

## ***Olympic View Water and Sewer District***

Olympic View Water and Sewer District provides potable water and treats waste water/effluent. It serves a population of approximately 15,000 people, or 6,680 residential customer equivalents. It covers 3.9 square miles (about 2,500 acres) and includes the Town of Woodway and part of the City of Edmonds as well as areas of unincorporated Snohomish County.<sup>1</sup>

To provide services, the District owns and maintains 206,000 feet (39 miles) of sewer mains and 338,000 feet (64 miles) of water mains.

Olympic View Water and Sewer District purchases most of their supply from Seattle Water. Seattle's water originates in two watersheds: the Cedar River Watershed (located between Snoqualmie Falls and the Cascade foothills) and the South Fork Tolt River Watershed (located in the Cascade foothills). Between the two sources, approximately 1.3 million people are supplied with water on a daily basis.<sup>2</sup> In addition, approximately 40% of Olympic View Water and Sewer District's annual demand is supplied by a treated surface source located in the Town of Woodway.

To provide water and sewer services, the District employs about people.<sup>3</sup>

***Annex M identifies critical structures for Olympic View Water and Sewer District.***

### **Hazard Identification**

Olympic View Water and Sewer District is more vulnerable to some hazards than others. At the same time, the District is part of the region's critical facilities. Not only will it cause significant problems if water and sewer services are disrupted, but loss of water service could also be a safety issue with loss of fire flow.

Due to the importance of the District's function in the community, Olympic View Water and Sewer District identified key areas of operation within the organization and rated the natural hazards according to these segments. They are: collection system; distribution system; well and springs; office and shop; lift stations; treatment plant; booster pump stations; 28th Street equipment storage; rolling stock; and storage reservoirs.

Based on past experience, regional information, and emergency response plans, the District rates its risk of natural hazards as follows:

### *Collection System*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	56
FLOOD (100-YEAR)	44
LANDSLIDE	32
SEVERE STORM	20
TSUNAMI & SEICHE	10
VOLCANO	10
WILDLAND URBAN INTERFACE FIRE	20

### *Distribution System*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	56
FLOOD (100-YEAR)	32
LANDSLIDE	24
SEVERE STORM	20
TSUNAMI & SEICHE	10
VOLCANO	10
WILDLAND URBAN INTERFACE FIRE	20

### *Well*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	20
FLOOD (100-YEAR)	20
LANDSLIDE	20
SEVERE STORM	20
TSUNAMI & SEICHE	10
VOLCANO	10
WILDLAND URBAN INTERFACE FIRE	20

*Office and Shop*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	48
FLOOD (100-YEAR)	20
LANDSLIDE	20
SEVERE STORM	20
TSUNAMI & SEICHE	10
VOLCANO	10
WILDLAND URBAN INTERFACE FIRE	20

*Lift Stations*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	56
FLOOD (100-YEAR)	44
LANDSLIDE	20
SEVERE STORM	32
TSUNAMI & SEICHE	10
VOLCANO	10
WILDLAND URBAN INTERFACE FIRE	20

*Treatment Plant*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	48
FLOOD (100-YEAR)	20
LANDSLIDE	44
SEVERE STORM	48
TSUNAMI & SEICHE	10
VOLCANO	18
WILDLAND URBAN INTERFACE FIRE	20

### *Booster Pump Stations*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	48
FLOOD (100-YEAR)	20
LANDSLIDE	20
SEVERE STORM	36
TSUNAMI & SEICHE	10
VOLCANO	18
WILDLAND URBAN INTERFACE FIRE	20

### *28th Street Equipment Storage*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	32
FLOOD (100-YEAR)	20
LANDSLIDE	20
SEVERE STORM	24
TSUNAMI & SEICHE	10
VOLCANO	12
WILDLAND URBAN INTERFACE FIRE	20

