



**SOUTH TAHOE PUBLIC  
UTILITY DISTRICT  
LOCAL HAZARD  
MITIGATION PLAN**

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## **I. INTRODUCTION**

### **A. DISTRICT PROFILE**

The South Tahoe Public Utility District (STPUD), a public agency chartered in 1950, operates on the south shore of Lake Tahoe in El Dorado County. The District supplies drinking water and provides wastewater collection and treatment for the community of South Lake Tahoe. The District recycles 100% of its wastewater and transports it to Alpine County, where its application benefits agricultural land. Lake Tahoe's seasonal tourism and the large number of part-time residents cause wide fluctuations in both daily water production and wastewater flows.

The District serves water to more than 13,900 homes and businesses, with annual water production at nearly 2.6 billion gallons. The water system includes 14 active wells, 22 water tanks, 15 booster stations, and 370 miles of water mainline.

The sewage collection system consists of more than 420 miles of collection lines and 42 lift stations, providing service to more than 17,800 homes and businesses. The wastewater treatment plant capacity is 7.7 million gallons per day. The design and operation of the wastewater treatment plant makes it possible to achieve water quality that allows water and biosolids recycling. Each year the plant treats and exports more than 1.6 billion gallons of recycled water that meets high reuse standards. Under provisions of the 1968 Porter-Cologne Water Quality Control Act, the District transports the recycled water nearly 26 miles out of the Tahoe Basin to the District-owned and operated Harvey Place Dam and Reservoir. The recycled water facilities, known as Diamond Valley Ranch (DVR,) are located near Woodfords, California in neighboring Alpine County.

The District's state-certified laboratory performs more than 30,000 tests annually to monitor a variety of chemicals and microorganisms in the drinking water, wastewater treatment, and recycled water export systems. These tests on groundwater, surface water, and soils safeguard District customers and the environment.

As part of providing a high-level of customer service, the District diligently alerts and educates customers on matters affecting their water supply and water quality. The District also provides all customers with an annual Consumer Confidence Report (CCR) that easily explains critical drinking water information. The CCR is available on the District's web site at [www.stpud.us](http://www.stpud.us).

#### **Past Development Trends**

The District's unique water distribution system is an amalgam of small private water systems dating back to the late 1940s. The District began acquiring these private water companies in the 1970s after the passage of the Clean Water Act, when many of these companies sought to sell their systems instead of complying with the new, costly regulations. In addition to regulatory challenges, most of the waterlines in the systems did not meet the District's present standards with regards to size. Smaller waterline size impacts potable water pressure and delivery of fire fighting water.

For the last thirteen years the District has worked diligently on replacing waterlines to improve water quality, quantity, and fire suppression capabilities. While not a legal mandate, waterline projects include fire hydrant installation at 500-foot intervals. The District considers the upsizing of waterlines and the installation of fire hydrants to be a public service for community safety. Since 1994, 8 major waterline projects have taken place. These improvements are a key resource for fire fighters. Contributing to the operational success are three new water wells, three new booster stations, and six new water storage tanks built during that same timeframe.

In total, since 1994 the District has spent more than \$22 million for waterline replacement, \$9 million for new supply wells, \$1.5 million for booster pump stations, and \$5.9 million for water tank replacement or rehabilitation. During the past fiscal year, District crews or contractors replaced more than 22,000 lineal feet of water lines (complete or in progress) at a cost of over \$5 million. Finally, the District's ten-year capital improvement plan includes another \$21 million for future waterline replacement projects. The District has made waterline replacement and fire flow enhancement a high priority.

Nearly eleven years ago, laboratory tests detected the presence of Methyl Tertiary Butyl Ether (MTBE) in the District's drinking water supply. MTBE is a fuel oxygenate designed to improve air quality by making gasoline combust more completely. It is a suspected carcinogen and imparts a turpentine-like taste and odor to drinking water at incredibly low levels, rendering the water undrinkable. In addition, it is extremely water-soluble and moves very quickly with groundwater. Due to MTBE contamination or threatened contamination, more than one-third of the District's drinking water wells were closed. This resulted in a 36% water production loss. Efforts to restore the lost production have been ongoing since that time.

The District is a leader in MTBE treatment technology. Advanced oxidation MTBE treatment systems were placed at the Arrowhead and Bakersfield Wells in 2002 and 2004, respectively. Both treatment facilities, located in Meyers, are distinctive in being the only MTBE treatment systems approved by California Department of Health Services (DHS) to treat to non-detect levels and then safely return the treated water into the potable water supply.

In addition to wellhead treatment, the District is concurrently pursuing an aggressive drinking water well development program. The Bayview Well, put on line in summer of 2007, is the third new well replacing water production lost to MTBE contamination. The Bayview Well, producing 3,600 gallons of water per minute, is the District's highest producing well. Its strategic location is in the heart of the water distribution system. To accommodate the size of the well, a larger transmission line was also put in service. With completion of this well, the District has nearly returned to pre-MTBE production capability.

Funding for these projects came from the District's landmark lawsuit against the oil companies responsible for the contamination. After successful litigation, the Board of

Directors directed all MTBE settlement funds be used exclusively for MTBE-related projects. Experts expect the MTBE contamination to impact the water system for many years. The remaining MTBE settlement funds are set aside to address the impacts of MTBE plumes reaching additional District wells in the future.

In addition, the Tahoe Restoration Act (TRA) provides federal funds specifically for MTBE studies and clean up. The TRA funding is the result of the District's successful legislative advocacy program. TRA funds, matched by District dollars, paid to destroy four MTBE-contaminated District wells when treatment systems were not cost effective. Well destruction reduces the risk of these defunct wells being a possible conduit for future groundwater contamination.

### **Current Development Trends**

In 2000, the District hired consultants to develop a Master Plan for the recycled water and freshwater facilities in Alpine County. The Master Plan's objective is to provide guidance for the District's recycled water system in regards to operations and regulatory compliance for the next twenty years or more. During the initial development of the Master Plan, the need to obtain additional District property in Alpine County became evident. The property is necessary to provide more operational flexibility. The Master Plan was temporarily put on hold as the District pursued the purchase of 1,443 acres of land in Alpine County, now known as Diamond Valley Ranch. Since completing the purchase in 2006, progress on the Master Plan has resumed. After public input and environmental considerations, the preferred alternative will be chosen to best meet the District's needs for security, reliability, and economy for its freshwater and recycled water programs in Alpine County. Various triggers, such as the loss of existing privately owned recycled water application sites, coupled with higher recycled water flow rates and volumes, will set the priorities for 18 improvement projects resulting from the Master Plan.

During the year, more than \$14 million was invested in infrastructure replacement. To further enhance the infrastructure planning process, the District is using asset management technology. This database allows the District to predict asset failure and establishes optimal replacement schedules to achieve service goals. An active grant-seeking program is also in place to bring in additional resources for both infrastructure and operations. In fiscal year 2007, \$3.7 million in new grants were awarded to the District for future projects and programs.

Careful stewardship of financial resources, along with a focus on long-term financial planning, provides the District with a firm financial base. The District has shown its financial abilities in capably responding to the huge expense associated with the MTBE problems and responsibly investing in infrastructure replacement. The Board of Directors' policies carefully coordinate grant funding, reasonable rate increases, and prudent borrowing to meet the District's mission.

## **B. BACKGROUND**

Natural hazards, such as floods, landslides, and hurricanes are a part of the world around us. Their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. However, through *hazard mitigation planning*, we can control what comes afterward. By minimizing the impact of natural hazards upon our built environment, we can prevent such events from resulting in disasters.

“Hazard mitigation” is simply a technical term for reducing risks to people and property from natural hazards. It includes both structural measures, such as protecting buildings and infrastructure from the forces of wind and water, and non-structural measures, such as natural resource protection and wise floodplain management. These activities can target existing development or seek to protect future development by avoiding any new hazardous construction.

The easiest way a community can get serious about hazard mitigation is through the development and adoption of a local **hazard mitigation plan**. A mitigation plan will ensure that measures to reduce the present and future vulnerability of a community are thoroughly considered before, during, and after the next disaster strikes.

Mitigation planning has the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of mitigation is that current dollars invested in mitigation practices will significantly reduce the demand for future dollars by lessening the amount needed for emergency recovery, repair, and reconstruction.

