



## CITY OF LANGLEY

# Jurisdiction-Specific Vulnerability Assessment & Mitigation Strategies

## Introduction

The City of Langley, in conjunction with Island County and other cities and special districts in Island County, is an active participant in the planning process to develop a multi-jurisdictional hazard mitigation plan for Island County. This document was prepared with information provided by city officials, including the Director of Public Works, Police Chief, Building Official, City Administrator, etc. The City of Langley values community participation in all areas of government and this plan is being reviewed by the City's Emergency Planning Committee, consisting of several community members.

## City of Langley Overview

<u>Contact Information:</u>	Rick Hill, Director of Public Works City of Langley 112 Second Street P.O. Box 366 Langley, WA 98260 360-221-4246
<u>Population of Langley:</u>	1055
<u>Geographical Size:</u>	653 Acres (Just over 1 square mile)
<u>Principal Economic Base:</u>	Retail and Commercial, especially tourism

## Critical Facilities Within City Limits

There are several publicly and privately owned facilities within the city limits which, for a variety of reasons, are considered critical (addresses of some facilities are not provided in this document, due to security concerns). The approximate assessed values of some of the city owned properties are given. Most of the assessed values are believed to be less than the actual cost of replacing the asset. There are several pieces of city owned, critical infrastructure where values are not given, due to lack of data. Critical facilities:

- Wastewater Treatment Plant (\$1.2 Million)
- Sewage Lift Stations (Lift Station #2 \$120,000; other two unknown)
- City Wells, including the Backup Well



- City Water Storage Tank (\$227,000)
- City Hall, including the Langley Police Department (\$1.3 Million; includes Langley Library)
- Langley Harbor (\$300,000)
- Whidbey Telecom Central Office
- Fire District #3 Langley Station
- Langley Middle School
- South Whidbey School District Offices

#### Other Publicly Owned Facilities Within City Limits

- Whidbey Island Center for the Arts (WICA)
- Langley Public Library
- Island County Fair Grounds
- United States Post Office

#### Other Public Places of Special Community Interest (shelters, food, etc.)

- The Star Store
- Christian Missionary Alliance Church of Langley
- Langley United Methodist Church
- St. Hubert Catholic Church
- Good Cheer Food Bank

#### Repetitive Loss Properties

There are no repetitive loss properties within the City of Langley.



## Current Codes Affecting Hazard Mitigation

The City of Langley is subject to a wide variety of hazards. This document is intended to identify the types of hazards that pose a high degree of risk of occurrence and the mitigation measures that are currently in place to reduce or mitigate loss of life, deleterious health effects, property loss or environmental degradation.

The City of Langley has adopted a number of codes necessary to ensure safe building practices. These codes are adopted in Langley Municipal Code Section 15.04.040, effective 2004. The purpose of these codes is to provide minimum standards to safeguard life and limb, health, property and public welfare.

- 2003 edition of the International Building Code (IBC)
- 2003 International Residential Code
- 2003 International Mechanical Code
- 2003 International Fire Code
- 2003 International Plumbing Code and Uniform Plumbing Code Standards (except as provided in RCW 19.27.170)
- Physically disabled and elderly access standards as defined in RCW Sections 70.92.100 through 70.92.160
- 2003 International Fuel Gas Code
- 2003 Washington State Energy Code
- 2003 Washington State Ventilation and Indoor Air Quality Code
- NFPA 58 Liquefied Petroleum Gas Code
- 1997 Edition of the Uniform Code for the Abatement of Dangerous Buildings

In addition to the general standards for construction, the IBC provides for geographically specific requirements for seismic design, high wind design and high snow load design. Langley spells out these geographical requirements in Table 301.2 in the Langley Building Code in Chapter 15.04 of the Langley Municipal Code.

The City of Langley also regulates types and uses of structures via its Zoning Code contained in Title 18 of the Langley Municipal Code and revised on March 10, 2006.

Periodically, the City of Langley enacts new codes and ordinances designed to enhance the degree of protection afforded its citizens. The City has recently enacted Section 15.24 of the Langley Municipal Code governing Flood Hazard Prevention.