### *Rolling Stock*

HAZARD	RATING (OUT OF 80 POSSIBLE)
DROUGHT	20
EARTHQUAKE	20
FLOOD (100-YEAR)	20
LANDSLIDE	20
SEVERE STORM	20
TSUNAMI & SEICHE	10
VOLCANO	10
WILDLAND URBAN INTERFACE FIRE	20

## Storage Reservoirs

HAZARD	RATING (OUT OF 80 POSSIBLE)
<b>DROUGHT</b>	<b>20</b>
<b>EARTHQUAKE</b>	<b>56</b>
<b>FLOOD (100-YEAR)</b>	<b>20</b>
<b>LANDSLIDE</b>	<b>20</b>
<b>SEVERE STORM</b>	<b>20</b>
<b>TSUNAMI &amp; SEICHE</b>	<b>10</b>
<b>VOLCANO</b>	<b>10</b>
<b>WILDLAND URBAN INTERFACE FIRE</b>	<b>20</b>

### **Drought**

Rating: 20

Olympic View Water and Sewer District rated drought consistently at 20 points out of a possible 80 across all segments. The District obtains its water supply from Seattle Water who, in turn, gets the water from two very stable sources: the Cedar River Watershed and the South Fork Tolt River Watershed.

Drought in this area is considered likely to occur every 25 years or less. Even with fairly regular occurrences, the droughts have historically been of short duration and last for less than one year.

Drought is considered a *MODERATELY-LOW* risk.

### **Earthquake**

Rating: 20 - 56

Olympic View Water and Sewer District has identified earthquake as the greatest natural hazard risk.

Earthquake risk varies significantly between Olympic View Water and Sewer District's business sections. The rolling stock (equipment and supplies stored in vehicles) and the District's well are both considered very low risk, and they are rated at 20 points. The 228th Street Equipment Storage facility is at a significantly greater risk, and was scored at a 32.

Infrastructure for the Water District is considered to be very vulnerable. Distribution and collection systems are made up of miles of pipes that may be displaced, damaged, or destroyed by a prolonged or violent

earthquake. Depending on the level of damage sustained, it could take weeks to identify all the breaks, and dig up and replace the damaged pipes. For this reason, Olympic View Water and Sewer District rated these systems at 56 each.

Booster pump stations and lift stations are rated at 48 and 56 respectively. These stations are necessary to move water and effluent through the pipes when the terrain and gravity work against the flow. If these stations are damaged and disabled, some residents may not receive water until repairs are completed. Further, sewage may back up and overflow the system causing public health concerns as well as property, environmental, and economic damages.

The treatment plant hazard rating is identified at 48. If this plant was significantly damaged or put out of commission, it would mean the spring source of supply would be shut down.

The three storage reservoirs are of significant concern as they handle millions of gallons of water. Failure of these structures could cause significant damage to the surrounding area and impact fire fighting capabilities. The reservoirs hazard rating was identified at 56 points.

The risk of earthquake is *SIGNIFICANT*.

## **Flood**

Rating: 20 - 44

Olympic View Water and Sewer District has a range of risks identified with flooding. Those areas with low risk, rated at 20, include: Olympic View Water and Sewer District's well and spring, the office and shop, treatment plant, booster pump stations, the 28th Street equipment storage, rolling stock, and storage reservoirs. These facilities are not located in the 100-year floodplain, nor are they significantly prone to damage from urban flooding.

Collection systems and lift stations hazards are rated at 44. Distribution systems are rated at 32. If any or all of these systems or stations are overwhelmed by flooding, sewage backups will occur. The result will be moderate-to-high damage to property and environment. There is a potential for high economic damage to the collection systems.

Hazards to lift stations are also rated at 44. This has the potential to impact approximately half of the District's customers, and could cause damage to a large number of properties. The environment could experience significant damage, and the area could experience moderate amounts of economic disruption.

Risk varies from site-to-site from *MODERATELY-LOW to MODERATE*.

### **Landslide**

Rating: 20 - 44

Most of the District's buildings are located in areas where they would not be prone to damage from landslides. As a result, most of the facilities are rated at a risk level of "20." The exceptions to this are the collection and distribution systems, and the treatment plant.