Both the State of California and the U.S. Congress made the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for mitigation grant funding. Communities with an adopted plan will therefore become “pre-positioned” and more apt to receive any available mitigation funds. “Local government” has been defined by the Federal Emergency Management Administration (FEMA) to include counties, cities, school districts, special districts, Indian tribes, and other small and large governmental entities.

The South Tahoe Public Utility District is located in a region of California that is particularly vulnerable to the effects of a range of natural hazards. These hazards threaten the life and safety of District employees and local residents, and have the potential to damage or destroy both public and private property. The District has, in fact, suffered disaster losses in years past that resulted in significant property damage.

The South Tahoe Public Utility District Local Hazard Mitigation Plan satisfies the federal legislation, The Disaster Mitigation Act of 2000, and the requirement for local governments to formulate and enact a pre-disaster mitigation program in order “to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazard, and to establish a coordinated process to take advantage of the plan, taking advantage of a wide range of resources.” (44 CFR, sec. 201.1)

The District has the option to file a stand alone plan or an addendum to El Dorado County’s Plan. The South Tahoe Public Utility District staff has chosen to prepare the LHMP as an addendum to the El Dorado County Plan.

**C. PURPOSE**

The purpose of this Local Hazard Mitigation Plan is:

- To protect life, safety and property by reducing the potential for future damages and economic losses that result from natural hazards;
- To qualify for additional grant funding, in both the pre-disaster and post-disaster environment;
- To speed recovery and redevelopment following future disaster events;
- To demonstrate a firm commitment to hazard mitigation principles; and
- To comply with both state and federal legislative requirements for local hazard mitigation plans.

**D. PARTICIPANTS IN THE PLANNING PROCESS**

The participants in the development of this Local Hazard Mitigation Plan included the persons listed in the following table.

<b>Name</b>	<b>Job Title</b>
Richard H. Solbrig	General Manager
Paul Sciuto	Assistant General Manager
Randy Curtis	Manager of Field Operations
Mary Alsbury	Computer Systems Tech II
Ivo Bergsohn	Hydro-Geologist
Hal Bird	Land Application Manager
Linda Brown	Purchasing Agent
Dennis Cocking	District Information Officer
Bill Frye	Information Systems Administrator
Jim Hoggatt	Construction Manager/Engineer
Nancy Hussmann	Director of Human Resources
Ross Johnson	Manager of Plant Operations
Jeff Lee	Operations Supervisor
Larry Norton	Electrical/Instrumentation Tech
Jeff Penner	Pump Station Operator II
Glenn Roderick	Pump Station Operator II
Rhonda McFarlane	Chief Financial Officer
Kathy Sharp	Executive Services Manager
Carol Swain	Information Systems Manager
John Thiel	Senior Engineer
Christina Dingman	Engineer

## **E. DESCRIPTION OF THE PLANNING PROCESS**

The planning process began in 1999 with natural hazard mitigation plan meetings with Department Managers. The purpose of the meetings was to identify plan participants and stakeholders, and to develop an approach for researching, writing, and implementing an effective natural hazard mitigation strategy for the South Tahoe Public Utility District. Natural hazards that could potentially affect District facilities, staff, and infrastructure were identified and analyzed. Data Tables assessing the hazards and providing a vulnerability analysis were created and over the next 3 years were circulated amongst plan participants. These tables allowed for input by the concerned parties while surveying the plan participants about their specific natural hazard concerns. In addition, site visitations were scheduled with each plan participant to inventory assets and estimate potential losses.

Concurrently, District staff was also involved in the development of the Alpine County Local Hazard Mitigation Plan, completed and adopted in 2004. This plan includes objectives and mitigation action items specific to the wastewater distribution system located in Alpine County. As a part of this process, community meetings and public meetings via the Alpine County Board of Supervisors were held for input regarding the development of mitigation objectives. A full description of this process is included in the Alpine County LHMP. The District sent staff to Alpine County to attend these public meetings, where they assisted in the development of the plan and gained valuable insight into hazard mitigation planning and the creation of mitigation objectives.

The next stage of the planning process for STPUD was the development of mitigation projects for the identified hazards for each department. Mitigation goals were formulated and objectives and actions were identified for each natural hazard. In 2005, development of the actual Hazard Mitigation Plan Document began. Bi-monthly meetings were held with the Maintenance, Operations, and Engineering departments where the plan was discussed, developed, and updated.

In July of 2008, the information and input gathered over the prior years was assembled into the South Tahoe Public Utility District's Local Hazard Mitigation Plan. At this time, a draft of the plan with all current revisions was made available for public input. The STPUD Board of Supervisors also held a public hearing for comments on the draft LHMP. Although there were no written or verbal comments received from the public, the Board offered several suggestions and comments that were incorporated into the final plan.





## II. HAZARD IDENTIFICATION AND ANALYSIS

The South Tahoe Public Utility District has identified several hazards that are examined and addressed within this Hazard Mitigation Plan. These include: wildland fires, thunderstorms, flooding, drought, landslide, avalanche, high winds, severe winter storms, and earthquakes. In addition, several human and technological hazards have been identified which may impact District operations. The following is the hazard identification and risk assessment for these hazards.

### A. NATURAL HAZARDS

**Wildland fires:** Wildland fire is one of the most dangerous natural disaster threats in the Lake Tahoe Basin. Regardless of the seasonal environmental variables that act as indicators of wildland fire potential, most wildland fire events are caused by human actions. Whether the ignition source is a discarded cigarette, an unattended campfire, or an act of arson, it is people who have the greatest impact on and control over the number of wildland fires in a fire season. Mother Nature can also be responsible for igniting wildland fires. Lightning is an especially dangerous element during the dry summer season.

**Hazard Assessment:** Wildland fire danger is a seasonal hazard and provides some measures of awareness and predictability to the hazard. The threat of wildland fire increases as winter snowpack melts, summer temperatures rise, and forest fuels become dry and susceptible to fire. These fires can have devastating effects that are essentially measured in terms of how much area is burned in the fire.

The District's facilities and infrastructure are at risk due to the fire load and terrain setting. A wildfire storm could potentially destroy power facilities, interfere with water delivery & storage, create water contamination, cause environmental damage, and cause potential injury and/or death to staff and the public. In summer of 2007, the Angora fire occurred in the Lake Tahoe Basin, burning approximately 3,100 acres, 242 residences, and 67 commercial structures. The District suffered minor, but costly, losses as a result of damage caused by the Angora fire to two structures, the Forest Mountain Tank and Pump Station.

**Severe Storms:** The climate of the Lake Tahoe Basin is conducive to severe storm weather events, which can happen at any time of the year. These severe weather events can be broken down into two categories:

- 1) Severe Thunderstorms
- 2) Severe Winter Storms

**Severe Thunderstorms:** During the summer months, climatic factors combine to promote the development of thunderstorms. As heated air from lower elevations rises and rapidly cools, intense thunderstorm cells can develop in some of the Lake Tahoe Basin's high elevation landscape.

**Severe Winter Storms:** A winter storm is an event in which the dominant varieties of precipitation are forms that only occur at cold temperatures, such as snow or sleet, or a rainstorm where ground temperatures are cold enough to allow ice to form, causing an ice storm. Cold moisture-laden air masses are carried from the Gulf of Alaska southward with the Westerlies. Following the storm track, this moist air encounters the Sierra Nevada, becomes unstable as it is forced over this natural barrier, and provides large amounts of precipitation before migrating eastward. In the winter months, heavy snows might be the result, with strong winds accompanying the precipitation.

**Hazard Assessment:** Severe storms can be quite dangerous. Severe thunderstorms introduce natural hazards of lightening, hail stones, and flooding. Electricity can be interrupted by lightening strikes, property damage can occur if hail stones reach a large diameter, and flooding can occur with particularly intense or prolonged rain events associated with the thunderhead.

Electrical power outages happen with most extreme weather events. Power outages could cause temporary interruptions to the District's water supply. A 6 inch snowstorm can make unplowed roads impassible, and it is possible for roofs to collapse due to the weight of the snow load. Standing trees and power lines can also be brought down by the weight of the snow, especially if it is wet or very dense. Even a few inches of dry snow can form drifts many feet high under windy conditions.

Although snowstorms are usually considered less dangerous than ice storms, the snow brings secondary dangers. Mountain snowstorms can produce large amounts of snow in a short time period, as well as cornices and avalanches. In 1987, a heavy snow load collapsed a covered reservoir owned by the District, threatening the domestic water supply in the Stateline zone.

