

# Community Risk Assessment

## Hazards, Vulnerabilities and Risks in the Town of View Royal

2009



Prepared for:  
Town of View Royal  
Emergency Program

Prepared by:  
**Smart Risk Control, Inc.**  
Victoria, BC

May 31, 2009

**Note:** *This Document is Designed for Double-Sided Printing*

The Community Risk Assessment for the Town of View Royal was made possible with funding from the Joint Emergency Preparedness Program (JEPP).

**Limitation of Liability** – This report represents information available at the time of production and may contain errors or omissions. Users of this information are cautioned of the limitations of this study, and assume full responsibility for its application.

# Table of Contents

<u>Section</u>	<u>Page</u>
<b>1.0 Introduction.....</b>	<b>1</b>
1.1 The Community .....	2
1.2 Physical Setting .....	3
1.3 Climate .....	4
<b>2.0 Community Profile.....</b>	<b>5</b>
2.1 Demographics.....	5
<i>Land Use and Planning Areas.....</i>	<i>6</i>
<i>Special Occupancies.....</i>	<i>10</i>
<i>First Nations .....</i>	<i>11</i>
2.2 Infrastructure.....	14
<i>Electrical Power.....</i>	<i>14</i>
<i>Water Systems .....</i>	<i>15</i>
<i>Sewer Systems.....</i>	<i>16</i>
<i>Road Transportation.....</i>	<i>16</i>
<i>Rail Transportation .....</i>	<i>18</i>
<i>Other Infrastructure .....</i>	<i>19</i>
2.3 Community Services .....	20
<i>Schools in View Royal.....</i>	<i>20</i>
<i>Health Care Facilities .....</i>	<i>21</i>
<i>First Responder Services .....</i>	<i>22</i>
<i>Emergency Program Services.....</i>	<i>23</i>
2.4 Economy.....	24
<i>Core Businesses .....</i>	<i>25</i>
<b>3.0 Hazards .....</b>	<b>27</b>
1. <i>Atmospheric Hazards .....</i>	<i>28</i>
2. <i>Disease - Human.....</i>	<i>30</i>
3. <i>Earthquake .....</i>	<i>32</i>
4. <i>Fire, Major Urban.....</i>	<i>34</i>
5. <i>Hazardous Materials .....</i>	<i>36</i>
6. <i>Structure Collapse.....</i>	<i>38</i>
7. <i>Terrorism .....</i>	<i>40</i>
8. <i>Transportation - Road .....</i>	<i>42</i>
9. <i>Tsunami.....</i>	<i>44</i>
10. <i>Utility Failure.....</i>	<i>46</i>
11. <i>Wildland Fire.....</i>	<i>48</i>
<i>Other Hazards .....</i>	<i>50</i>
<b>4.0 Priority Concerns .....</b>	<b>51</b>
<b>5.0 Action Items .....</b>	<b>52</b>
<b>6.0 References .....</b>	<b>55</b>

This page intentionally blank

# Community Risk Assessment

## Hazards, Vulnerabilities, and Risks in the Town of View Royal

### 1.0 Introduction

This report addresses hazards that could affect the residents, institutions, and businesses of the Town of View Royal and lead to a major emergency or disaster. The purpose of a community risk assessment is to guide preparedness and mitigation activities that reduce both the likelihood of emergencies and the consequences when disaster cannot be avoided.

Hazards and vulnerabilities are important community elements to understand in preparing emergency response, business continuity, and recovery plans. The term “hazard” refers to a situation or event that can adversely affect human health, property, the environment, or other elements of value to the community. Hazards may be natural in origin, such as an earthquake or severe winter storm, or human-caused, such as a structural fire or hazardous material spill.

The term “vulnerability” indicates those characteristics of a community that are particularly susceptible to the effects of hazards. Among the View Royal population, factors that increase vulnerability include economic status, age, and physical disabilities that influence the ability of individuals to adequately respond to and recover from emergencies. Vulnerabilities may also include infrastructure that is critical to community functionality, such as the water supply.

The ultimate objective of this project is to identify practical actions that will reduce risks associated with major emergencies. The View Royal Emergency Management Committee intends for this report to carry forward, from one generation to the next, an understanding of threats so thoughtful and effective actions may be undertaken with confidence.

A number of sources and knowledgeable persons contributed information to this Community Risk Assessment. Municipal managers in Fire / Rescue, Planning and Building Services, Engineering, Public Works, and Financial Services provided essential information on the hazards and vulnerabilities in the community.

A complete list of references may be found at the back of this report.

The Emergency Program Coordinator will ensure this community risk assessment is updated at least every five years.

#### Legal Requirement to Assess Risks

As a local authority Under the British Columbia *Local Authority Emergency Management Regulation*, the Town of View Royal is required to reflect...

*The potential emergencies and disasters that could affect all or any part of the jurisdictional area for which the local authority has responsibility, and*

*The local authority's assessment of the relative risk of occurrence and the potential impact on people and property of the emergencies or disasters.*

## 1.1 The Community

The Town of View Royal is located at the crossroads of the Capital Region, seven kilometres west of Victoria on Vancouver Island, British Columbia. As shown in Figure 1, the Town is bounded by the District of Highlands to the north, City of Langford to the west, and the District of Saanich to the east. View Royal shares its southern border with City of Colwood, the Township of Esquimalt, and parts of Esquimalt Harbour.

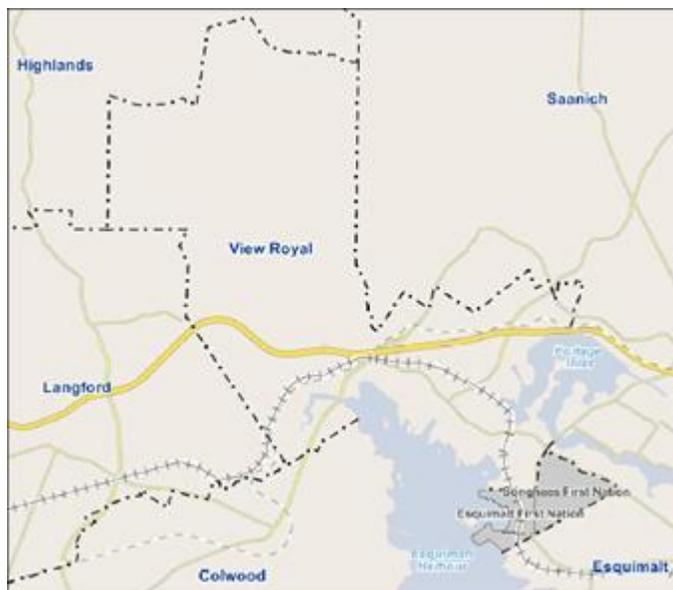


Figure 1. Location of View Royal in the Capital Region

This largely residential community, incorporated in 1988, currently holds more than 9,000 residents. At approximately 1,731 hectares of land, View Royal is the second smallest municipality in the Capital Region.

The Town is traversed by three major transportation routes – The Trans-Canada Highway, the Island Highway, and the Esquimalt and Nanaimo (E&N) rail line. As the connection between Victoria and the Western Communities, the Town plays a critical role in regional transportation. The transportation corridor also divides the community and defines neighbourhoods.

The Town has numerous businesses and historic sites that draw visitors from throughout the Capital Region, including Craigflower Manor, the Four Mile Pub, the Six Mile Pub, and Great Canadian Casino.

In 1996, the Town annexed a large tract of land north of Thetis Lake Park, including several rural residences that share the wildland interface with forested parcels.

Two First Nation Reserves neighbour the community of View Royal and are included in the Emergency Program. The Songhees First Nation occupies about 66 hectares on the south-eastern border of View Royal. The Esquimalt First Nation occupies 19 hectares at Plumper Bay on Esquimalt Harbour.

The Town also lies immediately adjacent to Esquimalt Harbour, administered by the Department of National Defence, and the Esquimalt Shipyards, which support a number of industrial operations that include hazardous materials.

### Implications of Location:

View Royal's location on Vancouver Island places the community among a number of natural hazards, including earthquake, tsunami, and severe weather events. As the hub of the region's transportation network severe road accidents and hazardous material releases are among the concerns for major emergencies.

## 1.2 Physical Setting

The Town of View Royal consists mostly of a coastal plain, varying in elevation from sea level to 130 meters. The general topography consists of rolling hills, hillocks, and marine basins, with a few steep rocky cliffs in places. The landscape is generally well-drained, but water encroachment can occur in a few locations along the shoreline at the highest tides.

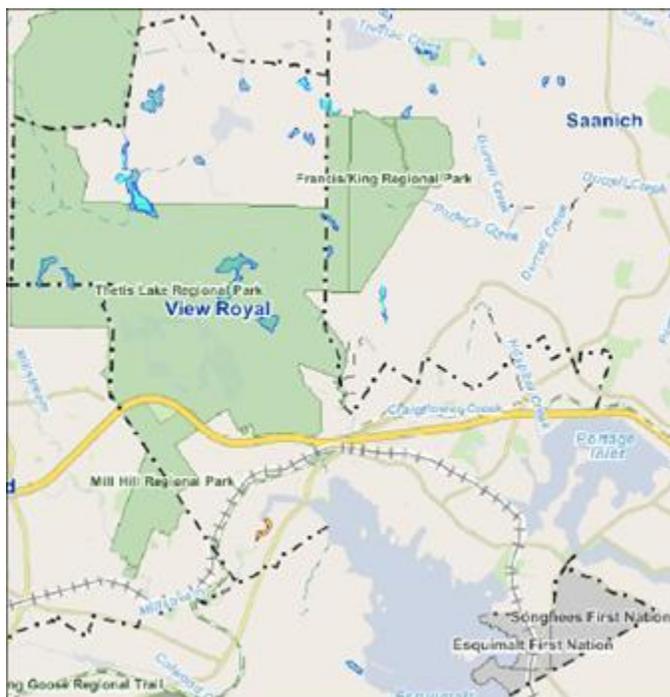


Figure 2. Geographic Landscape of View Royal

Thetis Lake Regional Park, at 224 hectares, comprises about 13 percent of the total land area. Shown in Figure 2, the Park and the area to the north consist of large land holdings characterized by a wide variety of terrain types, old-growth forest, streams and lakes.

A wide range of marine environments have shaped the form and character of the View Royal community. Aquatic habitat ranges from the salt water bays of Esquimalt Harbour and Portage Inlet, and brackish waters in the Craigflower and Millstream Creek estuaries, to the fresh water ecosystems of Thetis, Prior, Pike, and McKenzie Lakes. The seashore is subject to tidal ranges that, when combined with storm conditions, can lead to localized high water.

There have been no historical incidents of widespread flooding in View Royal. Centennial Park, a re-claimed wet land, may

flood during a combination of heavy rains and high tides.

The Town of View Royal, like the rest of the Capital Region, resides in one of the most active seismic zones in North America. Earthquake threats include the Cascadia Subduction Zone off the west coast of Vancouver Island, and shallower earthquakes near Georgia Strait and Puget Sound.

An earthquake can also trigger one or more landslides. Steep slopes in residential areas may present risks in the following neighbourhoods:

- Chilco Road
- Highland Road
- Holland Ave
- Kaleigh Lane
- Marler Drive
- Riverside Drive
- Thanet Road

**Implications of Physical Setting:** Forested lands in the northern sections of the community present the threat of wildfire and impacts to View Royal residents and businesses.

Earthquake ranks among the natural hazards of greatest concern in View Royal. Shoreline properties are subject to the threat of tsunami.

The municipality's location on Vancouver Island means it is distant from emergency assistance available from the Lower Mainland of BC.

## 1.3 Climate

View Royal enjoys an overall climate that is among the mildest in Canada. The community's climate is influenced by the Olympic Mountains to the south, resulting in what has been called the Inner Coast climate. Extremes in temperature, precipitation, or wind speeds are rare events relative to other regions of Canada. Nevertheless, View Royal has experienced hurricane-force winds, sudden and heavy snowfalls, and both extreme rainfalls and drought conditions. Infrequent harsh weather events may expose a lack of preparedness among community residents.

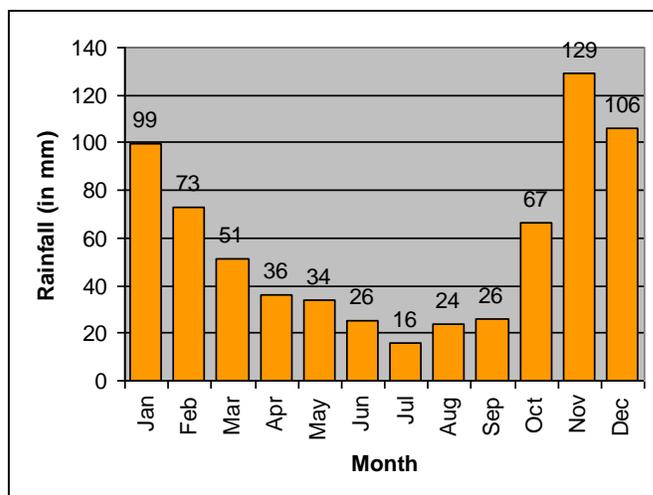


Figure 3. Average Annual Rainfall by Month – View Royal<sup>1</sup>

occurred on five occasions since 1880, including one December day in 1996 when weather stations recorded 64.5 cm of snow in the Greater Victoria area (the highest amount recorded was 91 cm in 1887).<sup>2</sup>

Southern Vancouver Island is also subject to the effects of *El Nino*, a phenomenon that occurs every two to seven years. Warm ocean currents generate rising moist air that generally mean warmer and somewhat drier winters in BC. *La Nina*, the opposing phase, results in colder and wetter winters.

Like the rest of the world, the Town of View Royal will experience the effects of global climate change. Although the exact impacts are difficult to forecast, the consequences in View Royal by 2050 will likely include:

- Challenges to local water supplies in summer months
- Wetter winters and springs, with increased frequency of localized water intrusion and landslides
- Increased salt-water intrusion in coastal areas
- Sea level rise and increased coastal erosion<sup>3</sup>

**Implications of Climate:** Events of severe weather are infrequent, and may demand unexpected response from municipal staff, residents and businesses. Global warming may result in more intense storms, with stronger winds and higher rates of precipitation in spring, and more summers with drought conditions. Sea level rise may directly impact coastal properties and municipal infrastructure.

View Royal sees relatively wet winters and typically dry summers. Figure 3 highlights the range in average precipitation over the course of a year. Heavy rainfall events are more likely in November, December and January than at any other time of the year.

Pacific winter storms common to these winter months usually bring very moist air from the subtropical regions in systems known locally as the “Pineapple Express.”

Extreme snowfalls (over 50 cm in a single day) are rare events, but have

<sup>1</sup> Environment Canada

<sup>2</sup> Keith C. Heidorn, 2005

<sup>3</sup> Pacific Climate Impacts Consortium, 2007

## 2.0 Community Profile

### 2.1 Demographics

According to the 2006 census, the population of the Town of View Royal numbered 8,768 residents in about 3,350 private households. The population for 2007 was estimated at 9,213, and some projections have this increasing by 22 percent to 10,700 by 2026. In addition, there are about 3,200 residents on the Songhees and Esquimalt First Nations lands.

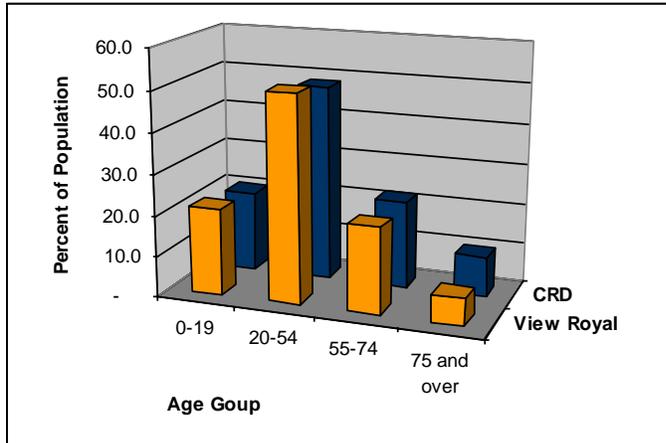


Figure 4. Age Distribution in View Royal, 2006 (source: Statistics Canada)

Age – The age distribution of View Royal residents, shown in Figure 4, suggests that a smaller percentage of the population comprises the older age groups than for the Capital Region as a whole. Census information identified 590 (6.7%) View Royal residents of age 75 or older, as compared with 10 percent for the CRD.

In addition to the elderly, a number of households in the municipality have disabled residents, including those suffering from dementia. These vulnerable persons may require assistance in preparing for emergencies and in receiving special care during some events.

Income Levels – View Royal residents earned an average of \$78,511 in family income in 2005, 38 percent above the average for Victoria metropolitan families.<sup>4</sup> However, low income households are known to exist in the community and may require assistance during emergencies, such as during an evacuation.

The Town’s population includes more than 350 single parents, accounting for 14.1 percent of the residents, somewhat less than the 15.7 percent for the Capital Region. About half (49.9 %) of the View Royal residents have moved within the last five years – a greater frequency than for the Capital Region as a whole.