The collection and distribution systems are rated at 32 and 24, respectively. Water and sewer pipes go to where the people are. As a result, these pipe systems run throughout the area and may be routed near slide-prone slopes.

The treatment plant is another area of higher risk. It is rated at a score of 44 of a possible 80 risk points.

Overall, risk varies from site-to-site from *MODERATELY-LOW to MODERATE*.

### **Severe Storm**

Rating: 20 - 48

The collection and distribution systems, office and shop, rolling stock, storage reservoirs, and well are all rated at 20 risk points.

The other sections are rated as follows:

- 28<sup>th</sup> Street equipment storage – 24
- Lift station – 32
- Booster pump stations – 36
- Treatment plant – 48

The increased vulnerability for these sections comes, in part, for the need for electricity to operate. If the power supply is interrupted to the lift station, pump stations, or treatment plant, the effluent will back up in the collection system and will not be treated.

Risk varies from *MODERATELY-LOW to MODERATE* with the treatment plan considered to be at the highest level of risk.

## **Tsunami & Seiche**

Rating: 10

While tsunami and seiche are possible for this area, the likelihood is very low. As mentioned in Section II of this document, the north King and south Snohomish Counties area is protected by the islands that lie within Puget Sound. These islands would serve as a barrier and would help break up any tsunamis that might occur in this area.

Seiche, while it is still a possibility, is limited in scope by the size of the body of water and is a relatively rare event, as well.

Even if a tsunami or seiche were to occur in the Puget Sound area, very little of Olympic View Water and Sewer District is located in an area that would be vulnerable to this event. As a result, the risk is evaluated as *VERY LOW*.

## **Volcano**

Rating: 10 - 18

Volcano is considered to be a *VERY LOW* risk for Olympic View Water and Sewer District.

As mentioned in the HIVA section of this document, the most likely impacts to this area from a volcanic eruption would be ashfall and an influx of refugees from those areas nearer the volcano. Each of these has some possibility of affecting the District: the latter from overwhelming the system's capacity, and the former blocking air intakes for equipment, vehicles, and HVAC systems. For this reason, the booster pump stations are rated at 18, the 28th Street equipment storage is at 12, and the rest of the infrastructure is rated at 10.

## **Wildland-Urban Interface Fire**

Rating: 20

Wildland-urban interface fire is another *LOW* risk for Olympic View Water and Sewer District. Pipes are buried and are relatively well-protected from fire even in those areas where this type of fire is prone to occur. The other infrastructure for the District is not considered especially vulnerable because of location: it's not built in heavily wooded or forested areas.

**Table 1: Olympic View Water and Sewer District Hazard Rating Recap**

	<b>Drought</b>	<b>Earthquake</b>	<b>Flood</b>	<b>Landslide</b>	<b>Severe Storm</b>	<b>Tsunami &amp; Seiche</b>	<b>Volcano</b>	<b>Wildland-Urban Interface Fire</b>
<b>228th St. Equipment Storage</b>	20	32	20	20	24	10	12	20
<b>Booster Pump Stations</b>	20	48	20	20	36	10	18	20
<b>Collection System</b>	20	56	44	32	20	10	10	20
<b>Distribution System</b>	20	56	32	24	20	10	10	20
<b>Lift Stations</b>	20	56	44	20	32	10	10	20
<b>Office and Shop</b>	20	48	20	20	20	10	10	20
<b>Rolling Stock</b>	20	20	20	20	20	10	10	20
<b>Storage Reservoirs</b>	20	56	20	20	20	10	10	20
<b>Treatment Plant</b>	20	48	20	44	48	10	18	20
<b>Well</b>	20	20	20	20	20	10	10	20

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## Mitigation

### **Existing and Ongoing Mitigation Activities**

Olympic View Water and Sewer District is taking the following actions in ongoing efforts to mitigate for natural hazards and to maintain public safety.