An additional danger, following a snowy winter, is spring flooding if the snow melts suddenly due to a dramatic rise in air temperature or a rain-on-snow event. As a result of large winter storms, the District experienced several rain-on-snow events in 1983, 1986, and 1997, causing partially treated wastewater spills.

An ice storm involves rain, which freezes upon impact. Ice forming on the roads will make them impassible, disrupting travel and making emergency response and repairs difficult. An ice coating one-fourth inch in thickness is heavy enough to damage trees, and overhead wires disrupting power and communication.

**Flooding:** A flood is a temporary overflow of an expanse of water that submerges land, such as from a river or lake. As a result, some of the water flows or sits outside of the normal perimeter of the body of water. Causes can range from abnormal snow melt due to untimely warm weather during the winter, to storm events depositing too much rain on already saturated soil. Floods may cause loss of life, property damage, water supply contamination, and loss of power.

The District's property and facilities are located entirely within the mountainous Sierra Nevada, in El Dorado County and Alpine County. Drainages that course from the Sierra

Nevada traverse through high-relief, deeply-cut river canyons with only occasional level areas that might be termed floodplains. Regardless, tremendous amounts of water can be gravitationally fed through these river canyons; Alpine County has a long history of flood events.

**Hazard Assessment:** The risk of floods in the Lake Tahoe Basin is confined primarily to meadows and marshes, and the areas near waterways. The District has a few low lying pump stations and wells that could be impacted in a flood, and there is the potential that the sewer system could be inundated from storm water leaking into manholes. Most likely, the majority of flood related hazards would occur on District Property in Alpine County. The related hazard assessment and mitigation objectives are outlined in the Alpine County Natural Hazard Mitigation Plan.

**Drought:** A drought is an extended period of months or years when a region experiences a deficiency in its water supply. This occurs when a region receives consistently below average precipitation, either in the form of rain or snow.

**Hazard Assessment:** Drought can have extensive, far-reaching effects within the District. It can have a substantial impact on the ecosystem, tourism and agriculture of the region. The greatest impact of drought to the District is the threat to the water supply. All District water supplies are drawn from groundwater tables. In drought conditions, depth to water tables increases and well production can decrease. In the worst drought conditions, well production can be severely reduced or eliminated.

Drought also initiates concern for other natural hazards. Wildfire potential grows exponentially as drought conditions lengthen in time. Additionally, to a much lesser extent, drought can be responsible for landslide events. Lowered moisture content weakens soil structure characteristics and increases landslide potential.

**Landslides:** Landslides are caused when the stability of a slope changes from a stable to an unstable condition. Natural causes include erosion due to loss of vegetation and soil structure. Weakening of a slope can also occur through saturation by snowmelt, or heavy rains. The potential for this type of landslide increases after a wildfire event. Earthquakes can add loads to barely-stable slopes causing liquefaction and destabilizing of slopes. STPUD has facilities, water, and waste water conveyance systems that have been identified as being in geologically active zones. Additionally, human causes which include earthwork, construction, and forestry activities can alter the shape of a slope, or imposes new loads on an existing slope.

**Hazard Assessment:** Landslides that occur within the District's service area and/or properties are most often experienced as part of a larger, more widespread natural hazard event. Landslides can take place as a result of severe storms, floods, and earthquakes. They can also happen as an aftermath to wildland fires.

The District has several water tanks located on steep hillsides, which could be damaged or destroyed in the event of a major landslide. If electrical lines are compromised within the slide, electrical power can be lost causing momentary interruptions in District

Services. Water lines and other buried facilities can be put in danger or lost to a landslide as well.

Another danger is the potential for a land or mudslide due to a malfunction in the District-operated ditch system in Alpine County, which is used for the transportation of fresh water to Indian Creek Reservoir. Recently, the District-operated Snowshoe Thompson Ditch #1 became clogged with debris and overflowed, causing a mudslide. The slide hit a motel located at the base of the slope and caused extensive and costly structural damage.

**Avalanches:** An avalanche shall refer to any fall, release, or slide of snow in an amount sufficient enough to cause damage to or threaten the safety of people. Avalanches are possible when weak layers of snow within the cumulative seasonal snowpack fail to support the weight of the snow above and collapse. The result causes the overlying snow to break free and flow down hill.

**Hazard Assessment:** The effects of an avalanche are for all intents and purposes confined to the areas within and around the avalanche path. The areas of substantial avalanche danger are clearly known and usually avoided. Thus, few unplanned or damage-causing avalanches occur in places where people or property might be threatened. Still, avalanches can and do happen in the Lake Tahoe Basin and potentially could impact STPUD personnel and/or water and wastewater conveyance systems and roadways, especially in remote areas and in Alpine County. The District also has Water Tanks located on steep hillsides which could be vulnerable to avalanches. A massive avalanche could potentially damage and interrupt service for extended periods of time.

**High Winds:** Significantly high winds can and often do occur at all times of the year in the Lake Tahoe Basin, especially during winter storms and thunderstorms. Falling objects, property damage, downed trees and downed power lines are dangerous risks associated with high winds.

**Hazard Assessment:** High winds pose potential hazards. Power and phone lines may be knocked over and electrical power might be lost. Downed power lines pose a fire and/or electrocution threat. Much of the District's property is located in heavily forested areas and could be easily damaged by uprooted or downed trees and fallen limbs. Uprooted trees and fallen limbs also pose possible hazards to District vehicles and staff.

**Earthquakes:** California has often been associated with geologic events and there are several active and inactive faults within the Lake Tahoe basin. Earthquakes can cause a variety of hazards including damage to buildings and bridges, disruption of communications, gas, electric, water, recycled water, and sewer lines. Earthquakes can also often cause flash floods, fires, landslides, and avalanches.

Lakes in seismically active areas, such as Lake Tahoe, are significantly at risk from tsunami and seiches. Geological evidence indicates that the shores of Lake Tahoe may have been hit by seiches and tsunamis as much as 33 feet high in prehistoric times. Local researchers have called for the risk to be factored into emergency plans for the region.

The University of Reno is actively researching the potential threat of a level 6 or 7 earthquake in the Tahoe basin area. More information is available at the university's website (<http://www.seismo.unr.edu/htdocs/WGB/LakeTahoeTsunami/>) Information and the potential threat to STPUD operations and its customers will be further reviewed.

**Hazard Assessment:** Earthquakes can also initiate other natural hazard events. An earthquake can be the direct cause of landslides, avalanches, and dam failure due to seismic shaking of the ground and fracturing that might accompany any shaking. The damages wrought within an earthquake event can be the indirect cause of other natural hazard events too. Damages resulting from an earthquake might be responsible for igniting wildland fires if fallen power lines ignite or gas lines are ruptured.

The primary concern in assessing earthquake hazard is structural damage from the earthquake event. High magnitude earthquakes would most probably cause widespread structural damage to District property, especially near the epicenter of the seismic activity. Too, areas more susceptible to ground shaking are at a greater risk of damage from earthquakes. In that earthquakes cannot be predicted, all of the structures within STPUD's service area and property are at risk of damage to one degree or another.

In an extreme earthquake, dam failure can become a concern. There are 3 small dams on District property in Alpine County at Harvey Place Reservoir and Indian Creek Reservoir. Although these dams have not been damaged in past earthquakes, it is impossible to measure their success in any future hazard event. If the dam of a reservoir were to be compromised as a result of an earthquake, there would be many resulting ramifications to residents in the resulting path of inundation. Fortunately, Alpine County has few residents and threat to life is minimal. Still tremendous property damage could be anticipated in the event of any dam failure resulting from an earthquake.

**Dam Failure:** Dam Failure is a potential "man-made" natural disaster that has the possibility to impact the District. It is man-made in that the dam itself was constructed through human effort. Without man's effort, no dam would exist and, as such, no dam failure could be contemplated. It is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, dam failure would most probably happen in consequence of another natural disaster such as an earthquake, severe storm, or flood.