Language – English continues to be the overwhelming home language for View Royal residents. About 98 percent of the residents understand English.

In addition to residents, others may be present in View Royal on a transient basis during an emergency, such as workers, visiting tourists, park recreationalists, and motorists on arterial or main roadways.

**Implications of Demographics:** There are about 3,350 households in the community. Each requires the capability to sustain themselves for up to seven days without assistance. Special needs populations include 590 residents over 75 years of age, and 350 single parent families.

Residents who have recently moved to the community may not be aware of local hazards and preparedness plans. The Town should continue to invite individuals and households that require assistance during emergencies to identify themselves.

Response plans should account for transient populations, such as patrons of the Great Canadian Casino and motorists on the Trans-Canada Highway.

<sup>4</sup> CRD Household Income, 2005

# Land Use and Planning Areas

## Land Use

Of the 3,350 private households in the municipality, about half (50.1%) are detached single family dwellings. Most single-family homes are concentrated on the waterfronts of Esquimalt Harbour and Portage Inlet. Although some houses were constructed as early as the 1930s, most residences in the Town were built in the 1960s and 1970s.

In 1998, CRD trunk sewers were extended through View Royal to Colwood and Langford as part of a major infrastructure program, coordinated by the CRD with significant federal and provincial funding. The extension of services allowed for new development and redevelopment at higher densities in some parts of View Royal.<sup>5</sup>

There is a much larger proportion (17.8%) of town houses in View Royal than in the Capital Region (6.3%). In addition, there were 185 mobile homes in the community, representing a larger percentage (5.8%) than for the region (1.4%).

Household sizes tend to be larger in View Royal (76.3% with more than one person) than for the Capital Region overall (66.7%), indicating more families with children in the community.

Currently, the Official Community Plan makes no provision for heavy industrial development. Limited light manufacturing use is provided for within the scope of the Business Park Commercial land use category. Some commercial outlets, such as hardware and building supply retail stores, present community hazards when the potential for fire and toxic smoke is considered. A significant portion of the community is devoted to parks, recreation, and open space. Land use planning is coordinated with infrastructure development within the jurisdiction.

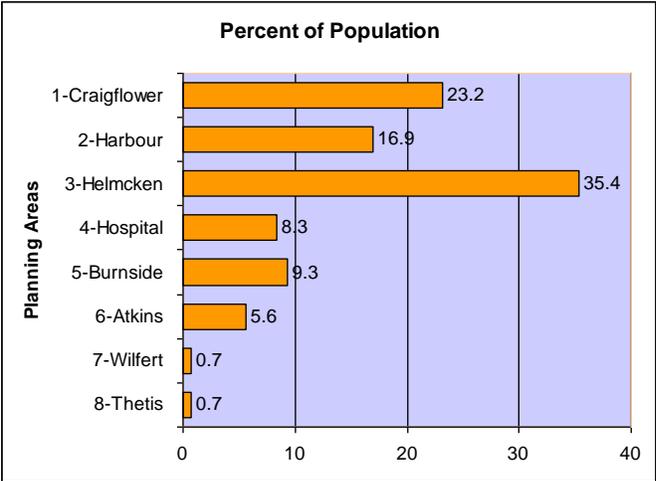


Figure 5. Relative Population in Planning Areas

## Planning Areas

For planning purposes, View Royal is divided into eight distinct Local Planning Areas based on topography, transportation corridors, and the natural environment. These Planning Areas are defined in the Town of View Royal Official Community Plan.

Three planning areas hold more than 75 percent of the community’s population, as illustrated in Figure 5:

- Helmcken
- Craigflower
- Harbour

Figure 6 illustrates the relative location of the eight planning areas.

<sup>5</sup> View Royal Official Community Plan

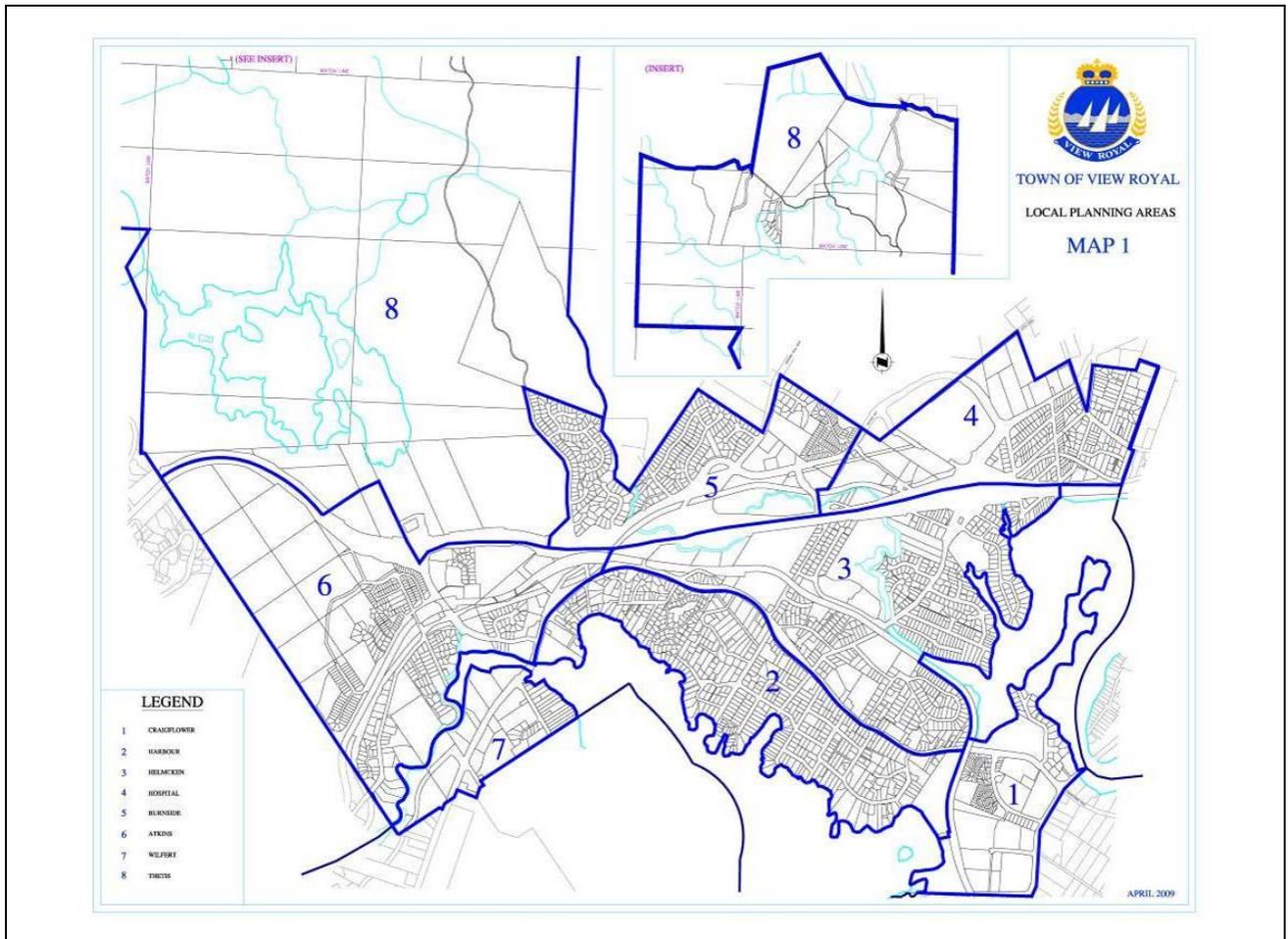


Figure 6. Eight Planning Areas in View Royal

View Royal Planning Areas

1. Craigflower
2. Harbour
3. Helmcken
4. Hospital
5. Burnside
6. Atkins
7. Wilfert
8. Thetis

Each Planning Area is summarized on the following pages in terms of hazards and vulnerabilities.

**Implications of Planning Areas:** The Emergency Program can take advantage of the planning areas in promoting disaster preparedness. The Town should encourage neighbourhood preparedness planning by engaging residents in emergency and disaster preparedness sessions, including education regarding evacuations and survival kits.

Some residential areas are exposed to more risk than others, and these neighbourhoods should receive priority attention. Owners of dwellings in wildland-urban interface fire risk areas, for example, should be identified and informed of specific hazards and evacuation plans.



Christie Point Apartments

**1. Craigflower Planning Area** – Craigflower serves as the eastern entrance to the Town. With a mixture of residential and commercial development, the area includes important retail outlets, such as Admirals Walk Shopping Centre and Nelson Square, and Shoreline Middle School. Multi-family dwelling units reflect both affordable housing and special needs housing projects, including seniors' housing. Historical assets include the Craigflower Manor farmhouse. An extensive marine shoreline exposes residents to tsunami risks. Soils at Thetis Cove are severely contaminated due to historical use of the area for fuelling naval vessels and as the site of a plywood mill. Contaminated soils are also present at the former industrial site off Hallowell Road, where it ends at Esquimalt Harbour.



Hedde Avenue

**2. Harbour Planning Area** – The majority of the housing in the Harbour Area consists of traditional single-family detached dwellings on large lots. Many of the streets are narrow, and some are steep, offering residents views of Esquimalt Harbour. Important buildings in this area include the View Royal Town Hall, the Community Hall, and the historically significant Four-Mile Pub. Road access depends on the Island Highway. Some of the higher risk areas for tsunami include Tovey Bay, Millstream Creek, and the residential areas between Helmcken Road and Portage Inlet.



Fort Victoria RV Park

**3. Helmcken Planning Area** – This planning area is mostly residential, dominated by single-family dwellings. The Helmcken area contains several vulnerable components, including the Fort Victoria Recreational Vehicle Park and Campground, the Lions Cove Seniors' Housing Project, and View Royal Elementary School. Helmcken also includes the Town Hall and Fire Hall, vulnerable elements of the Town's operations. The area is bisected by Helmcken Road and flanked by the Trans-Canada Highway and the Island Highway. A truck accident on one of these routes could release hazardous materials that require an evacuation. The area includes Craigflower Creek and Portage Inlet, which are subject to tsunami events and sea level rise.



Victoria General Hospital

**4. Hospital Planning Area** – Primarily older single family residential neighbourhoods comprise this northern entrance to View Royal. Most homes are located east of Helmcken Road, with steep slopes are evident near Holland Avenue. The area includes the Galloping Goose Regional Trail and the Strawberry Vale Community Hall. The Victoria General Hospital and Regional Hospital Laundry facility lie west of Helmcken Road, with a few large semi-rural land parcels and attached residential development. The Hospital represents both a vulnerable element of the community, considering such threats as structural fire and utility failure, and a source of hazard, considering the wide range of chemicals and radiological materials used on site.

**5. Burnside Planning Area** – This area consists of mostly larger, newly built single-family homes. The Trans-Canada Highway defines the southern boundary of this area, where hazardous materials could be released from a road accident. The sensitive environment of Craigflower Creek runs through the neighbourhood. The western boundary joins Thetis Lake Regional Park, where densely forested tracts bring the risk of wildfire. Some homes are located along steep slopes. While there are no commercial or industrial buildings in this area, it contains the Eagle View Elementary School, the Galloping Goose Regional Trail, and the Youth Custody Centre.



Highland Road at Thetis Lake Park

**6. Atkins Planning Area** – Currently, most new development within Town limits is occurring with this planning area, which now includes full road, sanitary sewer, drainage, and water services. Bisected by the E&N Railway and the Galloping Goose Regional Trail, the area is bounded on the east by the Island Highway and on the north by the Trans-Canada Highway, and thus subject to hazardous materials incidents. The area is characterized by steep slopes and woodlands that enhance the risk of wildfire. Residents along Millstream Creek and its estuary are subject to the risk of tsunami.



Millstream Creek

**7. Wilfert Planning Area** – This neighbourhood is dominated by commercial strip development along Island Highway. The Highway itself and the traffic it supports serve to divide the Wilfert Planning Area into two parts. The waterfront of Esquimalt Harbour south of Parson's Bridge includes traditional single family housing. More rural parcels are evident along the heavily-treed banks of Millstream Creek. The Wilfert Planning Area presently has the second lowest population in View Royal. Hazards in this area include the risk of hazardous materials release from a truck accident, and tsunami along Millstream Creek.



Island Highway at Wilfert Road

**8. Thetis Planning Area** – This area is sparsely populated and mainly consists of large rural parcels characterized by a wide variety of terrain types, old-growth forest, streams and lakes. The area lacks municipal services and improved road access, sanitary sewer, and water services. The area north of Thetis Lake, including Barker Road and the vicinity of Pike Lake and McKenzie Lake, is considered to be "wildland / urban interface," susceptible to wildfire hazard. Highland Road provides the only access to the few dwellings in the area. There are also hazards associated with steep slopes in some locations. Thousands of visitors may be found throughout the Thetis Lake Park in summer months.



Thetis Lake Park

**Special Occupancies**

A number of special occupancies deserve attention as facilities of particular vulnerability in major emergencies. Special occupancies include locations where there may be a high density of a vulnerable population at the time of an emergency.

High-density occupancies include multi-family dwellings, such as those listed in Figure 7. High-density occupancies, if subjected to a sudden emergency such as a structural fire, explosion, or earthquake, can quickly result in multiple casualties. Existing affordable housing projects and cooperatives, as high-density residential buildings, require advanced emergency planning.

*Figure 7. High-Density Residential Occupancies in View Royal*

Name	Units
Cameo Housing Coop	63
Christie Point Apartments	40
Craigflower Housing Coop	50
Four Mile Heights Housing Coop	16
Helmcken Meadows Apartments	70
Pheasant Meadows Housing Coop	40
Portage Place Housing Coop	17

*Figure 8. Buildings with Vulnerable Populations in View Royal*

Name	Maximum Occupants
Aldersmith Seniors' Condos	40 units
Harbour's End Seniors' Condos	17 units
Great Canadian Casino	2,000 persons
Lions Cove Seniors' Apts	66 units
Victoria General Hospital	414 beds
Water's Edge Seniors' Condos	63 units
Youth Custody Centre	42 beds

Other vulnerable populations are evident in housing units and businesses that serve the elderly, the infirm, and the confined, such as those listed in Figure 8. The schools listed in Section 2.3 also qualify as occupancies with vulnerable populations. Special occupancies include

locations where people may be insufficiently sheltered from a threatening incident, such as a strong wind storm or tsunami. Unsheltered locations in View Royal include campgrounds and trailer parks, such as those listed in Figure 9. Campsites and trailers that rely on propane for heating and cooking may provide an advantage to residents during a prolonged power outage.

In addition to these unsheltered locations, Thetis Lake Regional Park draws many visitors from the Capital Region each year. On any given summer day, when wildfire risks are greatest, Thetis Lake Park may host thousands of hikers, bikers, and other recreationalists.

*Figure 9. Unsheltered Locations in View Royal*

Name	# of Sites
Thetis Lake Campground and Trailer Park	14 Camp sites 18 Mobile home sites 40 Trailer sites
Fort Victoria Trailer Park	340 RV sites

Each of these special occupancies represents a distinctly vulnerable property. The consequences of emergencies at special occupancies tend to be more extreme than at other locations in the municipality.

**Implications of Special Occupancies:** High density occupancies may allow ready transmission of respiratory diseases, such as influenza. Owners of special occupancies are responsible for devising emergency plans that protect occupants, including provisions for alerting them to such threats as structural fire, and evacuating them to safety.

## First Nations

Two First Nations communities are located adjacent to the Town of View Royal. The Town provides fire protection services to both Reserves.

The **Songhees Nation Reserve** occupies about 66 hectares between Admirals Road and Craigflower Road between the municipalities of View Royal and Esquimalt. The Band Office and Community Hall are located in temporary buildings at 1500 Admirals Road.

The main settlement area, located south of Craigflower Road, consists of a mixture of single-family dwellings, mobile homes, apartments, and townhouses. Recent official population estimates for the Songhees Nation Reserve are not available. However, Figure 10 attempts to estimate the current population by identifying the principal residential features.

*Figure 10. Songhees Nation Reserve Population Estimate - 2009*

Residential Feature	No. Units	No. Residents
Band Member Residences	84	400
Mobile Homes Occupied by Non-Band Members	521	1,042
Pacific Village Apartments	172	860
Pacific Village Townhouses	72	216
Songhees Retirement Home Park	130	260
<b>Total Estimate</b>	<b>979</b>	<b>2,777</b>

Band members occupy 84 homes on the Reserve, accounting for about 350 residents. In addition to these Band members, another 50 non-Band persons reside with them for a total of 400.

Mobile homes occupied by non-Band members are situated on Band member properties, mostly with addresses on Craigflower Road and Coopers Road. There are currently 521 mobile homes on the Reserve, each assumed to contain about two residents, for a population of 1,042.

The Pacific Village Apartment complex located at 1441, 1443, and 1445 Craigflower Road has 172 one and two bedroom units in the apartment block, with some 3 bedroom rental units. Due to a greater-than-average occupant density in these units, these apartments may hold up to 860 residents. The Pacific Village Townhouses consists of 72 strata units, accounting for 216 residents if an occupation rate of 3 per unit is assumed. The Songhees Retirement Park holds 130 units, with an average of 2 persons per unit, for an estimate of 260 residents.