#### **All Hazards**

- Add 1,000 gallon diesel fuel tank at Maintenance Facility.
- Codes and Plans
  - Sewer and Water Comprehensive Plans
  - Capital Improvement Plan
  - Emergency Response Plan
  - Operations and Maintenance Plan (annual)
  - Capital Budget Plan (annual)
  - District Emergency Plan

#### **Drought**

- Encourage water conservation.
- Educate the public

#### **Earthquake**

- Build to code
- Flexible pipe systems, etc., to best of ability/technology

**Photograph 1: Before below-ground retrofit**



(Source: Olympic View Water and Sewer District)

**Photograph 2: After below-ground retrofit**



*(Source: Olympic View Water and Sewer District)*

**Photograph 3: View of above-ground flexible fitting retrofit**



*(Source: Olympic View Water and Sewer District)*

**Photograph 4: View of above-ground flexible fitting retrofit**



(Source: Olympic View Water and Sewer District)

- Upgrade Forest Glen Lift Station

### **Flood**

- Test/mitigate for leaking into/out of systems
- Maintain against blockages

### **Landslide**

- Build to code (pipe systems and buildings)

### **Severe Storm**

- Build to code
- Ensure trees and brush are kept clear of equipment, etc.
- Back up power supply
- Standby generator at 228<sup>th</sup> Street Booster Station

### **Tsunami and Seiche**

- None at this time

### **Volcano**

- Maintain stock of filters for key vehicles and engine-driven equipment

**Wildland-Urban Interface Fire**

- Keep brush and undergrowth trimmed and maintained.
- Water wisely.

## **Mitigation Action Items**

The Mitigation Plan identifies short- and long-term action items developed through data collection, research, and the public participation process. Mitigation Plan activities may be considered for funding through federal and state grant programs and when other funds are made available through the school budgeting process or the passage of school bonds.

Action items address multi-hazard (MH) or hazard-specific issues. Upon implementation, the coordinating organizations may look to partner organizations for resources and technical assistance.

To help ensure activity implementation, each action item includes several pieces of information in the description. These include:

- *Coordinating Organization*  
The coordinating organization is that which is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation. The coordinating organizations may be local or regional agencies.
- *Timeline*  
Action items include both long- and short-term activities. Each action item includes an estimate of the timeline for implementation. *Short-term* action items (ST) are activities that organizations may implement with existing resources and authorities within one to two years. *Long-term* action items (LT) may require new or additional resources or authorities, and may take between one and five years to implement.
- *Ideas for Implementation*  
Each action item includes ideas for implementation and potential resources.
- *Plan Goals Addressed*  
The plan goals are identified to monitor and evaluate how well the Mitigation Plan is achieving its goals once implementation begins.
- *Benefit-to-Cost Review*  
Olympic View Water and Sewer District has identified a range of mitigation projects to be completed over the next several years. Those projects that are short-term in nature are generally part of the current budget and have relatively “hard” data attached to them.

Longer-term projects do not have the same level of information available at this point in time. This information will be obtained as the projects develop.

For this reason, Olympic View Water and Sewer District is using two different methodologies in the cost-benefit analysis. The *first methodology* allows for the more concrete data to be used and is used for the short- and mid-range projects.

For these mitigation actions, the projects are well-defined and have gone through internal development processes. Estimated costs are specific and generated to current specifications.

A water outage or reduction in water pressure affects the community in a variety of ways. One of these, and one of the most crucial, is the loss or drop in fire flows. Inadequate water supply directly affects the fire departments' ability to suppress fires which, in turn, leads to the potential for loss of life and/or property. With these facts in mind, the project benefits are predicated on the following assumptions:

- A complete water outage of 24 hours or longer = \$10 million value
- A reduction in water pressure of more than 24 hours = \$5 million value
- A complete water outage or reduction in water pressure of less than 24 hours = \$1 million value

Other potential damages not relating to fire include:

- A reduction in service that causes environmental damage = \$1 million value
- A reduction in service impacting homes and businesses, but not causing permanent or long-term damage = \$100,000 value

To obtain the ranking, the benefit value is then divided by the associated costs to obtain the cost-benefit ratio.

