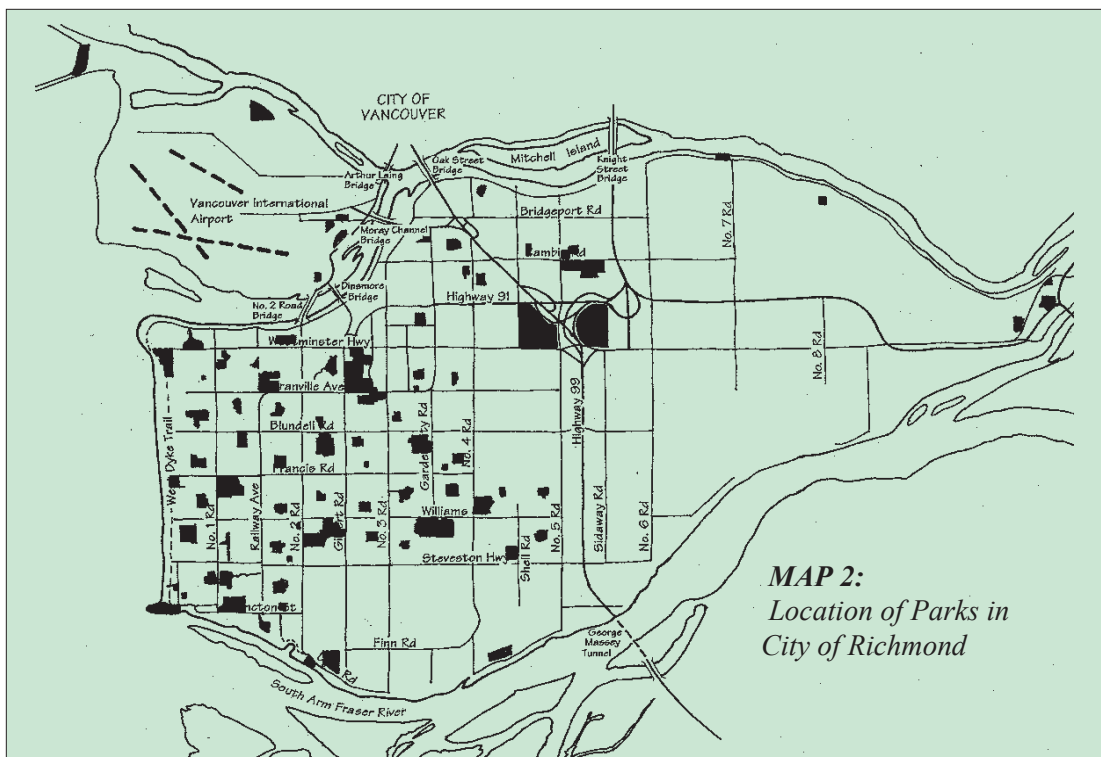
#### What is Being Measured

- Size of parkland owned by the City.

This indicator includes all terrestrial parks and protected areas, including those protecting Environmentally Sensitive Areas (see Indicator A3) and those on other lands.

There is a strong overlap between this indicator and Indicator A3.

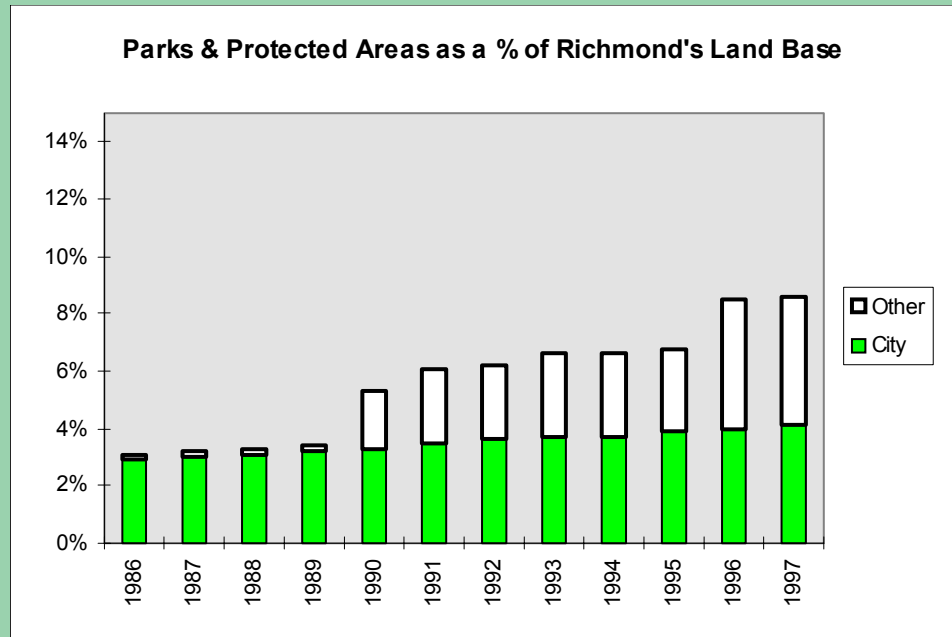
*The area of City-owned parkland has increased 40% since 1986.*





**Figure 6**

*In 1997, 8.5% of the Richmond landbase was within parks and protected areas, owned by the City as well as other levels of government.*



## Results

In 1997, the City owned 567 hectares of parkland (representing 4% of Richmond’s land base). Other agencies owned an additional 630 hectares, so a total of 8.5% of Richmond’s landbase is within protected areas (see Figure 4 and Map 3). The City also manages 80 km of trails, including an extensive trail system around the dykes.

Total City-owned parkland has increased 40% since 1986, at an average rate of about 13 hectares per year. Over the past 5 years, rates of new park acquisitions have not met population growth rates.

In 1997 the total size of terrestrial protected areas was three times the 1986 area, thanks to large designations during the 1990s by the GVRD, Nature Trust and provincial and federal governments.

## Discussion

### What is Happening

The City can acquire parkland when land is subdivided. The City may also purchase new parcels in areas having a perceived need for parks, using money from development cost charges. The City’s

park acquisition has been affected by rising land costs and competing priorities.

In recent years, large areas have been protected by other agencies - for example the 1996 84 ha addition to Iona Regional Park, the 1996 designation of the 140 ha Sea Island Conservation Area, and the 1991 designation of the 886 ha South Arm Island Wildlife Management Area. These large protected areas are important for preserving viable habitat for birds, wildlife and fish.

### Existing City Programs

As private land in the City becomes more developed and greenspace becomes rarer, the importance of publicly-owned parks increases for both environmental and recreational reasons. Traditionally, park acquisition and planning focuses mainly on formal recreation uses. But over the years, Richmond has acquired and developed a *variety* of parks including passive and natural open spaces such as the Terra Nova West Park, Garry Point Park, the Nature Park and the Bog Forest. Recent public consultation has confirmed that residents continue to want passive and interesting parks with opportunities for walking, unstructured play activities, and environmental enhancement.

As Richmond continues to become a more urban community, new park acquisitions become more difficult, particularly in the City Centre area. To address this problem, and complement the Land Acquisition Program, the City has recently launched a **Civic Beautification Strategy** to create a more attractive, greener and “park-like” City. The strategy focusses on the entire urban realm including non-traditional open spaces like roads, buildings and firelanes. Some of the initiatives include:



- a) A City Centre pedestrian and cyclist circulation plan (see E3 & E4) which connects residents in areas with few open spaces to existing parks along enhanced streetscapes;
- b) A street tree planting plan for the City Centre (see A4);
- c) New road standards which have more emphasis on the pedestrian environment;
- d) A median planting program, and
- e) Guidelines for more interesting and diverse parks including areas for passive recreation.

Since 1996, the City has also promoted a program called Privately Owned Publicly Accessible Spaces (POPAS). Approximately two acres of open space has been provided to date through this program. This program encourages developers to include publicly-accessible, privately-owned open space in developments, in addition to regular development cost charges which help fund public parks and other needed services.

## Richmond and the Region

Comparisons among municipalities on total area of parkland are not possible, because municipalities use different definitions of park in their calculations. Some municipalities include only public parks, while others include school playing fields, ski hills, golf courses and exhibition grounds. Estimates by the GVRD on percent of municipality in parks in core GVRD municipalities range from under 10% to 35%.

## The Future

### Targets and Influences

The Provincial Government has set a target of protecting 12% of British Columbia’s land base as park by the year 2000. At time of writing, approximately 10.6% of BC’s landbase is in provincial protected areas.

The City of Richmond has not set targets on the percent of the landbase that should be set aside as parkland. Park planners have traditionally assessed park needs on the basis of area per person. This type of assessment emphasizes service delivery levels, rather than a strictly ecological function. Future work on target development and indicator refinement could focus on more ecological aspects, such as: the proportion of permeable surfaces in parks (as opposed



to hard surface area); amount of tree and vegetation cover in parks; and the degree of connectivity between parks and pedestrian / cycling routes.

### **What Citizens Can Do**

Citizens can help protect greenspace on both private and public lands by volunteering with non-profit groups that play a role in park stewardship (e.g., the Vancouver Aquarium marsh enhancement project at Britannia Heritage Shipyard). See also A3 - Environmentally Sensitive Areas for other suggestions.

### **Related Topics:**

Air Quality  
Water Quality  
Land Use & Settlement  
Resource Consumption

### **Related Indicators:**

Environmentally Significant Areas  
Street Trees Planted by the City  
Pedestrian-Friendly Streets  
Cycling Lanes

## INDICATOR A3: ENVIRONMENTALLY SENSITIVE AREAS

City Influence: **Medium**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator

The City of Richmond encompasses two main islands, and several smaller ones, at the mouth of the Fraser River estuary. Estuaries are among the most biologically productive areas in the world, supporting a great variety of fish, wildlife, insects, and plants. The Fraser River estuary has Canada’s highest concentration of wintering birds of prey, is a key feeding and resting stop on the Pacific Flyway for migratory waterfowl and shorebirds, and provides essential habitat for over 80 species of fish and shellfish, including all five salmon species<sup>2</sup>.

In 1991, Richmond commissioned a report to identify all Environmentally Sensitive Areas (ESAs) in the City. At that time, the study showed that most of the ESAs in Richmond are remnants of land that have not been cultivated or developed for urban purposes. Many of these lands are privately owned. As the community grows, landowners may press to develop natural areas for industrial, residential, commercial, or agricultural use.

*Despite additions to protected areas, development trends suggest that the total area of ESAs will have decreased over time*

Data on the size of ESAs is available from Richmond’s ESA database<sup>3</sup>. ESAs include marshes, bogs, grasslands, shrubs, forests, and sloughs, supporting a variety of birds and small mammals. Landowners’ use of ESAs can alter boundaries and affect actual ecological value.

This report defines “protected areas” as a sub-set of ESAs with stronger protection, these include City parks, GVRD parks, federal conservation areas, lands owned by non-governmental nature trusts, and provincial Wildlife Management Areas. The indicator also includes a provincial designation called a Section 13 under the Land Act, that prevents development that might harm the ESA.

Not all ESAs within Richmond are completely protected. All ESAs are designated as Development Permit Areas (DPAs), meaning that landowners require a special development permit and must meet a set of extra requirements before they can build on ESAs<sup>4</sup>. DPAs cannot, however, prevent landowners from building on their property. As a result, ESAs that have no other protection may be damaged or reduced

#### What is Being Measured

This indicator tracks:

- The total size of remaining *terrestrial* ESAs in the City (i.e. ESAs above the high tide mark);
- The size and proportion of *terrestrial* ESAs that are designated as parks and protected areas;
- The size of *aquatic* ESAs designated as parks and protected areas (i.e. ESAs below the high tide mark)

<sup>2</sup> (FREMP 1994)

<sup>3</sup> The ESA database may overestimate the area of ESAs, due to initial measurement errors. Furthermore, some lands that were identified as ESAs in 1991 may have subsequently been cleared or developed, reducing or eliminating their ecological values. These “ex-ESAs”, however, are still legally designated as ESAs in the database. The City seeks to improve the database in future years.

<sup>4</sup> Richmond has produced a design manual to guide landowners developing on ESAs (City of Richmond. 1991. Criteria for the Protection of ESAs: A Design Manual).

through the development process. Similarly, the indicator includes some portions next to the dykes as “protected areas”. The dykes are an engineering structure to protect lands from flooding, and will be adjusted to meet safety requirements. These adjustments could affect adjacent ESAs.

## Results

Although the inventory was conducted in 1991, the database has been recently changed to address some of the measurement errors that occurred with initial designation, so past trends would be meaningless.

The size of terrestrial ESAs in Richmond in 1997 is 1,900 hectares (4,692 acres) — 13.5% of Richmond’s total land base.

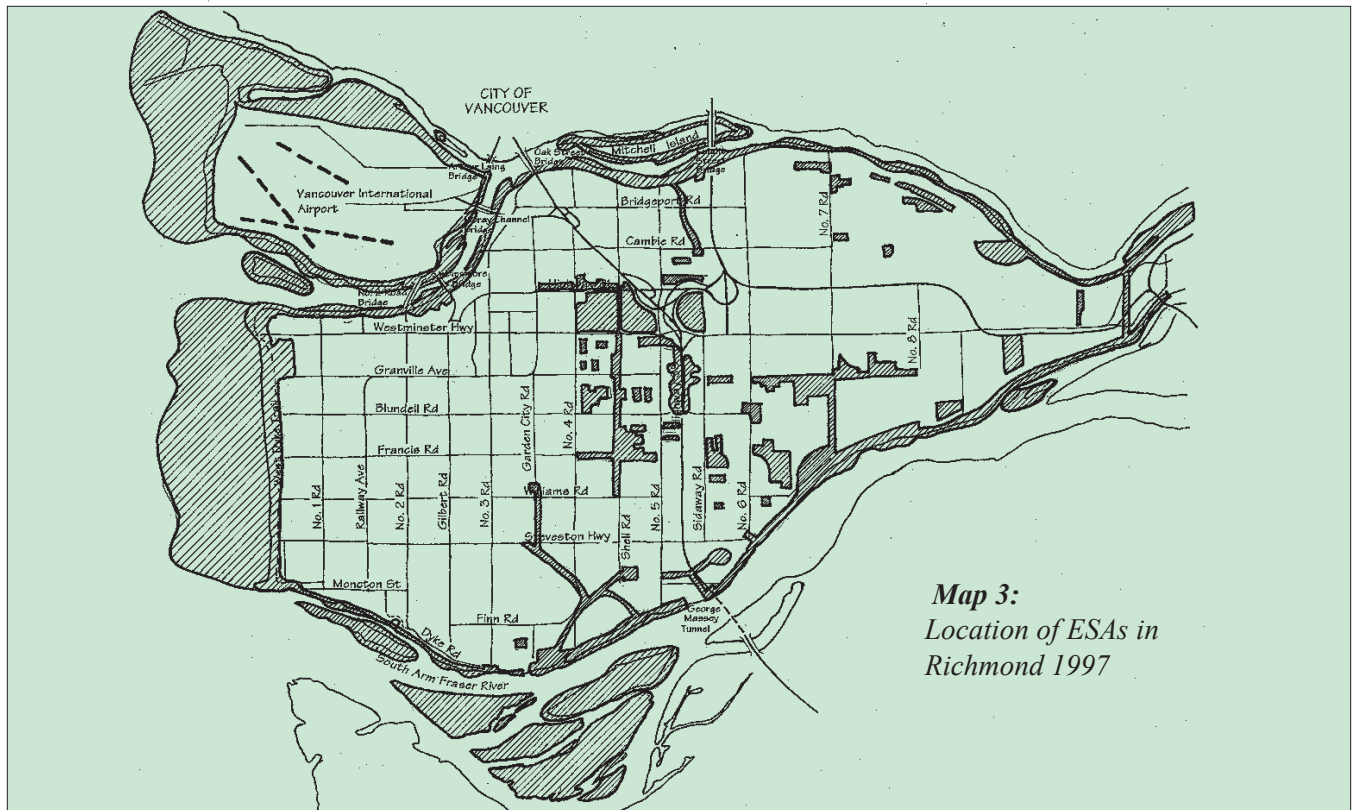
In 1997, 788 hectares of terrestrial ESAs were formally protected in parks or protected areas, accounting for 42.7% of all terrestrial ESAs. A fifth of these parks and protected areas were owned by the City. As indicator A1 shows, the size of parks and protected areas has increased rapidly over the past decade.

In addition, 5264 hectares of aquatic ESAs are designated as protected areas, at Sturgeon Banks and around the South Arm Islands.