In total, the population of Band and non-Band residents on the Reserve may currently represent about 2,750 persons.

The Songhees Reserve includes a number of vulnerable residential occupancies. High density dwelling units, including the Pacific Village Apartments, are subject to particular threat from major urban fire and earthquake. The 521 mobile homes on the Reserve are more vulnerable to severe storms than homes with firm foundations. Overall, the Reserve suffers from overcrowding.

The Songhees Retirement Home Park includes many residents with limited mobility that may impede a quick evacuation. Some residents rely on medical equipment that requires a consistent source of electrical power. This complex is immediately adjacent to the commercial operation of Slegg Lumber at 1496 Admirals Road, which represents a potential threat of major fire and toxic smoke.

According to Statistics Canada, the 2006 population of the Reserve included 365 residents of age 70 and older. The Songhees Nation anticipates completing a project in the summer of 2009 that would identify and locate vulnerable residents who may need assistance in emergencies.

The Songhees Nation collects property taxes from approximately 670 commercial properties located on the Reserve, including the mobile homes. These tax revenues are used to support the many services provided to residents, including water and sewer infrastructure, road maintenance, and the fire and other emergency services provided by the Town of View Royal. A widespread disaster that resulted in the loss of these revenues would impair the ongoing ability to provide such services.

The governance structure for the Songhees Nation consists of a Chief and five Councillors, elected by the Band under Section 10 of the Indian Act. The Chief and Councillors have the authority to oversee and direct emergency response measures undertaken within the jurisdiction of the Reserve.

The Bylaw Officer currently also serves as the emergency management position for the Reserve. Although this function does not include “first responder” duties, it does call for support to fire, police, and ambulance for any emergency affecting Reserve residents. The West Shore RCMP Detachment has assigned one Aboriginal Police Constable to be shared between the Songhees and Esquimalt Reserves. The Town of View Royal offers both fire services and emergency management services to the Songhees Nation at this Reserve.

Although there currently is no all-hazards Emergency Plan for the Songhees Reserve, the Songhees Nation prepared a Pandemic Plan in 2005 that contained policies and procedures to apply in a pandemic situation.<sup>6</sup>

---

<sup>6</sup> JEL Protection, Ltd. 2005. Songhees Nation Pandemic Influenza Plan

The **Esquimalt Nation Reserve** encompasses about 19 hectares on the east shore of Plumper Bay to the south east of View Royal in Esquimalt Harbour. The Reserve occupies elevations ranging from sea level to about 20 metres above mean sea level. The Band Office is located at 1189 Kosapsun Crescent, accessed from Thomas Road off Admirals Road.

From a total registered Band population of 255, the Esquimalt Reserve currently houses 143 members. About a dozen residents are under three years of age, and only two are over 75. Residential dwellings consist of a mixture of single-family homes and mobile homes. Two families live in trailers on the Reserve.<sup>7</sup>

There are no special buildings that hold vulnerable populations, and no schools or day care centres operate on the Reserve. No residents currently rely on medical equipment requiring consistent electrical power. Special events may occur on the Reserve three times per year, on average, at which as many as 300 people gather at one time and location. Such events are subject to threats from major fire, building collapse from earthquake, food poisoning, and exposure to communicable disease.

There are no major businesses on the Reserve responsible for the majority of tax revenues and, therefore, no over-reliance on single revenue sources. However, the Esquimalt Nation has been considering intensive, mixed-use development possibilities for several years. No existing businesses present unusual hazards.

The Esquimalt Reserve receives policing services from the West Shore RCMP Detachment, through an Aboriginal Police Constable shared with the Songhees Nation. The Town of View Royal offers both fire services and emergency management services to the Esquimalt Nation at this Reserve.

The governance structure consists of a Chief and two Councillors, elected using a custom electoral system. The Chief and Councillors are authorized to direct all emergency response measures undertaken within the jurisdiction of the Reserve.

Neither First Nations community currently has an emergency plan or organization, and officials have not yet identified a reception centre within the communities.

Under federal and provincial law, First Nations are responsible for emergency preparedness and response.

The Town of View Royal welcomes both the Songhees and Esquimalt Bands as partners in planning coordinated response to all emergencies.

**Implications of First Nations:** Hazards of concern for both First Nations communities include:

- Disease
- Earthquake
- Oil spill
- Severe weather
- Social disturbance
- Structure fire and toxic smoke
- Tsunami

Both First Nations Bands should work with the Town of View Royal and the First Nations Emergency Services Society (FNESS) to develop an emergency planning partnership for such requirements as personal preparedness and evacuation.

---

<sup>7</sup> Esquimalt Nation Band Administrator, May 2009

## 2.2 Infrastructure

Most of the utilities that serve Esquimalt, Central Victoria and the Saanich Peninsula pass through View Royal. The Town serves as a gateway to Victoria for major infrastructure of gas, water, hydro lines, sewer, and road systems.

### Electrical Power

Electrical power service in View Royal is provided by BC Hydro, using high-voltage lines managed by the British Columbia Transmission Corporation (BCTC). Power may arrive via three routes, illustrated in Figure 11.<sup>8</sup>

**Duncan Substation** – Electrical power is delivered by way of two 138-kV alternating current circuits and two high-voltage direct current circuits in submarine cables from Tsawwassen by way of Galiano Island and Salt Spring Island to the large substation near Duncan on Vancouver Island.

Power is then transmitted overland to Victoria and View Royal via three 138 kV circuits.

Due to the age of the Duncan Terminal transmission facilities, BCTC is planning to replace and upgrade these existing 138-kV facilities in the coming years.

**Qualicum Substation** – A northern route connects two 230-kV alternating current circuits south of Powell River to a terminus located north of Qualicum Beach on Vancouver Island. If the southern route were disrupted, View Royal customers of BC Hydro could receive power via this northern route.

**Jordan River Hydro Generation Facility** –The Jordan River hydroelectric project is the only major facility on the southwest coast of Vancouver Island. A single turbine powerhouse is capable of 170 MW maximum sustained generating capacity, and could contribute

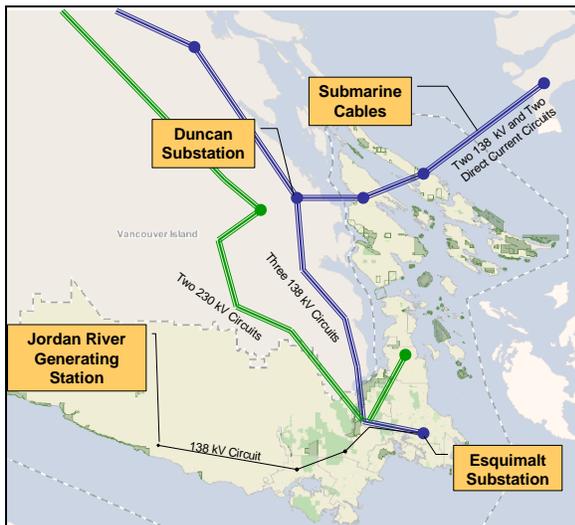


Figure 11. Power Line Routes to View Royal (BC Transmission Corporation)

up to 35 percent of the total island hydroelectric generation, if required.<sup>9</sup> One 138 kV circuit serves the electrical power grid available in the Capital Region.

BC Transmission Corp regional power transmission lines cross the northern tracts of the Town of View Royal, near the border with the District of Highlands.

Critical power users in View Royal include the Victoria General Hospital, schools, businesses along the Island Highway, and the Town of View Royal.

**Implications of Electrical Power:** Severe weather events pose the primary threat to sustained electrical power delivery to the community, but interruption events are likely to be relatively short-term, lasting a matter of days.

Although long-term power disruption is possible, it would require either multiple simultaneous failures in Vancouver Island facilities, or in specific equipment near Victoria. This type of failure is possible with a major earthquake.

<sup>8</sup> British Columbia Transmission Corporation

<sup>9</sup> BC Hydro Project Team and the Jordan River Water Use Plan Consultative Committee

## Water Systems

Water for domestic and commercial use in View Royal is obtained from the Sooke Lake Reservoir, owned and operated by the Capital Regional District (CRD). Four of the water supply mains operated by the CRD pass through the community, as shown in Figure 12. In recent years, the CRD has hardened the water distribution system to protect against earthquake damage.

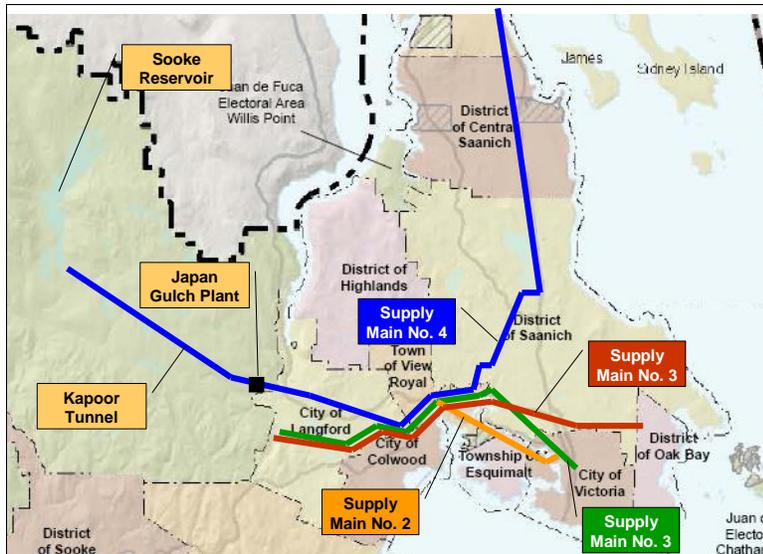


Figure 12. CRD Water Supply System to View Royal<sup>10</sup>

View Royal is connected to the Capital Regional District water system. Residents and businesses in the Town are on metered water services and receive direct billing from CRD for water consumption.

Water distribution systems within the Town of View Royal are owned, operated and maintained by the CRD Water Department.

The CRD Water Department installs fire hydrants at locations requested by the View Royal Fire Department. The CRD owns and maintains the hydrant system, and incurs all costs associated with annual maintenance and new installations.

Supply mains to the majority of the Town provide sufficient quantities of water for commercial, institutional and domestic uses, as well as for fire protection purposes. Areas currently served by water mains include the Chilco Road neighbourhood of the Atkins Planning Area. Most of the Thetis Planning Area remains without water service.

In 2004, the CRD Water Department completed an upgrade of the primary disinfection system at the Japan Gulch and Charters Treatment Plants to include both chlorine and ultraviolet treatments.

The CRD Water Department tests for water quality daily, weekly, and monthly for a range of parameters. The quality of the water supplied to the Town of View Royal consistently falls within health guidelines.

Within parts of rural View Royal, groundwater remains an important water supply source and is the main source of water supply for a few domestic users. The CRD WELL database records 19 water wells within the View Royal jurisdiction.<sup>11</sup>

**Implications of Water Systems:** Water system failure is most likely to be caused by impacts of a severe earthquake on the water reservoir and CRD distribution systems. Widespread water contamination is possible through human error or terrorist action. Emergency response plans should consider the availability and quality of groundwater if main supplies are interrupted.

<sup>10</sup> CRD Water Services

<sup>11</sup> Silvia Kenny, 2004

**Sewer Systems**

Sewage collection and conveyance to the CRD trunk line is a municipal responsibility. The Town of View Royal's sewer system, first constructed in the late 1970s, comprises 17 pump stations and about 48 kilometres of sewer mains (41 gravity mains and 7 forced mains). Collected material is delivered to the CRD's Esquimalt Trunk at Craigflower Pump Station on Shoreline Drive, and transported to the Macaulay Point outfall in Esquimalt. The trunk system includes several pump stations, minor lift stations and wastewater bypass locations.

The Atkins Road area (approx 30 houses) and a few other properties in town remain unsewered.

The Macaulay Point pump station, constructed in 1971, provides the pressure necessary for the outfall operation. In 1989, fine screens were installed in the station to remove sewage solids, plastic, and floatable materials larger than 6 mm. The screenings are transported to Hartland landfill twice weekly for disposal.

The 900 mm diameter outfall, also constructed in 1971, extends off Macaulay Point a distance of 1.7 km, discharging some 48,500 cubic metres of sewage per day (1999 average) at a depth of 60 metres.

As the CRD Trunk system has aged, structural deficiencies have resulted from corrosion, erosion due to wastewater flow, and construction material decay. Breaks in the system over the years have resulted in increased stormwater infiltration into the trunk sewer system, particularly during wet weather, increasing the frequency and duration of sewage overflows.

The Town of View Royal system is monitored continually by a state-of-the-art system that was upgraded in 2004.

**Implications of Sewer Systems:** Failure of the sewer system, such as following a severe earthquake, can lead to high economic losses in the community. Multiple points of failure are possible in the collection system, pumps, and treatment plant. Backup electrical power is needed for pumps in case of prolonged power interruption.

**Road Transportation**

Roadways in View Royal play a critical role in regional transportation.

Highways that connect Victoria with the Western Communities and the rest of Vancouver Island pass through View Royal.

While residents of View Royal travel these roads, the majority of users live beyond the Town's boundaries. The Western Communities generate about 115,000 daily person-trips to the Victoria Urban Core, using the main roadways in View Royal, including the Trans-Canada Highway and the Island Highway. All major arterial roadways are congested during peak traffic periods. The section of the Trans-Canada Highway through View Royal is the busiest highway in the region.<sup>12</sup>

These two main highways bisect the Town of View Royal east to west, effectively separating the community's neighbourhoods, as illustrated in Figure 13.

<sup>12</sup> Colledge Transportation Consulting, 2008

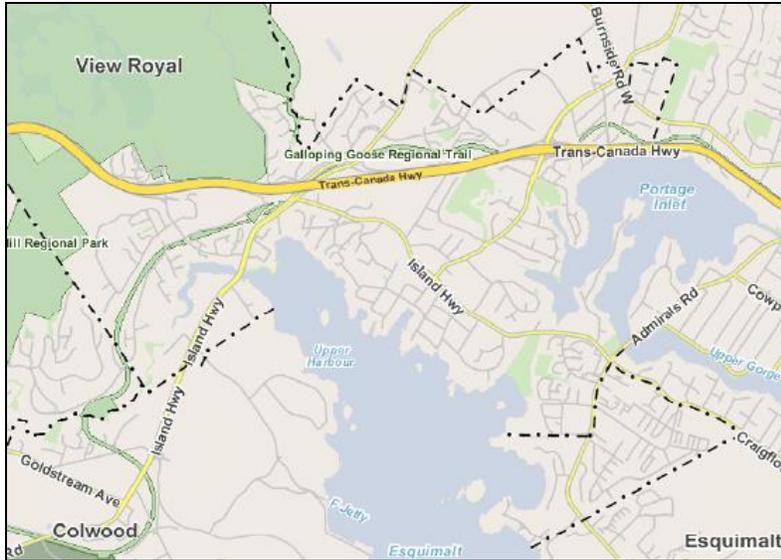


Figure 13. Principal Roadways in View Royal

The **Trans-Canada Highway** separates neighbourhoods to the north of the highway (Burnside, Hospital) from those to the south.

Congestion on the **Island Highway** is common. Heavy traffic volumes at rush hour suggest that difficulties may arise if wide-area evacuations are needed.

Both of these highways are heavily used by commuting traffic and commercial trucks, including haulers of dangerous goods.

The BC Ministry of Transportation and Infrastructure bears responsibility for maintaining the

following roadways in View Royal:

- Trans-Canada Highway
- 6 Mile Road from Island Highway to Trans-Canada Highway
- Admirals Road from the Island Highway/Craigflower intersection south to Hollowell Road

The Town of View Royal is responsible for the operation and maintenance of 47.5 kilometres of paved roads, including design and construction of roads, sidewalks, and traffic control measures. Municipal responsibility for roadways includes the following arterial roads:

- Atkins Road
- West Burnside Road
- Helmcken Road
- Island Highway

Some of the more significant local roads and summer peak daily traffic volumes are shown in Figure 14.

The View Royal Engineering and Parks Department implements the municipal infrastructure maintenance program that includes traffic safety, road surface maintenance, street lighting, traffic signals and signs, road sweeping, snow clearing, and ditch maintenance.

Most working residents of View Royal commute to Victoria for employment (46.5%), while some travel to Saanich (17.2%) and Esquimalt (10.2%) for their jobs. Only 9.2 percent of employed View Royal residents travel to work within the community.

Route	Vehicles per Day
Trans-Canada Highway	88,000
Island Highway	25,500
West Burnside Road	7,000
Admirals Road	6,800
Six Mile Road	2,000
Helmcken Road	2,900

Figure 14. Summer Peak Traffic Volumes

Public transit in the Town is managed by the Victoria Regional Transit System. There are ten bus shelters located in View Royal. The provincial government recently unveiled a \$14-billion public transit plan that calls for new, dedicated bus lanes between Victoria and Langford through View Royal.

Maintenance and repair of other critical utilities, such as electrical power, water systems, and sewer systems, depend on road access.