## **Methodology**

Hazard Mitigation analyses conducted by the City of Langley staff and Alan Whitman, acting as consultant to the city, were based on the best currently available information and data regarding the characteristics of the city, the natural hazards that threaten the people, property and environment of the city, as well as the impacts from disasters that the city has suffered in the past. This information includes the following:

- State of Washington, Office of Financial Management, Population Determination, June 29, 2006
- Assessor tax records
- FEMA Flood Insurance Rate Maps—as of August 2, 2006
- Island County and City of Langley GIS data of various types
- Department of Natural Resources data
- US Geological Survey elevation and slope data
- Natural Resource Conservation Soil Data
- Washington State Geological Survey Geological Data
- City of Langley data sets
- Other information as available
- Appropriate maps

In many cases the experience, knowledge and judgment of City of Langley officials were used in the planning, including assumptions and approximations that were believed to be reasonable. In addition, simplified straightforward technical analyses were used for tasks such as estimating property values, determining the size of populations affected and so forth. The City recognizes that additional analyses may be required at the time when a proposed mitigation initiative is undertaken.



## **Hazards Likely to Affect the City of Langley**

### **Drought**

The risk of drought is always present in Island County. According to Doug Kelly, Island County Hydro Geologist, drought only affects aquifer water levels after decades of infiltration. As a result, drought effects are basically negligible on water *supply*, as they become part of the long-term infiltration rate. However, the *use* of water substantially increases due to higher irrigation needs.

Although drought is not expected to directly impact the city's water supply, there are two possible negative effects from drought:

- Increased fire danger due to low fuel moisture. See the Wild Land Fire section below for further information.
- Langley could be called on to supply water to other parts of the island that lose water service due to excessive draw down. This would also apply in the case that other factors rendered other water systems or private wells unusable (e.g. earthquake damage, well contamination, etc.).

The City of Langley has a fairly robust water system. The water system storage tank can hold 600,000 gallons and is expected to completely meet the needs of system users for 5 days without refill (with usage restrictions). Langley has several wells tapping reliable aquifers and it is believed that they can be pumped for the foreseeable future. One of the important features of this system is the ability to power it using the City's portable generator. This will prevent the loss of water due to power outage. Public Works maintains what it believes to be an adequate supply of fuel on hand for the generator. At this point, it is believed that Langley can be self-sufficient for normal domestic needs for any reasonably foreseeable drought.

The largest vulnerability of the Langley water system is in case of major fire. The current system is not designed to meet large fire flow needs such as those encountered in a major conflagration. A large fire, especially in the downtown area, would rapidly deplete the entire storage in the system. In recent years a large house fire produced a large draw down of the water tank to extremely low levels. Also, the combination of excessive leakage from cracked pipes and the near certainty of fire following a major earthquake make this a serious deficiency.

Langley has a backup well located at a site remote from the primary wells. This well has been used in the past to pump water during fire emergencies. The City Public Works Department feels that the combined action of this well with that of the main wells should be adequate to meet fire flow needs during any large fire. However, there are problems with using the backup well: 1—the backup well is contained in a cinder block building highly vulnerable to earthquake damage or collapse, 2—there is no means of automatically or remotely activating the backup well upon major draw down of the water



storage tank, and 3—water from the backup well is not chlorinated, necessitating “boil orders” and other water safety protection measures when it is activated.

## Earthquake

The City of Langley is located in Seismic Zone D2 as determined by the International Building Code. While the frequency of severe earthquakes is low, the consequences could be very high. Mitigation of likely earthquake effects may be an area for City investigation in the future.

The Puget Sound area is subject to three types of earthquakes: Benioff (intra-plate), subduction and crustal. All three types are easily capable of producing quakes with a Moment Magnitude (hereafter referred to as “Magnitude” and abbreviated “M”) greater than 6.

A subduction zone earthquake is likely to be in excess of M9. According to the USGS 2002 PSHA, there is about a 9 -10% likelihood of an M 9 or greater in the next 50 years.

Langley sits only a few miles from the South Whidbey Fault (SWF) zone and earthquakes probably occur with greater frequency there than Benioff or subduction earthquakes. Planning for a quake on this fault and other Puget Sound Lowland faults is most appropriate.