The *second methodology* uses a more general evaluation process. The steps associated with the long-term projects are as follows:

1. Olympic View Water and Sewer District rates the project cost as "high," "medium," or "low" in relation to budget and previous projects, and each rating is assigned a numerical value.
2. The Water District then rates the project outcome as "low," "medium," or "high," and each of these ratings is assigned a numerical value.

3. Add the two values, and the total provides the cost-benefit and the priority.

Example:

If a project has a *medium approximate cost*, and is considered to be highly effective, the boxes would be marked as shown below.

Approx Cost	+	Effectiveness	=	Cost-to-Benefit Review
<input type="checkbox"/> 1 – High		<input type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium		<input type="checkbox"/> 2 – Medium		<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low		<input checked="" type="checkbox"/> 3 – High		<input type="checkbox"/> 4
				<input checked="" type="checkbox"/> 5
				<input type="checkbox"/> 6 – Highest

- **Priority**  
Olympic View Water and Sewer District further identifies priorities as 1, 2 or 3. While the District looks first to the Cost-to-Benefit Review to set priorities, other issues also play a part in setting final priority.

Definitions are as follows:

- “1” – Highest priority. Considered to be a key or important project. Funding sources and timeline for implementation are identified.
- “2” – Middle priority. Either a key priority but without identified funding sources, or the project is funded but considered to be of a lower value.
- “3” – Lowest priority. Not a key project, and no funding sources are identified at this time.

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## MULTI-HAZARD Mitigation Actions (MH)

None identified at this time.

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## DROUGHT Mitigation Actions (D)

### OV-01-D-ST: Provide water conservation information to consumers.

#### Ideas for Implementation:

- Identify existing resources for education materials and make these materials available to consumers.
- Provide watering schedule or cycle to consumers.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations; *Consultants; Contractors*

**Estimated Price:** \$1,000

**Funding Source:** General fund

**Timeline:** Ongoing

**Plan Goals Addressed:** Facilitate Continuity & Recovery; Protect Natural Systems

**Benefit-to-Cost Review:** 3

**Priority:** 2

Approx Cost	+	Effectiveness	=	Priority / Cost-to Benefit Review
<input type="checkbox"/> 1 – High		<input checked="" type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium		<input type="checkbox"/> 2 – Medium		<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low		<input type="checkbox"/> 3 – High		<input checked="" type="checkbox"/> 4
				<input type="checkbox"/> 5
				<input type="checkbox"/> 6 – Highest

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## EARTHQUAKE Mitigation Actions (E)

**OV-02-E-ST: Build new District Office to meet current earthquake and building codes.**

### Ideas for Implementation:

- Obtain Land Use Authority
- Complete design and specifications.
- Obtain Building Permits
- Complete construction.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
*Consultants; Contractors*

**Estimated Price:** \$8,500,000

**Funding Source:** Revenue Bond Sales

**Timeline:** 3 years

**Plan Goals Addressed:** Protect Life & Property; Facilitate Continuity & Recovery; Provide for Emergency & Critical Services

**Benefit-to-Cost Review:** 2

**Priority:** 2

Approx Cost + Effectiveness = Priority / Cost-to Benefit Review

1 – High       1 – Low       2 – Lowest

2 – Medium       2 – Medium       3

3 – Low       3 – High       4

5

6 – Highest

**OV-03-E-ST: Install flexible joints at all pipe-structure penetrations.**

**Ideas for Implementation:**

- Identify all pipe-building penetrations.
- Add identified projects to CIP.
- Establish budget and obtain funding.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
*Consultants*

**Estimated Price:** To be determined

**Funding Source:** To be determined

**Timeline:** 3 years

**Plan Goals Addressed:** Protect Life & Property; Provide for Emergency & Critical Services; Facilitate Continuity & Recovery