**Implications of Road Transportation:** Roads are critical features in View Royal, and are subject to impact from severe weather, earthquake, and congestion, such as during a wildfire evacuation.

Roadway clearing and emergency road repairs will be essential in assisting other critical infrastructure and in overall community recovery.

## ***Rail Transportation***

Via Rail offers passenger rail service on the Esquimalt and Nanaimo Railway (E&N Rail) from Victoria to Courtenay. The *Malahat* offers one departure per day in each direction. The journey time to Courtenay is approximately 4½ hours.



*Via Rail Car the Malahat*

Future use for the rail line may include freight and increased passenger traffic, especially excursion-oriented trips. Tentative plans by the CRD call for a commuter train to be running on the E&N line by 2011, pending approval by affected municipalities.

To the 2 current trains per day, the proposed commuter service would add 20 trains a day (1 northbound and 1 southbound train each hour for 10 hours).<sup>13</sup>

The proposal calls for five train stations between Westhills in Langford and the existing station on

Government Street in Victoria, as well as refurbishing the tracks and buying or leasing a rail car for the service. Reports suggest a 98-seat push-pull car may be used for the new service, similar to the O-Train in Ottawa.

Rail safety in View Royal may be an issue, especially considering the requirement for public road / rail level crossings at the following possible locations in the municipality:

- Hallowell Road (mile 3.6 from Government station)
- Burnett Road (mile 4.8)
- Kislingbury Road (mile 5.0)
- Private Road at 30 Atkins Road (mile 5.6)

Risks of mass casualty incidents involving passenger rail traffic may increase if the proposed commuter service is implemented in the future.

<sup>13</sup> Colledge Transportation Consulting, 2008

**Other Infrastructure**

View Royal is served by a number of other community facilities and services that may be vulnerable to major hazardous events.

Telecommunications Systems – Telus, Bell, Shaw, Rogers and other telecommunications service operators provide commercial telephone, cellular telephone, and high-speed Internet services in View Royal. These systems are important to residents, businesses, and institutions.

Radio stations that can be accessed from View Royal include:

- CBC Radio One am 690
- CBC Radio Two fm 90.5
- CFX am 1070
- CFUV fm 101.9
- CKMO am 900
- Kool fm 107.3
- The Ocean fm 98.5
- The Q fm 100.3
- The Zone fm 91.3

Natural Gas – Terasen provides natural gas to individual properties in View Royal. The company manages a gas trunk system, distribution services, gas service lines, and regular facilities. In a natural gas emergency, Terasen’s responsibilities include providing information on the location of gas facilities and plants, detection equipment to determine the presence or absence of natural gas, and response teams on a 24/7 basis to halt gas leaks.

Stormwater Drainage – Storm water runoff for most of View Royal is comprised of open ditches, culverts and driveway culverts to either Craigflower or Millstream Creeks. The open ditch drainage system provides reasonable protection against local flooding.

**Implications of Other Infrastructure:** Community infrastructure represents vulnerable elements in View Royal. All commercial operations should have emergency response and business continuity plans. In addition, the Town should develop plans with the CRD for handling large quantities of diverse and hazardous wastes following a disaster with significant property damage, such as an earthquake.

Solid Waste – The Capital Regional District (CRD), responsible for solid waste disposal under British Columbia legislation, operates the Hartland Landfill located within the District of Saanich boundaries. The first phase of the landfill site was closed in 1997, when the filling of Heal Basin began the second phase. The Heal Basin will likely reach its design capacity in about 2045, and will be closed.

## 2.3 Community Services

### *Schools in View Royal*

View Royal falls within the catchment area of School District No. 61 (Greater Victoria). Two elementary schools and one middle school currently serve students living in View Royal, as listed in Figure 15.

*Figure 15. Schools in View Royal*

<b>Name</b>	<b># of Occupants (Sep 2008)</b>
Eagle View Elementary School	231 students 20 staff
Shoreline Middle School	315 students 24 staff
View Royal Elementary School	227 students 25 staff



*Eagle View Elementary School*

**Eagle View Elementary** – This one-storey school opened in September of 2000 and currently serves 231 students in Kindergarten through Grade 5. The school has 20 adult staff members.

Built to current seismic standards, Eagle View Elementary has a natural disaster protocol document that addresses earthquakes, structural fire, and lockdown procedures for an armed intruder, although it does not address all hazards.

Eagle View serves as a secondary Reception Centre for the Town’s Emergency Social Services Program.

**Shoreline Middle School** – This is the largest of the three schools in the community, with 315 students in Grade 6-8 and 24 adult staff. Built in 1968 and expanded in 1980, the school is rated as moderate to high in terms of seismic risks. The institution is also located adjacent to the Island Highway, which carries many trucks containing hazardous materials.

The Shoreline Middle School Emergency Management Plan was developed in 2004 to address fire response and evacuation, earthquake rapid damage assessment, search and rescue functions. Shoreline Middle School has been identified as a primary Reception Centre for the Town of View Royal.



*Shoreline Middle School*

View Royal Elementary School – This school currently serves 227 students from Kindergarten through Grade 5 with 25 adult staff. View Royal, constructed in 1948, is the oldest school in the community, with the latest structural addition in 1991.



*View Royal Elementary School*

Electrical power lines pass over the school, which may represent an additional hazard following an earthquake. This school has also been identified as a secondary Reception Centre under the Emergency Social Services program. The school has no formal emergency plan.

Responsibility for emergency preparedness and response at schools rests with the School District 61 Board, and with each of the school Principals.

In addition to these public schools, View Royal contains more than a dozen day care centres, serving children ranging in age from infants to school-age youth.

None of the public schools currently has complete “all-hazard” emergency plans based on the BC Emergency Management System (BCERMS).

**Implications of Schools:** All schools and day care centres should have multi-hazard emergency response plans that address staff and student safety, and that follow BCERMS. The Town Emergency Operations Centre should have contact information for each school, including emergency numbers for staff.

## **Health Care Facilities**

Health care facilities in View Royal include the second-largest regional hospital in the Capital Region, as well as two medical clinics.<sup>14</sup>



*Victoria General Hospital*

Victoria General Hospital provides emergency, general surgery and medical treatment services in the Capital Region. The hospital offers 344 acute-care beds, 30 neuro-rehabilitation beds, and 40 geriatric ward beds. Victoria General is the designated trauma and pediatric centre for Vancouver Island, and receives more than 1,500 helicopter flights per year. In addition, this hospital also provides a wide range of outpatient services, including an emergency room, day surgery, and diagnostics.

The Admirals Medical Clinic is located in View Royal at 275 Island Highway near the Fire Hall. The hours of operation run from 8:00 am to 8:00 pm, Monday through Saturday.

**Implications of Health Care Facilities:** Health care facilities must be functional during major emergencies and after disaster to provide emergency care and ongoing public health services. All health care centres require emergency plans and annual exercises.

<sup>14</sup> Within the region, only the Royal Jubilee Hospital is larger, with 425 beds.

## First Responder Services

The residents of View Royal are served by professional fire, police, ambulance, and search and rescue organizations.

**Fire Rescue Department** – The View Royal Fire / Rescue Department provides fire prevention and protection services to the community through a combination of career and volunteer members. At present, there are 32 volunteers and 4 career personnel on staff.



*View Royal Fire Department*

Fire and rescue services are offered from the single fire hall located at 280 Island Highway. A 2007 study found this fire hall to be particularly vulnerable to seismic events, noting that the structure would likely collapse if an earthquake of even moderate intensity were to occur nearby. Not only would earthquake damage to the building likely result in injuries to the occupants, the function of the fire department would be severely impaired.

The Fire Rescue Department works cooperatively with other municipal departments and adjacent municipalities to ensure the best available coverage for all area residents and businesses.

The Department provides the community with emergency medical aid, fire prevention, auto extrication, marine response, limited hazardous materials response, and disaster response.



*West Shore RCMP Detachment*

**Police Department** – The Town of View Royal is served by the West Shore Royal Canadian Mounted Police (RCMP) detachment located at 698 Atkins Avenue in Langford.

The West Shore RCMP has about 55 regular members and 16 support staff, and provides 24-hour police service. West Shore RCMP includes several specialized units such as the Police Dog Service Unit.

In addition to the regular policing services provided by West Shore RCMP, the detachment also participates in disaster response, including the coordination of evacuation services when life-threatening situations arise, such as wildfire and hazardous materials incident.

**Ambulance Services** – Emergency ambulance services are offered through the British Columbia Ambulance Service (BCAS). Two BCAS stations are available to serve View Royal, one on Ellery Street at Lampson in Esquimalt, and one on Jacklin Road at Sooke Road in Colwood. All ambulance personnel are notified through the regional dispatch centre in Victoria.

The BC Ambulance Service applies the Incident Command System under BCERMS, which may include set up of casualty assembly, triage, and treatment areas. BCAS paramedics also notify area hospitals of victim numbers and types of injuries expected and arrange for patient transport.

Search and Rescue – The Town of View Royal relies on the City of Victoria for Search and Rescue teams and assistance during an emergency. The Victoria Search and Rescue Team services include wilderness search and rescue, and evacuation of neighbourhoods at risk. Search and Rescue teams from Juan de Fuca may also be available in some situations.

**Implications of First Responders:** The Fire Hall should be upgraded or reconstructed to meet the standards of a post-disaster facility.

All first responders should be trained in the Incident Command System and BCERMS, and understand the role of the EOC in providing site support.

In a major disaster, the limited number of trained response personnel will be available for the Town. It is vital to the emergency response effort that fire, RCMP, and ambulance services be available in the event of major emergency. This suggests that all first responder personnel must have home emergency kits and plans for protecting their families, and that mutual aid resources are readily available.

## ***Emergency Program Services***

The View Royal Emergency Program utilizes the BCERMS site and site-support system for its organizational structure. An Incident Commander is always present to oversee activities at the site of an emergency, and an Emergency Operations Centre is activated, if required, to support the site and to coordinate off-site activities. Langford Dispatch offers initial site support for most incidents.

The Emergency Program is guided by an Emergency Management Committee, who represents key municipal departments.

The Town has prepared an Emergency Response and Recovery Plan, based on an understanding of hazards and potential emergencies in the community. View Royal participates in the Emergency Preparedness Week in early May of each year.

Emergency Social Services – Emergency social services are currently provided to View Royal residents through a joint program with the City of Colwood. The View Royal / Colwood Emergency Social Services Program currently includes a Director and a core group of 15 trained and certified volunteers. The Program welcomes and trains new volunteers on a continual basis.

Emergency Social Services assists people during a disaster by establishing reception centres, and registering and referring those who are unable to return to their homes due to an evacuation or damage to their homes. ESS ensures the availability of basic needs, such as food, clothing, and lodging, and family reunification through a network of businesses in the community. The View Royal / Colwood ESS Program includes personal disaster assistance (Level 1) to people forced from their homes by relatively small scale events, such as an apartment building fire or collapse.

ESS volunteers also provide support to local emergency services during extended operations, participate in public education for emergency preparedness, and assist in the maintenance of emergency supplies for reception centres.

Reception Centres identified in the Town of View Royal include the following:

1. Shoreline Middle School (primary)
2. Eagle View Elementary School (secondary)
3. View Royal Elementary School (secondary)
4. Juan de Fuca Seniors' Centre (secondary)
5. Parking area of Six-Mile Pub (if needed)

The Town has arranged for a container of emergency equipment to be located at each school, including Reception Centre and Search, such as limited food and water supplies, and search and rescue equipment, such as hard hats and gloves. Each Reception Centre has an emergency power generator.

ESS teams carry their own “Level 1 ESS First Responder” kits to ensure they can offer emergency services as quickly as possible.

In addition to these provisions, the View Royal / Colwood ESS Program has formal written agreements with local businesses to provide food and accommodation during emergency response.

The View Royal / Colwood ESS Program works closely with the Provincial Emergency Program. If required, ESS resources from throughout the province could be re-allocated to support emergency response in the Town of View Royal.

Disaster Response Routes – The Town of View Royal actively participates in the regional disaster response route program. The purpose of the system is to enhance access by emergency vehicles to incident sites by reducing the use of specific roadways by general motorists. Information signs, such as the example shown at right, have been installed throughout the region on the Trans-Canada Highway, McKenzie Avenue, and the Pat Bay Highway.



In View Royal, the designated Disaster Response Routes include:

- Island Highway, from Admirals Road to Helmcken Road
- View Royal Avenue, from Island Highway to the Town Hall
- Helmcken Road, from Island Highway to the Hospital
- Watkiss Way, from Helmcken Road to Eagle View School

## 2.4 Economy

The Town of View Royal has numerous businesses that are frequented by both visitors and residents alike. Retail trade accounts for the largest number of business locations in View Royal (17%), followed by Construction (13%) and Health Care and Social Assistance (13%)

Small businesses account for nearly 90 percent of the employment in View Royal, led by business locations with 1-to-5 employees (66%) and 6 to 10 employees (22%). Only six locations in the town reported more than 50 employees.

There are no heavy industrial operations within View Royal. Limited light manufacturing may be allowed within the Business Park Commercial land use category. The Town of View Royal is also home to the historic Craigflower Manor, and the Four Mile and Six Mile Pubs, which are sources of economic value, revenue, and community pride.

**Core Businesses**

Victoria General Hospital – One of the largest employers on Vancouver Island, Victoria General Hospital, is centrally located in View Royal. Of those employed within the Town boundaries, a significant majority (61.1%) are engaged in the Health Care & Social Assistance industry. This fact highlights the importance of the Victoria General Hospital employment to the Town and the region. The Hospital received approval in 2007 for a \$19-million expansion, including a renovated emergency department.



*Great Canadian Casino on Island Highway*

Great Canadian Casino – This casino, located at 1708 Island Highway, offers slot machines, card tables, and several dining options, including a self-serve bistro. This is the second largest employer in the community, and offers positions in catering and food services, entertainment management, and security services. The maximum occupant load of the Casino is currently 1,200 persons. However, renovations now underway will increase the maximum load to 2,000 occupants.

Although building evacuation plans are in place and have been tested, there is a need to manage the occupants once they have left the building, particularly if they are unwilling or unable to leave the premises using their own vehicles. Many of the

patrons are elderly and may require assistance, especially in severe weather. Over the years, the Great Canadian Casino has developed into an important source of revenue for the Town.

Reliable Controls Corporation – Reliable Controls designs and manufactures electronic control units for heating, ventilation, and air conditioning systems in retail, institutional, industrial, and residential buildings.

The company currently employs more than 70 personnel at the View Royal location, which is the head office. Sales offices are located in Ontario, Pennsylvania, Ohio, California, and China. Current plans call for an expansion of the enterprise by adding buildings and personnel to the existing View Royal site, approximately doubling the number of employees.



*Reliable Controls Corporation*

**Implications of Core Businesses:** Sudden loss of key commercial or industrial businesses in the community, for whatever reason, could have a wide-ranging impact on the economic health of View Royal. Leaders of each core business should have a clear understanding of the hazards they face, as well as up-to-date emergency response and business continuity plans.

This page intentionally blank

### 3.0 Hazards

The Emergency Management Committee has identified 11 hazard types that could affect View Royal to an extent that might require site support through the Emergency Operations Centre. These are listed below.

<b>May Require Significant Site Support</b>	<b>Not Likely to Require Significant Site Support</b>
<ol style="list-style-type: none"> <li>1. Atmospheric Hazards</li> <li>2. Disease - Human</li> <li>3. Earthquake</li> <li>4. Fire, Major Urban</li> <li>5. Hazardous Materials</li> <li>6. Structure Collapse</li> <li>7. Terrorism</li> <li>8. Transportation Accident - Road</li> <li>9. Tsunami</li> <li>10. Utility Failure</li> <li>11. Wildland / Urban Interface Fire</li> </ol>	<ol style="list-style-type: none"> <li>1. Bomb Threat</li> <li>2. Disease, Animal or Plant</li> <li>3. Flooding</li> <li>4. Food Contamination</li> <li>5. Landslide, Debris Flow</li> <li>6. Lost Persons</li> <li>7. Social Disturbance, School Violence</li> <li>8. Volcanic Eruption</li> </ol>

In selecting these events for consideration, the View Royal Emergency Management Committee acknowledges the potential, however small, that other types of emergency may demand site support in the future.

The following sections examine each of these hazards alphabetically to assess the relative risks to the community and to highlight opportunities for mitigation, preparedness, emergency response, and coordinated recovery.

## 1. Atmospheric Hazards

Risk: High

### A. Description

Atmospheric hazards may cause a variety of community damage, depending on the weather type. “Atmospheric hazard” is a general term that includes the following conditions:

- Fog
- Hail
- Heavy Snowfall and Blizzard
- Heavy Rain
- High Winds
- Ice Storm
- Lightning
- Temperature Extremes

Impacts may range from temporary power and utility outages due to thunderstorm and high wind activity to the sometimes, although rare, destructive force of a major snow storm or ice storm. Extreme weather events can lead to long-term economic repercussions. Snowstorms, for example, can result in serious impact to roadways, power transmission facilities, and communication networks, shutting down schools and businesses. Heavy snowfalls can also lead to collapse of public and private structures.

