



City of Sandy

Natural Hazards Mitigation Plan Addendum

Prepared for
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

In cooperation with

Clackamas County Emergency Management
2200 Kaen Road
Oregon City, OR 97045

Adopted by City Council on January 4, 2010





FEMA

January 13, 2010

Honorable Lynn Peterson,
Chair, Board of County Commissioners
2051 Kaen Road
Oregon City, OR 97045

Dear Chair Peterson:

On October 19, 2007, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) approved the *Clackamas County Natural Hazards Mitigation Plan Update 2007* as a multi-jurisdictional local plan as outlined in 44 CFR Part 201. With approval of this plan, the following entities are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through October 19, 2012:

Clackamas County
City of Estacada
City of Oregon City

City of Canby
City of Johnson City
City of Sandy

City of Damascus
City of Milwaukie
City of West Linn

The list of approved jurisdictions has been updated to include the Cities of Johnson City and Sandy, which have recently adopted the *Clackamas County Natural Hazards Mitigation Plan Update 2007*. To continue eligibility the plan must be reviewed, revised as appropriate, and resubmitted within five years of the original approval date.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our state counterpart, Oregon Emergency Management, which coordinates and administers these efforts for local entities.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Carey".

Mark Carey, Director
Mitigation Division

cc: Dennis Sigrist, Oregon Emergency Management

KM:bb

RESOLUTION NO. 2010-01

A RESOLUTION ADOPTING THE CITY OF SANDY'S REPRESENTATION IN THE CLACKAMAS COUNTY MULTI-JURISDICTION HAZARD MITIGATION PLAN

WHEREAS, the City of Sandy is vulnerable to the human and economic costs of natural, technological and societal disasters, and

WHEREAS, the City Council of the City of Sandy recognizes the importance of reducing or eliminating those vulnerabilities for the overall good and welfare of the community, and

WHEREAS, the City of Sandy has participated in the development of the Clackamas County Multi-Jurisdiction Natural Hazard Mitigation Plan, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities, and

WHEREAS, the City of Sandy's representatives and staff have identified natural hazard risks and prioritized a number of proposed actions and programs needed to mitigate the vulnerabilities of the City of Sandy to the impacts of future disasters, and

WHEREAS, these proposed projects and programs have been incorporated into the Clackamas County Multi-Jurisdiction Natural Hazard Mitigation Plan that has been prepared and promulgated for consideration and implementation by the cities of Clackamas County; NOW THEREFORE

THE COMMON COUNCIL OF THE CITY OF SANDY RESOLVES AS FOLLOWS:

Section 1. The Common Council of the City of Sandy hereby accepts and approves of its section of the Clackamas County Multi-Jurisdiction Hazard Mitigation Plan as a reasonable process to identify and plan for potential hazards in the City of Sandy and Clackamas County,

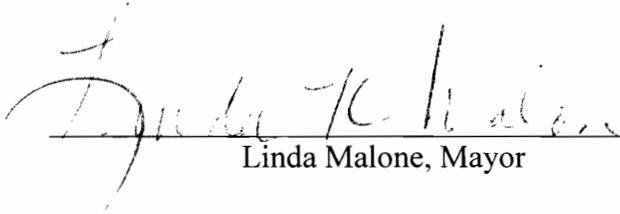
Section 2. The agency personnel of the City of Sandy are requested and instructed to pursue available funding opportunities for implementation of the actions and proposals designated therein,

Section 3. The City of Sandy will, upon receipt of such funding or other necessary resources, seek to implement the mitigation proposals identified by the jurisdiction's Hazard Mitigation Planning Committee, and

Section 4. The City of Sandy will continue to participate in the updating and expansion of the Clackamas County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead, and

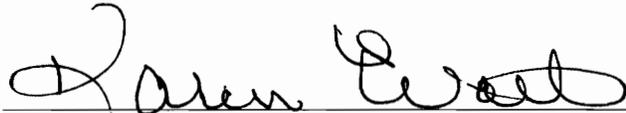
Section 5. The City of Sandy will further seek to encourage the businesses, industries and community groups operating within and/or for the benefit of the City of Sandy to also participate in the updating and expansion of the Clackamas County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead.

PASSED BY THE CITY COUNCIL AND APPROVED BY THE MAYOR, this 4th day of January, 2010.



Linda Malone, Mayor

ATTEST:



Karen Evatt, City Recorder

City of Sandy Natural Hazards Mitigation Plan Addendum

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Overview

What is Natural Hazard Mitigation?

Natural hazard mitigation is defined as permanently reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. Example strategies include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; education and outreach to targeted audiences, such as Spanish speaking residents, or the elderly. Mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government.