**Hazard Assessment:** There are three dams located on land owned by the District in Alpine County: Harvey Place Dam and Harvey Place Auxiliary Dam, which hold back Harvey Place Reservoir, and Indian Creek Dam, which holds back Indian Creek Reservoir. Both of the Harvey Place dams are used to hold treated waste water. If dam failure were to occur, it could result in treated wastewater entering Millich Ditch or Indian Creek (both freshwater channels) and eventually the Carson River, a main source of water for Carson City. There is also the possibility that Diamond Valley Road might be made impassible by mud and debris from a resulting flood.

## **B. HUMAN HAZARDS**

**Contamination:** The uncontrolled distribution of material in a given environment. The hazards to people and the environment from contamination depend on the nature of the contaminant, the level of contamination, and the extent of the spread of contamination.

**Waterborne Disease:** Waterborne diseases are caused by pathogenic microorganisms which are directly transmitted when contaminated drinking water is consumed.

Contaminated drinking water, used in the preparation of food, can be the source of food borne disease through consumption of the same microorganisms.

**Fire/Arson:** Arson is the crime of maliciously, voluntarily, and willfully setting fire to woodlands or to the buildings, or property of others.

**Loss of key Staff:** Loss of critical management decision makers and/or loss of on site personnel necessary to maintain or repair equipment and critical water and sewer systems.

**Fuel Shortage:** An inadequate supply of fuel necessary for emergency response vehicles and back up generators and pumps.

**Terrorism/Sabotage:** The willful destruction or impairment of facilities or equipment necessary for the continued operation of water and sewer systems.

**Canal Failure:** Flooding due to a breach of an embankment or channel allowing the uncontrolled flow of water.

**Chemical Spill:** Chemicals have the ability to react when exposed to other chemicals under certain physical conditions. When chemical reactions are not properly managed, they can create harmful or catastrophic consequences, such as toxic fumes, fires, and explosions. These reactions may result in death and injury to people, damage to physical property, and severe effects on the environment.

**Wastewater Spill:** Uncontrolled discharge of sewage or unprocessed waste causing contamination of drinking water, recreational facilities, and the environment.

## **C. TECHNOLOGICAL HAZARDS**

**Power Outage:** Power failure can be a defect in a power station, damage to a power line or other part of the distribution system, a short circuit, or the overloading of electricity mains.

**Natural Gas Outage:** An unexpected disruption in natural gas supply. Utility services are often jeopardized by natural and man-made disasters. Weather related occurrences can lead to loss of heat, resulting in frozen pipes and safety hazards such as fire and explosion.

**HVAC Failure:** Plumbing & HVAC failures have been the cause of leakages and flooding in numerous buildings. This results in lost time and damage to property, due to failure of boilers, fire water pipes, drainage lines, and can cause associated electric fires. Leakages in plumbing systems are caused by improper assembly of joints, sub-standard fittings, corrosion, pressure surges, traffic loads and non compatible pumping equipment.

**Road Closure:** Inability to respond to and move material, personnel, and supplies where needed.

**Communication Failure:** Inability to communicate with the staff or public regarding safety, and the efficient movement of material, personnel, supplies and equipment.

**SCADA Failure:** Refers to an industrial control system monitoring and coordinating a process. The process can include water treatment and distribution, wastewater collection and treatment, electrical power transmission and distribution, and large communication systems.

**Computer Failure:** Computers are performing more tasks in the office and workplace than ever before. Computer failure can affect the districts ability to maintain control of monitoring equipment. It can also affect communication, information systems, engineering, accounting, purchasing, billing, payables and payroll.



**D. IDENTIFIED ASSETS AND POTENTIAL LOSSES**

The South Tahoe Public Utility Local Hazard Mitigation Plan identifies critical facilities located within the District and the hazards to which these facilities are susceptible. The following table lists the critical facilities and the potential losses that might occur. Insured replacement cost values for structures and contents (as of 2008) are as follows:

<b>Description</b>	<b>Building Appraised Insurable Cash Value</b>	<b>Contents Estimated Replacement Cost</b>
<b>South Tahoe Public Utility Treatment Plant</b>		
Administration Building	12,000,000	4,000,000
Grit Building	567,937	467,028
Headworks Building	906,757	745,401
Emergency Pump Station	625,216	705,167
Furnace Building	2,339,698	806,242
Filter Building	1,972,704	680,433
Secondary Clarifiers	6,749,230	739,214
RAS Building	434,940	529,910
Chlorine Storage Building	181,563	54,658
Maintenance Building #1	219,205	43,336
Maintenance Building #2	427,462	86,600
Maintenance Building #3	153,754	123,742
Maintenance Building #4	138,838	0
Maintenance Building #5	167,615	0
Cold Storage Building	211,651	67,073
Primary Clarifiers	4,498,211	1,022,334
Blower Building	748,557	496,967
Flow Equalization Basin	1,305,817	91,806
Aeration Basins	7,579,188	1,038,187
Ballast Ponds	3,463,862	387,659
Final Pumping Station	434,957	248,457
Emergency Generator Building	125,259	152,602
Emergency Retention Basin - Valve House	31,087	38,664
Emergency Retention Basin	469,702	0
Asphalt Storage	146,612	0
Rectangular Primary Clarifier	1,246,610	622,708
Office Trailers (2)	78,790	20,672
2400 KW Emergency Generator	0	928,063
Utility Treatment Plant - Sludge Storage	394,700	90,000
Utility Treatment Plant - Bio Building	6,108,430	2,000,000
Utility Treatment Plant - Chemical Feed	212,700	77,000
Underground Process Piping - In Plant	1,523,081	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**Pump Stations**

Trout Creek Pump Station	373,741	247,483
Black Bart Lift Station	140,428	147,433
Luther Pass Lift Station	1,188,420	2,492,834
Baldwin Beach Lift Station	140,428	147,433
Taylor Creek Lift Station	140,428	147,433
Kiva Beach Lift Station	140,428	147,433
Camp Richardson Lift Station	140,428	147,433
St. Mortiz Lift Station	140,428	147,433
Tahoe Keys Lift Station	356,166	250,483
Upper Truckee Lift Station	356,076	311,354
Pope Beach Lift Station # 1	118,122	61,871
Pope Beach Lift Station # 2	118,122	61,871
Gardner Mt. Lift Station	941,452	51,680
Bellview Lift Station	140,428	147,433
Al Tahoe Lift Station # 1	355,266	311,354
Al Tahoe Storage Lift Station	414,777	234,953
Bijou Lift Station # 1	173,779	76,497
Bijou Lift Station # 2	593,310	435,096
Beecher Lift Station	140,428	147,433
Stateline Lift Station	140,428	147,433
Johnson Lift Station	356,166	250,483
Venice Lift Station	140,428	147,433
Pioneer Village Lift Station	140,428	147,433
Ski Run Lift Station	296,655	185,613
Ponderosa Lift Station	593,310	247,483
Iroquois Shed	38,846	4,846
Stanford Generator	69,757	9,284
Tallac Lift Station	140,428	147,433
Fallen Leaf Lake Lift Station	296,655	248,483
Fallen Leaf Lake Electric Lift Station # 1	90,367	61,871
Fallen Leaf Lake Electric Lift Station # 2	90,367	61,871
Fallen Leaf Lake Electric Lift Station # 3	90,367	61,871
Fallen Leaf Lake Electric Lift Station # 5	90,367	61,871
Fallen Leaf Lake Electric Lift Station # 6	90,367	61,871
Fallen Leaf Lake Electric Lift Station # 7	90,367	61,871
Fallen Leaf Lake Electric Lift Station # 8	90,367	61,871
Fallen Leaf Lake Electric Lift Station # 9	90,367	61,871
Fallen Leaf Lake Vacuum Valve Station # 3	90,367	61,871
Fallen Leaf Lake Vacuum Valve Station # 4	90,367	61,871
Fallen Leaf Lake Vacuum Valve Station # 5	90,367	61,871
Fallen Leaf Lake Vacuum Valve Station # 6	90,367	61,871
Fallen Leaf Lake Vacuum Valve Station # 7	90,367	61,871
Fallen Leaf Lake Vacuum Valve Station # 8	90,367	61,871