The SWF is believed to be capable of producing earthquakes of about M7. USGS maps show about a 2 % probability of ground accelerations exceeding 60% of gravity within 50 years. This corresponds to a Modified Mercalli Intensity Scale of about X (ten), which is described as: “Very Violent” “Extreme Damage” (i.e. a catastrophic earthquake). Even an M6 earthquake centered on the SWF near Langley is expected to produce very substantial damage.

There are a few buildings in Langley that, due to construction and type of occupancy, are of particular concern regarding earthquakes. It should be noted that all of these structures have survived significant earthquakes (albeit at some distance) with only minor damage (1949—M 7.1 Olympia, 1965—M 6.5 Seattle-Tacoma, 2001—M 6.8 Nisqually).

- **Langley Middle School**—located at 732 Camano Avenue. The school has several brick facades of a type known to be very hazardous during earthquakes. These facades have not been retrofitted to make them perform better during earthquakes. This facility is owned and operated by the South Whidbey School District.
- **Langley City Hall, 112 2<sup>nd</sup> street**—This building is a wood frame structure with a façade of brick constructed in 1948. While it appears to be of good construction, it has not been retrofitted and the façade is not expected to perform well during larger earthquakes.



- **Star Store, 201 1<sup>st</sup> Street**--The Star Store is the only grocery store in the City of Langley. The Star Store appears to have been constructed in stages over a number of years, but the basic central structure which contains the groceries and other essential supplies is of brick construction and was built in 1929. No retrofit to assure better earthquake performance of the building has been undertaken nor is any planned. The rest of the store has been constructed over the past two decades to recent earthquake standards.

These structures pose the following issues:

- The collapse of brick structures or facades can cause serious injuries or death to both occupants and people outside near the structure and can render the structures unusable and inaccessible for extended periods.
- Some of the above structures provide critical services during an emergency (e.g. government and food). Loss of these structures could compound response and recovery.

Another concern regarding earthquakes is the potential of bluff collapse. Bluff collapse is very common during Puget Sound earthquakes. See the Landslide section for further information.

## Flood

Some areas of Langley are at risk for combined tidal and storm flooding. The areas subject to this effect are small in area and population. While flooding could have serious consequences for these areas, the overall risk to the city is considered fairly low.

The other type of flooding that Langley can experience is due to heavy run off after an unusually heavy rainfall and/or snowmelt. Historically, downtown Langley suffered flooding on a regular basis. In 1996 the City installed the Park Avenue Storm Interceptor to catch runoff before it could build in volume above ground and overwhelm the downstream storm drains. Instances of flooding have been greatly reduced as a result. The storm drain system in the City can accommodate all but the heaviest run off. Any flooding which results from a greater run off is expected to have only minor, short-term effects.

Langley is not subject to flood plain flooding such as that occurring at river deltas, although there are occasional small floods near creeks. Langley is located in a federally designated flood zone along its shoreline.



## Landslide

Langley has significant bluff areas. Bluff sloughing is a natural process that occurs on all steep bluffs along bodies of water. While Langley has enacted codes and ordinances to help mitigate this issue, existing building stock and infrastructure are located in areas either below or supported by bluffs subject to failure. These landslides could be caused by water intrusion and/or seismic events. Bluff collapse in some of these areas could produce significant safety and economic hazards. This is particularly true of the north side of First Street and the bluff below Camano Street and above the harbor.

The bluffs have not been systematically assessed for likelihood of failure but most (close to 90%) bluff properties have geotechnical reports on file with the City. Some properties have been retrofitted to make failure less likely. The City requires good bluff stewardship subsequent to building, including proper drainage and replanting of vegetation.

The City has taken measures to reduce the occurrence and impact of bluff collapse. In one case a street was rerouted to minimize the effect on transportation of an unstable bluff. In some cases the City is approving building being built into the side of bluff, engineered in such a way as to stabilize the bluff face.

## Pandemic Flu

Langley is as much at risk from pandemic flu as anywhere else in Island County. Public Health experts consider that periodic pandemic flu is a normal and inevitable process. While pandemics may not be avoidable, it is commonly agreed that the effects can be lessened by minimizing physical contact between people. The ideal case is that people not venture out into public places. It is, of course, not possible to completely do this, but one strategy to minimize the impact on local government is to close City Hall and for all workers to operate via telephone and computer connection to maintain government services. Obviously, some field work must still be performed, but the City should explore the viability of allowing its workers to work from home during pandemics or when other disasters make reporting to work impractical. As an adjunct to this, Public Works vehicles might be equipped with notebook computers, both for data retrieval and for relaying of requests for service. This is especially useful during disasters when telephones and voice radios may be overloaded.