## Discussion

### What is Happening

Trends on the change in size of ESAs over time cannot be tracked. One key addition to ESA was the restoration of 140 hectares of wetland as compensation for the airport construction. These lands were designated by the federal government as the Sea Island Conservation Area in 1996, and compensated for 84 hectares of ESAs lost during the building of the new runway. Another important addition was the 14 hectare Terra Nova Natural Area, purchased by the City and currently being restored as a habitat area with limited perimeter access, in partnership with Ducks Unlimited. Activities by senior levels of government will also have an impact on ESAs (both positive & negative). The City has recently acquired additional lands in the North West Quadrant which could be partially restored for habitat value.



**Map 3:**  
*Location of ESAs in Richmond 1997*

Yet despite additions to protected areas, development trends suggest that the total area of ESAs will have decreased over time. ESAs are also impacted by land use practices. A study by the Advisory Committee on the Environment and Kwantlen College students on the state of ESAs on selected private parcels, indicated that many ESAs have been severely degraded, by vegetation clearance

The key means of protecting ESAs is therefore through land acquisition and designation as parks and protected areas. The recent increase in size of parks and protected areas, both by the City and other agencies is encouraging.

### Existing City Programs

The City is seeking to balance development pressures with protection of ESAs. All ESAs are designated as Development Permit Areas (DPAs), but these have limited powers in protecting ESAs. The City can only prevent development on ESAs if it acquires land through purchase or donation, or if a conservation covenant is purchased, registered and enforced on the land title. Land acquisition is expensive and at time of writing, the City has no formal comprehensive strategy for acquiring lands just for conservation purposes.

Many of Richmond's ESAs also extend below the high tide line into the intertidal area. Protection of these areas requires close co-ordination with other agencies that regulate coastal development (e.g., Ministry of Environment, Lands, and Parks, Department of Fisheries and Oceans). In 1991, the City signed a Statement of Intent with the Fraser River Estuary Management Program (FREMP) to co-ordinate all government activities and policies for waterfront habitat areas. Any development on coastal lands is subject to FREMP's co-ordinated environmental review, in addition to any City assessment.

### Richmond and the Region

Other municipalities and organizations in the region have mapped their environmentally sensitive areas (e.g., City of Surrey, District of Maple Ridge, Township of Langley, District of North Vancouver, District of Port Coquitlam, Fraser River Estuary Management Plan,). Statistics on total ESA area however, are not comparable among jurisdictions,

because municipalities have used different definitions and inventory techniques for identifying ESAs.

## The Future

### Targets and Influences

The City has no targets or goals for the proportion of ESAs it wishes to see preserved in parks or protected areas. But the City intends to continue its partnerships with other levels of government through the FREMP. The new OCP may also identify some general directions for improving ESA management.

Senior governments have set the following objectives for the Fraser River Estuary:

- *Department of Fisheries and Oceans (DFO):* Return salmon population to historic levels in the Fraser River. DFO maintains a policy of "no net loss" for fisheries habitat.
- *Canadian Wildlife Service:* Maintain, at a minimum, the present abundance of migratory birds in the Fraser River estuary (FREMP 1994).

### What Citizens Can Do

Many ESAs are on private lands. Citizens could consider the following for protecting and enhancing ESAs:

- Plant native vegetation in your garden to provide habitat for wildlife and birds –For ideas on how, consult Naturescape BC.
- If you own lands that include ESAs, consider placing conservation covenants on the ESA or even donating the lands to a conservation Land Trust.
- Volunteer with conservation organizations and local natural history societies to assist in identifying and monitoring ESAs.
- Join volunteer groups involved in land stewardship or habitat restoration programs.
- Find out more about the Delta Farmland and Wildlife Trust farmland stewardship program.

## **Related Topics**

Air Quality  
Water Quality  
Land Use & Settlement  
Resource Consumption

## **Related Indicators**

Parks and Protected Areas

## INDICATOR A4: STREET TREES PLANTED BY THE CITY

City Influence: **High**

Public Priority: **Medium**

### Introduction

#### Why We Should Measure This Indicator

Street trees offer both environmental and aesthetic benefits. Urban development often results in large-scale removal of trees and vegetation. Street trees help restore greenery to the City. Street trees provide habitat for birds and serve as a wind screen, rain canopy while sunshade and providing a sense of scale.

*Since 1994 the City has planted 1,266 new street trees.*

In 1994, the City adopted a program to plant street trees when new roads are constructed, or wherever roads or sewers are rebuilt.

#### What is Being Measured

This indicator measures total new trees planted along Richmond roads during road maintenance and new road construction.

In future years, the indicator could be adapted or supplemented to address the issue of biodiversity. Overreliance on two or three major species reduces diversity and increases susceptibility to diseases that affect individual species (eg: Dutch Elm disease).

### Results

Since 1994 the City has planted 1,266 new trees during road maintenance, averaging approximately 300 - 400 trees per year. In addition 1,861 street trees have been planted along roads in new subdivisions.

### Discussion

#### What is happening?

The 1994 street tree program has meant the planting of many new trees in the City, restoring some greenery after road development and leading to more pleasant and appealing streets. Greenery will increase over time, as the trees grow and mature.

Readers should note, however, that the indicator only measures new street trees that are planted by the

City or developers. It does not assess how trees are impacted by major development projects. (In future reports, this information will be provided through Indicator A5). Therefore, although many new trees may be planted, the indicator does not measure whether the **total number** of trees in the City has increased.

#### Existing City Programs

The City has developed standards for street tree planting, including tree type, spacing and maintenance. The City uses trees that are drought-resistant and most resilient to living in urban areas (e.g., maple and Chinese oak trees). Many native trees will not survive as street trees, so other types are used.

In addition to the street tree program, the City also plants vegetation and trees in public parks.

#### Richmond and the Region

Street tree planting has been adopted by many cities in the region (e.g., Surrey, Vancouver, North Vancouver). The City of Vancouver maintains more than 107,500 street trees and stores information on age and maintenance in a detailed computerized inventory of all street trees.



## The Future

### Targets and Influences

There are no targets for this indicator at present.

The number of new trees planted will depend on the amount of new road construction and road maintenance. Since 1994, trees have been planted along all new and retrofitted roads and under the Beautification Strategy, trees are being added to road and parks even without reconstruction. The City is seeking to plant a wide diversity of trees, to reduce risks of tree loss from disease outbreaks. The City is also developing a program to inventory all major trees in the City centre.

### What Citizens Can Do

Street trees are just a small proportion of trees in Richmond. Most trees are located on residents' private property. Richmond residents can help preserve trees and vegetation in the City by caring for their own trees, and replanting trees if they are removed. The City encourages residents to retain trees whenever possible.

### Related Topics:

Air Quality  
Water Quality  
Land Use & Settlement  
Resource Consumption

### Related Indicators:

Street Trees Planted by the City

## INDICATOR A5: TREES LOST AND GAINED THROUGH MULTI-FAMILY DEVELOPMENT

—The 1998 State of the Environment Report Contains No Data for this Indicator—

City Influence: **High**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator

Trees have many benefits, as noted earlier under Indicator A4 - Street Trees Planted by the City. Ensuring a healthy urban tree inventory involves public and private property. The City has the most leverage over private trees through the *development process*, particularly over multiple-family developments. Measuring total trees lost and gained through multi-family development helps us assess how effectively we use the existing tools.

#### What Will Be Measured:

At present, applicants to rezone a property or take out a multiple-family development permit must make a tree survey, so staff can assess the location, number and type of trees on-site. Through negotiations, applicants are encouraged to retain existing trees where feasible. Where retention won't work, they must replace those trees. The indicator will thus compare trees before development with those retained or planted upon completion<sup>5</sup>.

#### Why There is No Data

The City recently switched to a new development application tracking system, which must be adjusted to monitor trees lost and gained through multi-family developments. These adjustments can be done shortly, but we need a year's worth of data before reporting is worthwhile.



These large trees have been retained on a new development site.

#### Related Topics:

Air Quality  
Water Quality  
Land Use & Settlement  
Resource Consumption

#### Related Indicators:

Street Trees Planted by the City

<sup>5</sup> At some point this measurement could be expanded to reflect diversity of species planted.

## TOPIC B: WATER QUALITY

Water is a basic element of life and a good indicator of overall environmental health.

This topic looks at two indicators:

- Fraser River Water Quality; and
- Drinking Water Quality.

These two indicators are quite distinct. The Fraser River is an important salmon-spawning river, but also the recipient of treated sewage and industrial effluent. The Fraser is geographically far removed from the source of Richmond's drinking water, which is generally transported from the Capilano Reservoir in the North Shore mountains. More information on the environmental significance of each indicator is provided in the information that follows.

## INDICATOR B1 FRASER RIVER WATER QUALITY

City Influence: **Low**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator

The health of the Fraser River is important to citizens in Richmond, other GVRD municipalities, and the province as a whole. The Fraser River is an estuary, where salt and freshwater meet, and thus a unique type of ecosystem which is home to many important forms of life. Because it is a major salmon spawning ground, the Pacific Northwest fishing industry depends on the health of this river. The river is also an important recreational amenity for local residents.

The following types and sources of pollution, all of which exist in Richmond, may impair water quality:

- untreated urban runoff and combined sanitary/storm sewer overflows;
- sewage treatment plant effluent;
- commercial and industrial effluent;
- runoff from agricultural land and wastes;
- leachate and runoff from contaminated sites and landfills; and
- accidental spills and leaks, and other emergency occurrences.



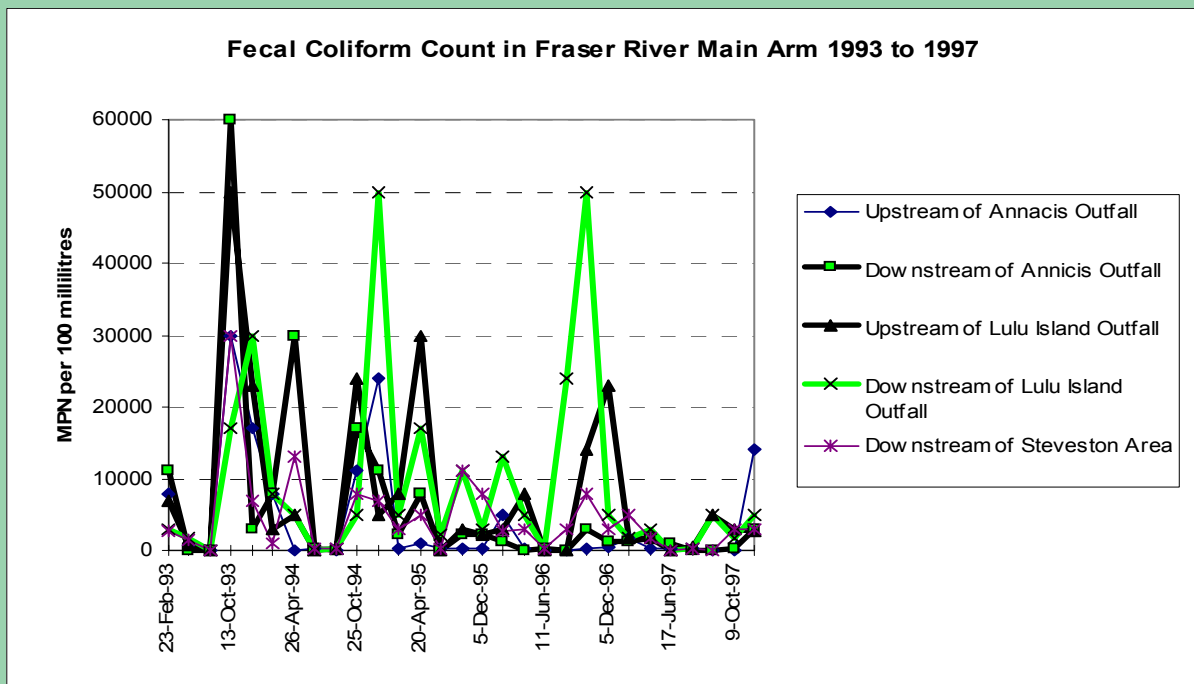
#### What is Being Measured

There is no single source of data that presents a comprehensive picture of Fraser River Water Quality. At present, the City does not collect suitable indicator data that would represent water quality, or water quality impacts, in the Richmond area. Although the Ministry of Environment, Land & Parks conducts ambient water quality monitoring in various locations throughout the province, no repeated sampling points relevant to Richmond have been identified to date. Nonetheless, relevant conclusions on the quality of the Fraser River Main Arm, from the *British Columbia Water Quality Status Report* (April 1996), are cited in the Discussion section.

The best available data comes from regional (GVRD) monitoring. As a condition of its sewage treatment plant operating permits, the GVRD must monitor certain water quality characteristics of the Fraser River, at locations upstream and downstream of the treatment plant discharge points at Lulu and Annacis. While these data do not reflect overall water quality in the Richmond area, they do give a general sense of Fraser River water quality, which will have an impact on Richmond. Since 1993, the GVRD has collected samples from five locations in the Main Arm of the Fraser River, approximately every two months. The samples are collected at random with respect to the tidal cycle, but are usually taken in the morning, using a boat and moving from downstream to upstream.

The water samples are analyzed for several chemical and physical parameters; however, only two water quality parameters—fecal coliform count and dissolved oxygen—are presented here.

Figure 7a



Source: GVWD, 1997

Fecal coliform bacteria are produced in the intestinal tract of warm-blooded animals. Elevated concentrations of fecal coliforms in water indicate impact from human and animal wastes, and the possible presence of disease-causing bacteria and viruses.

Dissolved oxygen is found in natural surface water. Natural concentrations vary depending on factors such as temperature, salinity and atmospheric pressure. Adequate amounts of dissolved oxygen must be available in water for fish and other aquatic life to survive.

Note that recommendations for a more suitable Water Quality indicator that relates to Richmond actions is provided at the end of this section.

## Results

During the period 1993 to 1997, *fecal coliform concentrations* often **failed** the water quality objectives set for GVRD monitoring (see Technical Addendum), particularly in the Spring and Fall. This is a *discouraging* trend.

During the same period, *dissolved oxygen concentrations* consistently **passed** the water quality objectives. This is an *encouraging* trend.



## Discussion

### Fecal Coliform and Dissolved Oxygen

From May to September sewage treatment plant effluent is chlorinated (and then de-chlorinated before discharge), to reduce bacterial concentrations. As a result, fecal coliform concentrations tend to be lower in the mid-summer months. Winter concentrations frequently fail the objectives by a significant amount. High fecal coliform concentrations which exceed the objectives mean that irrigation with this water would be a concern, especially for crops eaten raw (eg: cranberries). High coliform counts in the river may also affect the quality of water at beaches in Richmond.

Dissolved oxygen concentrations can be affected by decomposing organic wastes and by other chemicals that oxidize (break down) once released into the water. Dissolved oxygen can also fluctuate naturally through the year, due to changes in temperature, river discharges, and oxygen producing activity of aquatic plants. Concentrations above the objective are good, helping to protect marine life. Tests for this parameter have always met the water quality objective during the period 1993 to 1997.

### BC Environment Observations

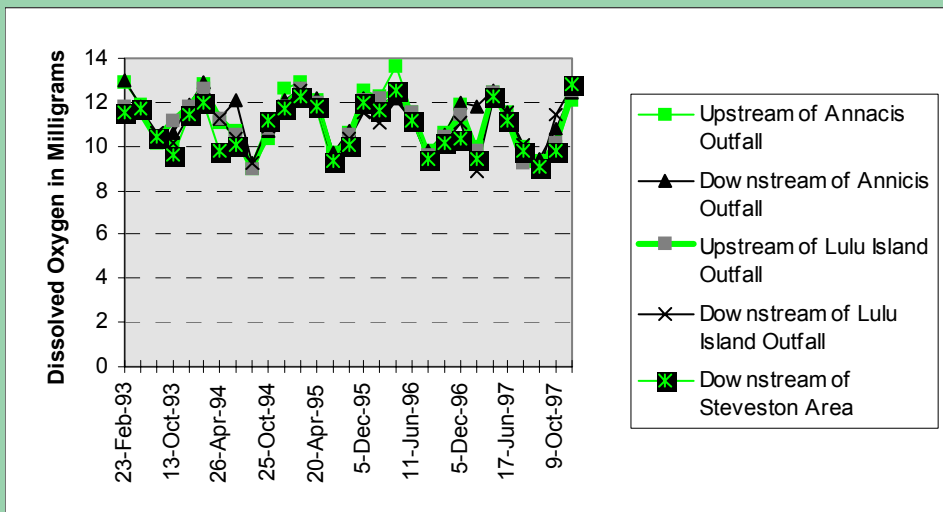
An earlier study by BC Environment (1996) classified the water quality of the Fraser River Main Arm, between New Westminster and the mouth, as “Fair”: between 1987 and 1993, fecal coliform concentrations were high on a regular basis, and did not meet objectives. As well, objectives for dissolved oxygen, PCBs, chlorophenols, copper and pH were not met on occasion.