South Tahoe Public Utility District Local Hazard Mitigation Plan

**Water Wells**

Airport Well	181,589	128,884
Al Tahoe Well # 2	272,901	235,047
Al Tahoe Storage Building	33,012	8,762
Blackrock Well # 1 & # 2	165,135	117,555
College Well	327,276	267,018
Elk's Club Well	908,669	350,161
Glenwood Well # 2	143,880	111,972
Helen Well # 1	65,046	52,609
Helen Well # 2	126,335	90,728
Industrial Well # 2	7,945	5,772
Martin Ave Well	148,610	103,311
Mountain View Well	62,923	44,366
South Upper Truckee Wells # 1 & # 2	0	0
Tata Well # 4	5,603	4,123
Paloma Well	189,372	154,658
Sunset Well	20,392	16,505
Bakersfield Well	1,380,296	255,437
Arrowhead Well # 3	1,393,781	258,400
Valhalla Well	199,301	180,437
Chris Ave Well	73,270	75,000

**Booster Stations**

Keller Booster Station	58,307	48,560
David Lane Booster Station	123,278	75,245
Boulder Mt. Booster Station	111,758	86,619
Apache Booster Station	27,262	26,816
Cornelian Booster Station	571,644	150,438
Cold Creek Filter Plant	115,584	113,409
Ralph Booster A	117,546	114,476
Ralph Booster B	56,288	110,367
Cold Creek Booster Station	48,564	47,448
Black Bart Booster Station	8,566	6,083
H Street Booster Station	26,261	18,580
Clement Airstripper	447,696	485,623
Forest Mt Booster Station	401,050	123,742
Flag Pole Booster	157,338	134,056
Airport Booster Station	15,481	12,785

**Steel Water Tanks**

Lookout Water Tank	450,772	0
Keller Water Tank # 1	1,969,932	0
Keller Water Tank # 2	309,672	0
Heavenly Water Tank	569,970	0
Angora Water Tank	133,991	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

Echo View Water Tank	305,732	0
Arrowhead Water Tank	569,970	0
Gardner Mt. Water Tank # 1	305,732	0
Gardner Mt. Water Tank # 2	305,732	0
Country Club Water Tank	306,702	0
Iroquois Water Tank (2)	645,592	0
Iroquois Water Tank # 2	257,740	0
Christmas Valley Water Tank	305,722	0
Cold Creek Water Tank	369,484	0
H Street Water Tank	167,479	0
Ralph Water Tank	305,722	0
Forest Mt. Water Tank	305,722	0
Tata Water Tank	305,722	0
Stateline Water Tank # 1	890,742	0
Stateline Water Tank # 2	569,970	0
Flag Pole Water Tank # 1	305,722	0
Flag Pole Water Tank # 2	305,722	0
Luther Water Tank # 1	569,970	0
Luther Water Tank # 2	369,484	0
Stateline Water Tank - Control Building	59,210	56,000
Arrowhead Water Tank - Valve Building	26,320	25,000

**Waste Storage Facilities**

Fountain Ave. Storage	41,810	10,318
Fountain Shop	78,374	16,501
Fountain Vehicle Storage	40,842	11,359
Tahoe Paradise Offices	135,246	19,602
Tahoe Paradise Storage	66,080	18,576

**Dams**

Harvey Place Dam	13,324,664	0
Harvey Reservoir Outlet	483,516	100,053
Harvey Place Compressor Building	41,742	14,023
Harvey Place Auxiliary Dam	3,927,399	0
Harvey Channel Irrigation Structure	399,740	0
Diamond Ditch	1,971,700	0
Indian Creek Dam	4,009,399	0
Indian Creek Compressor Building	19,452	48,497

**Reservoirs**

Harvey Place Reservoir	150,000	0
Indian Creek Reservoir	1,500,000	0

**Lift Stations**

Flanders Waste Lift Station	89,867	61,871
Taggerts Waste Lift Station	89,867	61,871

**Alpine County**

Ranch House	115,900	11,700
Maintenance Shop	281,700	115,400

<b>Underground Piping Throughout District</b>	0	0
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**TOTAL:** **111,344,581** **29,235,868**

**Ditches** **Acquired** **Book Value**

Dressler on farm Ditch Repair	148,923	91,836
Parshall Flume Ditch	4,745	0
Snowshoe Thompson Ditch # 1	362,363	262,835
Diamond Ditch Culvert	5,792	1,014
Diamond Ditch Concrete Liner	544,265	149,673
Diamond Ditch Improvement	2,896	1,014

Subtotal: 1,068,984 506,371

**Roads** **Acquired** **Book Value**

Harvey Place Road Improvement	23,392	12,086
Alpine County Bldg Road	2,660	0
Diamond Valley Ranch Road	45,401	44,644
Stateline Reservoir Road	36,589	13,111
Keller Tank Road	26,862	8,506
Santa Fe Access Road	1,236,602	972,616

Subtotal: 1,371,506 1,050,963

**Grand Total:** **113,785,070** **30,793,201**

**E. Hazard Assessment and Vulnerability Analysis Tables**

The Hazard and Risk Assessments of this plan have been quantified and scaled in order to recognize which hazards pose the greatest threat to STPUD's operations and to provide an overall assessment of where those threats lie. From these tables, a measure of the identified hazards was calculated. The Hazard Assessment/Vulnerability Analysis Tables provide the foundation from which to build a more refined comprehension and plan of action to mitigate hazardous threats within the district.

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Administration

Administration Building

Date of Analysis: April 16, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	3	12
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	2	6
Landslide	1	3	3	2	6
Flood	3	2	6	3	18
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	3	18
Waterborne Disease	1	3	3	3	9
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	3	12
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	2	12
Wastewater Spill	3	3	9	2	18
<b>Technological Events</b>					
Power Outage	3	3	9	3	27
Natural Gas Outage	2	3	6	2	12
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	3	27
Communication Failure	2	3	6	2	12
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	3	12

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Bijou, Ski Run, and Al Tahoe Force Main

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	0	0
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Booster Stations

Date of Analysis: June 18, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	2	8
Heavy Snow	3	2	6	2	12
Avalanche	1	3	3	2	6
Landslide	1	3	3	2	6
Flood	3	2	6	2	12
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	1	3	3	3	9
Waterborne Disease	1	3	3	3	9
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	2	8
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	1	9
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	1	6
SCADA Failure	2	3	6	1	6
Computer Failure	1	3	3	0	0



South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: District EOC & Operations

1275 Meadow Crest Drive

Date of Analysis: January 2008

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	1	6
Loss of Key Staff	2	2	4	3	12
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill	3	3	9	1	9
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	1	6
HVAC Failure	2	3	6	1	6
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	3	18
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	3	9

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Emergency Retention Basin

Date of Analysis: August 8, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	3	3	9	3	27
Forest Fire	3	2	6	2	12
Severe Storm	2	2	4	1	4
High Winds (70+mph)	3	2	6	1	6
Heavy Snow	2	2	4	2	8
Avalanche	1	3	3	1	3
Landslide	1	2	2	2	4
Flood	1	2	2	2	4
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	0	3	0	0	0
Fire/Arson	2	2	4	2	8
Loss of Key Staff	2	3	6	3	18
Fuel Shortage	0	1	0	0	0
Dam Failure	1	3	3	3	9
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	0	3	0	0	0
Chemical Spill	0	3	0	0	0
Wastewater Spill					
<b>Technological Events</b>					
Power Outage	0	3	0	0	0
Natural Gas Outage	0	3	0	0	0
HVAC Failure	0	3	0	0	0
Millennium Bug	0	3	0	0	0
Road Closure	2	3	6	1	6
Communication Failure	0	3	0	0	0
SCADA Failure	0	3	0	0	0
Computer Virus	0	3	0	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Export System: A-Line

Date of Analysis: April 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	1	3
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	0	0
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Export System: B-Line

Date of Analysis: April 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	1	3
Landslide	1	3	3	2	6
Flood	3	2	6	3	18
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	0	0
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Export System: C-Line

Date of Analysis: April 16, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	1	3
Landslide	1	3	3	2	6
Flood	3	2	6	2	12
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	2	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	0	0
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Fallen Leaf Lake Force Main

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	1	3
Landslide	1	3	3	1	3
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Fallen Leaf Lake Sewage System

Date of Analysis: June 18, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	3	12
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	2	8
Heavy Snow	3	2	6	3	18
Avalanche	1	3	3	3	9
Landslide	1	3	3	3	9
Flood	3	2	6	3	18
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	3	18
Waterborne Disease	1	3	3	3	9
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	2	8
Fuel Shortage	2	2	4	3	12
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	3	27
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	3	27
Communication Failure	2	3	6	3	18
SCADA Failure	2	3	6	3	18
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Finance Division - Accounting