## Severe Storm

Severe storms are a regular, seasonal occurrence in Langley. The primary damage caused by these storms is that of wind damage to trees and subsequent power outages, building damage and road closures. Other effects can be caused by high wave action and heavy rain and snowfall. Langley has historically been subjected to snow storms that have dropped as much as several feet of snow. Large snow events have caused significant community disruption (e.g. school and road closures, etc.) for up to seven



days. However, large snow events seem to have decreased in frequency and are now considered to have a relatively low rate of occurrence. Every year Langley can expect to get one or two major rain and wind storms that result in some disruption of normal community activities. Every few years there will be a storm that causes significant disruption. The consequences of these storms are unlikely to cause large, long-term effects.

One severe effect of large storms is the possible occurrence of large waves that can cause under-cutting of bluffs, increasing the likelihood of failure. To reduce this effect, the City has constructed a sea wall that runs for a substantial portion of the downtown shoreline. The marina is protected by a breakwater. Other properties in the city have bulkheads that have allowed some sea water to impinge upon and undermine bluff faces. Severe storms can disrupt Washington State Ferry service from Mukilteo to Whidbey Island and storm damaged dock facilities could be unusable for extended periods of time. In the February, 2006 storm, the Clinton ferry dock sustained significant damage but was able to continue service.

Very severe weather, especially if extended in duration, can cause disruptions in transportation, electrical power and other services. A small stock-pile of necessary supplies (for government, business and personal use) is usually adequate to deal with storm disruptions.

### Tsunami

Tsunamis have historically occurred in Puget Sound and will occur again. Langley is situated in a manner that the effects of a major tsunami at sea should cause no more than a 2 meter rise in sea level. While this would have a major impact on the low lying areas of town, those areas are limited in size, so the overall effect would likely be moderate. Disruptions to the Washington State Ferries could have a significant effect on access to and from the island.

Seiches are periodic waves caused by seismic or atmospheric disturbances that occur within a confined body of water, such as Puget Sound. Historically, Puget Sound has experienced seiches. A seismically caused seiche within the Sound could cause greater wave heights than those expected from a Tsunami. Depending on the height of the waves generated, Langley could experience more extensive flooding and damage. However, only a tsunami of 30 feet or greater in height is likely to cause extensive damage to any part of the city other than that mentioned above. The one exception is the effect of tsunami waves on bluff stability. As mentioned in the Severe Storm section, wave action can cause undermining of bluffs.



## Urban Fire

An urban fire in downtown Langley could have extremely serious effects. Much of the building stock in the core commercial area is quite old and built to very outdated fire safety standards. Langley conducts regular fire inspections of all commercial buildings, but retrofitting buildings with sprinklers or other preventive measures is not required and would be prohibitively expensive.

## Volcano

Langley is located about 65 miles from Mt. Baker, about 80 miles from Mt. Rainier and about 40 miles from Glacier Peak. All are considered active volcanoes. While volcanic eruptions are infrequent, they can have very serious consequences. The extent of the consequences depends largely on the type of eruption. Cascade volcanoes are often subject to explosive eruptions, pyroclastic flows and lahars. While Langley would almost certainly avoid the direct results of any of these, ash fall can affect very wide areas. Ash fall from a major volcanic eruption in the area could cause very large disruptions to Langley for an extended period of time (e.g. ash fall from the 1980 Mt. Saint Helens eruption caused “complete darkness” in Spokane, 250 miles away). Since prevailing winds generally would push ash away from Langley, it is considered a hazard less likely to occur. A large eruption of any of these volcanoes could result in significant indirect effects on Langley by producing major disruptions to the commercial and transportation sectors in the entire Puget Sound area.

Volcanoes can also generate earthquakes and tsunamis. See those sections.