### B. Past Events

View Royal regularly experiences weather events, mostly as winter storms bringing heavy precipitation and strong winds. Environment Canada records and publishes weather records. Some highlights of past events include the following:

#### Historic Blizzards

According to weather records, the Victoria region has seen several snowfalls of more than 50 centimetres in a single day more, including:

- 1880 – 61 cm
- 1887 – 91 cm
- February 2, 1916 – 53.3 cm
- February 14, 1923 – 50.8 cm

#### January 1935 – Snow and Cold Wave

Winter weather caused temperatures to drop to minus 16°C, with more than 40 cm of snow. The extreme cold led to fuel shortages and frozen water pipes. A quick thaw followed by 267 mm of rain over the next four days caused extensive roof damage throughout the region.

#### October 1962 – Typhoon

Remnants of Typhoon Freda struck BC's Lower Mainland, causing 7 deaths and damages in excess of \$10 million. In Greater Victoria, winds reached sustained speeds of 90 km/h with gusts to 145 km/h.

#### December 1996 – Heavy Snowfall

The “Pacific Storm of 1996,” struck View Royal from December 22, 1996 to January 3, 1997, dumping 64.5 cm of snow in a single day. The entire southern region of BC was affected. Economic losses reached about \$200 million.

#### January 2003 – Heavy Rain

A huge rain storm, one of the Pineapple Express systems that periodically affect the region, brought record rainfall to the Victoria area.

#### June to August 2003 – Drought

Environment Canada's weather station at the Victoria Airport recorded 2003 as the driest summer (June to August) in over 60 years.

#### November 2006 – Blizzard

Snow and wind struck View Royal and the rest of the Capital Region in a severe winter attack, causing trees to topple and power lines to fail.



### C. Hazard Areas

Long-term climate characteristics are similar throughout the Capital Region. The coldest months are January and February; the warmest months are July and August.

Severe weather systems generally arrive from the southwest, although heavy outflow winds sometimes stream down Georgia Strait.



*Damage from Typhoon Freda 1962*

### D. Vulnerabilities

All arterial highways and the Trans-Canada Highway could be temporarily closed due to the effects of severe weather, including heavy snowfall, ice accumulation, or fallen trees and other debris. Vulnerable roads include the Island Highway, Atkins Road, Helmcken Road, and Highland Road.

Neighbourhoods throughout the municipality could be isolated by severe weather events, forcing residents to rely on each other. Populations vulnerable to prolonged power outage in winter include many seniors with limited mobility.

Schools and commercial buildings with flat roofs may be threatened by heavy snowfall. Atmospheric hazards may also result in power outages that could interrupt business in this area. Business collaboration can also be a strength in severe weather events, where adjacent business work together to clear snow and debris.

Some critical infrastructure may be affected by weather, e.g., sewage treatment, power supply, and telephone services.

### E. Implications

#### Mitigation

- Develop an Urban Forestry Management Plan to address utility failures caused by tree blowdowns.

#### Response

- Priorities have been established for snow plowing roadways.
- Identify location of backup snow removal equipment.
- Warn occupants/owners of flat-top buildings of snowfall amounts that should trigger monitoring.
- Remove snow from municipal roofs, if warranted.
- Assist residents with heat, power, food, water. Warn residents of dangers of indoor heating.

#### Municipal Business Continuity

- Identify transportation (e.g., snowmobiles, 4x4s) to help municipal staff reach their workplaces.

#### Community Recovery

- Organize local businesses to share snow-clearing efforts to quickly return business to normal.

### A. Description

Human diseases include a large array of parasitic, bacterial, and viral agents that can cause illness and death. A great variety of events can lead to disease outbreaks and epidemics among View Royal residents and visitors. The most notable disasters associated with human diseases include respiratory viruses, such as high-mortality influenza and Severe Acute Respiratory Syndrome (SARS).

Drinking contaminated water has also affected tens of thousands of North Americans in the last decade alone. The protozoa parasite *Giardia lamblia* was the agent most commonly implicated in these outbreaks. Food-borne disease outbreaks, such as *Salmonella* or *Escherichia coli*, could reach disaster levels where large numbers of consumers receive food from a single source. The West Nile virus disease does not occur in British Columbia, although it is found in neighbouring provinces and states.

A significant impact of a large-scale and sudden human disease outbreak, such as pandemic influenza, will be the limited capability of health care services to deal with number of expected patients.

### B. Past Events

#### March 1862 – Smallpox, Victoria

A miner brought smallpox from San Francisco to Victoria in 1862. The disease spread quickly, especially among the approximately 2,500 Native people living on the outskirts of Victoria at the time.

#### November 1918 – Influenza Pandemic

Influenza in 1918 hit Canadians hard, affecting more than one quarter of the population. The “Spanish Flu” rapidly spread across Canada along the railway lines, arriving in Vancouver in October of 1918. A second wave arrived in 1919. This pandemic of 1918-1919 resulted in 50,000 fatalities in Canada, and more than 2,000,000 Canadians became ill.



#### May 2000 – Walkerton, Ontario

The small community of Walkerton, Ontario, was hit by an outbreak of *E. coli* in the public water supply. Seven persons died from this disease, and more than 2,300 people suffered health problems. The impact of this event is evident nationwide, as provinces and communities continue to re-assess drinking water standards and treatment methods, including a major review in British Columbia.

#### April 2003 – SARS Outbreak

In April, 2003, an outbreak of the SARS virus spread from China to Canada, affecting residents in Toronto and Vancouver. The resulting number of cases in BC was low, with only 4 probable and 46 suspect cases, and all cases recovered. While 43 people died in Ontario, no deaths occurred in BC. Almost all BC cases were among returning travelers, and were identified in all parts of the province.

#### October 2005 – Legionnaires Disease

At least 21 people died and more than 100 fell ill during an outbreak of legionnaire’s disease at the Seven Oaks Home for the Aged in Toronto, Ontario, This particular outbreak may be related to a new strain of the bacteria.

## View Royal

## 2. Disease – Human

### C. Hazard Areas

For respiratory diseases, high-hazard areas are those with dense concentrations of people. In View Royal, these include all schools, the Victoria General Hospital and the Great Canadian Casino. Of the more than two dozen business establishments that serve food to the public in View Royal, none are “FoodSafe Excellence Certified” by the Vancouver Island Health Authority.

Most residents draw daily potable water from the CRD water system and, therefore, would be affected by regional contamination.



View Royal Elementary School

### D. Vulnerabilities

Populations of special concern in View Royal include the frail elderly in the community for the transmission of human diseases. Nearly 600 residents in View Royal are age 75 or older. Children may also suffer more from illness than adults because of under-developed immune systems.

The View Royal population includes more than 1,800 children under the age of 19. Schools can be particularly vulnerable during outbreaks of communicable diseases.

Municipal staff members are also vulnerable members of the community, where they deliver specialized services. For example, the View Royal Fire Department includes about 32 volunteer firefighters. If a substantial percentage became ill, fire services in the community could be affected. The same holds true for public works, recreation, and other municipal personnel.

### E. Implications

#### Mitigation

- Promote annual influenza vaccinations among municipal staff, residents and businesses.
- Work with VIHA to ensure inspection of food preparation for major events.
- Prepare for the arrival of West Nile virus and track BCCDC Health Alert recommendations.

#### Response

- Prepare a Town of View Royal Pandemic Influenza Plan.
- Work with Victoria General Hospital and schools to develop Pandemic Influenza Plans.
- Develop roles and responsibilities among faith-based organizations and others to support health and emergency care within the community during a disease outbreak.

#### Municipal Business Continuity

- Develop a Business Continuity Plan given a shortage of key resources, such as during an influenza epidemic.

#### Community Recovery

- Identify community resources, such as service clubs, that could contribute to recovery.

## 3. Earthquake

Risk: Moderate

### A. Description

View Royal resides in one of the most seismically active zones in Canada. Earthquakes may cause a number of harmful phenomena, including ground motion, surface faulting, ground failure, liquefaction, landslides, and tsunamis. The primary mechanism of damage is the violent shaking that accompanies ground motion.

The largest credible earthquake that could affect the Capital Region is a Cascadia Subduction Zone incident off Vancouver Island, with a magnitude of about 9.2. Such an event may last a few minutes or more. However, other lower magnitude earthquakes that are closer to the community could cause severe damage. These include crustal earthquakes in or near the Strait of Georgia and Puget Sound, with magnitudes of 6.5 to 7.5.

In addition to direct damage from shaking, the community may experience structural fires, release of hazardous materials, prolonged utility failures, and delays in emergency aid from unaffected regions.

### B. Past Events

#### January 1700 – Cascadia Earthquake

On January 26, 1700, Vancouver Island was hit by a major subduction zone earthquake measuring between 8.7 and 9.2 on the Richter Scale. The fault rupture was about 1,000 km in length, with an average slip of 20 meters.

#### December 1918 – Vancouver Island Quake

On December 6, 1918, Vancouver Island was hit by a 7.0 earthquake, resulting in extensive damage on the west coast of Vancouver Island.

#### June 1946 – Courtenay Earthquake

A magnitude 7.3 earthquake struck Vancouver Island on June 23, 1946. This earthquake caused extensive damage along the east coast of Vancouver Island, affecting rail lines, buildings, and schools. The earthquake knocked down 75% of the chimneys in the closest communities, Cumberland, Union Bay, and Courtenay. Two deaths resulted from this earthquake, one due to drowning when a small boat capsized in an earthquake-generated wave, and the other from a heart attack in Seattle.

#### April 1949 – Southern Seattle Earthquake

A 7.0 earthquake hit the Puget lowland area on April 13, 1949. The epicentre was deep and caused much damage in Seattle and Tacoma.

#### August 1949 – Queen Charlottes Earthquake

On August 22, 1949, a magnitude 8.1 quake occurred west of the Queen Charlotte Islands.

#### April 1965 – Seattle Earthquake

On April 29, 1965, an earthquake struck Seattle, registering 6.5 in magnitude. The shaking resulted in much damage in the Seattle area.

#### February 2001 – Nisqually Earthquake

On February 28, 2001 a major earthquake measuring 6.8 struck 20 km northeast of Olympia, Washington. The earthquake was felt from Portland, Oregon, to Penticton, BC. Extensive damage occurred in the State of Washington. No injuries were reported in BC.



Starbucks Headquarters in Olympia

### C. Hazard Areas

The BC Geological Survey has characterized the Capital Region in terms of soils subject to amplification, liquefaction, and subsidence, including parcels within the Town of View Royal.

Most of the seismic hazard in View Royal is due to soil types that tend to amplify the intensity of ground shaking. This type of hazard is greatest where peat and organic soils sit on top of thick deposits of soft clay and lowest where bedrock is exposed. High hazard areas are noted among properties on Craigflower Creek and Millstream Creek. Liquefaction potential is also noted at Tidewater Road and south of Ashe Head off Admirals Road.

Slopes may also fail due to earthquake. View Royal has few areas where the slope grade exceeds 30 percent, such as sections of the Burnside Planning Area.

Structural fires and the release of hazardous materials may occur where natural gas lines and commercial operations provide ready fuels.

### D. Vulnerabilities

Community elements that are most vulnerable in seismic events include high-density buildings, especially older structures that have not been retrofitted for earthquake protection. In View Royal, vulnerabilities include:

- Schools
- Victoria General Hospital
- Fire Hall

Critical utilities are also vulnerable to earthquake damage, with consequent impacts to the community. These include:

- Electrical power
- Telephone services
- Water services, including reservoir
- Sewer services
- Natural gas pipelines
- Roads and bridges
- Financial institutions

Overall, the location of View Royal on Vancouver Island indicates help from unaffected communities may be long in coming.

### E. Implications

#### Mitigation

- Implement earthquake retrofitting or replacement of municipal buildings, infrastructure.
- Determine where redevelopment may be allowed with normal construction, and areas where special measures will be needed.

#### Response

- Advise residents, businesses and institutions to prepare to survive for at least seven days.
- Priorities for clearing roadways of earthquake debris are the same as for snow removal.

#### Municipal Business Continuity

- Prepare alternate measures for continuing essential municipal services, critical infrastructure.

#### Community Recovery

- Consider assigning a single leader to coordinate Western Community disaster recovery, and develop a collaborative recovery organization that includes the City of Langford, the City of Colwood, and the District of Highlands.

### A. Description

The threat of fire to buildings in View Royal ranks among the most likely and dangerous types of emergencies. Although severe fires are rare due to today's fire prevention measures, fire in a residential, commercial, or institutional building could result in catastrophic impacts, especially among high-density occupancies, such as schools and homes for seniors.

Major urban fires can be ignited by a number of causes, such as faulty electrical wiring, improper use of smoking materials, and arson. Damage to residential units can render occupants homeless for weeks or more, and in need of immediate care and shelter, depending on their insurance coverage.

In addition to the threat from heat and direct fire contact, View Royal occupants face the hazard of toxic smoke from urban fires, especially when commercial buildings holding paints or pesticides are involved. A fire in such a structure could result in evacuation of several square kilometres as a precaution.

### B. Past Events

#### November 1991 – Landfill Fire

A smouldering fire in the Maple Ridge landfill, fuelled by massive amounts of wood waste in the dump, burned for several weeks in November of 1991.

#### June 1993 – Arson Fire in Lumberyard

In June of 1993, a suspected arson fire destroyed a Merritt lumberyard, leading to losses between \$3 and \$5 million.

#### February 1994 – Multi-Family Housing Fire

A fire destroyed a new housing development in Coquitlam. Response required more than 1,000 firefighters to keep the blaze from spreading, and estimated costs reached \$8 million.

#### January 1996 – Fire in Care Home

In January 1996, about 120 bed-ridden residents were rescued from a burning extended care home in Duncan on Vancouver Island.

#### 1998 – Russian Trawler Fire

The *Gijon*, a Russian trawler burning in dry dock at the Victoria Shipyard, created toxic smoke that caused the evacuation of 220 persons from nearby areas. ESS volunteers from three separate municipalities responded with coordinated assistance.

#### November 1999 – Landfill Fire

The Delta Shake and Shingle Landfill burned for weeks before the municipality declared a state of local emergency. Smoke from the fire cast a thick haze over Vancouver. Streams in the area were threatened by leachate pools forming from the firefight.

#### November 2001 – School Evacuation

On November 6, 2001, a fire burning in a nearby industrial area forced an evacuation of a 7-block radius, including Fairview Junior High School and Roi Daniels Elementary in Calgary. Another school had been pre-arranged as a reception site and, with the assistance of city and private bus companies, more than 800 students and staff members moved to safety within 30 minutes.

#### September 2002 – Gas Explosion and Fire

An explosion and fire at the Shell Canada Station laundromat in View Royal caused structural damage to the building, blew out all the plate glass windows and injured three persons. Langford and Colwood fire crews, RCMP constables, and BC Ambulance Service paramedics attended to assist the View Royal Fire Department.

#### January 2009 – Fire at Historical Site

Quick response by View Royal fire crews averted the total loss of the Craigflower Manor, when flames erupted from a faulty space heater.

### C. Hazard Areas

Fire is more likely to occur in the built-up neighbourhoods of Helmcken, Craigflower, and the Harbour Planning Areas.

A fire at a commercial building with hazardous materials, such as Canadian Tire and Slegg Lumber, would likely generate the release of highly toxic smoke and gases, and may require the evacuation of the surrounding neighbourhood and temporary closure of the Island Highway.



*Commercial Operations with Hazardous Materials*

### D. Vulnerabilities

Some elements of View Royal are more vulnerable to fire than others. The Casino would be particularly difficult to both evacuate and fight fire. Evacuees would likely require assistance with transportation or shelter if they could not access their vehicles.

A fire at the Victoria General Hospital would be especially hazardous if it required the evacuation of patients while fire suppression was underway. Some sections of the hospital contain hazardous materials.

Other buildings of fire concern include the Lions Cove Seniors' Apartments, Christie Point Apartments, Songhees Retirement Home Park, and the Youth Custody Centre.

Structural fires in commercial buildings, such as the Casino and Thrifty Foods, would not only present life-safety challenges, but may also result in economic losses felt throughout the community.

### E. Implications

#### Mitigation

- Fire prevention measures receive priority attention among municipal safety efforts.
- All new developments are required to meet the BC Building Code and fire safety standards.

#### Response

- The Town has entered into an automatic aid agreement with the City of Colwood for fire response to high hazard and complex structures.
- The Town ensures all vulnerable occupancies, including apartments, institutions and high-density commercial operations, have fire safety plans, evacuation plans, and regularly practice fire drills.

#### Municipal Business Continuity

- Prepare alternate measures for continuing essential municipal services in the event of fire in municipal hall, including backup storage of essential records off site.

#### Community Recovery

- ESS teams have identified temporary accommodations for fire victims from multi-family dwellings, and for use in evacuations.

## 5. Hazardous Materials

Risk: Low

### A. Description

A hazardous material is any substance that may be explosive, flammable, poisonous, corrosive, reactive, or radioactive because of its characteristics. A hazardous materials incident involves the uncontrolled release of a hazardous substance during transportation, storage or use. Possible effects from hazardous materials range from straightforward road obstruction to widespread evacuation, injury and possibly death.