Date of Analysis: April 6, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	1	6
High Winds (70+mph)	3	2	6	1	6
Heavy Snow	3	2	6	1	6
Avalanche	0	3	0	0	0
Landslide	0	3	0	0	0
Flood	1	2	2	1	2
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	2	12
Loss of Key Staff	2	2	4	3	12
Fuel Shortage	2	2	4	1	4
Dam Failure	0	3	0	0	0
Terrorism/Sabotage	2	3	6	1	6
Canal Failure	0	3	0	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill					
<b>Technological Events</b>					
Power Outage	1	3	3	2	6
Natural Gas Outage	1	3	3	1	3
HVAC Failure	2	3	6	1	6
Millennium Bug	1	1	1	1	1
Road Closure	3	3	9	1	9
Communication Failure	1	3	3	3	9
SCADA Failure	0	3	0	0	0
Computer Virus	1	3	3	1	3



South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Gravity Sewers Mainline Side

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	1	6
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	1	3
Landslide	1	3	3	1	3
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	1	6
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill	3	3	9	1	9
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	6	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Gravity Sewers Mainline Trunk

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	1	3
Landslide	1	3	3	1	3
Flood	3	2	6	2	12
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	2	12
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	2	18
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Harvey Channel

Alpine County

Date of Analysis: April 12, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	1	6
Forest Fire	2	2	4	1	4
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	2	6
Landslide	1	3	3	3	9
Flood	3	2	6	3	18
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	1	6
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	3	27
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	1	9
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	0	0
Communication Failure	2	3	6	2	12
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Harvey Place Reservoir

Alpine County

Date of Analysis: April 12, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	1	3
Landslide	1	3	3	1	3
Flood	3	2	6	2	12
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	3	18
Waterborne Disease	1	3	3	2	6
Fire/Arson	2	3	6	2	12
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	1	4
Dam Failure	2	3	6	3	18
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	1	9
Chemical Spill	2	3	6	2	12
Wastewater Spill	3	3	9	3	27
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	1	6
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	2	18
Communication Failure	2	3	6	2	12
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Information Systems

Administration Building

Date of Analysis: April 16, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	18
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	2	12
Loss of Key Staff	2	2	4	3	12
Fuel Shortage	2	2	4	1	4
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	3	27
Natural Gas Outage	2	3	6	1	6
HVAC Failure	2	3	6	1	6
Road Closure	3	3	9	2	18
Communication Failure	2	3	6	3	18
SCADA Failure	2	3	6	1	6
Computer Failure	1	3	3	3	9

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Indian Creek Reservoir

Alpine County

Date of Analysis: April 12, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	1	3
Landslide	1	3	3	1	3
Flood	3	2	6	3	18
Drought	2	1	2	1	2
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	2	12
Waterborne Disease	1	3	3	2	6
Fire/Arson	2	3	6	2	12
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	3	18
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	2	12
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	0	0
Communication Failure	2	3	6	2	12
SCADA Failure	2	3	6	2	12
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Johnson Boulevard Force Main

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	0	0
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	1	6
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Luther Pass Pump Station

Date of Analysis: June 18, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	3	12
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	2	8
Heavy Snow	3	2	6	2	12
Avalanche	1	3	3	2	6
Landslide	1	3	3	0	0
Flood	3	2	6	0	0
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	3	12
Fuel Shortage	2	2	4	3	12
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	2	12
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	1	6
HVAC Failure	2	3	6	1	6
Road Closure	3	3	9	2	18
Communication Failure	2	3	6	2	12
SCADA Failure	2	3	6	2	12
Computer Failure	1	3	3	0	0



South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Maintenance Office and Buildings

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	1	6
Forest Fire	2	2	4	1	4
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	1	6
Waterborne Disease	1	3	3	1	3
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	1	4
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill	3	3	9	1	9
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	2	12
HVAC Failure	2	3	6	1	6
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	1	6
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	1	3

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: On-Farm

Alpine County

Date of Analysis: April 12, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	1	6
Forest Fire	2	2	4	1	4
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	0	0
Landslide	1	3	3	1	3
Flood	3	2	6	3	18
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	1	6
Waterborne Disease	1	3	3	1	3
Fire/Arson	2	3	6	1	6
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	2	12
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	3	27
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	1	9
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	2	18
Communication Failure	2	3	6	2	12
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Phones

Administration Building

Date of Analysis: April 16, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	3	12
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	2	8
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	3	12
Fuel Shortage	2	2	4	1	4
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	3	27
Natural Gas Outage	2	3	6	1	6
HVAC Failure	2	3	6	2	12
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	3	18
SCADA Failure	2	3	6	1	6
Computer Failure	1	3	3	3	9

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Pioneer Village Force Main

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	0	0
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: PRV's

Date of Analysis: June 18, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	0	0
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	2	12
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	2	12
Wastewater Spill	3	3	9	2	18
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	2	18
Communication Failure	2	3	6	1	6
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Purchasing

Administration Building

Date of Analysis: April 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	3	12
Severe Storm	3	2	6	3	18
High Winds (70+mph)	2	2	4	3	12
Heavy Snow	3	2	6	3	18
Avalanche	1	3	3	2	6
Landslide	1	3	3	2	6
Flood	3	2	6	3	18
Drought	2	1	2	1	2
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	1	6
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	2	8
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	2	12
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	1	6
HVAC Failure	2	3	6	1	6
Road Closure	3	3	9	2	18
Communication Failure	2	3	6	3	18
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	1	3

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Sewage Pump Stations

Date of Analysis: June 18, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	3	12
Severe Storm	3	2	6	3	18
High Winds (70+mph)	2	2	4	3	12
Heavy Snow	3	2	6	3	18
Avalanche	1	3	3	1	3
Landslide	1	3	3	1	3
Flood	3	2	6	3	18
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	3	12
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	1	6
Road Closure	3	3	9	3	27
Communication Failure	2	3	6	3	18
SCADA Failure	2	3	6	3	18
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Snowshoe Thompson Ditch No. 1

Alpine County

Date of Analysis: April 12, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	3	18
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	1	3
Landslide	1	3	3	3	9
Flood	3	2	6	3	18
Drought	2	1	2	1	2
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	1	6
Waterborne Disease	1	3	3	1	3
Fire/Arson	2	3	6	2	12
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	3	27
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	2	12
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0



South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Tahoe Keys Force Main

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	1	6
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Tallac Force Main

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	0	0
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Upper Dressler Ditch

Alpine County

Date of Analysis: April 12, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	1	4
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	1	4
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	1	3
Landslide	1	3	3	2	6
Flood	3	2	6	3	18
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	1	6
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	3	27
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	0	0
Communication Failure	2	3	6	1	6
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Upper Truckee Force Main

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	1	6
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	1	3	3	0	0
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	0	0
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	2	12
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Wastewater Treatment Plant

Date of Analysis: August 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	3	3	9	3	27
Forest Fire	3	2	6	2	12
Severe Storm	2	2	4	2	8
High Winds (70+mph)	3	2	6	2	12
Heavy Snow	2	2	4	2	8
Avalanche	1	3	3	1	3
Landslide	1	2	2	1	2
Flood	2	2	4	2	8
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	0	0
Waterborne Disease	2	3	6	0	0
Fire/Arson	2	2	4	2	8
Loss of Key Staff	2	3	6	3	18
Fuel Shortage	2	1	2	1	2
Dam Failure	1	3	3	1	3
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	0	3	0	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill					
<b>Technological Events</b>					
Power Outage	3	3	9	1	9
Natural Gas Outage	3	3	9	1	9
HVAC Failure	2	3	6	1	6
Road Closure	2	3	6	1	6
Communication Failure	2	3	6	1	6
SCADA Failure	2	3	6	1	6
Computer Failure	2	3	6	1	6

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Water Distribution, Primary Lines

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	2	12
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	0	0
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	1	3
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	3	18
Waterborne Disease	2	3	6	3	18
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	3	18
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Water Distribution, Secondary

Date of Analysis: April 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	1	6
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	0	0
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	0	0
Landslide	1	3	3	1	3
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	3	18
Waterborne Disease	2	3	6	3	18
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	3	18
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Water Interties