## The Future

### Targets and Influences

Targets for this indicator do exist as provisional water quality objectives for municipal and industrial discharges between New Westminster and Richmond in the South Arm of the Fraser River. They included objectives for fecal coliforms, dissolved oxygen, metals, chlorophenols, PCBs, and pH (BC Environment 1996). Results for this indicator will

**Figure 7b Dissolved Oxygen Concentration in Fraser River Main Arm 1993 to 1997**



Source: GVWD, 1997

likely improve once planned upgrades to nearby wastewater treatment plants are completed. At present, about 95% of Richmond's sewage is treated at the Lulu Island Waste Water Treatment Plant; about 1% is treated at Annacis Island, and approximately 4% from Vancouver International Airport is treated at Iona.

The GVRD is currently in the process of upgrading the Lulu and Annacis treatment plants. Secondary treatment is expected to be operational at Lulu by early 1999. About one third of the waste water at Annacis currently receives secondary treatment; full-scale secondary treatment is scheduled to be in place by the summer.

The above indicator and GVRD objectives do not however, give enough direct guidance for Richmond to use in modifying City actions. Recent research concludes that the effective impermeable area (see glossary) of a watershed provides a good indication of the impact of land development on water quality and aquatic habitat health. Importantly, imperviousness can be quantified, managed and controlled at every stage of development. This indicator could be developed for Richmond, using data collected at the development application stage and entered into the computerized tracking system.

## **Related Topics**

Greenspace - Garden City  
Land Use  
Transportation  
Resource Consumption and Waste Generation

## INDICATOR B2: DRINKING WATER QUALITY

City Influence: **Medium**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator

Drinking water is a basic necessity. A person might survive 6 to 8 weeks without food, but only a few days without water. And contaminated water can cause a range of health effects. Microbiological contamination can cause skin rashes, vomiting, diarrhea, and dizziness. Chemical contamination generally yields more chronic side-effects from long term, repeated exposure, which could include: cancer, liver and kidney damage, and birth defects.

Our drinking water comes from the Greater Vancouver Water District (GVWD), and is transported through a local Richmond network. The GVWD provides water from three different reservoirs: Capilano, Seymour, and Coquitlam. Most water received in Richmond comes from Capilano; but in some parts of 1995 and 1996 our water came from Seymour, due to a 1995 land slide at the Capilano reservoir. (A mix of sources is still possible at any time.)

#### What is Being Measured

This indicator analyzes total days of non-compliance with:

- Canadian Drinking Water Guidelines for water chemistry variables; and
- BC Safe Drinking Water Regulations for bacteriological content.

#### About the Canadian Drinking Water Guidelines

These guidelines cover 24 parameters. Guidelines set for parameters with direct health consequences are called “health objectives”. Guidelines set for other parameters, such as iron or sodium, are “aesthetic objectives”, which relate more to general taste and appearance.

The five Canadian Drinking Water parameters assessed in this report are:



1. Trihalomethanes, or byproducts from chlorination (*health objective*)
2. Lead (*health objective*)
3. Iron (*aesthetic objective*)
4. Turbidity (*health and aesthetic*)
5. pH Levels (*considered an aesthetic objective, but some health consequences as noted in discussion*)

#### About the BC Safe Drinking Water Regulations

The regulation specifies the following for treated water in local distribution systems:

- They must contain no fecal coliform bacteria;
- Samples of water in the system should be negative for total coliform bacteria 90% of the time; and
- Water samples that do contain coliform bacteria must contain no more than 10 total coliform per 100 ml.

#### Data Weaknesses

The above variables relate to our drinking water at its source, but may not tell us enough about the quality of water that comes from household taps. En route to our homes, our drinking water is affected by many things, including leaching of metals from corrosion in the pipes that transport it. Additionally, the longer our water sits still in the distribution system without a chlorine residual, or in household pipes, the more likely bacterial regrowth will occur.



Total samples taken by the City that fail the BC safe drinking water regulation for bacteriological content can be misleading in that sample readings may vary widely depending on the location where the sample is taken .

## Results

Although there have been some consumer concerns about regional water quality, Richmond’s water is safe to drink. Detailed results are described below.

### A. Canadian Drinking Water Guidelines (Water Chemistry)

#### Trihalomethanes and Lead

From 1993 to 1996 the guidelines for these parameters were always met (0 days of failure).

#### Iron

The guidelines for this parameter were consistently met, except in 1994 when there were 12 days of failure.

#### Turbidity

In 1993 there were 16 days of failure, and 11 days of failure in 1994. There were no failing days in 1995 and 1996 (Capilano was shut down due to a land slide for part of this time).

### pH Levels

In 1993 and 1994 there were almost no days when this parameter met the guidelines. In 1995 and 1996 there was some improvement in performance, but still more days of failure than of meeting the guideline.

### B. BC Safe Drinking Water Regulation (Biological factors)

In 1993 there were 2 days when local water failed the BC standards. There were no days of failure in 1994 or 1996; 1 day of failure in 1995; and 3 days of failure in 1997.

## Discussion

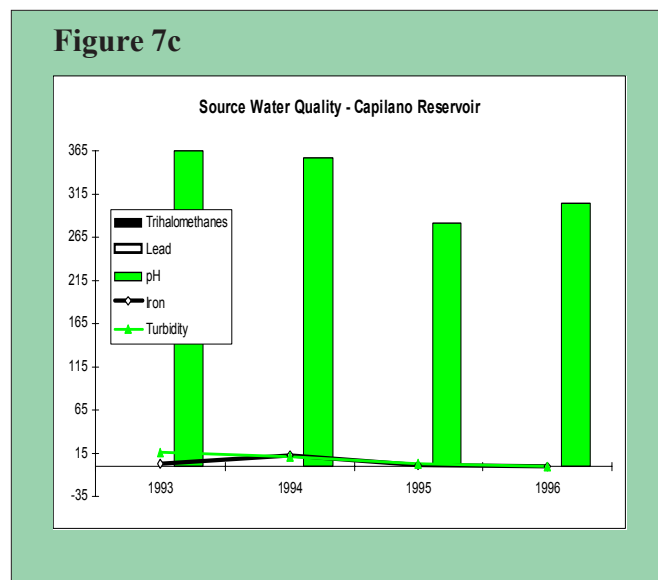
During the period studied, our water consistently met Canadian guidelines for trihalomethanes and lead. This has positive implications. During 1993 and 1994 there were several days when iron and turbidity failed Canadian standards, but the standards for these variables are based on aesthetic, as opposed to health criteria. Again, this reflects a generally acceptable performance. However, turbidity must be monitored frequently –it is a health concern if it interferes with disinfection, as waterborne bacteria can latch onto large particles in the water and escape disinfection.

An area of concern is the consistent failure of our source water to meet standards for pH levels. While our highly acidic water is safe and naturally occurring, it accelerates corrosion in pipes *transporting* water from the source to our homes. So while the metal content of our *source* water is acceptable, the water’s high acidity means that the metal content in water *that reaches households* may fail Canadian standards. For example, the green stains many residents see in their sinks and bathtubs are copper deposits resulting from accelerated corrosion of their own building pipes. (A short term solution to this problem is to run water for long periods of time each morning before actual use.)

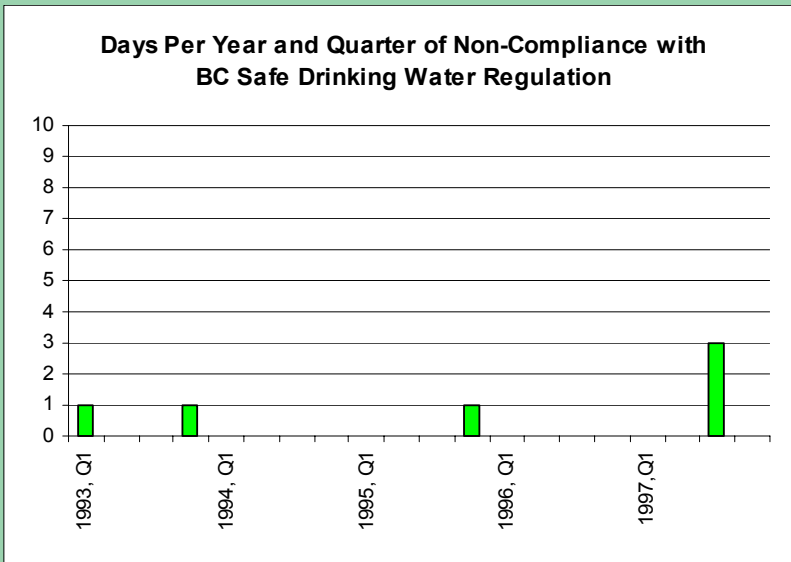
## City and Regional Programs

### Source Water:

The only forms of treatment for our water to now have included coarse screening, disinfection with chlorine, and limited re-chlorination. However, the GVWD has already taken steps to adjust the pH balance of our source water, so that it is less acidic. The GVWD has also begun to increase chlorination in our drinking



**Figure 7d**



Source: GVWD, authorized by the City of Richmond

ensures that quality pipes are used. Gradually metal pipes and water mains are being replaced with PVC and concrete.

Whenever an older home is demolished and being re-built, a City bylaw ensures developers will replace (and pay for) new water laterals to the new home.

## The Future

### Targets and Influences

Some targets exist for our drinking water quality in the form of Canadian and BC guidelines. GVWD efforts should result in improved performances on many of the variables measured by the guidelines. In addition to those mentioned under the Discussion

water. This will prevent bacteria regrowth, but could have some negative side effects such as:

- A chlorine after-taste; and
- Potential increases in some chlorine by-products.

The GVWD has already conducted a number of pilot studies on this, and have confirmed that results will still be well below the maximum allowable level under Canadian guidelines. The GVWD will continue to monitor the situation closely.

### Water Distribution:

The City of Richmond installs and maintains the water distribution network within City limits. In this role, the City does many things to ensure good local water quality. First, staff conduct regular annual flushings or cleanings of the entire distribution system. This helps prevent bacteria regrowth. Second, the City has designed the network to minimize dead end lines where feasible –and this ensures that water does not stagnate in our system. (Stagnant water is more likely to have bacteria re-growth.) Third, where dead-end lines do occur, the City does monthly cleanings of the nearest water main. Fourth, staff test water quality every week at 17 different locations. Finally, the City

section, other GVRD projects that could improve drinking water quality include a pilot project for a filtration system at the Seymour Reservoir, and completion of the Westerly Transfer Station. The latter will help improve access to water from the Coquitlam reservoir through to Vancouver and Richmond if there are future problems with land slides (and thus, turbidity) at the Capilano Reservoir.

### What Citizens Can Do

Become informed about your water supply:

- For more information on drinking water improvements, call the GVWD at 451-6010.
- Check out the water supply for yourself. Free tours of the Capilano watershed (and others) can be arranged in Spring and Summer through the Watershed Management office of the GVWD. Just call 432-6410.

### Related Topics

Greenspace - Garden City  
 Land Use  
 Resource Consumption and Waste Generation

## TOPIC C: AIR QUALITY

Air quality is affected by human activities (e.g., cars emissions, industry, agriculture, forestry), weather patterns (e.g., still air, fog, temperature), and other natural events (e.g., wildfires, wind-blown soil, ocean spray).

Air quality is important to the health of wildlife, plants, and humans. Exposure to air pollutants can irritate human eyes, nose, throat and respiratory systems, particularly affecting the young or people with cardiovascular or respiratory disease. Long term exposure to some pollutants may increase the risk of developing chronic respiratory disease. Poor air quality can also limit plant growth, resulting in lower crop yields.

This section focuses on ambient air quality, that is, air quality at ground-level sites around the region. The air we breathe in Richmond affects our health and that of wildlife and vegetation around us. We need to understand: whether air quality is getting better or worse; the key sources of air pollutants in the City; and the actions being taken to improve air quality.

Human activities may also affect global atmospheric conditions, such as the greenhouse effect and stratospheric ozone depletion. These global issues are not covered in the Richmond SOE Report, but the main source of greenhouse gas emissions in urban areas is the motor vehicle - the same source of pollutants that affects ambient air quality. Efforts to reduce motor vehicle emissions to improve ambient air quality will have the added benefit of reducing greenhouse gas emissions.

## INDICATOR C1: MEAN ANNUAL AIR QUALITY INDEX IN RICHMOND

City Influence: **Low**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator?

Air quality is important to the health of humans, wildlife and plants. This indicator tells us whether air quality is improving or deteriorating in the City.

#### What is Being Measured

The Greater Vancouver Regional District operates an extensive network of air quality monitoring stations in the region. These stations monitor ambient air quality, that is, air quality at particular ground-level sites. The GVRD's monitoring site is in South Richmond at Williams Road and Aragon Road.

The GVRD monitors up to 10 parameters at each station, including ground level ozone, sulphur and nitrogen dioxide, and particulate matter. Each parameter is evaluated against national and provincial guidelines or objectives, established to protect public health and the environment. Results are then used to calculate an Air Quality Index (AQI). The AQI provides a qualitative description of the concentrations of each parameter being measured. Air quality is rated on a scale of 1 to over 100, and is characterized as good (0-25), fair (25-50) and poor (50-100). Air quality that is over 100 is rated as very poor. The AQI is calculated every hour.

*Richmond's air quality is good, but could be threatened in future by auto and industrial emissions.*

### Results

As Figure 8 shows, the mean Air Quality Index in the City over the past decade has consistently measured between 9 and 17, well within the "Good" category. Every year, some hours exceed the standards for good air quality and are categorized as "Fair". In 1996, some measurements recorded "Poor" air quality. The average AQI for the year, nonetheless remained "good".<sup>1</sup>

### Discussion

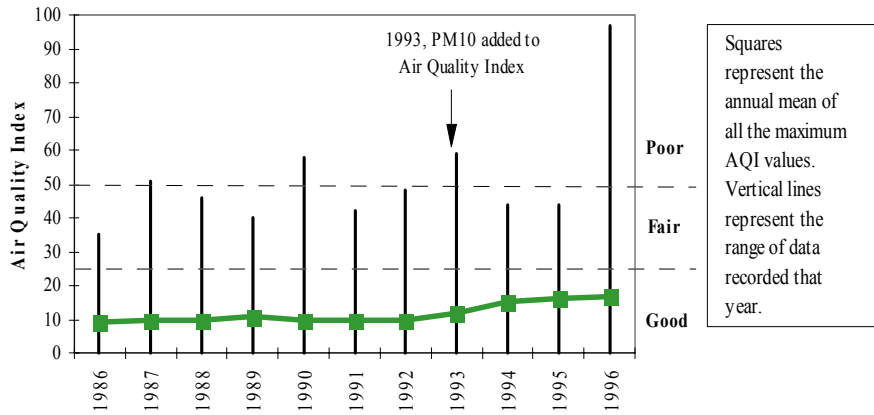
#### What is Happening

The historical data are not entirely comparable, because in 1993 the GVRD began measuring a new pollutant (PM<sup>10</sup>) and incorporating it into the AQI. PM<sup>10</sup> are atmospheric particulates with a diameter of less than 10 micrometres. This size of particle is most likely to be inhaled and deposited in the thoracic region of the lungs, creating health problems or exacerbating existing health conditions. PM<sup>10</sup> levels may have been high in years prior to 1993, but AQI would not register this, because the pollutant was not measured.

PM<sup>10</sup> was the cause of the "poor" air quality readings in 1996. PM<sup>10</sup> is emitted from a variety of sources, including motor vehicle exhaust, wood smoke and saw mill emissions. These "poor" readings were taken in

<sup>1</sup> This indicator does not measure the number or proportion of hours that the Air Quality Index registers Good, Fair and Poor, because this will be affected by the number of hourly recordings taken each year. Number of recordings differ between stations in the region. In addition, PM<sup>10</sup> is recorded once every 24 hours, so an exceedence in one hour may trigger several hours of AQI exceedences. For more detail see the technical addendum accompanying this report.