## Wild Land Fire

Langley is located at the urban/wild land interface. Wild land fires are always a possibility, especially during droughts, and the spread of such a fire to the town could have large effects, especially if the downtown area became involved. The likelihood of such an event is considered low but would have very large consequences. The likelihood of wild land fire increases dramatically during periods of extended drought. See Drought section for discussion of water availability for fire fighting.



## **Mitigation Initiatives**

### **Multi-Hazard Initiatives**

#### **Multi-hazard Initiative #1**

Implement public education program in conjunction with Island County Department of Emergency Management to educate the community about the hazards faced in Langley and the appropriate preparedness and response measures. This initiative stresses the importance of personal and neighborhood preparedness. Langley embraces the concept of Community Emergency Response Teams (CERTs) and its community education program will encourage participation in Island County CERT training.

Langley has begun to undertake this initiative using citizens' committees and will be doing public presentations, particularly at community events. A public information program will provide a greater increase in the level of citizen and community preparedness at lower cost than the other initiatives making it Langley's first priority for implementation.

Lead Agency: City Administrator  
Funding Source: Normal Disaster Planning Budgetary Funds  
Time-Line: Beginning 2007 and on-going

#### **Multi-hazard Initiative #2**

Obtain a second trailer-mounted emergency generator. This will allow simultaneous powering of city government facilities and the pumping of water or operation of the sewage pumping stations as needed.

The purchase of a commercial trailer mounted generator will allow the community to address potable water, fire flow issues, and sewage service continuity at lower cost than modifying existing facilities to accept a permanent generator. A mobile generator also allows Langley to meet other power emergency needs in the immediate Langley area. Since power outages happen fairly frequently, this initiative is Langley's first priority for funding. A cost benefit analysis will be conducted prior to grant application.

Lead Agency: Langley Public works  
Funding Source: Pre-Disaster Mitigation Program and other grant sources  
Time-Line: Short term—immediately upon receiving funding



### Multi-hazard Initiative #3

Establish a City Emergency Operations Center (EOC). The city is currently working on a temporary EOC at the existing Langley Fire Station. The City is also working with Fire District # 3 to implement a permanent EOC at the District's new fire station in Langley, when it is completed (estimated to be Fall, 2007). A cost benefit analysis will be conducted prior to grant application.

Lead Agency: Langley Public works  
Funding Source: Normal Disaster Planning Budgetary Funds/ Pre-Disaster Mitigation Program and Other Grant Sources  
Time-Line: Temporary EOC—less than 3 months  
Permanent EOC—upon completion of new fire station in coordination with Fire District # 3

### Multi-hazard Initiative #4

Secure a cache of notebook computers to be stored at a location other than Langley City Hall (probably the new fire station, which will be built to current critical facilities earthquake standards). In conjunction with this, Langley will set up a process for regular, on-going, off-site storage of critical city operating data. This will enable the City of Langley to continue operations should City Hall become unusable or should a pandemic make it beneficial or necessary for most employees to work from home. At least one Public Works vehicle would be equipped with a notebook computer that would be able to receive data over existing radio frequency links (either county police links or wireless internet). This would allow exchange of data to and from the field during emergencies, aiding emergency response operations, as well as allowing dispatching for service calls without requiring anyone to physically be at City Hall. A cost benefit analysis will be conducted prior to grant application.

Lead Agency: Langley Public works  
Funding Source: Pre-Disaster Mitigation Program and Other Grant Sources  
Time-Line: Begin upon receiving funding; completion within 1 year

### **Fire/Earthquake Initiative**

Rebuild the backup well structure and add features designed to make it effective during periods of high flow rates during fire fighting. This entails the following actions:

- Rebuilding the structure to one that is resistant to earthquake forces and properly secured from theft and tampering
- Security monitoring of the facility



- Provide telemetry between the city's water storage facility and the backup well to enable automatic operation when the main system levels become too low
- Provide a system for injection of chlorine for water quality
- Provide emergency power

Upgrading the backup well facilities provides Langley with a more reliable means of meeting water supply needs during fire suppression operations. The ability to rapidly suppress major fires could greatly limit the destruction of large portions of the city. A cost benefit analysis will be conducted prior to grant application.

Lead Agency: Langley Public works  
Funding Source: Pre Disaster Mitigation Program and other grant sources  
Time-Line: Short term—begin shortly after receiving funding; completion expected to take less than 1 year