Date of Analysis: April 19, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	1	6
Forest Fire	2	2	4	0	0
Severe Storm	3	2	6	0	0
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	1	6
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	1	3	3	1	3
Waterborne Disease	1	3	3	1	3
Fire/Arson	0	0	0	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	0	0	0	0	0
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	1	6
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	1	6
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	0	0
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	0	0
SCADA Failure	2	3	6	0	0
Computer Failure	1	3	3	0	0



South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Water Storage Tanks

Date of Analysis: June 18, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	1	4
Severe Storm	3	2	6	0	0
High Winds (70+mph)	2	2	4	0	0
Heavy Snow	3	2	6	0	0
Avalanche	1	3	3	2	6
Landslide	1	3	3	2	6
Flood	3	2	6	0	0
Drought	2	1	2	0	0
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	3	18
Waterborne Disease	2	3	6	3	18
Fire/Arson	2	3	6	0	0
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	1	4
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	0	0
Wastewater Spill	3	3	9	0	0
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	2	3	9	1	9
Communication Failure	2	2	4	1	4
SCADA Failure	2	2	4	1	4
Computer Failure	1	3	3	0	0

South Tahoe Public Utility District Local Hazard Mitigation Plan

**South Tahoe Public Utility District**

Location: Wells

Date of Analysis: June 18, 1999

Reviewed/Updated: December 2008

<b>Hazard Assessment</b>			<b>Vulnerability Analysis</b>		
Hazard Type	Probability of Occurrence	Reaction Factor	Hazard Factor	System Impact	Weight
<b>Natural Events</b>					
Earthquake	2	3	6	3	18
Forest Fire	2	2	4	2	8
Severe Storm	3	2	6	2	12
High Winds (70+mph)	2	2	4	2	8
Heavy Snow	3	2	6	2	12
Avalanche	1	3	3	0	0
Landslide	1	3	3	0	0
Flood	3	2	6	1	6
Drought	2	1	2	1	2
Hurricane	0	2	0	0	0
<b>Man-made Events</b>					
Contamination	2	3	6	3	18
Waterborne Disease	2	3	6	3	18
Fire/Arson	2	3	6	3	18
Loss of Key Staff	2	2	4	1	4
Fuel Shortage	2	2	4	2	8
Dam Failure	2	3	6	0	0
Terrorism/Sabotage	2	3	6	3	18
Canal Failure	3	3	9	0	0
Chemical Spill	2	3	6	2	12
Wastewater Spill	3	3	9	2	18
<b>Technological Events</b>					
Power Outage	3	3	9	2	18
Natural Gas Outage	2	3	6	0	0
HVAC Failure	2	3	6	0	0
Road Closure	3	3	9	1	9
Communication Failure	2	3	6	3	18
SCADA Failure	2	3	6	3	18
Computer Failure	1	3	3	0	0

### **III. STPUD NATURAL HAZARD MITIGATION STRATEGY**

The South Tahoe Public Utility District's Local Hazard Mitigation Plan has identified the hazards, both human and natural, that could impact operations, staff, the public, and/or local residents. It is the intent of this Mitigation Plan to address STPUD's vulnerabilities and identify mitigation strategies.

#### **A. MITIGATION GOALS**

The goals identified in the STPUD Local Hazard Mitigation Plan are to:

- Save lives and protect property.
- Ensure adequate resources for continued operation.
- Accelerate recovery from disasters.
- Enable post-disaster funding.
- Reduce the impact of future disaster events.

The goals listed above are applicable to all hazards identified in this plan. The objectives of South Tahoe Public Utility District's Local Hazard Mitigation Plan have been formulated by these goals. In Section III.C, these objectives are listed and have been arranged to individually address each hazard.

#### **B. PRIORITIZING MITIGATION MEASURES**

In the event of a disaster, we have assessed our facilities and systems and determined a restoration priority list. This list will assist us in prioritizing which facilities/systems will have the greatest impact and allow for the highest level of continued operation.

**District Facilities**

Administration  
Bijou, Ski Run, and Al Tahoe Force Mains  
Booster Stations  
Customer Service Operations  
District EOC & Operations  
Emergency Retention Basin  
Export System A-Line  
Export System B-Line  
Export System C-Line  
Fallen Leaf Lake Force Main  
Fallen Leaf Lake Sewer System  
Finance Division-Accounting  
Fountain Shop  
Gravity Sewer, Mainline Side (laterals)  
Gravity Sewer, Mainline Trunk (mainline down street)  
Harvey Channel  
Harvey Place Reservoir  
Information Systems  
Indian Creek Reservoir  
Johnson Boulevard Force Main  
Luther Pass Pump Station  
Maintenance Office and Buildings  
On-farm System (Alpine County)  
Phones  
Pioneer Village Force Main  
PRV Stations  
Purchasing  
Sewage Pump Stations  
Snowshoe Ditch No. 1 (Alpine County)  
Tahoe Keys Force Main  
Tallac Force Main  
Upper Dressler Ditch  
Upper Truckee Force Main  
Wastewater Treatment Plant  
Water Distribution, Primary Lines (lines going down the street) Water Distribution,  
Secondary Lines (service lines to individual properties)  
Water Interties and Zone Isolation Valves  
Water Storage Tanks  
Wells

**Facilities Restoration Priority List**

**Highest Priority = 1**

**Medium Priority = 2**

**Lowest Priority List = 3**

**Priority 1**

- Water Tanks
- Wells
- Gravity Sewer – Main Line Side
- Gravity Sewer – Main Trunk Line
- Water Distribution – Primary Lines
- Bijou Force Main
- Upper Truckee Force Main
- Tahoe Keys / Al Tahoe Force Main
- Johnson Boulevard Force Main
- Purchasing
- Wastewater Treatment Plant
- Booster Stations
- Sewage Pump Stations
- SCADA System
- Phone System

**Priority 2**

- Maintenance Shop
- Radio Communications Equipment
- Water Distribution – Secondary Lines
- Export System: A-Line
- Export System: B-Line
- Luther Pass Pump Station
- Finance Division / Accounting
- Emergency Retention Basin (ERB)
- Information Systems
- PRV's

**Priority 3**

- Customer Service Operations
- Administration Building
- Water Interties
- Pioneer Village Force Main
- Fallen Leaf Lake Force Main
- Fallen Leaf Lake Sewer System
- Export System: C-Line
- Harvey Place Reservoir
- Diamond Ditch

## C. MITIGATION OBJECTIVES

Following is a list of objectives developed in conjunction with the overall goals of this plan. Each objective involves one or more actions designed to accomplish the objective. The objectives are organized by specific natural and man made hazards and are arranged in order of priority, as identified in the Natural Hazard Rating Table. The highest priority objectives and actions are listed first; the lowest priority objectives and actions listed last.

### **Wildland Fires**

**Objective #1:** Minimize the threat to lives and property posed by the possibility of wildland fire within STPUD boundaries.

**Action 1.1:** Create defensible space by eliminating fuel sources within identified District areas subject to wildland fires. Cut and remove trees and vegetation adjacent to structures.

Timeframe: On-going.

Funding: Funding required.

Staff: STPUD personnel, Contractor, U.S. Forest Service, and affected government agencies.

**Action 1.2:** Install Solar Powered Battery backup at each water tank, pump, and booster station location. Needed to maintain communication and monitor tank levels with Scada system, ensuring that pumps will activate, are running, and water levels remain sufficient for fire suppression in the event that power lines are destroyed.

Timeframe: On-going.

Funding: Funding required.

Staff: STPUD staff, Contractor.

**Action 1.3:** Examine options for burying power lines to/from remote sources as additional power backup.

Timeframe: On-going.

Funding: Funding required.

Staff: STPUD staff, Contractor.

**Action 1.4:** Model fire flows throughout the service area and determine where improvements are needed most.

Timeframe: ongoing

Funding: No funding required at this time.

Staff: STPUD staff.

**Action 1.5:** Improve fire flows by a) increasing water delivery pipe size and b) increasing number of pumps and pump capacity.

Timeframe: On-going

Funding: Funding required.

Staff: STPUD staff, Contractor.

**Action 1.6:** Add new or upsize existing wells, water storage tanks, and hydrants throughout service area to provide fire flow.

Timeframe: On-going

Funding: Funding required.

Staff: STPUD staff, Contractor.

**Action 1.7:** Partner with Fire Safety Council to protect District structures.

Timeframe: On-going.

Funding: No funding required at this time.