The most dangerous types of hazardous materials include toxic gases, such as ammonia and chlorine, that are heavier than air, can travel with the wind, and can cause harm at very low concentrations.

Flammable gases, such as propane and natural gas, can cause “fireball” situations if ignited in large volumes. Spilled petroleum products, such as bunker fuel, can result in widespread damage to the marine shoreline.

### B. Past Events

#### January 1989 – Toxic Leak from Tanker Truck

In January, 1989, families in Quesnel were evacuated from their homes when sodium hydrosulphide leaked from a tanker-truck. This chemical is extremely toxic and can cause paralysis of the respiratory system.

#### May 1994 – Toxic Gas Release

On May 24, 1994, an explosion at a Port Moody resin-making factory released 10,000 kg of a potentially toxic chemical into the air. Fortunately, wind conditions dispersed the gas and smoke quickly into the atmosphere and monitoring did not detect significant amounts.

#### July 2000 – Malahat Propane Tanker

On July 18, 2000, a propane tanker released 35,000 litres of propane after overturning on the Malahat section of the Trans-Canada Highway. Langford declared a state of local emergency and established an evacuation zone within a 300 m radius of the site.

#### January 2005 – Carbon Monoxide Release

On January 29, high carbon monoxide levels in the Ridge Meadows Arena poisoned nearly 100 people, many of them children. A number of the victims fell sick after leaving the arena and sought treatment at area hospitals.

#### August 2006 – Marine Fuel Spill

On August 4, 2006, 29,000 litres of marine fuel leaked from the Westwood Annette cargo ship after it struck a pier near Squamish. The oil dispersed into Howe Sound, affecting the shoreline and wildlife of the Squamish estuary. Cleanup efforts cost more than \$100,000.

#### October 2008 – Break in Natural Gas Line

On October 31, a Terasen Gas line was breached by a construction company excavator and natural gas was released in the Viewcrest area of View Royal. Residents from seven homes voluntarily evacuated. RCMP temporarily closed road access to the area. Terasen closed the gas line and initiated repairs, allowing residents to return to the homes later in the day.



*Natural Gas Line Breach in View Royal*

### C. Hazard Areas

**Road** – Trucks carrying hazardous materials use the major routes in View Royal, including the Trans-Canada Highway, the Island Highway, and Helmcken Road. Hazardous materials carried by truck include fuel, ammunition, explosives, and hospital supplies. The Island Highway is the main route for CFB Esquimalt to transport hazardous materials, including waste from the Dockyard to warehouses and firing ranges in Colwood, Albert Head, and the Rocky Point Ammunition Depot.

**Pipeline** – Terasen Gas operates numerous natural gas transmission and delivery pipelines in the community. The greatest threat to pipeline safety involves excavation and construction activities at or near pipeline right-of-ways.

**Fixed Facilities** – Several facilities in View Royal contain hazardous materials, including automotive fuelling stations, Canadian Tire, and Victoria General Hospital.

**Marine** – View Royal is located directly across Esquimalt Harbour from the Canadian Forces Base and is, therefore, indirectly exposed to possible marine oil spills and terrorist actions involving nuclear vessels.

### D. Vulnerabilities

High density occupancies are more vulnerable to toxic and flammable hazardous materials due to the potential number of people exposed. In View Royal, these include the Island Highway commercial district and surrounding residences and school, and residential neighbourhoods adjacent to the Trans-Canada Highway.

The shorelines and marine areas of View Royal are sensitive and highly valued by local and regional residents. Marine environments sensitive to spills of fuel, oil and other chemicals include the environments of Millstream Estuary, Portage Inlet, and Esquimalt Harbour.



Propane Tanker Truck on Island Hwy

### E. Implications

#### Mitigation

- Request the Capital Regional District to assess hazardous materials transportation by road in the region, in cooperation with shippers, transportation companies, neighbouring fire departments.
- Controlled Access Zones provide for security around warships berthed or moving in the Harbour.

#### Response

- Ensure high density occupancies (such as schools) near fixed facilities and roadways carrying hazardous materials have plans for both immediate evacuation and sheltering in place.
- Arrangements are in place within the CRD for access to qualified hazardous materials response teams and equipment. Specialized equipment is located in Central Saanich.

#### Community Recovery

- Identify contacts for consultation during environmental rehabilitation, including ground-water monitoring.

## 6. Structure Collapse

Risk: Low

### A. Description

Structure collapse is a general term that refers to any failure of integrity in a designed building, walkway, or other community infrastructure. Structure collapse may be caused by engineering or construction problems, metal fatigue, severe weather events, or changes to the load bearing capacity of the structure.

When buildings collapse, there may be a significant number of injuries or fatalities, and fires may result. Such events also cause damage to support infrastructure, such as gas lines, electricity, water, sewer, and telephone lines. Factors that may contribute to structure collapse include building age, design, time of year, use levels, and seismic events.

### B. Past Events

#### April 1988 – Food Store Collapse

The Metrotown Save-on-Foods roof collapsed during opening ceremonies, only minutes after Mayor Bill Copeland, who was presiding over the grand opening, directed the evacuation of about 1,000 people. There were no fatalities. Fifteen people were briefly hospitalized.

#### November 1992 – School Collapse

On November 12, 1992, a school roof at Cedar Drive Elementary School in Port Coquitlam collapsed and destroyed one classroom and damaged another. Fortunately the collapse occurred on a Sunday and no students were in the classroom.

#### January 1997 – Arena Collapse

On January 8, 1997, the roof of the 3,000 square-metre Memorial Arena in Dawson Creek collapsed within minutes on an unusually windy night. The arena housed a hockey ice rink, bleacher seating and dressing areas. At the time of failure, the roof held less than the design snow load on the structure.

#### August 2007 – Bridge Collapse in Minnesota

A steel truss arch bridge failed catastrophically during the evening rush hour on August 1, 2007, killing 13 motorists and injuring 145. First responders received immediate assistance from mutual aid partners in the region, including charities and volunteers.

#### December 1996 – Snow Causes Collapse

As a result of heavy snowfall in 1996, some roofs and sundecks collapsed and a few large buildings in the Greater Victoria area sustained structural damage. Roofs caved in at James Bay Thrifty Foods, Panorama Leisure Centre, and Glen Meadows curling club. At the Capital City Yacht Club in North Saanich, the snow damaged boathouses, docks and watercraft; 31 boats sunk, more than 30 were damaged and 62 berths lost.

Heavy snow also caused widespread damage to greenhouses of the region's flower, tree seedling and vegetable growing sector. Damage estimates from Vancouver Island's agriculture section totalled \$21.4 million.

At the Victoria International Airport, Viking Air lost \$6-8 million worth of hangar space when the large structure collapsed under the weight of the snow.



2007 Bridge Collapse in Minnesota

## View Royal

## 6. Structure Collapse

### C. Hazard Areas

Buildings of concern in View Royal include older structures that were poorly designed or have not been maintained.

Commercial buildings with tilt-up construction performed poorly in the 1989 Loma Prieta earthquake. Engineering guidelines call for firm connections between walls and roof sections.



*Flat-Roof Structures at Shoreline School*

Buildings with large roof spans, such as school gymnasiums, are more susceptible to weather effects, such as heavy snow falls and high winds.

### D. Vulnerabilities

Buildings in View Royal that are more vulnerable to collapse include structures where large numbers of people may be present at any given time.

These include schools, commercial facilities, or recreation complexes. Many of the commercial buildings along the Island Highway have flat roofs that may be susceptible to failure in extreme snowfall events.

The View Royal Fire Hall is not seismically sound, and is vulnerable to collapse from heavy snow loads.



*Flat Roof at View Royal Fire Hall*

### E. Implications

#### Mitigation

- Inspections are required in View Royal before any new building can be occupied.
- The BC government has initiated a program of school inspections for earthquake integrity.

#### Response

- First responders have received training in crush injuries caused by building collapse.
- Ensure plans for response to structure collapse identify dog-search teams and heavy equipment.

#### Municipal Business Continuity

- All municipal buildings and infrastructure receive regular inspection by qualified professionals.

#### Community Recovery

- Ensure recovery plans include the ability to quickly assess the structural integrity of key community buildings, such as Municipal Hall and the Fire Station, following an earthquake.

### A. Description

Even with international terrorism events common in today's news, it is difficult to imagine an attack in View Royal. Yet, there have been past incidents in BC that, if repeated, could affect local residents and businesses.

Terrorism uses violence or the threat of harm to put the public, or any section of a community, in fear. The intent of terrorists typically is to draw widespread attention to a specific cause and, therefore attempt to gain the greatest public pressure to meet their demands.

A wide variety of actions could be taken by terrorists to disrupt society, including the use of chemicals, biological agents, radioactive and nuclear materials, and explosive devices. Typical targets of terrorism include political, religious, or economic symbols in communities.

### B. Past Events

#### 1960 to 1963 – Sons of Freedom

Dozens of arson and bomb attacks were carried out by the Sons of Freedom. Their targets were railways, utility poles and power lines belonging to the Kootenay Power and Light Company, and the homes of orthodox Doukhobors. One person was killed during this time, by his own bomb.

#### June 1985 – Bombing of Air India Flight 182

Air India Flight 182 was a Boeing 747 that exploded on June 23, 1985 while at an altitude of 31,000 feet (9500 m) above the Atlantic Ocean, south of Ireland. At 07:15 GMT, Air India Flight 182, which had departed Mirabel Airport in Montreal bound for London, England, disappeared from radar. All 329 on board were killed, of whom 82 were children and 280 were Canadian citizens.

#### December 1999 – Bomb Ferried from Victoria

On December 14, 1999, Ahmed Ressam drove his rental car onto the ferry from Victoria to Port Angeles, Washington. Ressam planned to detonate a bomb on or around January 1, 2000, at the Los Angeles International Airport. Customs Inspectors examining Ressam's rental car found explosives concealed in the spare tire well.

#### July 2001 – Suspected Water Contamination

In July, 2001, tampering of the Ladysmith water supply was suspected after a cloudy film appeared on the water. The reservoir was drained, but lab tests failed to determine exactly what caused the film on the water.

#### May 2004 – Chemical Release on City Bus

On May 25, 2004, passengers on a Vancouver city bus began to feel ill. The substance that made people sick aboard a Vancouver bus was methyl chloride, a gas commonly used in the chemical industry and industrial laboratories. A male suspect is believed to have released the gas on the bus. About 50 people, including police, news reporters and firefighters, were later quarantined in and around Waterfront station in downtown Vancouver while hazardous materials crews and the Vancouver police department's drug section tried to determine what had caused the reactions.

#### Oct-Dec 2008 – Pipeline Bombings – Pipelines

carrying sour gas in northwestern BC were bombed on four separate occasions in apparent cases of eco-terrorism. The gas contains hydrogen sulphide, which can be lethal if breathed even in small amounts. The targeted company, EnCana, operates natural gas wells and transportation near Dawson Creek. No one was injured in the blasts, but two pipelines were damaged and there was a small leak of toxic sour gas at a wellhead.

### C. Hazard Areas

It is difficult to predict which specific elements of the View Royal community may attract terrorist activity. Overall, past attacks elsewhere have targeted critical infrastructure, government buildings, and religious symbols.

Examples of critical infrastructure include:

- Energy and utilities (e.g. electrical power transmission and natural gas systems)
- Communications and information technology (e.g. telephone and broadcasting systems)
- Finance (e.g. banking institutions)
- Health care (e.g. hospitals and health care facilities)
- Food (e.g. distribution and food industry)
- Water (e.g. drinking water and wastewater management)
- Transportation (e.g. air, rail, marine and road)
- Government (e.g. facilities and key national sites)
- Manufacturing (e.g. chemical industry)

### D. Vulnerabilities

Virtually all members of the View Royal community could be affected by terrorist action against critical infrastructure. As with atmospheric hazard or human disease, the most vulnerable populations are the very young and elderly.

Disruption of transportation and communications could directly affect commercial and industrial operations in View Royal, particularly in the Island Highway commercial area.

Terrorist actions could have a direct impact on the tourism in the community, as evident following the attacks in the USA on September 11, 2001.

The Canadian Security Intelligence Service (CSIS) operates the Integrated Threat Assessment Centre, which evaluates the probability and potential consequences of terrorist activities in Canada and works with first responder organizations, such as local RCMP.

### E. Implications

#### Mitigation

- Assess critical infrastructure in and affecting View Royal for appropriate security measures.

#### Response

- Ensure response plans include the requirement to treat emergencies that may have been caused by terrorist action as potential crime scenes, and to preserve evidence.

#### Municipal Business Continuity

- Develop plans to continue critical municipal services in the event of terrorist action.

#### Community Recovery

- Ensure recovery plans include measures for keeping the public informed on the details of a terrorist attack, the potential for further attacks, and how members of the public can protect themselves.

### A. Description

Motor vehicle crashes can require emergency site support activities when accidents involve large numbers of casualties. Most occurrences result in property damages that require site clean up. Some crashes lead to major injuries or fatalities that require specialized response.

High-occupancy vehicles cause the greatest concern from the perspective of emergency response. Bus accidents can result in dozens of injuries, simultaneously requiring on-site emergency care and overloading nearby medical facilities. Consequences can be severe if fire is involved or the incident causes a release of hazardous materials.

Motor vehicle crashes typically require localized response to fuel spills, and may result in traffic congestion and detours.

### B. Past Events

#### 1977 – Nanaimo Multi-Vehicle Accident

A three-vehicle crash near Nanaimo involving a transport truck, a bus, and a pickup truck resulted in 11 fatalities.

#### January 1989 – Bus Accident

In January, 1989, a bus loaded with 30 passengers, lost control after being hit by a car on the icy Sea-to-Sky Highway. Fortunately the bus stopped with 10 metres hanging over a 10-m cliff. Seven passengers were injured.

#### July 1990 – Bus and Truck Collision

On July 26, 1990, a pipe laden truck slammed into a tour bus of young dancers and 5 adults, about 7 kilometres east of Golden, at Kicking Horse pass. One person was killed and 27 were injured, some severely.

#### November 1991 – Bus Crash

A passenger vehicle struck a Greyhound bus on the Princeton Highway, in November 1991, killing three people.

#### March 1992 – Bus Accident

On March 12, 1992, a bus traveling south on Highway 99 toward Richmond crashed into a parked tractor-trailer that had broken down in the bus lane. Two people were killed and many were injured.

#### March 2003 – School Bus Topples in Snow

On March 9, 2003, a bus carrying Pacific Christian School's senior boys basketball team crashed on the Trans-Canada Highway in Langley. In very poor, snowing winter conditions, the bus went into a ditch and rolled on its right side. There were no serious injuries.



*Bus Accident Smyth County, Virginia, 2000*

#### November 2000 – Bus Crash at Rogers Pass

On November 27, 2000, a bus carrying tourists from Taiwan crashed head-on with a transport truck in a tunnel on the Trans-Canada Highway, killing six and injuring 21. The accident happened in the 316-metre Lanark snowshed tunnel, closing the highway for about 14 hours. The transport truck was empty at the time of the accident.

## View Royal

## 8. Transportation - Road

### C. Hazard Areas

View Royal is served by more than 100 kms of local roads. Some of the more significant local roads include:

- 6 Mile Road
- Helmcken Road
- Island Highway
- Trans-Canada Highway
- West Burnside Road

The Trans-Canada Highway carries up to 88,000 vehicles daily in summer. The Island Highway can carry 44,000 vehicles on an average summer day. Congestion through the Island Highway corridor is a common occurrence during rush hour, and may impede an evacuation of residents in an emergency.

Known bus routes in the community include the Trans-Canada Highway, which accommodates transit buses, school buses, and tourist buses for the region.

In addition, significant bus traffic is noted on the Island Highway serving View Royal and points west to Sooke.

### D. Vulnerabilities

School-age children using bus transportation are among the most vulnerable groups affected by road accidents. Tourist buses can carry dozens of visitors who lack English as their first language, which could challenge first-responders and site support efforts to inform family members.

Closure of the Trans-Canada Highway for a substantial time period due to a mass-casualty vehicle accident would challenge residents and business owners in the region.



*Bus-Vehicle Accident in View Royal*

First responders are increasingly exposed to threats from alternate fuel vehicles, such as the high voltage associated with hybrid transit buses.

### E. Implications

#### Mitigation

- Ensure routes in View Royal frequently used by buses are assessed for safety hazards and the potential for risk reduction measures.

#### Response

- First responders have been trained on bus rescue. Ensure personnel receive updated training.
- Ensure practice exercises in mass casualty bus accidents include fire, police, and ambulance organizations utilizing the Incident Command System.
- Ensure response plans anticipate the need for emergency translation capabilities.

#### Community Recovery

- Consider the use of reception centres as information outlets for families and friends of transportation accident victims.

### A. Description

There are five potential sources of tsunami in View Royal:

Subduction Zone – A Cascadia Subduction earthquake of magnitude 8 or 9 could affect the Greater Victoria area, including View Royal. Such major earthquakes occur roughly every 500 to 600 years, with the last one in 1700 with an estimated magnitude of 9.0.