**Figure 8** Mean maximum Air Quality Index values, Richmond Monitoring Station, 1986-1996



Source: GVRD Air Quality Department, 1997

stations in the region, Rocky Point Park (Port Moody) and Chilliwack. These stations were selected because they are located in different parts of the region and both record PM<sup>10</sup> (PM<sup>10</sup> is only measured at some stations in the region). AQI results are similar at these three stations; they all show a change in the AQI since PM<sup>10</sup> began to be monitored.

One pollutant that shows regional variation is ground-level ozone. Ozone is formed when nitrogen oxides and

November, when heavy morning ground fogs covered Richmond (GVRD 1997). Stagnant air prevents pollutants from leaving the City, increasing the likelihood of high readings.

Other causes of fair and poor AQI readings over the past decade have been ground level ozone, carbon monoxide and coefficient of haze. Overall, however, air quality in the City remains good. Prevailing westerly winds tend to blow pollutants up the Fraser Valley.

reactive hydrocarbons chemically react in the presence of sunlight. Motor vehicle emissions are a major source of pollutants that cause high ozone levels. Ozone can irritate the eyes, nose, and throat, and may reduce crop yields. Higher ozone levels are typically recorded during summer months in the eastern part of the region (e.g. Langley, Abbotsford, Chilliwack and Hope), as pollutants from the rest of the region are blown up the valley and react to form ozone.

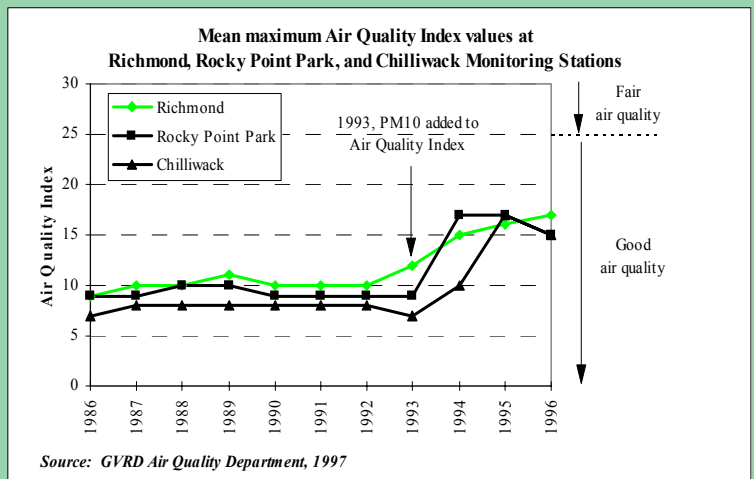
### Existing City Programs

Motor vehicle and industrial emissions pose major threats to our air quality. Permits for industrial emissions are controlled by the GVRD. Transportation and land use programs can, however, greatly affect levels of motor vehicle use and thus emissions. Topic E on transportation discusses City programs to improve alternative forms of transportation.

### Richmond and the Region

Figure 9 compares the annual mean AQI in Richmond with two other monitoring

**Figure 9** Mean maximum Air Quality Index values at Richmond, Rocky Point Park, and Chilliwack Monitoring Stations



Source: GVRD Air Quality Department, 1997



## The Future

### Targets and Influences

The GVRD has a target of maintaining hourly readings of the AQI at good or fair. Richmond has almost always met this target over the past decade.

Motor vehicles are probably the most important threat to air quality in Richmond and the rest of the region. While the BC Air Care program has helped and will continue to help reduce some of the polluting effects of Lower Mainland automobiles, it doesn't solve the whole problem. As Richmond's population grows, if the number of motor vehicles increases proportionately our air quality is likely to suffer (see Topic E, Transportation).

### What Citizens Can Do

Ways that citizens can reduce car use are discussed in Section E, Transportation. Additional actions include:

- Respect the City's bylaws — do not burn garden refuse or garbage;
- Switch to natural gas;
- Minimize car use; and
- Make sure furnaces are regularly maintained.

## Related Topics

Greenspace / Garden City  
Land Use & Human Settlement  
Transportation  
Resource Consumption & Waste Generation  
City Environmental Practices

# Environmental Stressors

- D. LAND USE AND HUMAN SETTLEMENT**
- E. TRANSPORTATION**
- F. RESOURCE CONSUMPTION AND WASTE MANAGEMENT**
- G. CITY ENVIRONMENTAL PRACTICES**
- H. NOISE**





## TOPIC D: LAND USE AND HUMAN SETTLEMENT PATTERNS

City Influence: **High**

Public Priority: **High**

—This Chapter Contains no Indicators—

### Introduction

#### Why We Should Monitor This Topic

Local government has significant potential to influence land use and settlement. A sustainable land use and human settlement pattern ensures that natural resources such as air, water, and natural areas, and wildlife habitat are protected.

The most effective way of protecting these environmental resources is to concentrate urban development in selected parts of a region, while leaving large areas of natural or cultivated land. Studies have shown that this development pattern not only preserves habitat and greenspace, but is more cost-efficient to service with roads and infrastructure.<sup>1</sup> Concentrating urban development in selected areas may also promote more compact, pedestrian-oriented communities, reducing car use and its attendant environmental problems.



Greater Vancouver municipalities have agreed to foster more sustainable land use and settlement by concentrating future development closer to the region's core, thus reducing urban sprawl up the Fraser Valley.<sup>2</sup> It is the responsibility of individual municipalities, however, to develop their own individual detailed definitions and strategies for achieving sustainable land use and settlement. These definitions should be developed in consultation with the public and reflected in each municipality's Official Community Plan.



Precisely defining sustainable land use and settlement patterns is complex and often involves several alternatives. Richmond's 1989 Official Community Plan (OCP) includes a growth management strategy that provides some direction by focusing most of the City's growth into the City Centre, leaving agricultural areas and most detached housing neighbourhoods intact. The strategy has also encouraged Richmond to become a complete community, with an equal balance of housing, jobs and services.

<sup>1</sup> Canada Mortgage and Housing Corporation. 1997. Conventional and Alternative Development Patterns. Phase 1: Infrastructure costs; Phase 2: Municipal Revenues.

<sup>2</sup> GVRD. 1995. Livable Region Strategic Plan

## Why There Are Currently No Indicators for This Chapter

The 1989 OCP is now under review, with a revised version to reach Council in June of 1998. The revised version will build on existing policies and refine the vision of sustainable land use and settlement patterns for Richmond and strategies for achieving the vision. The new OCP will not be completed until *after* the first edition of the State of the Environment Report, so it would be unwise to anticipate this new definition. The second edition of the SOE Report will reflect the new OCP's vision of sustainable land use and settlement, and it will also include the appropriate indicators for assessing Richmond's progress in reaching it.

### Related Topics:

Greenspace / Garden City  
Air Quality  
Transportation  
Noise

## TOPIC E: TRANSPORTATION

Transportation has a strong impact on our natural environment and on human health. The automobile is responsible for over 80% of the contaminants found in our air<sup>1</sup>, and 47% of all greenhouse gases in BC. (Industry only produces about 23% of total BC greenhouse gases<sup>2</sup>). Transportation also impacts water quality. The more pavement required for our road network, the less permeable area exists for ground water absorption and recharge. As particle contaminants from vehicle exhaust settle on paved areas, heavy rains will also wash the contaminants into local water bodies. It is thus important to encourage alternatives to the car by developing facilities that make such choices more attractive to residents. This report uses the term “sustainable transportation” to denote alternatives to the car.

The City cannot, however, plan sustainable transportation in isolation. ***First, sustainable transportation depends on compatible land use planning.*** To increase trips by cycling and walking (as opposed to driving alone), distances between citizens’ homes and key destinations (shops, services, etc.) must be shorter. It would not be reasonable to expect people to walk 10 km each way to grocery shop –but it **would** be reasonable if the grocery trip were ½ km or less. ***Second, the City does not have direct control of transit,*** and has little power to respond to citizens’ requests for service improvements that might improve transit use. ***Third, even if sustainable transportation is made more attractive, it is still up to individuals to choose that option over the private vehicle.***

This chapter includes indicators to help assess Richmond’s progress in developing and using sustainable transportation choices. Given the need for comprehensive action, the indicator sections

distinguish between measures within the City’s control and those which rest with other government agencies.

The indicators are:

1. Transportation Choice (mode split of travel by residents);
2. Vehicles per Household;
3. Pedestrian Friendly Streets; and
4. Cycling Lanes.

<sup>1</sup> City of Vancouver, State of the Environment Report, March 1995

<sup>2</sup> GVRD, Greenhouse Gas Management in Greater Vancouver, 1997

## INDICATOR E1: TRANSPORTATION CHOICE (MODE SPLIT DURING MORNING RUSH HOUR)

City Influence: **Low to Medium**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator

Motor vehicles that burn fossil fuels are the major producer of emissions which cause smog and greenhouse gases. Fewer vehicles on the road, used less often and consuming less fuel, will reduce harmful emissions. Switching from car use to transit and other more sustainable forms of transportation could also help save tax dollars.

*The trend: more cars on the road, fewer transit users, and more trips by foot and by bike.*

Studies by the Greater Vancouver Regional District (GVRD) estimate that **private automobiles in the Lower Mainland are subsidized \$2,700 per year by various governments, or seven times the amount that public transit is subsidized**<sup>3</sup>.

Data on Richmond residents' travel choices provide a clearer picture of our contribution to smog and global warming. The more that we avoid the single-occupant vehicle, the more sustainable our transportation choices. The data on travel choice also help us assess the effectiveness of government efforts at all levels to encourage sustainable travel patterns.

#### What is Being Measured

This report measures the proportion of morning rush hour trips taken:

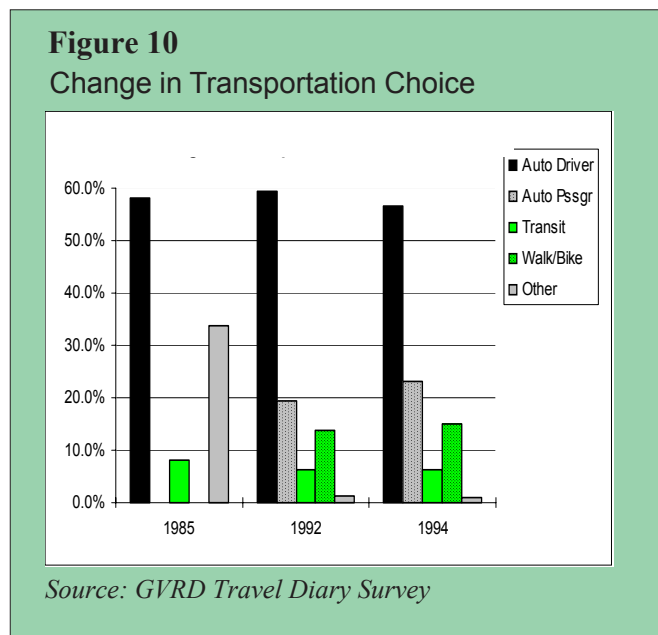
- By private, self-driven automobile (referred to as "auto driver" trips);
- By transit;
- As automobile passengers (mostly car-pool passengers; some are children being driven to school); and
- Walking / Cycling.

Where available, *total* trips are also included.

This data comes from the 1985, 1992 and 1994 Greater Vancouver Travel Surveys (GVRD). The morning rush hour, or "peak" was chosen because the data for other time periods have not been as widely available. However, where possible, we will refer to any differences between morning peak patterns and those for the entire day.<sup>4</sup>

### Results

As Figure 10 shows, the private car remains the dominant form of transportation in the City during morning rush hours.



<sup>3</sup> Globe & Mail, Jan '95

<sup>4</sup> Because this data on transportation choice will only be available every five years, readers should also refer to the indicator on average vehicles per household. The latter is updated every year, and provides a shadow measure of some aspects of transportation choice.



Data on the total number of trips are only available for 1992 and 1994. These statistics show, however, that the total number of trips taken by Richmond residents during morning rush hour is increasing faster than population growth (Figure 12).

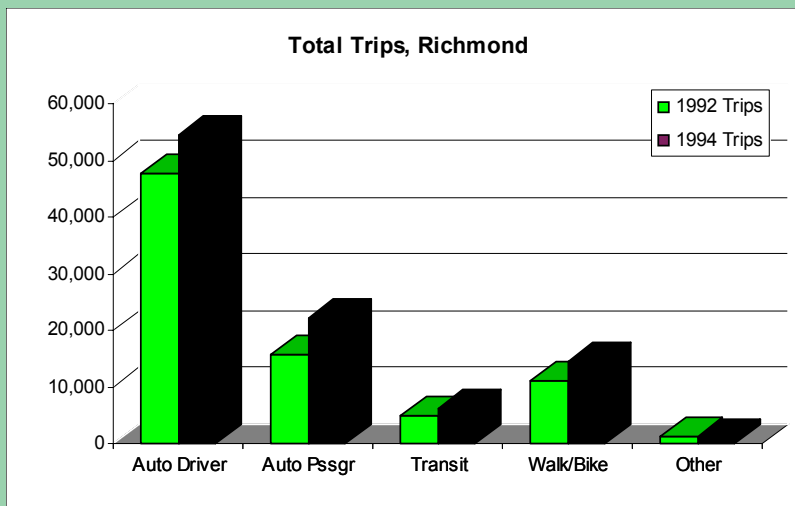
## Discussion

### What is Happening

Although the proportion of car drivers has dropped slightly since 1985, the increase in total car trips is worrying. More car trips create more congestion and pollution.

The low number of morning transit users is disappointing. Regional transit surveys link the declining use to inadequate service during the morning peak, so the trend could change if transit improved. Transit use outside rush hour has grown since 1985, likely due to less pressure on service in off-peak hours, and more people using transit for leisure activities.

**Figure 11**



The growth in alternative travel modes is generally encouraging. Gains in total walking and cycling trips may have resulted from people living close enough to work, school and other services to avoid relying on cars. Particularly in the City Centre, more people live close enough to services to avoid car use.

Trips by auto passengers grew significantly from 1992 to 1994. If due to more carpooling, this would be favourable—but the data likely include children being driven

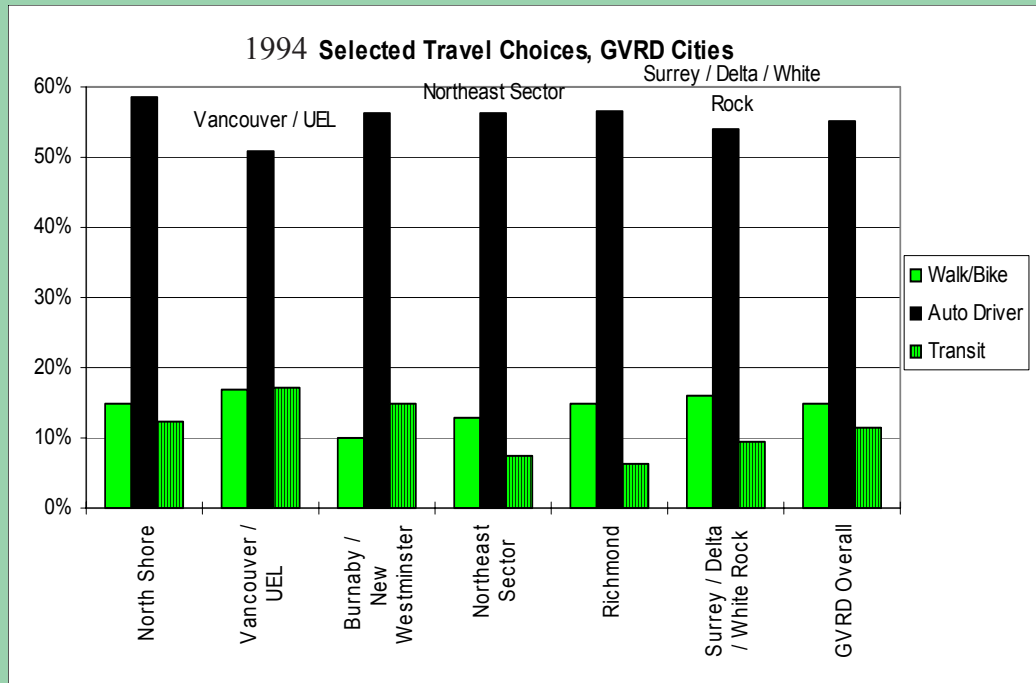
to grade school, which would reflect an unfavourable trend (see Technical Addendum).