**Benefit-to-Cost Review:** 4

**Priority:** 2

Approx Cost + Effectiveness = Priority / Cost-to Benefit Review

<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

**OV-04-E-LT: Make seismic upgrades to reservoirs.**

**Ideas for Implementation:**

- Install automatic earthquake valves at all reservoirs.
- Upgrade reservoirs to current earthquake codes.
- Establish budget and obtain funding.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
*Consultants*

**Estimated Price:** To be determined

**Funding Source:** Grants

**Timeline:** 5 years

**Plan Goals Addressed:** Provide for Emergency & Critical Services; Facilitate Continuity & Recovery

**Benefit-to-Cost Review:** 4

**Priority:** 3

Approx Cost + Effectiveness = Priority / Cost-to Benefit Review

<input checked="" type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input checked="" type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

**OV-05-E-OT: Conduct a structural evaluation of all District structures to determine appropriate earthquake mitigation measures.**

**Ideas for Implementation:**

- Establish study criteria, budgeting, and funding source.
- Select consultant.
- Conduct study.
- Evaluate results and incorporate into budget and CIP as appropriate.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
*Consultant*

**Estimated Price:** To be determined (medium cost)

**Funding Source:** To be determined

**Timeline:** 5 years

**Plan Goals Addressed:** Protect Live & Property; Provide for Emergency & Critical Services; Facilitate Continuity & Recovery

**Benefit-to-Cost Review:** 4

**Priority:** 3

<u>Approx Cost</u>	<u>+</u>	<u>Effectiveness</u>	<u>=</u>	<u>Priority / Cost-to Benefit Review</u>
<input type="checkbox"/> 1 – High		<input type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium		<input checked="" type="checkbox"/> 2 – Medium		<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low		<input type="checkbox"/> 3 – High		<input checked="" type="checkbox"/> 4
				<input type="checkbox"/> 5
				<input type="checkbox"/> 6 – Highest

**FLOOD MITIGATION ACTIONS (F)**

*None at this time.*

**LANDSLIDE Mitigation Actions (L)**

**OV-06-L-LT: Conduct a Landslide Vulnerability Study of the District to determine the location of slide areas and the probability of slides.**

**Ideas for Implementation:**

- Establish study criteria, budgeting, and funding source.
- Select consultant.
- Conduct study.
- Evaluate results and incorporate into planning documents as appropriate.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
*Consultant*

**Estimated Price:** Grants

**Funding Source:** To be determined

**Timeline:** 5 years

**Plan Goals Addressed:** Protect Live & Property; Provide for Emergency & Critical Services; Facilitate Continuity & Recovery

**Benefit-to-Cost Review:** 4

**Priority:** 3

<u>Approx Cost</u>	<u>+</u>	<u>Effectiveness</u>	<u>=</u>	<u>Priority / Cost-to Benefit Review</u>
<input type="checkbox"/> 1 – High		<input type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium		<input checked="" type="checkbox"/> 2 – Medium		<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low		<input type="checkbox"/> 3 – High		<input checked="" type="checkbox"/> 4
				<input type="checkbox"/> 5
				<input type="checkbox"/> 6 – Highest

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**OV-07-L-LT: Replace pipelines in landslide-prone areas with restrained joint pipelines.**

**Ideas for Implementation:**

- Identify landside-prone areas. (See LT-01-L-OV, above.)
- Establish priority list, budget and funding source.
- Select consultant.
- Design and construct pipelines.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
*Consultant*

**Estimated Price:** To be determined

**Funding Source:** To be determined

**Timeline:** 5 years

**Plan Goals Addressed:** Protect Live & Property; Provide for Emergency & Critical Services; Facilitate Continuity & Recovery

**Benefit-to-Cost Review:** 4

**Priority:** 3

<u>Approx Cost +</u>	<u>Effectiveness</u>	<u>= Priority / Cost-to Benefit Review</u>
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

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**OV-08-S-LT: Develop and implement a policy that all future manhole construction will include a lid seal.**

Ideas for implementation:

- Establish the policy.