Local Earthquake – Local earthquakes below the Strait of Georgia or Puget Sound, while presenting a significant hazard from shaking, and not likely to generate a tsunami in the Greater Victoria area.

Pacific Ocean Earthquake – View Royal is protected from a tsunami generated by an earthquake in the Pacific Basin by Vancouver Island and the Olympic Peninsula. The magnitude of a tsunami generated in the distant Pacific Ocean would be low once it arrives in the vicinity of View Royal, with water levels no greater than those caused by wind storms at high tide.

Landslide-Generated Tsunami – It is possible that a landslide or massive debris torrent into the waters of the Strait of Juan de Fuca may displace enough water to create a tsunami. However, it is impossible at present to predict the timing or in the magnitude of the resulting wave.

Impact from Space Debris – There is an extremely remote potential for a tsunami to be generated by a meteor, asteroid, or comet striking somewhere in the Pacific Ocean.

### B. Past Events

#### January 1880 – Haney Tsunami

On January 30, an 8 hectare chunk of land broke away from the north bank of the Fraser River and hit the water. The resultant wave reached a reported height of 20 m on the opposite bank, killing one farmer. Destructive waves spread both up and down stream, and were 3 meters high at a distance of 15 km from the slide.

#### May 1960 – Tsunami From Chile

On May 22, 1960, an earthquake in Chile resulted in a 1.2 metre wave striking the BC coast, including the Tofino area.

#### March 1964 – Port Alberni Tsunami

On March 27, 1964, a major earthquake in Alaska generated tsunami waves that hit the west coast of Vancouver Island. The shape of Alberni Inlet amplified three waves that struck the town between 12:20 am and 3:30 am on March 28. The event damaged 260 homes resulted in economic losses on Vancouver Island of about \$10 million.



*Port Alberni Tsunami in 1964*

#### December 2004 – Indian Ocean Tsunami

On December 26, 2004, a major subsurface earthquake off Sumatra, Indonesia, generated a massive tsunami that killed more than 300,000 people in 14 countries. Wave energy from this event was measurable in all of the world's oceans, including the Pacific Ocean off Vancouver Island.

### C. Hazard Areas

Computer modeling of tsunami for the Strait of Juan de Fuca shows that the wave energy from a Cascadia Subduction Zone earthquake will attenuate substantially in the Strait.

Natural Resources Canada and the Department of Fisheries and Oceans estimate that, at most, tsunami wave heights in View Royal from a subduction earthquake may reach 1.3 metres in height.

To allow for the potential run-up of tsunami waves on the shore, and to account for other unknown factors, scientists recommend that View Royal residents plan for evacuation and other controls within four (4) metres elevation above the normal highest tide along the shoreline.

### D. Vulnerabilities

There are few residences in View Royal within the 4-metre planning zone. Areas likely to be most affected by a tsunami include:

- Bays along Equimalt Harbour, including Thetis Cove, Limekiln Bay, Tovey Bay, Price Bay, and Plumper Bay
- Residents along Millstream Creek
- Residential areas between Helmcken Road and Portage Inlet, including Craigflower Creek and Christie Point

Regional use of beaches occurs in the summer months, with some limited use in winter. A number of parks in the area provide beach access, including:

- Portage Park and Richards Island at Thetis Cove
- Parsons Bridge Park, Mellor Park, and Kelvin Grove Park at Millstream Creek

### E. Implications

#### Mitigation

- Long-term land use planning for View Royal considers the hazards of tsunami. High risk areas include those threatened by any sea-level rise that may accompany global climate change.
- Ensure existing infrastructure investments, such as sewer pumping stations, are assessed for possible protection from tsunami and higher sea levels.

#### Response

- Provide residents and business owners occupying parcels within the 4-m tsunami planning zone specific information on how to protect themselves.
- Arrange to warn beach and park users of tsunami risk following earthquake.

#### Municipal Business Continuity

- Develop response measures to protect sewer pumping stations from tsunami damage.

#### Community Recovery

- Ensure recovery plans anticipate the long-term housing needs of any residents suffering damage to their dwellings.

## 10. Utility Failure

Risk: Moderate

### A. Description

Utilities include a variety of infrastructure-based services that support community standards of living. Because of the reliance of View Royal residents and business-owners on public and private utilities, any interruption in service could result in an emergency situation. Possible utility failures include:

Power Failure – Prolonged outages or when power is lost during times when ambient temperatures are very low can result in emergency requirements. Electricity is considered an essential service to maintain heat and cooking facilities, and to support other critical utilities.

Communications Failure – The communications infrastructure in the province can be considered a basic necessity in today's world. The telephone, fax, computer networks, data lines, and wireless radio and cellular phone systems are subject to failure through a number hazards, including windstorms, ice storms, and earthquakes.

Fuel Shortage – According census data, most View Royal residents (53%) rely on electricity for residential heat. About 36 percent of dwellings are heated by oil, and 1 percent by gas. Other fuels, including wood heat, account for 12 percent of heating fuels.

Water System Failure – Interruption of potable water can occur due to insufficient potable water access or contamination, or both. Prolonged incidents of either can affect the health of View Royal residents and lead to economic impacts for local businesses.

Sewer System Failure – As with potable water, much of View Royal depends on sewer systems. Prolonged outages could lead to health impacts among residents and the interruption of business activity in some sectors.

Solid Waste System Failure – Solid waste disposal services managed through the Capital Regional District are subject to failure due to strike, earthquake, fire, and other causes.

### B. Past Events

#### July 1996 – Power Outage

A major power outage in western USA and Canada began when a 345,000-volt transmission line failed in Idaho. More than two million customers were affected.

#### January 1998 – North East Power Outage

A prolonged power outage in severe weather was blamed for 30 deaths and for leaving more than 3.5 million people in the dark.

#### December 2000 – Natural Gas Failure

On December 21, a 15-cm gas line supplying Dawson Creek with natural gas froze and had to be shut down. Gas supply to all major industries was shut off, all schools were closed, and about 4,000 homes and users were impacted.

#### October 2003 – Vancouver Telephone Outage

A construction crew damaged Telus cable infrastructure, impacting service for 2,000 residential and business customers in the Vancouver area for 72 hours.

#### August 2006 – Tofino Water Shortage

On August 29, Tofino's Mayor declared that all local food service and lodging businesses were to shut down due to a severe water shortage.

#### December 2006 – Winds Cause Power Outage

When a series of major Pacific storms hit the Capital Region, wind gusts of 157 km/h brought down trees and power transmission lines. Power was cut to more than 250,000 homes and businesses on Vancouver Island and the Lower Mainland, some for five days in View Royal.

### C. Hazard Areas

View Royal receives transmitted power via a number of lines managed by the British Columbia Transmission Corporation. Power outages can be caused by heavy winds, ice storms, snowstorms, falling trees or other debris, vehicle impacts, and earthquakes.

The View Royal community receives natural gas via Terasen Gas, Ltd., the only pipeline gas system available in the community. Interruptions of piped natural gas are most frequently caused by digging during building or road construction.

Water supply depends on CRD collection, treatment, and delivery. The water system in the CRD is particularly exposed to risk from earthquakes in the region. Similarly, sewer sanitation systems are underground and may be affected by shaking, subsidence, and liquefaction caused by earthquake.

### D. Vulnerabilities

Institutions are among the community features most likely to be affected by utility failure. Schools will likely to be closed without access to power and water.

Hospital, medical clinics, and elderly care facilities rely on water, sewer, power, and communications systems for safe operation.

In addition, a number of senior citizens rely on steady electrical power to support oxygen supplies and other medical equipment.

Power and water interruptions can cause businesses to close temporarily, and result in economic hardships for business owners and employees.

Prolonged communications failures are likely to have devastating impacts on View Royal businesses, including home-based business sector. As a result, economic impacts are likely to be immediate and widely spread.

### E. Implications

#### Mitigation

- Work with utility companies and CRD to assess burying vulnerable transmission lines in the region.

#### Response

- Arrange for access to portable power generators for assisting Reception Centres.
- Warming Centres have been identified at the View Royal schools and Community Hall. Arrange for access to emergency power generators.
- The Town maintains a list of residents who require oxygen for emergency support.

#### Municipal Business Continuity

- The Emergency Operations Centre, located at Town Hall, is equipped with a power generator.
- Arrange for water trucks to provide potable water, working with the CRD and PEP.
- Generators for pumping stations are available.

#### Community Recovery

- Assist business organizations in organizing emergency water supplies for temporary operations.

## 11. Wildland Fire

Risk: Moderate

### A. Description

Wildland fire ranks among the hazards of greatest concern for the Town of View Royal, especially in neighbourhoods that border forested areas. The potential safety challenges of wildland fires in rural and urban areas have been emphasized by the loss of structures and lives in other similar communities in BC and elsewhere.

From June to October of most years, the community faces a threat from wildland-urban interface fires. While the cooler marine environments of the View Royal area may be less susceptible to wildland fires than the province's interior, occasional periods of high temperatures, low humidity, and high winds may exacerbate the risk.

More than any other hazard, wildfires can require immediate evacuation of persons and animals to preserve safety. Response requires careful planning to be effective in removing citizens from harm.

### B. Past Events

#### July 1994 – Garnet Fire, Penticton

Unpredictable winds plagued fire crews from the day the Garnet Fire began on July 20, 1994. Eighteen homes were destroyed, 3,000 people were evacuated and fire suppression costs exceeded \$5 million.

#### July 1998 – Silver Creek Interface Wildfire

On July 26, 1998, lightning struck a tree on a steep slope in the mountains above Silver Creek, just southwest of Salmon Arm, BC. Steep slopes hampered attempts to contain the blaze, and high winds forced the fire across Silver Creek valley, destroying more than 40 structures. Continued high winds lead to the evacuation of 7,000 people from Salmon Arm, the largest evacuation in BC history to that date.



#### July 2003 – McLure / Barriere Fire

High winds and temperatures in the 35-40 C range transformed a carelessly tossed cigarette into a fire storm within a few hours, forcing thousands to flee the rampaging fire. Residents from Barriere were evacuated from their homes as the 178-square-kilometre fire raged.

The Kamloops Fire Region received 1,500 lightning strikes in a 24-hour period, out of 6,000 in the province, sparking 90 new fires in the region.

#### August 2003 – Okanagan Mountain Park Fire

The Okanagan Mountain Park Fire was the most significant interface wildfire event in BC history. The fire's size was 25,600 hectares.

Much of BC was affected by the fire but the communities of Naramata and Kelowna suffered the largest effect when the blaze caused the evacuation of 33,050 people (4,050 of these people were evacuated for a second time) and 238 homes were lost or damaged.

The fire also claimed 12 wooden trestles and damaged 2 other steel trestles in the historic Myra Canyon.

**C. Hazard Areas**

Virtually the entire Town of View Royal is subject to wildland-urban interface fire risks to some degree, and periodically experiences high fire danger during the months of summer and early fall. Generations of effective fire suppression in the region has created a dense forest in some areas, with thick ground cover and ladder fuels that present a major risk of rapid fire spread and extreme fire behaviour.

B.A. Blackwell and Associates assessed the risks of wildland-urban interface fire for the Town in 2007, and noted the following areas:

- North of Thetis Lake Park – Pike Lake and McKenzie Lake areas have a moderate probability and high consequence of wildfire
- South East Portion of Thetis Lake Park – Homes adjacent to the park in the Helmcken and Burnside areas have a low probability of wildfire and high consequence.
- Atkins and Chilco Roads – Residential areas north of Atkins Road have a low probability of wildfire and high consequence.

In addition, as many as 25,000 visitors are drawn to Thetis Lake Park on busy summer weekends. There are no methods for alerting park users to the imminent threat of wildfire.

**D. Vulnerabilities**

The more prominent isolated neighbourhoods in View Royal include those listed in the table below.

**Isolated Neighbourhoods**

Number of Lots	Name of Road	Planning Area
40+	West Park Ln (Campgrd)	Atkins
31	Highland Road	Burnside
26	Meadowvale Drive	Burnside
24	Nursery Hill Drive	Atkins
20	Marler Drive	Burnside
19	Riverside Drive	Burnside
14	Park Ridge Place	Burnside
12	Ridgeview Rise	Burnside
11	Herbata, Westoby Roads	Thetis
10	Valley View Place	Burnside

In addition, new development in The Plateau of the Atkins Planning Area will introduce 80-100 homes into the wildland-urban interface.

Road access to Pike and McKenzie Lake residences is so narrow that evacuee vehicles may block access by fire apparatus. There is no access to fire suppression water north of Thetis Lake.

**E. Implications**

**Mitigation**

- Develop an Urban Forestry Management Plan to address wildfire fuel management practices.
- Consider the benefits of identifying requirements for development permit areas to control risks.

**Response**

- Develop public alert mechanisms and podcasts for municipal website.
- Develop warning systems to alert Thetis Lake Regional Park users of immediate wildfire risks.
- Practice wildfire evacuation procedures with RCMP and SAR teams.

**Community Recovery**

- Identify community elements to bring together in coordinated disaster recovery. List contacts.

## Other Hazards

A number of hazards could threaten View Royal without requiring the site support efforts available through the emergency program. To complete the list of concerns, the following paragraphs summarize other hazards that may require specific emergency response procedures.

Aircraft Crash – The crash of a large commercial aircraft in the community is very unlikely. However, smaller aircraft frequent the skies over View Royal. Ambulance helicopters account for approximately 1,500 landings at the Victoria General Hospital each year. Seaplanes regularly overfly the community enroute to Victoria Inner Harbour.

Bomb Threat – While specific buildings or infrastructure in View Royal may fall victim to the threat of bombing, it is unlikely that such an event would require the activation of an Emergency Operation Centre. The West Shore RCMP has procedures in place for responding to bomb threats.

Disease, Animal or Plant – With little agriculture in the community, View Royal is not subject to significant impacts from animal and plant diseases.

Flooding – The Town of View Royal is not subject to repeated or large scale flooding events. Severe rainfall can mean heavy flows in such prominent watersheds as Craigflower Creek and Millstream Creek. Centennial Park may flood when heavy rains coincide with high tides. The open swale storm water collection systems may be overwhelmed by extreme precipitation, but it is unlikely such events would result in a major emergency for the community.

Food Contamination – Although food service to large numbers of people occurs in View Royal, such as at the Hospital, it is unlikely that municipal emergency program will be called upon for response. The Vancouver Island Health Authority deals with threats of and responses to food contamination at health facilities.

Landslide, Debris Flow – There are only a few areas in View Royal where the slope exceeds 30 percent. Some sections of Burnside Planning Area are subject to steep slopes and surface erosion. There is no potential for landslide or mudslide to threaten residents in the community.

Lost Persons – Thetis Lake Park attracts a large number of visitors, hikers, bicyclists, and outdoor enthusiasts each year. Recreational opportunities and work requirements draw many people to the backcountry in distinct seasons. Occasionally, these visitors to remote areas are reported as overdue or missing. The consequences of lost persons are heightened when children are involved. Persons may become lost in the municipality while undertaking outdoor activities such as hiking, off-road cycling, and swimming from remote beaches. Summer visitors who are not familiar with the region would be most at risk. Search and rescue services, however, would not likely trigger support from an Emergency Operations Centre.

Social Disturbance, School Violence – Events of social disturbance are considered rare in View Royal, although not impossible. Violent incidents in schools, such as shootings, are not expected to require site support from the View Royal emergency operations centre. The West Shore RCMP has appropriate response procedures in place.

Volcanic Eruption – Volcanoes pose serious hazards to human populations in many parts of the world. In addition to destruction caused by ash fall and mudslides in the immediate vicinity of an erupting volcano, ash plumes injected into the atmosphere pose dangers to aircraft flying through them. There have been recent reports of volcanic activity on Mt. Baker, just south of the BC-Washington border. A major eruption might generate volcanic ash that could affect the region.

## 4.0 Priority Concerns

One purpose of this Community Risk Assessment is to identify priorities for action. The View Royal Emergency Management Committee considered the risk information presented in this report in identifying events that are most likely to result in large losses for the community.

Risk is considered the potential for loss and is made up of two components: Probability and consequence. The greater the probability of an adverse event, the greater the risk. Also, the greater the potential consequences of an incident, the greater the risk.

Considering both components of risk becomes important when allocating time and effort for emergency management. The highest priority is given to events that are both probable and can lead to severe consequences. Low priority events represent low probability occurrences of little consequence.

With these considerations in mind, a review of the primary hazards presented above yields the hazards and priorities identified in Figure 16.