### Existing City Programs

The City has little direct influence over the travel choices of Richmond residents (for example, cities can not legally restrict individual car use). But the City can make some choices more attractive. By providing and maintaining Richmond’s road network, the City facilitates all types of travel, including transit. And by creating pedestrian-friendly streets and cycling



Figure 12



Source: GVRD Trip Diary Survey

routes (see these related indicators), the City makes it easier for residents to avoid the car.

The City of Richmond does not have direct responsibility for transit. At present transit is still provided by the BC Transit Corporation, in consultation with GVRD member municipalities. Richmond's influence on transit provision has been through:

- Identifying local transit needs for BC Transit's 5-year, 3-year annual and quarterly planning processes;
- Working with BC Transit to plan for Rapid Bus and more frequent, convenient service between our City Centre, the Airport and Downtown Vancouver;
- Working with BC Transit to improve local (within Richmond) service delivery; and
- Implementing a Bus Stop Enhancement Program, providing landing areas; shelter and better transit access for the disabled.

### Richmond and the Region

In 1994, Richmond had a higher proportion of trips by

car than all the region except communities on the North Shore. Similarly, Richmond's proportion of trips by transit is the lowest in the region, and satisfaction with the level of transit service is the lowest.

Yet Richmond's share of morning peak trips by walking or cycling is among the most favourable in the region — lower only than those in Vancouver and Surrey / Delta / White Rock.

### The Future

#### Targets and Influences

At present there are no specific targets for improving sustainable transportation choice. The City of Seattle, however, is aiming by 2010 to have the following distribution of choices for commuting :

- 35% of trips by auto driver;
- 27% of trips by transit;
- 16% by walking and cycling; and
- the remainder of commuters carpooling or working at home.

The City of Richmond will improve traffic management in the City Centre; but this will simply ease frustrating traffic problems. To foster more sustainable transportation we must encourage people to avoid cars altogether. More sustainable land use patterns where people have jobs and services close to home should reduce long car trips to meet basic needs. Steveston and the City Centre are good examples of jobs, shops and housing close together.

While the City lacks direct transit control, the following will improve future service:

1. Rapid Bus implementation in 1998;
2. The restructuring and improvement of local service delivery (in conjunction with Rapid Bus); and
3. Potentially more direct influence on transit provision through a new regional transit authority (recently agreed to in principle by BC Transit and GVRD member municipalities).

With Rapid Bus installed, Richmond transit service will improve significantly, possibly resulting in service levels that compare favourably with the North Shore municipalities.

### **What Citizens Can Do**

The City is working to make alternatives to the car more attractive. But the ultimate choice rests with citizens. Here are some ideas to help:

- Try carpooling or bussing to work at least once a week (even consider a permanent switch);
- Try to walk or cycle when running errands;
- Encourage local merchants to set up grocery delivery service for a small fee (then leave the car at home when shopping); and
- Let children walk or cycle to school. (This will also keep them healthy.) If safety is a concern, team up with other parents to take turns escorting small groups of children to school on foot.

### **Related Topics**

Greenspace / Garden City  
 Air Quality  
 Land Use Human Settlement  
 Resource Consumption & Waste Management  
 Noise

### **Related Indicators**

Pedestrian Friendly Streets  
 Cycling Lanes

## INDICATOR E2: VEHICLE OWNERSHIP (VEHICLES PER HOUSEHOLD AND TOTAL VEHICLES IN CITY)

City Influence: **Low**

Public Priority: **Medium**

### Introduction

#### Why We Should Measure This Indicator

GVRD studies show that the more cars a household owns, the less likely its members are to take transit (and the more they use the car to get around). This indicator shows general reliance on car travel, which is particularly helpful for those years when data for the indicator E1 Transportation Choice are unavailable. The general environmental impacts of car travel are discussed in the previous indicator.

#### What Is Being Measured

This indicator measures:

- Total vehicles per household, and
- Total vehicles owned by Richmond residents

These data come from the Insurance Corporation of British Columbia (ICBC).

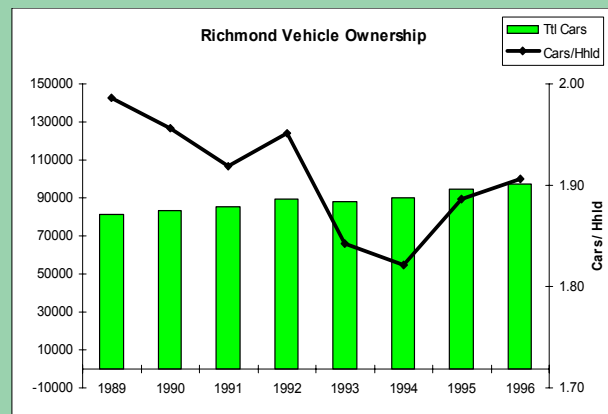
#### Results

The number of vehicles per household has fluctuated slightly since 1989, between 1.84 and 1.99 (Figure 13). In 1996 Richmond residents owned an average of 1.91 vehicles per household.

Although vehicle ownership has fluctuated only slightly, population growth has meant more vehicles on the road. Since 1989, there are 16,500 more vehicles registered in Richmond, an increase of 20%.

*Until transit improves, total cars will continue to grow.*

Figure 13



Source: ICBC data, licensed vehicles

### Discussion

#### What is Happening

The growth in total vehicles is discouraging because of the direct relationship between car ownership, use, and air pollution emissions.

The car is probably still the most reliable way for residents to get around, particularly for long distances. Unfortunately, until transit becomes a more attractive choice for such trips, we will likely see continued car growth.

#### Existing City Programs

City programs do not directly influence local car ownership. But there are programs for encouraging more sustainable transportation, described under other indicators in this section.



## Richmond and the Region

Compared with other core cities like Vancouver and Burnaby / New Westminster, Richmond has the highest average of cars per household. This is not surprising given that our transit infrastructure is not developed to the same extent as in the above cities.

Yet Richmond also has a higher average number of cars per household than Surrey, Coquitlam, and Delta - all further from the core, with lower levels of transit service than core municipalities.

## The Future

### Targets and Influences

There are no specific targets for improving this indicator at present. Many City programs which will help performance on this indicator have already been discussed under other related indicators.

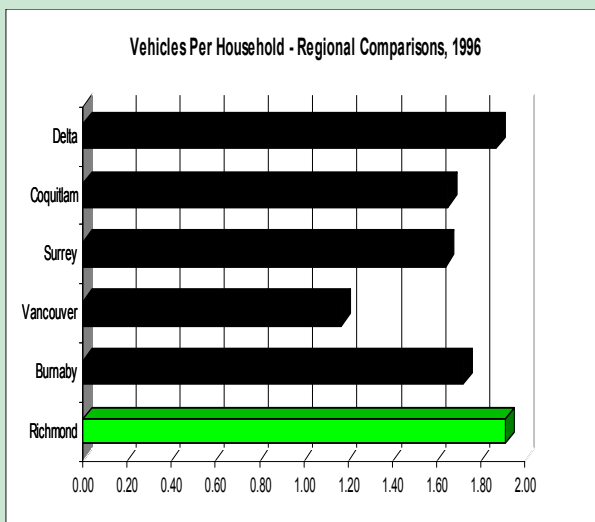


### What Citizens Can Do

Where possible, use other means of transportation to commute to work (see under Transportation Choice indicator).

If you depend on your car but want to reduce usage, you could start or join a car cooperative. A cooperative serving two Vancouver neighbourhoods has been started, and now boasts 35 members. For more information, call (604) 685-1393 or check it out on the internet at: [www.axionet.com/think/can/index.html](http://www.axionet.com/think/can/index.html)

Figure 14



Source: ICBC data, licensed vehicles

### Related Topics

- Greenspace / Garden City
- Air Quality
- Land Use Human Settlement
- Resource Consumption & Waste Management
- Noise

### Related Indicators

- Pedestrian Friendly Streets
- Cycling Lanes

## INDICATOR E3: PEDESTRIAN FRIENDLY STREETS (LENGTH AND PROPORTION OF STREETS THAT MEET MINIMUM AND NEW STANDARDS)

City Influence: **High**

Public Priority: **High**

### Introduction

#### Why We Should Measure This Indicator

Richmond and other suburbs were designed in an era that emphasized car travel—but today people want more choices. In both a random sample survey and discussions for Richmond’s Official Community Plan Review, people asked specifically for more pedestrian friendly (and wheelchair-accessible) neighbourhoods.

*The City is working to make walking more attractive. The rest depends on citizens’ choices.*

Walking can yield both environmental benefits (reduced car use, better air quality, less fuel consumption) and health benefits. It

can also encourage informal encounters between neighbours, enhancing residents’ sense of community.

In future years more rigorous guidelines could be added to the New Standard. Examples of more rigorous guidelines include:

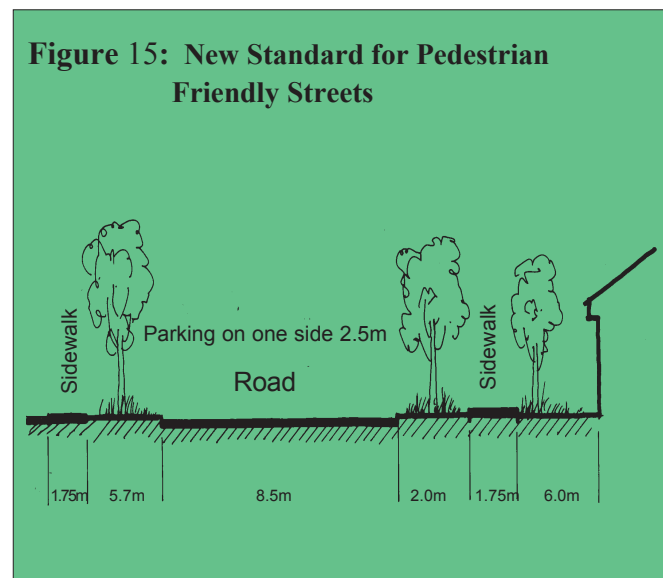
- The presence of curb cuts at intersections (for disabled access);
- Fewer driveway crossings along major roads;
- Connections to key destinations;
- Smaller blocks;
- Benches;
- Pedestrian short cuts in areas with curvy streets and cul-de-sacs; and
- “Eyes on the street” (buildings used beyond “9 to 5”, overlooking walkways).

These rigorous guidelines vary in cost and ease of implementation, but some are already being adopted in new streets.

#### What Makes a Pedestrian Friendly Street

A range of standards might define a “pedestrian friendly” street. This report looks at two:

1. The *Minimum Standard*: major streets should have sidewalks on one or more sides.
2. A higher or *New Standard* that applies to **all** roads (not just major ones). Nearly all new or rebuilt roads in Richmond now meet this standard, providing extra protection from traffic. On at least one side there is a boulevard strip, including street trees, separating the road and sidewalk (see Figure 15). In busier areas like the City Centre and Steveston, it may include a parking lane, widening the distance from traffic.



## What is Being Measured

This indicator measures:

- Length and proportion of *major streets* with *minimum standards* for pedestrian friendly streets
- Length and proportion of *all streets* with *new standards* for pedestrian friendly streets

## Results

As of 1997, 84 km of Richmond’s major roads met the *minimum standard*. This accounts for 61% of the total major road network <sup>6</sup> - a gain of 43% since 1990.

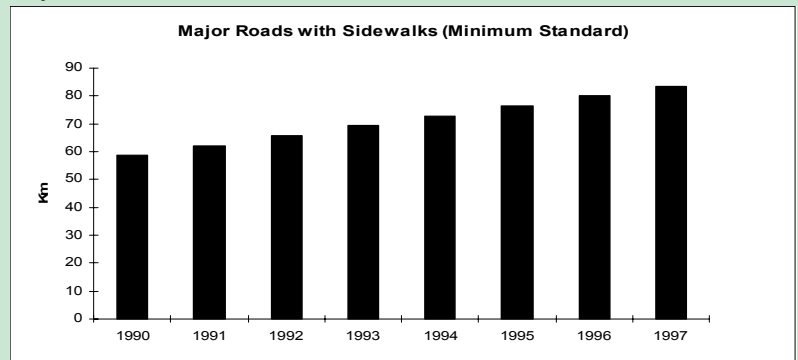
About 20 km of streets met the *new standard*. This represents 3.3% of Richmond’s total street network. In 1990 none of Richmond’s streets met this standard, so the gain over seven years has been significant.

<sup>6</sup> The *minimum* standard assumes it is acceptable to have *local roads without sidewalks*. The *new* standard does not.



The minimum standard: a start, but not so pedestrian-friendly

**Figure 16**  
*Major Roads with Sidewalks*



Source: City of Richmond

## Discussion

### What is Happening

The trend for this indicator has been a constant increase – an encouraging trend.

The increase in pedestrian friendly streets should encourage more walking as an alternative to car transportation.

### Existing City Programs

Pedestrian friendly streets are provided in Richmond through:

- The Five Year Capital Works Program
- The Development Approval Process;
- Local improvement programs; and
- The City Beautification Strategy.

The City also has 80km of multi-purpose trails. Trails are not tracked under this indicator, but they also help make Richmond “walkable”.

## Richmond and the Region

Sidewalk facilities in other cities depend in part on their size and the timing of their initial “growth spurts”. Vancouver had several major development cycles in an era when most trips were made on foot. By contrast, Richmond’s major development periods occurred in the 1950s and 1970s, when the automobile was in wide use.



A pedestrian-friendly corridor (No.3 Rd & Westminster Hwy)

At present GVRD municipalities do not record data on streets furnished with tree boulevards and sidewalks. However, a high percentage of Vancouver’s streets are furnished to this standard.

Outside the region, Seattle has about 68 km of pedestrian-friendly streets, accounting for 3% of total streets. Note that Seattle’s definition of pedestrian-friendly is more rigorous than Richmond’s new standard, and includes some of the criteria that we intend to add eventually.

## The Future

### Targets and Influences

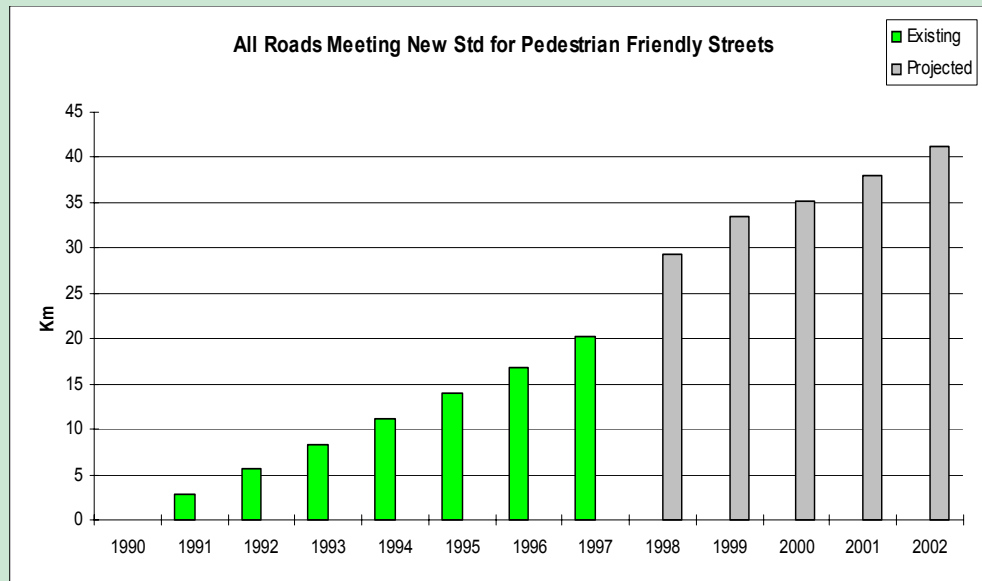
While there are no specific targets for improving this indicator, continued gains can be expected over the next five years from City-initiated and other additions. The current practice of building all new roads to the new pedestrian friendly standard should continue.

The City’s Five Year Capital Works plan provides for additions of 21 km by 2002 to the network of pedestrian friendly streets. Of these gains, 13 km will be along major roads. As projects outlined in this plan are subject to annual budget review, the timing may vary.

**Figure 17**

*Total roads meeting New Standard for Pedestrian Friendly Streets will continue to increase in future.*

*Source:  
City of Richmond,  
Urban Development*



It is difficult to predict gains through other means. For example, new roads built through development depend on the real estate market, and are difficult to estimate. Also, some upgrading projects for minor roads are funded through a local improvement program<sup>9</sup>.