Staff: STPUD staff, Fire Safety Council staff.

**Action 1.8:** Determine high risk areas in close proximity to wildlands and improve water supply in those areas.

Timeframe: On-going.

Funding: Funding required.

Staff: STPUD staff.

### **Severe Storms**

**Objective #2:** Minimize storm related damage from all types of severe storms that impact district facilities.

**Action 2.1:** Review snow removal, snow removal equipment, and snow storage and drainage capability. Review backup generator capacity and fuel storage.

Timeframe: 5 years.

Funding: Funding required.

Staff: STPUD staff, Contractor.

**Action 2.2:** Assess existing older structures (including buildings and tanks) for snow load and wind load capacity.

Timeframe: 3 years.

Funding: Funding required.

Staff: Consultant

**Action 2.3:** Assess and remove hazard trees.

Timeframe: 3 years

Funding: Funding required.

Staff: STPUD staff, Contractor.

### **Earthquakes**

**Objective #3:** Minimize the threat to lives and property as a result of a possible earthquake.

**Action 3.1:** Inspect and evaluate all District facilities, including pipes, treatment and pumping structures, roads and dams for seismic stability. Where applicable, upgrade structures to withstand earthquake events.

Timeframe: Ongoing.

Funding: Funding required.

Staff: Outside contract specialists.

**Action 3.2:** Distribute an employee guide on techniques to prepare for an earthquake, currently being developed by Community Council.

Timeframe: 5 years.

Funding: Funding required.

Staff: STPUD staff, Consultant.

**Action 3.3:** Purchase emergency response equipment, such as pumps and hoses, to help improve effectiveness of response.

Timeframe: 5 years.

Funding: Funding required.

Staff: STPUD staff, Consultant.

**Floods / Seiche Wave**

**Objective #4:** Minimize the threat to lives and property posed by the possibility of flood within STPUD jurisdiction or on property in Alpine County.

**Action 4.1:** Review recognized flood-prone areas and match to exposures of personnel, facilities and equipment. Review protection of collection system from I & I.

Timeframe: 1 year.

Funding: No funding required at this time.

Staff: Planning Department.

**Action 4.2:** Build a sufficient inventory of pumps, sandbags and related equipment to ensure an adequate supply to combat erosion during flood events. Develop a quick response team.

Timeframe: Ongoing.

Funding: Funding required.

Staff: To be determined

**Action 4.3:** Establish a safety zone and prepare an evacuation plan in the event of seismic induced tsunami and/or seiche wave activity.

Timeframe: Ongoing.

Funding: Funding required.

Staff: To be determined

**Action 4.4:** Consider structural improvements of those pump stations that are within 45 feet of the maximum lake level to resist wave impacts.

Timeframe: 3 years.

Funding: No funding required at this time.

Staff: STPUD staff, Contractor.

**Landslides**

**Objective #5:** Reduce soil erosion and possible landslide occurrences within STPUD property jurisdiction.

**Action 5.1:** As part of the District Erosion Control Program, inspect road cuts and fills for signs of slope failure. If necessary, stabilize slopes.

Timeframe: On-going.

Funding: Funding may be required.

Staff: Internal work crews.

**Action 5.2:** Identify questionable hillsides. Construct “rock pens” and drill & anchor points, and provide cut and fill techniques for finished slopes at the angle of repose at District facilities.

Timeframe: 3 years.

Funding: Funding required.

Staff: Internal and external support.

**Drought**

**Objective #6:** Minimize the threat to the natural environment and property posed by the possibility of drought.

**Action 6.1:** Develop and distribute a Resident’s guide to water conservation techniques.

Timeframe: Current and on-going.

Funding: Grant Funded.

Staff: Water Conservation Coordinator.



**Action 6.2:** Initiate landscaping rebates, commercial water saving programs, and incentive rebates for customer purchase of water saving devices.

Timeframe: Current and on-going.

Funding: Grant Funded.

Staff: Water Conservation Coordinator.

**Action 6.3:** Improve back-up well capacity.

Timeframe: 3 years

Funding: Funding required.

Staff: STPUD staff.

**Action 6.4:** Investigate expanded use of reclaimed water to mitigate drought impact.

Timeframe: On-going.

Funding: No funding required at this time.

Staff: STPUD staff.

### **Avalanche**

**Objective #7:** To diminish the threat to lives and property posed by the potential for avalanche by developing effective techniques of informing workers and the public on the level of avalanche danger within the STPUD's backcountry regions .

**Action 7.1:** Educate District personnel on cold weather survival, avalanche survival techniques, and travel by skis and snowshoes.

Timeframe: On-going.

Funding: Funding required.

Staff: Search and Rescue employees, cold weather survival school, and ski resort personnel.

**Action 7.2:** Train additional personnel in the safe operation of the Districts Snow Cat vehicles and become a "mutual aid" resource.

Timeframe: On-going.

Funding: Funding required.

Staff: Vendor.

**Action 7.3:** Assess threat to District facilities and install additional protection where appropriate.

Timeframe: On-going

Funding: Funding required

Staff: STPUD staff

### **Security**

**Objective #8:** To protect District infrastructure from security breaches.

**Action 8.1:** Perform a SCADA vulnerability assessment and add upgrades to improve security.

Timeframe: On-going.

Funding: Funding required.

Staff: Consultant.

**Action 8.2:** Perform facility security assessment for 50+ out buildings to include lighting, fencing, CCTV, and intrusion alarms. Install components as time and cost allow for it.

Timeframe: 3-5 years.

Funding: Funding required.

Staff: Contractor.

**ERB Failure/Inundation**

**Objective #9:** Prevent or Mitigate Emergency Retention Basin Failure/Inundation

**Action 9.1:** Conduct engineering analysis to determine what controls will best prevent or mitigate the occurrence of a natural hazard.

Timeframe: 5 years

Funding: Funding required

Staff: Consultant

**Action 9.2:** Install engineering controls as determined in action 9.1.

Timeframe: 5 years

Funding: Funding required

Staff: Contractor

**D. IMPLEMENTING MITIGATION STRATEGIES**

The STPUD Hazard Mitigation Plan is designed to function as an enhancement to preexisting plans, ordinance, rules and regulations.

Some of the mitigating actions are new and are not a part of any preexisting government requirement. The implementation of these action strategies will be contingent upon the necessary approvals from the appropriate governmental agencies. Implementation is also dependant on securing necessary funding from yet to be determined sources. STPUD will seek to secure funding for natural hazard mitigation through a variety of avenues including, but not limited to, consulting the Federal Emergency Management Agency’s website for a comprehensive list of available federal and state natural hazard mitigation grant funding and federal mitigation programs.

We have placed a primary emphasis on implementing actions that provide the highest cost-to-benefit ratio. The greatest natural hazard threat to lives and property in our area is wildland fire. We have placed a high priority on mitigation activities that will reduce the threat of wildland fires in the District and provide the greatest benefit.

**E. PLAN MAINTENANCE**

STPUD’s Local Hazard Mitigation Plan will be evaluated, at a minimum, every year to determine its continued effectiveness.

The annual evaluations of the natural hazard mitigation strategies will be examined to assess the number of projects completed and in progress. Also examined will be their effectiveness in relation to any prevailing land use requirements, and experience gained from dealing with actual events. A mandatory update to STPUD’s Plan will occur every five years in conjunction with the annual plan evaluation process.

Responsibility for organizing all Plan updates and/or reviews will be assigned to the District’s Engineering and Operations Departments. Timing will be coordinated with the

South Tahoe Public Utility District Local Hazard Mitigation Plan

El Dorado County Office of Emergency Services. The need for any plan update in excess of the fixed five-year update period will be determined and assessed by the OES.

South Tahoe Public Utility District is committed to public involvement within this hazard mitigation plan. For all plan review evaluations and updates, a public hearing may be held by the STPUD Board. The hearing will be announced and the public will be asked for comments concerning the plan.

In conjunction with El Dorado County, South Tahoe Public Utility District will strive to continue to develop the STPUD LHMP and utilize it as a capital projects planning tool. It is our goal to help the citizens of Lake Tahoe and Alpine County, and the customers of STPUD, to create a safer place to live, work, and play.

**ATTACHMENT “A”**

DISTRICT BOUNDARY MAP (Next Page)

Plan Submitted by: Ross Johnson, STPUD Plant Manager