**Coordinating Organization:** Olympic View Executive; Olympic View Management  
**Estimated Price:** To be determined (low cost)  
**Funding Source:** To be determined  
**Timeline:** 5 years  
**Plan Goals Addressed:** Protect Life & Property; Facilitate Continuity & Recovery  
**Benefit-to-Cost Review:** 5  
**Priority:** 3

<u>Approx Cost + Effectiveness = Priority / Cost-to Benefit Review</u>		
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input type="checkbox"/> 4
		<input checked="" type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

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**OV-09-S-LT: Conduct an infiltration study to determine areas of excessive infiltration.**

Ideas for implementation:

- Establish the study criteria.
- Establish a budget.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
**Estimated Price:** To be determined (medium cost)  
**Funding Source:** To be determined  
**Timeline:** 5 years  
**Plan Goals Addressed:** Protect Life & Property; Facilitate Continuity & Recovery  
**Benefit-to-Cost Review:** 4  
**Priority:** 3

Approx Cost + Effectiveness = Priority / Cost-to Benefit Review

<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

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**TSUNAMI AND SEICHE MITIGATION ACTION ITEMS (T)**

*No actions identified at this time.*

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## VOLCANO MITIGATION ACTIONS (V)

### **OV-10-V-LT: Add air intake filters at all unfiltered facility HVAC forced air intakes.**

Ideas for implementation:

- Evaluate facilities and identify unfiltered HVAC intakes.
- Include upgrades in District Capital Improvement Plan (CIP).
- Budget for capital facilities equipment upgrades.

**Coordinating Organization:** Olympic View Management; Olympic View Operations  
**Estimated Price:** To be determined (low cost)  
**Funding Source:** Capital Fund  
**Timeline:** 5 years  
**Plan Goals Addressed:** Facilitate Continuity & Recovery  
**Benefit-to-Cost Review:** 5  
**Priority:** 3

Approx Cost + Effectiveness		=	Priority / Cost-to-Benefit Review
<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low		<input type="checkbox"/> 2 – Lowest
<input type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium		<input type="checkbox"/> 3
<input checked="" type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High		<input type="checkbox"/> 4
			<input checked="" type="checkbox"/> 5
			<input type="checkbox"/> 6 – Highest

**WILDLAND-URBAN INTERFACE FIRE Mitigation Actions (W)**

**OV-11-W-LT: Install an automatic fire protection system at Woodway Booster Station.**

**Ideas for Implementation:**

- Establish a budget and obtain funding source.
- Develop project design and specifications.
- Install and test system.

**Coordinating Organization:** Olympic View Executive; Olympic View Management; Olympic View Operations  
*Consultant*

**Estimated Price:** To be determined (medium cost)

**Funding Source:** To be determined

**Timeline:** 5 years

**Plan Goals Addressed:** Protect Live & Property; Provide for Emergency & Critical Services; Facilitate Continuity & Recovery

**Benefit-to-Cost Review:** 4

**Priority:** 3

Approx Cost + Effectiveness = Priority / Cost-to Benefit Review

<input type="checkbox"/> 1 – High	<input type="checkbox"/> 1 – Low	<input type="checkbox"/> 2 – Lowest
<input checked="" type="checkbox"/> 2 – Medium	<input checked="" type="checkbox"/> 2 – Medium	<input type="checkbox"/> 3
<input type="checkbox"/> 3 – Low	<input type="checkbox"/> 3 – High	<input checked="" type="checkbox"/> 4
		<input type="checkbox"/> 5
		<input type="checkbox"/> 6 – Highest

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<sup>1</sup> Penhallegon Associates Consulting Engineers, Inc. *Olympic View Water and Sewer District Comprehensive Water System Plan* (2003).

<sup>2</sup> Seattle Public Utilities. *Drinking Water Quality Annual Report* (May 2003).

<sup>3</sup> Employment figures as of 2008.