### What Citizens Can Do

The City is working to make it easier for people to walk in their neighbourhoods. The rest depends on people using these facilities. Here are some ideas to help:

- Whenever possible, consider walking to get around;
- Participate in block watch programs to enhance street safety;
- Keep an outdoor light on at night to enhance safety and security for walkers; and Help keep streets clean and attractive – consider starting a neighbourhood litter patrol.

### Related Topics

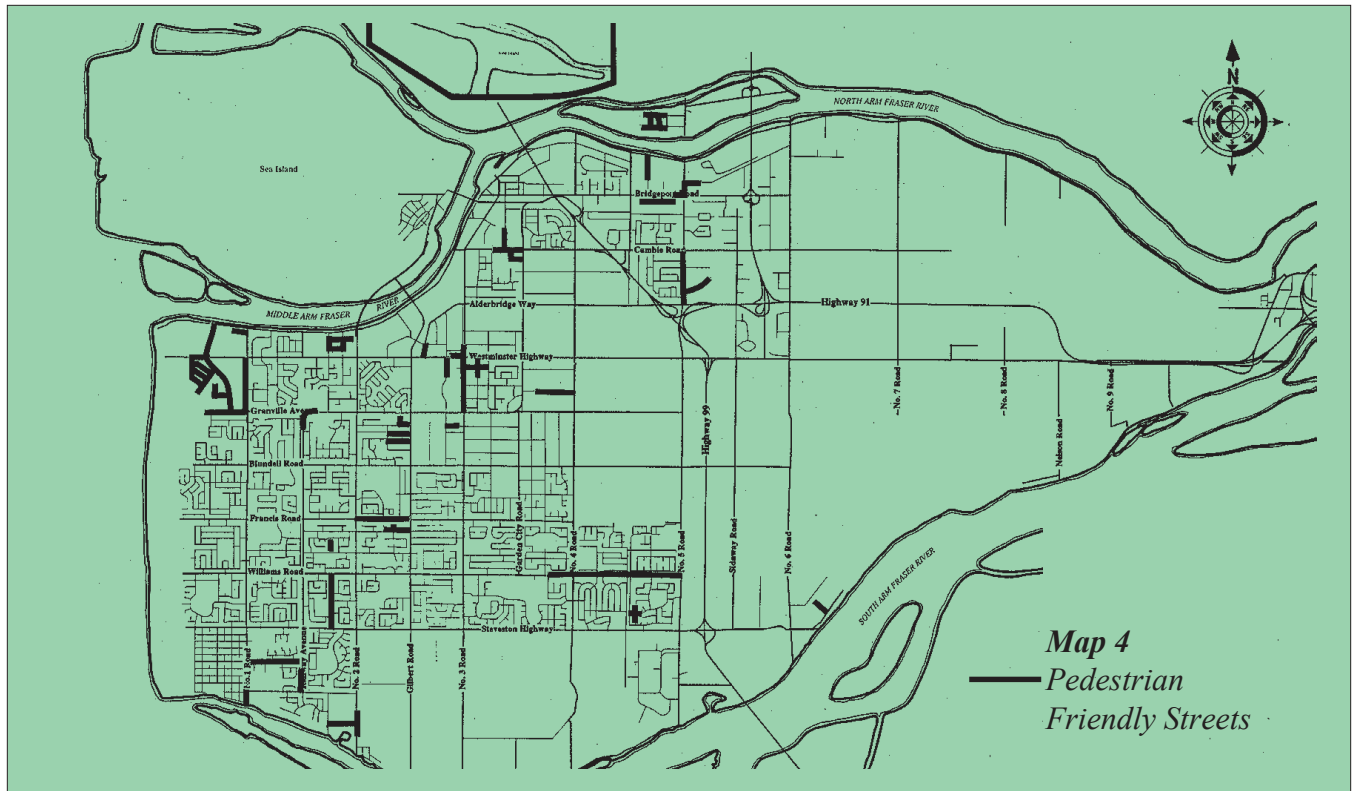
- Greenspace / Garden City
- Air Quality
- Land Use Human Settlement
- Resource Consumption & Waste Management

### Related Indicators

- Transportation Choice
- Cycling Lanes



Walking encourages informal encounters between neighbours



## INDICATOR E4: CYCLING LANES (LENGTH AND PROPORTION OF MAJOR STREETS WITH CYCLING LANES)

City Influence: **High**

Public Priority: **Medium**

### Introduction

#### Why We Should Measure This Indicator

Cycling is another sustainable travel alternative, with similar benefits to walking. Richmond is ideal for cycling given its flat topography.

#### What is Being Measured

The 1997 State of the Environment Report measures:

- Total kilometres of designated, purpose-built *cycling lanes*; and
- The *proportion* of the *major road network with cycling lanes* on one or both sides.

### Results

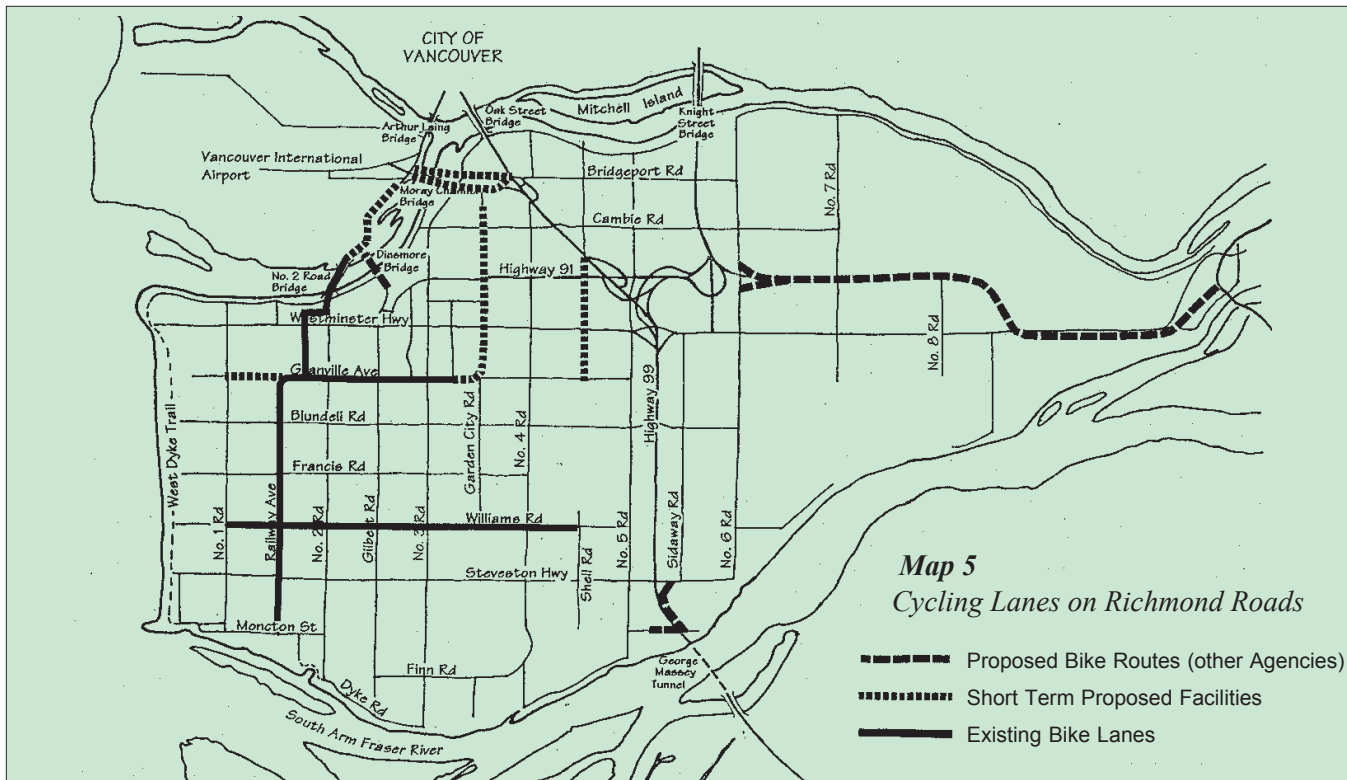
Before 1993 Richmond had only 5km of cycling lanes. As of the end of 1997, this length had tripled to 15 km. Cycling lanes now cover over 10% of major roads.

*Richmond's cycling facilities are among the region's best.*

### Discussion

#### What is Happening

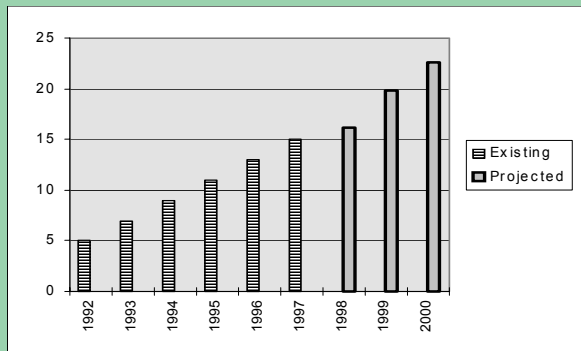
The increase in bike lanes is due to the City Programs discussed below.



## Existing City Programs

Planning for cycling in Richmond began in 1993 with the formation of the Richmond Cycling Committee. In 1996 Richmond's Cycling Network Plan was adopted by Council. This plan provides for future additions to connect major destinations for cyclists (e.g., community centres, major employment centres, bridge crossing locations, and business park areas). Many new facilities have been implemented through the City's Capital Works Program.

**Figure 18**



The City also has policies for bicycle parking. *City Centre Plan* guidelines require secured bike storage / parking facilities in new developments in the City Centre.

## Richmond and the Region

Richmond's cycling infrastructure is among the best in the region. The only GVRD municipalities with a larger network of cycling lanes are Surrey and Burnaby. The only GVRD municipality with more kilometres of cycling lanes and bicycle paths (see definitions) is the City of Vancouver.

## The Future

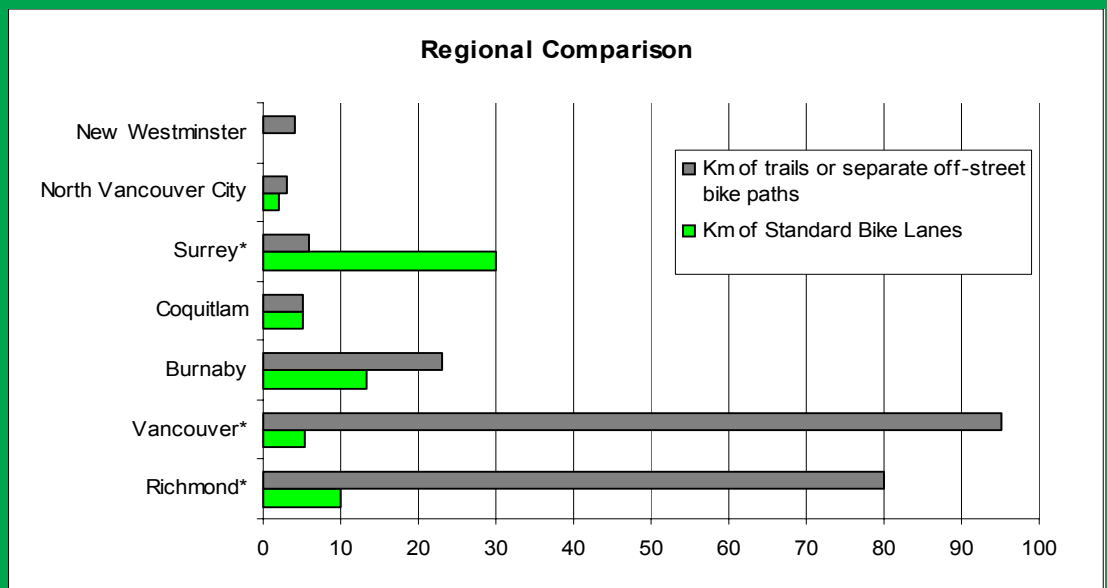
### Targets and Influences

The City has an interim, working target for this indicator. Based on transportation improvements in the 5-Year Capital Works Program, Richmond seeks a total of 24 km of cycling lanes by the year 2001. Given that the Capital Works Program is subject to annual budget review, reaching this target may vary from the anticipated date. The target is also subject to decisions by other agencies<sup>7</sup>.

<sup>7</sup> The 24 km figure includes some cycling lanes to be built by the Vancouver International Airport and the BC Ministry of Highways).

**Figure 19**

*Richmond - Among the Region's best cycling facilities.*



## What Citizens Can Do

Citizens can take advantage of Richmond's emerging cycling network through the following actions:

- Use cycling as an alternative means of transportation;
- Start a Bicycle Users Group at work, and encourage your employer to provide cycling facilities in your workplace (e.g., Storage, showers, etc.);
- Speak to local merchants about adding bike racks and storage facilities at their shops;
- Practice safe cycling -wear a helmet and follow road safety regulations at all times;
- Help others to cycle - consider starting a community bicycle recycling fund (See: <http://watserv1.uwaterloo.ca/~wpirg/rc/rc-howto.html>); and
- Consult the *Lower Mainland Cycling Map* for biking to places outside of Richmond (available for \$2.95 from the Greater Vancouver Regional District).

## Related Topics

Greenspace / Garden City

Air Quality

Land Use Human Settlement

Resource Consumption & Waste Management



## TOPIC F: RESOURCE CONSUMPTION AND WASTE GENERATION

Our consumption of resources and discharge of wastes has a widespread effect on the earth and its inhabitants. It has been estimated <sup>1</sup> that the average Canadian requires at least seven hectares of biologically productive land (see glossary), on a continual basis, to provide their resources and absorb their wastes. If Richmond residents mirror the Canadian average, *the current combined “ecological footprint” of the City of Richmond (population 143,000) is about one million hectares of biologically productive land, or an area about 75 times larger than the City itself.*

This section focuses on our consumption of water, and the consumption of other resources through the generation of solid waste. Some key questions to be answered in this section are:

- Are we using less water?
- Are we doing our part to reduce our materials consumption and landfilled waste?
- Are we reducing, reusing and recycling?
- How do we compare to the Region?

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<sup>1</sup> Wackernagel et al, 1997

## INDICATOR F1: WATER CONSUMPTION (TOTAL AND PER CAPITA)

City Influence: **Medium**

Public Priority: **High**

### Introduction

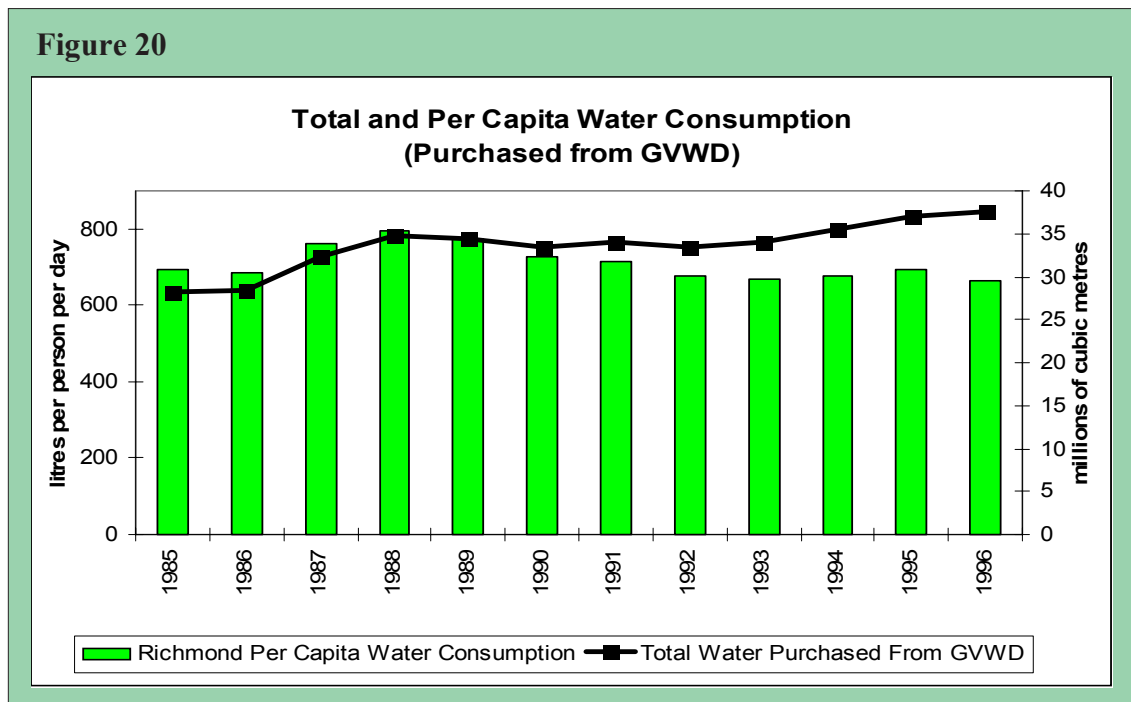
#### Why We Should Measure this Indicator

Monitoring our water consumption is important for several reasons. First, *our local water supply isn't as abundant as we think*. Richmond purchases potable water from the Greater Vancouver Water District (GVWD), which collects and treats surface water from storage reservoirs in the Coquitlam, Capilano, and Seymour watersheds. *This resource is shared among 18 municipalities with a combined population of over 1.8 million*, and its availability from the GVWD reservoirs depends on the amount of snowpack in the higher areas of the watershed, temperatures, the timing and quantity of precipitation, and demand. Water storage and transmission capacity is limited, particularly during dry summer months when residents and businesses increase their water use for irrigation and landscaping.