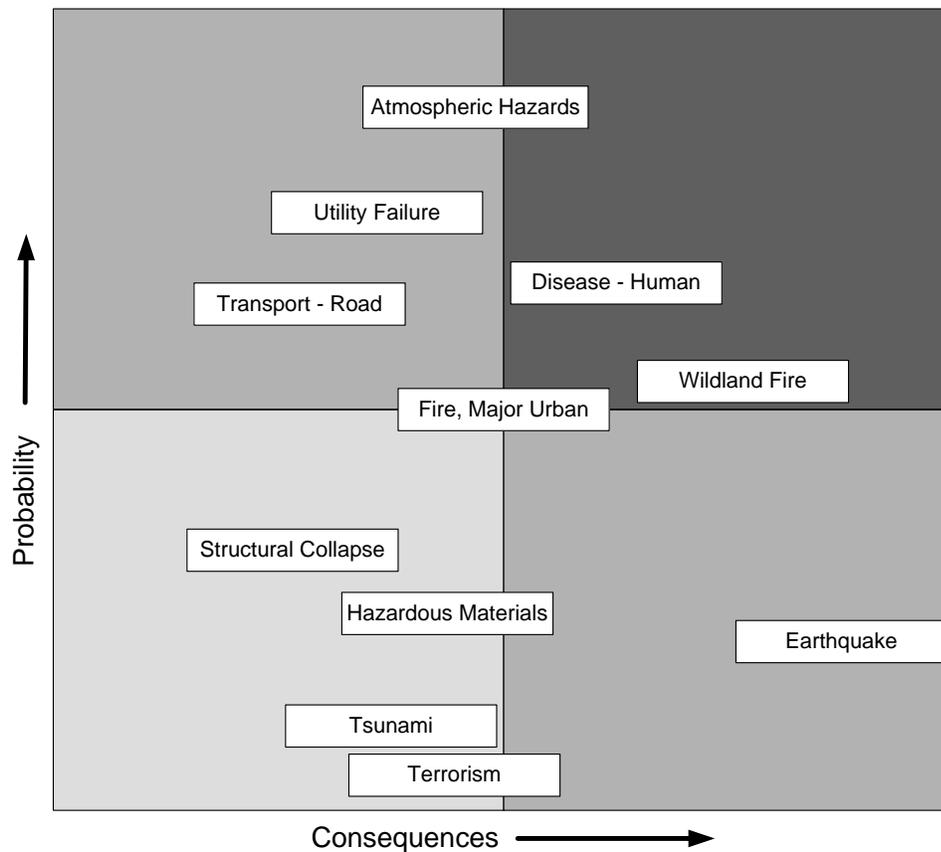


Figure 16. Priority Concerns for View Royal

## 5.0 Action Items

The foregoing review of risks and vulnerabilities demonstrates that several opportunities are available for advancing emergency management in View Royal. Each action plan corresponds to an observation or recommendation outlined in the previous section, and summarizes specific tasks to clarify the intent of the effort.

This section summarizes the actions that can and should be undertaken before an emergency or disaster strikes by listing them according to emergency phase. Within each phase, the projects are listed by priority, beginning with those judged to provide the greatest return on investment. Factors considered in this evaluation include:

- Effectiveness in reducing risk and vulnerability
- Ease of accomplishment
- Cost of implementation
- Logical sequence related to other actions

The Emergency Program Coordinator will consider this list in recommending action items for the emergency program each year.

### Hazard Mitigation

1. Request the Capital Regional District to assess hazardous materials transportation by road in the region, in cooperation with shippers, transportation companies, neighbouring fire departments.
2. Develop an Urban Forestry Management Plan to address utility failures caused by tree blowdowns.
3. Develop an Urban Forestry Management Plan to address wildfire fuel management practices.
4. Consider the benefits of identifying requirements for development permit areas to control wildfire risks.
5. Promote annual influenza vaccinations among municipal staff, residents and businesses.
6. Ensure routes in View Royal frequently used by buses are assessed for safety hazards and the potential for risk reduction measures.
7. Assess critical infrastructure in and affecting View Royal for appropriate security measures.
8. Implement earthquake retrofitting or replacement of municipal buildings, infrastructure.
9. Determine where redevelopment may be allowed with normal construction, and areas where special measures will be needed.
10. Work with utility companies and CRD to assess burying vulnerable transmission lines in the region.
11. Work with VIHA to ensure inspection of food preparation for major events.
12. Prepare for the arrival of West Nile virus and track BCCDC Health Alert recommendations.
13. Ensure existing infrastructure investments, such as sewer pumping stations, are assessed for possible protection from tsunami and higher sea levels.

## Emergency Response Preparedness

1. Practice wildfire evacuation procedures with RCMP and SAR teams.
2. Ensure practice exercises in mass casualty bus accidents include fire, police, and ambulance organizations utilizing the Incident Command System.
3. Develop public alert mechanisms and podcasts for municipal website.
4. Develop warning systems to alert Thetis Lake Regional Park users of immediate wildfire risks.
5. Ensure high density occupancies (such as schools) near fixed facilities and roadways carrying hazardous materials have plans for both immediate evacuation and sheltering in place.
6. Advise residents, businesses and institutions to prepare to survive for at least seven days.
7. Arrange for access to portable power generators for assisting Reception Centres.
8. Identify location of backup snow removal equipment.
9. Warn occupants / owners of flat-top buildings of snowfall amounts that should trigger monitoring.
10. Assist residents with heat, power, food, water. Warn residents of dangers of indoor heating.
11. Prepare a Town of View Royal Pandemic Influenza Plan.
12. Ensure plans for response to structure collapse identify dog-search teams and heavy equipment.
13. Develop roles and responsibilities among faith-based organizations and others to support health and emergency care within the community during a disease outbreak.
14. Remove snow from municipal roofs, if warranted.
15. Ensure personnel receive updated training for bus rescue.
16. Work with Victoria General Hospital and schools to develop Pandemic Influenza Plans.
17. Ensure response plans include the requirement to treat emergencies that may have been caused by terrorist action as potential crime scenes, and to preserve evidence.
18. Arrange to warn beach and park users of tsunami risk following earthquake.
19. Ensure response plans anticipate the need for emergency translation capabilities.
20. Provide residents and business owners occupying parcels within the 4-m tsunami planning zone specific information on how to protect themselves.

## Business Continuity Preparedness

1. Develop a Business Continuity Plan given a shortage of key resources.
2. Prepare alternate measures for continuing essential municipal services, critical infrastructure.
3. Prepare alternate measures for continuing essential municipal services in the event of fire in municipal hall, including backup storage of essential records off site.
4. Develop plans to continue critical municipal services in the event of terrorist action.
5. Develop response measures to protect sewer pumping stations from tsunami damage.
6. Arrange for water trucks to provide potable water, working with the CRD and PEP.
7. Identify transportation (e.g., snowmobiles, 4x4s) to help municipal staff reach their workplaces.

## **Disaster Recovery Preparedness**

1. Consider assigning a single leader to coordinate Western Community disaster recovery, and develop a collaborative recovery organization that includes the City of Langford, the City of Colwood, and the District of Highlands.
2. Identify community resources, such as service clubs, that could contribute to recovery.
3. Identify community elements to bring together in coordinated disaster recovery. List contacts.
4. Identify contacts for consultation during environmental rehabilitation, including ground-water monitoring.
5. Ensure recovery plans include the ability to quickly assess the structural integrity of key community buildings, such as Municipal Hall and the Fire Station, following an earthquake.
6. Ensure recovery plans include measures for keeping the public informed on the details of a terrorist attack, the potential for further attacks, and how members of the public can protect themselves.
7. Consider the use of reception centres as information outlets for families and friends of transportation accident victims.
8. Ensure recovery plans anticipate the long-term housing needs of any residents suffering damage to their dwellings.
9. Assist business organizations in organizing emergency water supplies for temporary operations.
10. Organize local businesses to share snow-clearing efforts to quickly return business to normal.

## 6.0 References

- B.A. Blackwell and Associates Ltd. 2007. *Town of View Royal and Capital Regional District Parks Community Wildfire Protection Plan*. Submitted to CRD Parks and Town of View Royal. November.
- BC Hydro Project Team and the Jordan River Water Use Plan Consultative Committee. 2002. *Consultative Committee Report Jordan River Water Use Plan*.
- British Columbia Government. 1996. *Emergency Program Act*. [RSBC 1996] Chapter 111 Queen's Printer, Victoria, British Columbia, Canada.
- British Columbia Government. 1996. *Local Authority Emergency Management Regulation*. Reg. 380/95, O.C. 1075/95 Deposited September 8, 1995 Queen's Printer, Victoria, British Columbia, Canada.
- British Columbia Government. 2008. *Climate Action Plan*.  
[www.livesmartbc.ca/attachments/climateaction\\_plan\\_web.pdf](http://www.livesmartbc.ca/attachments/climateaction_plan_web.pdf)
- British Columbia Government. 2008. *LiveSmart BC – Effects of Global Climate Change*.  
[www.livesmartbc.ca/learn/effects.html](http://www.livesmartbc.ca/learn/effects.html). Accessed December 15, 2008.
- British Columbia Transmission Corporation. 2006. *BCTC Facilities Pest Management Plan Site List*. February 7.
- Capital Regional District. 1996. *Capital Region Profile Regional Planning Services*. "Physical Setting," Vol. 1, No. 3 Spring
- Capital Regional District. 2000. *Core Area Liquid Waste Management Plan - Chapter 16, Trunk Sewer System Infrastructure Upgrading*. July 12
- Capital Regional District. 2006. *Core Area Liquid Waste Management Plan - Chapter 4, Existing Wastewater Infrastructure*. July 12
- Capital Regional District. 2006. *Solid Waste Division Annual Report – 2005*. Environmental Services
- Capital Regional District. *Fact Sheets*. <http://www.crd.bc.ca/>
- Clague, John and Bob Turner. 2003. *Vancouver, City on the Edge – Living with a Dynamic Geological Landscape*. Tricourni Press, Vancouver
- Cleverley, Bill. 2008. "Councillors Push for Commuter Rail within 2 Years," Times Colonist. January 29
- Colledge Transportation Consulting. 2008. *West Shore Tram Line Assessment*. Submitted to C4CR Group. January 28.
- Columbia Mountains Institute of Applied Ecology. 2005. *Implications of Climate Change in British Columbia's Southern Interior Forests*. April 26–27, 2005, Revelstoke, British Columbia Canada. [www.cmiae.org](http://www.cmiae.org)
- D.G. Regan and Associates Ltd. 2008. *Town of View Royal – West Nile Virus Mosquito Surveillance Program - Summary Report*. Prepared for Town of View Royal. File No. 4708. September 18.
- Dave Mitchell & Associates, Ltd. 2007. *Town of View Royal Fire/Rescue Department, Fire Station Facility Needs Analysis*. December
- EmergeX Planning Inc. 2006. *Hazard Risk and Vulnerability Assessment City of Victoria*. Prepared for the City of Victoria. March.
- Heirdorn, Keith C. 2005. *Weather Events. Victoria's Blizzard of 1996*.  
<http://www.islandnet.com/~see/weather/events/vicsnow96.htm>

- Hill, Phil and David Mate. 2003. "A Collaborative Approach," Geological Survey of Canada, Natural Resources Canada. In *Adapting to Climate Change in the Coastal Pacific Northwest: Challenges for Ecosystems, Communities, Industries and Institutions*. Held at the Victoria Conference Centre, Victoria, BC, May 23, 2003.
- Kenny, Sylvia. 2004. *Aquifers of the Capital Regional District*. University of Victoria. Prepared for the Capital Regional District, Victoria, B.C. December.
- Mazumder, Asit. 2003. "Challenges in Sustaining Quantity and Quality of Drinking Water Under Extreme Climate Variability: Sooke Watershed as a Case Study," University of Victoria. In *Adapting to Climate Change in the Coastal Pacific Northwest: Challenges for Ecosystems, Communities, Industries and Institutions*. Held at the Victoria Conference Centre, Victoria, BC, May 23, 2003.
- Ministry of Transportation. *Traffic Data*, [www.th.gov.bc.ca/trafficData/tradas/tradas.asp](http://www.th.gov.bc.ca/trafficData/tradas/tradas.asp)
- Mollin, Troy. 2008. "Review of Emergency Management for Schools in the Town of View Royal." Final Assignment: Emergency Management Certificate Program. Feb 15
- Moore, Elaine, Anna-Marie Krahn, and Claudia Lorenz. 2002. *The Spirit of Pestilence: The Smallpox Epidemic in Victoria in 1862*. University of Victoria.
- Mote, Philip. 2003. "Impacts of Climate Change in the Pacific Northwest," Climate Impacts Group, University of Washington. In *Adapting to Climate Change in the Coastal Pacific Northwest: Challenges for Ecosystems, Communities, Industries and Institutions*. Held at the Victoria Conference Centre, Victoria, BC, May 23, 2003.
- Pacific Climate Impacts Consortium. 2007. *Climate Overview 2007 - Hydro-Climatology and Future Climate Impacts in British Columbia*. Project Lead: D. Rodenhuis, University of Victoria, British Columbia. December 12.
- Pearce, Laurie and Larry Pearce. 2005. *A Century of Hazardous Events in British Columbia: 1905 to 2005*. March.
- Pearce, Laurie and Larry Pearce. 2005. *Potential Hazards in British Columbia: A Glossary*. Prepared for the Ministry of Health Services. March.
- Pearce, Laurie. 1997. *British Columbia: Hazard, Risk and Vulnerability Analysis*. The Disaster Preparedness Resources Centre, University of British Columbia.
- Phillips, David. *Blame it on the Weather – Strange Canadian Weather Facts*. Key Porter Books, Toronto, Ontario, 1998, ISBN 1-55013-968-1.
- Roxborough, Maria, Bernie Morris, and G. Stewart Irwin. 2006. *2005 Annual Bacteriological Summary of Greater Victoria's Drinking Water*. May 11.
- Royal Roads University. 2008. *View Royal Evacuation Plan*. Master of Arts in Disaster and Emergency Management Learners. April 30.
- Statistics Canada. 2001. *Census Custom Tabulation*.
- Statistics Canada. 2006. Census of Population – Esquimalt First Nation
- Statistics Canada. 2006. Census of Population - Songhees First Nations
- Steinhauer, Julie. 1997. *First Nations Water Rights in British Columbia – A Historical Summary of the Rights of the Esquimalt First Nations*. BC Ministry of Environment, Lands and Parks
- Tate, Jeremy. 2003. *Health Facilities Planning*. Capital Regional Hospital District Capital Regional Hospital District. Board Presentation Board Presentation October 8, 2003 October 8.
- Taylor, Bill. 2003. "Climate Trends in BC, Canada, and the World," Environment Canada. In *Adapting to Climate Change in the Coastal Pacific Northwest: Challenges for Ecosystems, Communities, Industries and Institutions*. Held at the Victoria Conference Centre, Victoria, BC, May 23, 2003.
- Town of View Royal. 2008. *Annual Report*.

Town of View Royal. 2008. *Official Community Plan*. Bylaw No. 361 1999. Consolidated Revisions to November 2007.

Town of View Royal. 2008. *View Royal News*, Spring / Summer.

### **Internet Resources**

BC Ministry of Energy, Mines and Petroleum Resources – EQ Hazard Map  
[www.em.gov.bc.ca/mining/geolsurv/surficial/hazards/slope.htm](http://www.em.gov.bc.ca/mining/geolsurv/surficial/hazards/slope.htm)

BC Provincial Emergency Program, Weekly Incident Situation Reports  
[www.pep.bc.ca/incidents/](http://www.pep.bc.ca/incidents/)

BC Transmission Corporation  
[www.bctc.com](http://www.bctc.com)

Capital Regional District  
Planning  
[www.crd.bc.ca/regionalplanning/facts/](http://www.crd.bc.ca/regionalplanning/facts/)  
[www.crd.bc.ca/es/natatlas/](http://www.crd.bc.ca/es/natatlas/)

CRD Water Services  
[www.crd.bc.ca/water/index.htm](http://www.crd.bc.ca/water/index.htm)

Indian and Northern Affairs Canada  
<http://sdiprod2.inac.gc.ca/FNProfiles>

School District 61  
Eagle View [www.sd61.bc.ca/school.aspx?schno=0067](http://www.sd61.bc.ca/school.aspx?schno=0067)  
Shoreline [www.sd61.bc.ca/school.aspx?schno=0058](http://www.sd61.bc.ca/school.aspx?schno=0058)  
View Royal [www.sd61.bc.ca/school.aspx?schno=0029](http://www.sd61.bc.ca/school.aspx?schno=0029)

Songhees First Nations  
[www.songheesnation.com/html/taxation/index.html](http://www.songheesnation.com/html/taxation/index.html)

Statistics Canada  
[www.statcan.ca/start.html](http://www.statcan.ca/start.html)  
[www12.statcan.ca/](http://www12.statcan.ca/)

Terasen Gas  
[www.terasengas.com/](http://www.terasengas.com/)

Town of View Royal  
[www.viewroyal.ca/](http://www.viewroyal.ca/)

Vancouver Island Health Authority  
[www.viha.ca/](http://www.viha.ca/)

VIA Rail  
[www.viarail.ca/trains/en\\_trai\\_roch\\_vico.html](http://www.viarail.ca/trains/en_trai_roch_vico.html)

Victoria General Hospital  
[www.viha.ca/finding\\_care/facilities/victoria\\_general\\_hospital.htm](http://www.viha.ca/finding_care/facilities/victoria_general_hospital.htm)