Second, *our water resources will come under more pressure in future, affecting taxpayers and local government finances*. Continued population growth, without significantly curbing per capita water consumption, will eventually result in demand that exceeds the existing supply. To meet the needs of the region during the next decade, the GVWD is currently negotiating with BC Hydro to obtain additional supply from the Coquitlam reservoir. Growth and increased demand will require costly infrastructure expansion, such as distribution piping, water treatment systems and sewage treatment plants.

Third, *by expanding reservoir capacity instead of reducing consumption, we risk harming other ecosystems and reducing opportunities for using valuable land*. In the next century, development of new reservoirs in other relatively pristine watersheds,

Figure 20



## Results

Since 1985, the per capita rate of consumption has decreased by 4%, to about 670 litres per person per day. Population growth, however, has meant that total water consumption in Richmond grew by 33% between 1985 and 1996. In 1996, Richmond purchased over 37 million cubic metres of water.

Annual consumption of purchased water by all sectors has increased since 1985. Unmetered users, which include single and multiple family residences and schools (GVRD, 1997), consume about 57% of the purchased water.

## Discussion

### What is Happening

Although per capita water consumption has declined slightly since 1985, total consumption has increased by a third, placing considerable additional demands on

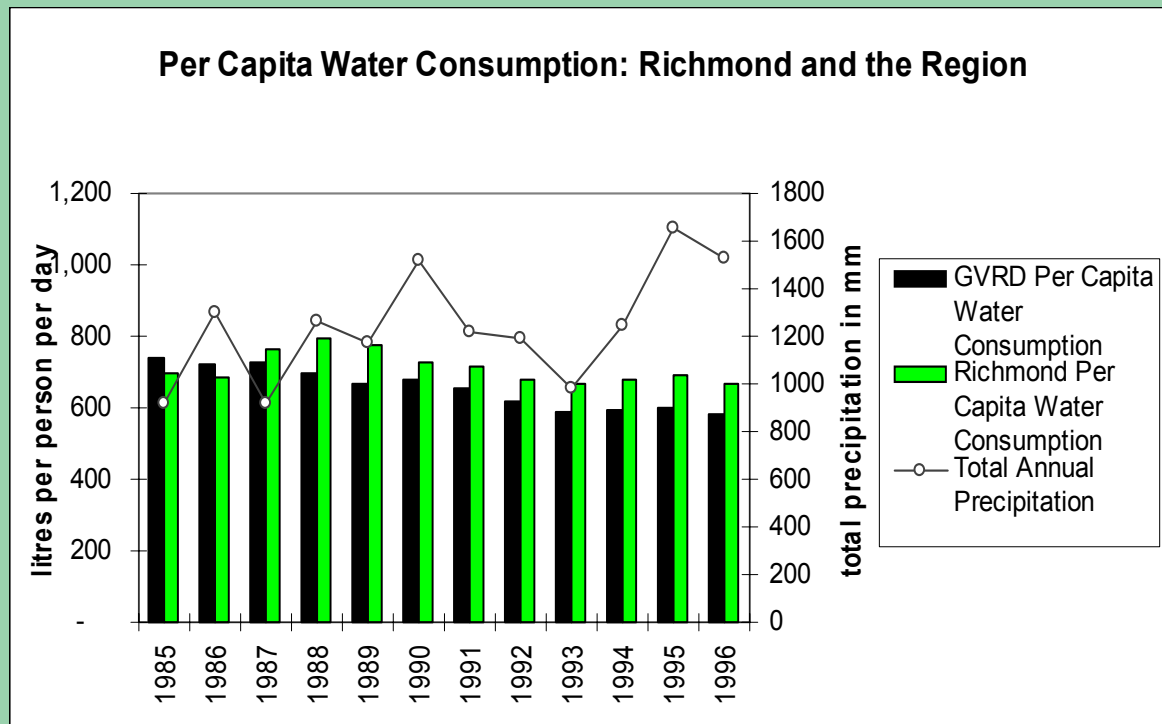
water supplies. Demands on the water supply are particularly high during the summer months (June to August), when residents use about 20 to 50% more water per day than on an average day during the winter months (December to February).

Regional surcharges were introduced for certain types of wastewater discharges, and could help lower industrial and commercial sector consumption significantly in the future. And in coming years, the GVRD will likely raise prices to offset water treatment and other infrastructure costs. If these costs are passed on to water users, there is incentive to consume even less.

### Existing City Programs

Since 1993, like other municipalities in the Region, Richmond has been asked by the GVRD to implement lawn watering bans or restrictions from June 1 to September 30 each year. In Richmond, lawn watering for this period is

Figure 23



Source: GVRD, 1997

restricted to two days per week. A complete ban on lawn sprinkling was imposed in 1992. Lawn watering restrictions are established through a City by-law (also enforced by the City). No other water conservation programs are currently in effect.

### **Richmond and the Region**

Since 1985, per capita water consumption in the GVRD has dropped by about 22%, while per capita consumption in Richmond has dropped by only about 4%. At present, per capita consumption in Richmond is 15% higher than that of the Region.

## **The Future**

### **Targets and Influences**

The City currently has no stated goals related to water consumption.

### **What Citizens Can Do**

- Run dishwashers and washing machines with full loads
- Avoid letting taps run
- Take shorter showers and install water-saving devices on showerheads and toilets
- Follow the GVRD's twice-weekly lawn sprinkling restrictions during the summer months, and water during the cool time of the day
- Choose drought-tolerant plants for your yard.

## **Related Topics**

Water Quality  
Land Use & Settlement

## INDICATOR F2: SOLID WASTE GENERATION

City Influence: **High**

Public Priority:

**Medium**

### Introduction

#### Why We Should Measure this Indicator

Among other things, monitoring solid waste tells us about our consumption patterns. *Materials sent to landfills or incinerators represent wasted natural resources.* Continued population growth, without reducing consumption and waste, applies further pressure to our finite resources.

*Solid waste also affects other environmental assets,* both in Richmond and elsewhere. Burning solid waste can affect air quality. Landfills for disposing of solid wastes affect our land resources. In Greater Vancouver, we have limited landfill capacity that must be shared among many municipalities. And existing landfills must be managed to minimize their impact on groundwater and surface water, and to control methane and carbon dioxide — greenhouse gases that are produced as the wastes decompose.

Finally, the creation of new landfills, which take up land and are often sited outside the communities generating the waste, is becoming increasingly difficult. About two thirds of Richmond’s total solid waste goes to the Burns Bog landfill, which is managed, owned and operated by the City of Vancouver (but considered part of the Greater Vancouver Regional Solid Waste Management Plan). About 20% is sent to the GVRD incinerator, and the remaining 14% is shipped to the Cache Creek landfill<sup>3</sup>.

The City of Richmond’s main role in solid waste management is in:

- Collecting waste and recyclables from *single family* dwellings, and
- Operating recycling programs for other residents.

Since December 1997, all non-recyclable waste from single family homes has been disposed of at the Burns Bog Landfill.

#### What is Being Measured

This indicator measures the tonnage of waste generated, disposed and recycled by Richmond residents living in single family homes, in total and per resident. Approximately 59% of Richmond residents currently live in single family homes. Waste and recyclables collected by the City are weighed before disposal or processing.

A better indicator would be the per capita and total solid waste generated by all sectors<sup>4</sup> in Richmond; however, these data are not available because:

- Waste from other sectors (eg: apartments), and recyclables from businesses and institutions, are collected by private contractors. Prior to disposal, each load is weighed, and contractors report the source municipality to the GVRD; but a single load may contain waste from several municipalities. Therefore, the total amount of disposed waste is measured by the GVRD, but data on the municipality of origin are not reliable enough to use as an indicator.

<sup>3</sup> Historically, some Richmond waste may also have been disposed of at the Port Mann Landfill; this operation closed in November 1997.

<sup>4</sup> The sectors include: single family residential; multiple family residential; institutional, commercial and industrial (IC&I); and demolition, land clearing and construction (DLC).

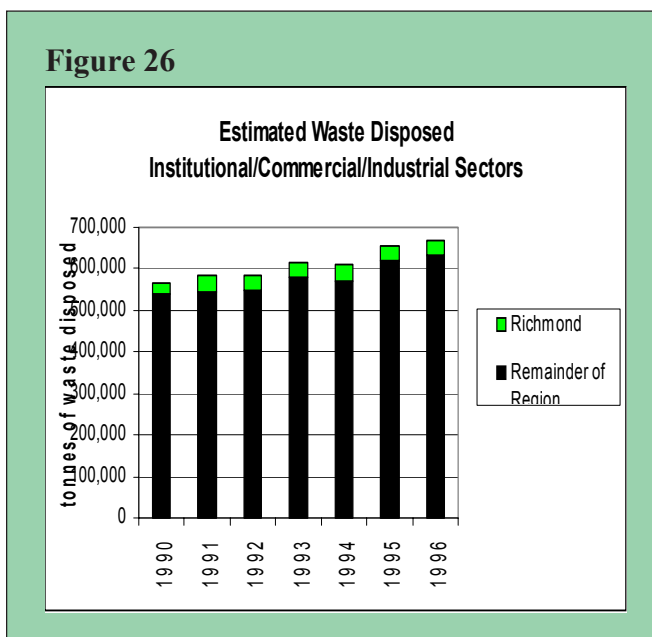
## Existing City Programs

Major milestones in the development of the City's solid waste management and recycling program include:

- December 1990: Blue Box recycling begins
- January 1995: Recycling for apartments
- July 1991: Recycling for Townhomes
- Spring 1996: Two-can limit and seasonal yard-waste pickup introduced for single family homes
- March 1993: Recycling depot expanded
- December 1997: Additional plastics recyclable
- May 1993: Additional paper and plastic recyclable in Blue Box
- December 1997: Year-round yard-waste pickup for single family homes

## Richmond and the Region

The estimated amount of disposed waste, collected by private contractors from Richmond apartments, townhouses, and the institutional, industrial and commercial sectors, has increased by about 15% since 1990. Across the region, the amount of disposed waste from these sectors increased by about 17% during the same period.



## The Future

### Existing Targets

By the year 2000, as mandated by the Provincial Government, the Greater Vancouver Regional District must reduce the per capita waste disposed to 50% of 1990 levels.

Residents of *single family* dwellings have reduced per capita waste disposed to 60% of 1990 levels. If *all* Richmond residents and businesses are taking advantage of reduction, reuse and recycling opportunities in a similar manner, the community may be doing its part to help GVRD meet its year 2000 goal.

Existing solid waste objectives in Richmond's current OCP include:

- Encourage recycling of useful materials from garbage; and,
- Monitor emissions from solid waste incinerators.

### What Citizens Can Do

Here are some ideas to consider:

- Actively participate in local recycling programs.
- Encourage employers to implement recycling and waste reduction programs at work.
- Buy products in refillable containers and purchase reusable products
- Buy environmentally-friendly cleaning products
- Buy in bulk to reduce packaging
- Compost kitchen/yard organic waste to reduce garbage.
- Rent or share seldom used items
- Donate toys, clothes or other items to charity or school

### Related Topics

Air Quality  
Water Quality

# TOPIC G: CITY ENVIRONMENTAL PRACTICES

City Influence: **High**

Public Priority: **Medium**

—*This Chapter Contains no Indicators*—

## Why We Should Monitor this Topic

The City of Richmond employs approximately 1,420 staff and had a 1997 annual budget of about \$230 million. City programs include:

- Road and infrastructure maintenance;
- Parks management;
- Solid waste management and recycling; and
- Urban planning and development.

Each of these programs uses energy and resources (e.g., electricity, fuel, paper, land). The City can help promote environmental stewardship in Richmond by setting a good example and using best environmental practices. These practices may save money and reduce liability as well as resulting in environmental benefits.

## Why There Are Currently No Indicators for This Chapter

The City has many environmental programs, but work is needed to fully define good practices and a *short* list of indicators that *best* measure our environmental stewardship. Finances did not permit this topic to be reviewed in 1998, but future reports will include indicators.

## Existing City Programs

The City has begun adapting its internal practices for sustainability. Some initiatives include:

- Converting City vehicles to run on both natural gas (a cleaner fuel) and gasoline;
- Recycling and re-furbishing waste from Works Yard job sites;

- Recycling all office paper generated at various City facilities
- A pilot project to plant slow-growing turf in City parks and boulevards. This will help reduce mowing, watering and fertilizing, thus contributing to improved water quality;
- Minimizing use of chemical pesticides on civic property through alternatives like biological agents and selection of pest resistant plants and trees;
- An employee ride-matching program to encourage carpooling; and
- Energy conservation (eg: upgrading heaters / air conditioners and using energy-efficient lighting). From 1991 to 1996 the City earned Powersmart awards for these projects.

Future programs worth investigating include:

- City purchasing policies;
- Economic development programs to foster markets for recycled materials; and
- Promoting the establishment of local re-use and repair centres.

## Related Topics:

Potentially All (To be Assessed)

# TOPIC H: NOISE

City Influence: **Medium**

Public Priority: **Medium to High**

—This Chapter Contains no Indicators—

## Why We Should Monitor this Topic

Most topics in the State of the Environment Report are directly related to the City’s natural environment. Noise does not have a direct, long-term impact on plants and trees, but over the long term will affect wildlife. It also has significant impacts on human health and city livability. Excess noise can contribute to stress related illness, interfere with learning, and worsen emotional problems. Loud or disruptive noise causes:

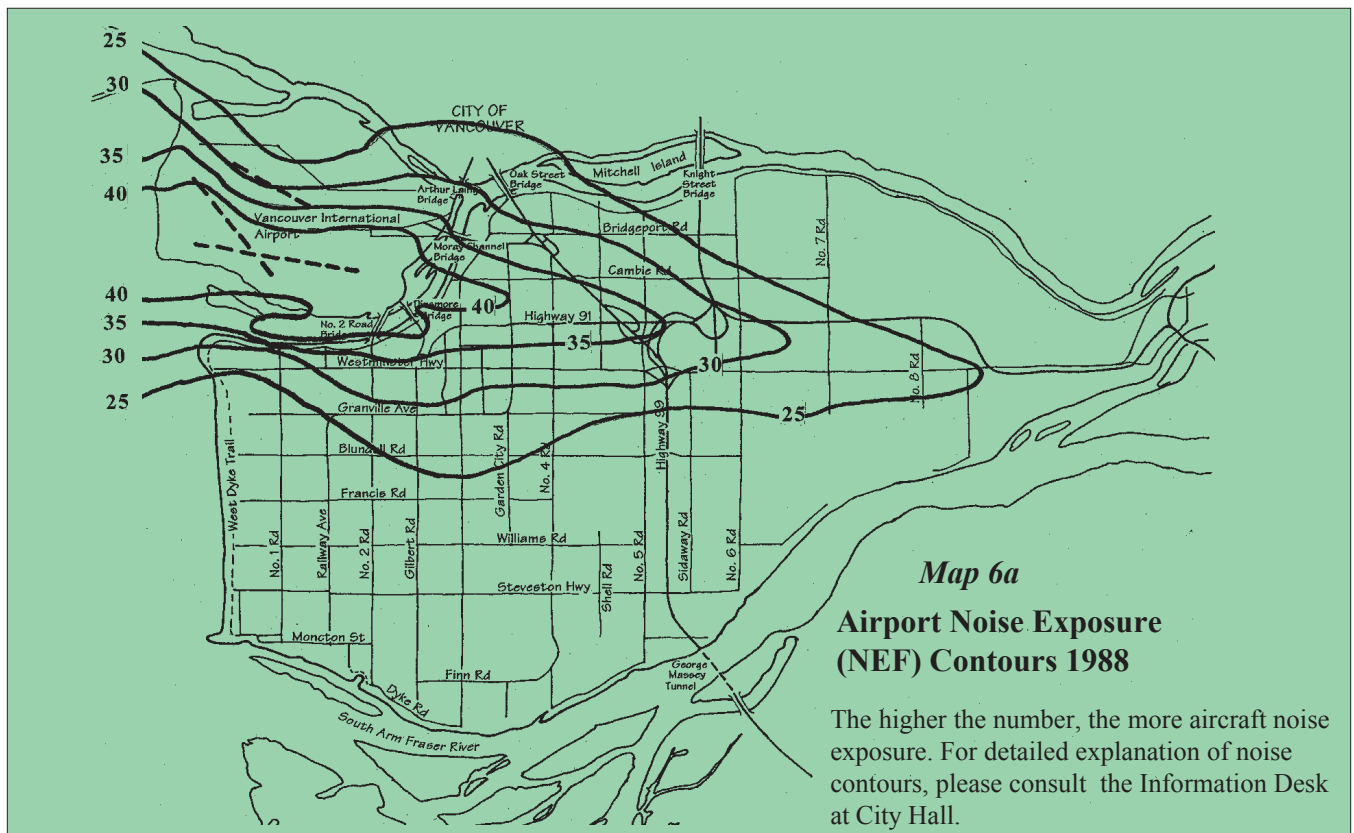
- blood pressure increases;
- heart rate and rhythm changes;
- digestion upset; and
- weakened immune system, which lowers resistance to disease and infection.

Residents identified noise as a concern during the City’s survey of environmental issues, and through consultation on the Official Community Plan Review. It is important to monitor noise to determine:

- what actions the City should take to reduce noise impacts; and
- whether such actions are effective.

There are three types of noise affecting Richmond residents:

- Noise from the construction of new buildings;
- Ambient noise, which generally becomes more pronounced as the concentration of people in an area increases (e.g., from traffic, leaf





- blowers, entertainment districts); and
- Aircraft noise, which affects people living near or under the airport flight path.

Aircraft noise is the most serious problem in Richmond. Ambient noise and construction noise are subject to Richmond’s Noise Control Bylaw. As the City grows, ambient noise will require continued monitoring to ensure that it does not become a major problem.

**Why Are There Currently No Indicators for This Chapter?**

This edition of the SOE Report does not include an indicator for noise. As with human settlement patterns, the definition of sustainable or healthy noise levels is a complex exercise. Further analysis is required to determine which aspects of noise (aircraft and other) would yield the most relevant data for informing city noise policies. For example, is it more important to have data on:

- The number of properly insulated homes under the flight path;
- The number of reported noise by-law violations
- Average decibel levels throughout the City; or
- The average number of severe noise disturbances in a given day.

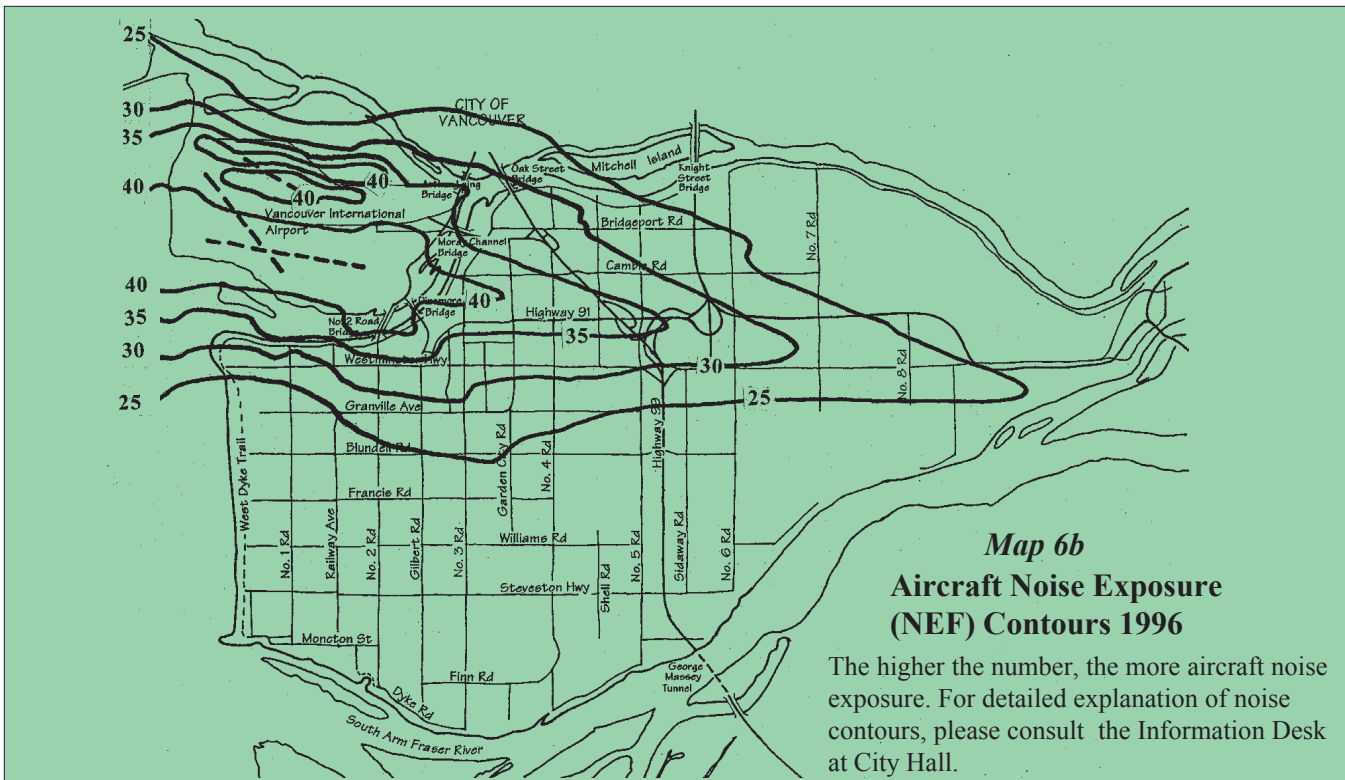
It is also difficult to establish a reasonable or desired noise level. The City therefore intends to conduct further study and develop appropriate indicators for a future edition of the report.

**Related Topics**

Land Use & Human Settlement  
Transportation

**Related Indicators**

Street Trees Planted by the City  
Trees Lost & Gained Through Multi-Family Development



## 3.2 Selected SOE Reports from Other Cities and Jurisdictions

Preparing this report involved reviewing other State of the Environment Reports as models, both in paper and on the Internet. Reports consulted are listed below.

### NATIONAL REPORTS

Canada  
Environment Canada  
**The State of Canada's Environment, 1991**  
**The State of Canada's Environment, 1996**  
**National Environmental Indicator Series, Ongoing**  
Website: <http://199.212.18.12/~soer>

Norway  
**State of the Environment in Norway 1997 - Adapted for Internet**  
Website: <http://www.grida.no/soeno97>

### PROVINCIAL / STATE REPORTS

British Columbia  
Ministry of Environment, Lands and Parks  
**State of the Environment Report for British Columbia, 1993.**

**Environmental Indicator Series, Ongoing**  
Website: <http://www.env.gov.bc.ca>

Manitoba  
Manitoba Environment  
**State of the Environment Report for Manitoba, 1995 - Focus on Agriculture**

Alberta  
Alberta Treasury  
**Measuring Up '96, 1996**  
Website: <http://www.treas.gov.ab.ca/comm/measup96/intro.html>

Oregon (USA)  
Oregon Progress Board  
**Oregon Benchmarks, 1992**

Maine (USA)  
Maine Economic Growth Council  
**Measures of Growth, 1997**  
Website: <http://www.mdf.org/megc/growth97/home.htm>

### LOCAL GOVERNMENT REPORTS

Greater Vancouver Regional District  
Prepared for the Strategic Planning Department by Westland Resource Group  
**A Monitoring Program for the Greater Vancouver Regional District Livable Region Strategic Plan 1997.**

Capital Regional District (Victoria, BC)  
Prepared for the CRD Roundtable on the Environment by Westland Resource Group  
**Report on the Environment, Phase 1, June 1997**  
**Report on the Environment, Phase 2, Forthcoming**

City of Vancouver  
Special Office for the Environment  
**State of the Environment Report, March 1995**  
Website: <http://www.city.vancouver.bc.ca/commsvcs/enviro/stateofenvironment.html>

City of Ottawa  
Dept. Of Engineering and Works - Environment Management Branch  
**Land & Water Highlight Report** (part of the SOE Reporting Program, 1993)  
Contact: (613) 244-5300

City of Toronto

**Toronto's First State of the City Report**, June, 1993

City of Seattle (Washington, USA)

Office of Management and Planning:

**Promoting Environmental Stewardship in Seattle.**

**Seattle's Environmental Action Agenda: 1994**

**Implementation Update**, December 1994

**Seattle's Comprehensive Plan: Monitoring Our**

**Progress**, 1996

Contact: (206) 684-8080

Sustainable Seattle

**Indicators of Sustainable Community**, 1993.

Contact: (206) 382 5013

City of Olympia (Washington, USA)

Sustainable Community Roundtable

**State of the Community Report (Draft)**, 1993

Website: <http://weber.u.washington.edu/~common/cases/case5.html>

Jacksonville, (Florida USA)

Jacksonville Community Council (citizen group)

**Life in Jacksonville: Quality Indicators for**

**Progress**, November 1991

Contact: (904) 396-3052

Website: <http://libertynet.org/~edcivic/jackslib.html>

International Centre for Sustainable Cities

Prepared by the Cascadia Institute (Vancouver) and

Discovery Institute (Seattle Washington)

**Opportunities for Achieving Sustainability in Cascadia**

Contact: (604) 666-0061

U.S. Department of Energy's Office of Energy

Efficiency and Renewable Energy

Centre of Excellence for Sustainability

Website: <http://www.sustainable.doe.gov>

Hart Environmental Data

**Measuring Progress Toward Sustainability**

<http://www.subjectmatters.com/indicators/>

## OTHER REPORTS

BC Roundtable on the Environment,

**State of Sustainability: Urban Sustainability and**

**Containment.** 1994.

Fraser Basin Management Program

**Fraser Basin Management Board Report Card,**

1995

Contact: (604) 660-1177

## 3.3 References

References used in this document include text and personal communications.

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# Personal Communications

## City of Richmond

Pascal Best, *Parks Planner*  
David Brownlee, *Special projects Planner*  
Suzanne Bycraft, *Manager, Waste and Recycling*  
Erland Carlson, *Engineering Technician*  
Ian Chang, *Community Planner*  
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Frank Sciberras, *Supervisor, Mapping &  
Production*  
Dave Semple, *Manager, Park Design and  
Programs*  
Yvonne Stich, *Parks Planner*  
Victor Wei, *Transportation Engineer*

## Other Agencies

Tony Barnard, *BC Ministry of Environment, Lands  
and Parks*  
Leslie Beckman, *Fraser River Management  
Program.*  
Patricia Bell, *Strategic Planning Department,  
Greater Vancouver Regional District*  
Ron Erikson, *Nature Trust of BC.*  
Dominic Mignacca, *Air Quality Department,  
Greater Vancouver Regional District*  
Paul Montpellier, *Parks Department, City of  
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Anne Murray, *Head, Environmental Management,  
Vancouver Airport Authority.*  
Surjit Nizzar, *Air Quality Department, Greater  
Vancouver Regional District*  
Martha Norman, *Parks Department, City of  
Surrey.*  
Ken Stubbs, *Manager, Air Quality Department,  
Greater Vancouver Regional District*  
Don Watmough, *Parks Department, Greater  
Vancouver Regional District*

## 3.4 Glossary

**Agricultural Land Commission (ALC)** Provincial body responsible for managing the Agricultural Land Reserve, with the power to remove lands from the reserve.

**Agricultural Land Reserve (ALR)** Privately-owned farm lands which have been designated under provincial (BC) statute, to be retained for agricultural purposes. Under certain conditions, designated lands may be removed from the ALR.

**Ambient Air Quality** Air quality measured at a ground-level site (as opposed to global air quality issues, such as the greenhouse effect or stratospheric ozone).

**Ambient noise** Noise which comes from several sources, and is of long duration (as opposed to a single, short term noise event, such as aircraft noise).

**BC Transit** Provincial Crown Corporation currently responsible for providing transit services to all BC municipalities, including the City of Richmond.

**Biologically Productive Land** Land in this category includes agricultural areas; environmentally significant areas; forests; meadows and estuaries. Biologically unproductive land includes paved or developed areas.

**Capital Works Program / Capital Works Plan** These two terms are used interchangeably. They refer to a list of major infrastructure (utility and transportation) projects, the projected time frame for their completion, and their relative priority.

**City Beautification Strategy** A strategy designed to enhance Richmond's physical appearance, primarily through street tree-planting and public art initiatives.

**Complete Community** An area containing jobs and needed services (e.g. Grocery stores, banking, schools) close to major housing areas. The average resident could comfortably walk and / or cycle to those destinations from their homes.

**Core municipalities** Municipalities including and immediately surrounding the City of Vancouver, generally assumed to include: Richmond, Burnaby, North Vancouver City and District; and Coquitlam.

**Cycling lanes** A lane that forms part of a major road, designed and designated for the use of cyclists. In some situations, small portions of these lanes may also be used as right-hand turning lanes for automobiles.

**Development Permit** A permit required in special pre-defined conditions to control the form and character of a development, as set out in the *BC Municipal Act*.

**Environmentally Sensitive Areas** Areas identified as having ecological value by having one or more of the following characteristics: significant plant or animal species; large areas where biotic features are self-sustaining; natural diversity; uniqueness; and high aesthetic values. For more information, please consult the *Richmond Official Community Plan*, and *Criteria for the Protection of Environmentally Sensitive Areas*.

**Greenhouse Effect / Global Warming** A warming of the Earth's atmosphere caused by the presence in the atmosphere of certain gases (e.g., water vapour, carbon dioxide, methane) that absorb radiation emitted by the Earth, thereby retarding the loss of energy from the system to space. The greenhouse effect has been a property of the Earth's atmosphere for millions of years. Today, because people are affecting the proportions of gases in the atmosphere, the greenhouse effect is thought to be causing a rise in average global temperatures.

**Greenhouse Gases** Gases that cause the greenhouse effect (see above)

**Greater Vancouver Regional District(GVRD)** Regional level of government comprising over twenty municipalities including and surrounding the City of Vancouver

**Lower Mainland** Descriptive term used by BC residents to refer to Vancouver and the surrounding area, including the GVRD and two other Regional Districts.

**Major roads** As used in this report, major roads include all roads which separate mapped sections of land in Richmond. Transportation and Planning staff refer to these roads as “section-line roads”. Most are major arterials, but a few are minor and local roads that perform an important circulation function.

**Native Vegetation** Plant material originating in the Pacific Northwest (British Columbia, Washington and Oregon).

**Official Community Plan (OCP)** A legal document identifying city-wide goals, as well as development and servicing objectives. It includes a land management strategy, and a map prescribing specific land uses for individual areas within the city.

**Pedestrian Friendly Streets** A pedestrian-friendly street is one which has been designed to maximize the comfort of people travelling on foot, wheelchair, or motorized scooter. It must include a sidewalk, and may include other additional features (refer to this indicator under the Transportation Section).

**Privately-Owned / Publicly-Accessible Open Spaces (POPAS)** Privately-owned property made available for public open space use through development agreements with the City of Richmond.

**Rapid Bus** An articulated bus to be used on the Richmond - Downtown Vancouver service route. Rapid bus makes fewer stops than the typical bus, and designed with a similar level of amenity to light rail transit, including automated ticket dispensers; and electronic displays indicating total wait time for the next bus.

**Sustainable Transportation** Modes of transportation which use lower amounts of energy and produce fewer greenhouse gases per person travelling than the private automobile (i.e. transit, walking or cycling).

**Turbidity** The presence of suspended solids in drinking water. In Greater Vancouver, this generally results from storm-induced mud slides in local watersheds, or from resuspension of sediment from the edges of the lakes during periods of low water levels.

**Urban run-off** The part of precipitation that reaches streams by flowing over urban areas.