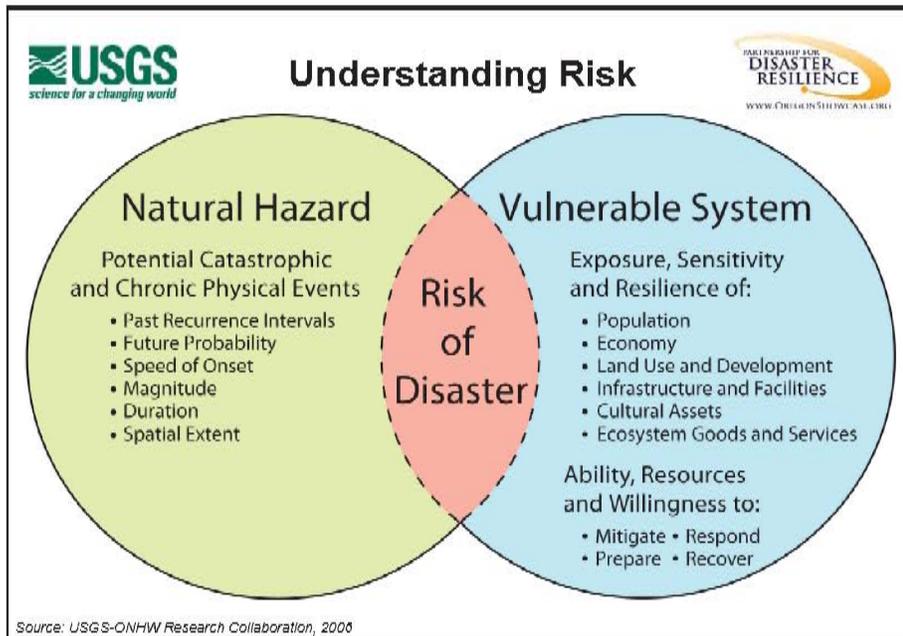
Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects.

Why Develop a Mitigation Plan?

The City of Sandy developed this addendum to the Clackamas County multi-jurisdictional Natural Hazards Mitigation Plan in an effort to reduce future loss of life and damage to property resulting from natural hazards. It is impossible to predict exactly when disasters will occur, or the extent to which they will affect the city. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

The figure below is utilized throughout the plan to illustrate the concepts of risk reduction.

Figure 1 Understanding Riskⁱ



A natural hazard mitigation plan can assist the community in understanding what puts the community at risk. By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capabilities, the City of Sandy can become better equipped to identify and implement actions aimed at reducing the overall risk of hazards.

This plan focuses on the primary natural hazards that could *affect* Sandy, Oregon, which include flood, landslide, wildfire, severe storms, earthquake and volcano. The dramatic increase in the costs associated with natural disasters over the past decades has fostered interest in identifying and implementing effective means of reducing vulnerability. A report submitted to Congress by the National Institute of Building Science’s Multi-hazard Mitigation Council (MMC) highlights that for every dollar spent on mitigation, society can expect an average savings of \$4.ⁱⁱ This addendum to the Clackamas County multi-jurisdictional Natural Hazards Mitigation Plan is intended to assist the City of Sandy in reducing its risk from natural hazards by identifying resources, information, and strategies for risk reduction.

The plan is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the city; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements (44 CFR 201.6) and qualifying for assistance programs. The mitigation plan works in conjunction with other city plans and programs including the city’s Comprehensive Plan, Community Wildfire Protection Plan, Municipal Code, and Stormwater Management Incentive Program as well as the State of Oregon Natural Hazards Mitigation Plan.

The plan provides a set of actions to prepare for and reduce the risks posed by natural hazards through education and outreach programs, the development of partnerships, and the implementation of preventative activities. The actions described in the plan are intended to be implemented through existing plans and programs within the city.

Policy Framework for Natural Hazards in Oregon

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon communities.

Statewide land use planning Goal 7: Areas Subject to Natural Hazards calls for local plans to include inventories, policies and ordinances to guide development in or away from hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards. Through risk identification and the recommendation of risk-reduction actions, this plan aligns with the goals of the jurisdiction's Comprehensive Plan, and helps each jurisdiction meet the requirements of statewide land use planning Goal 7.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include Oregon Emergency Management (OEM), Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

The Disaster Mitigation Act of 2000 (DMA 2000) amended the Robert T. Stafford Disaster Relief and Assistance Act and is the current federal legislation addressing mitigation planning. DMA 2000 is implemented through 44 CFR 201.6. It reinforces the importance of mitigation planning and emphasizes planning for natural hazards before they occur. As such, this Act established the Pre-Disaster Mitigation (PDM) grant program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels, and 44 CFR 201 provides information on the policies and procedures for state and local mitigation planning. Local jurisdictions must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Additionally, mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.

Section 1: Planning Process

1.1 How was the Addendum Developed?

In the fall of 2007, the Oregon Partnership for Disaster Resilience (OPDR / the Partnership) at the University of Oregon's Community Service Center partnered with Oregon Emergency Management, Resource Assistance for Rural Environments (RARE), Clackamas County, and cities within Clackamas County to develop a Hazard Mitigation Grant Program (HMGP) planning grant proposal. The City of Sandy joined the Partnership by signing a memorandum of understanding for this project. FEMA awarded the Partnership with a grant to support the development and update of city addenda in Clackamas County, and Sandy's local planning efforts began in January, 2009. RARE provided a staff person ('RARE Participant') to facilitate and document the city's addendum development process.

Participants in the Planning Process

Representatives from the Sandy Emergency Operations Center Group (SEOC) served as Steering Committee members for the City of Sandy's natural hazards mitigation planning process. Committee members included:

- Chris Alfino, City of Damascus GIS Technician
- Seth Atkinson, City of Sandy Assistant to City Manager
- Carnetta Boyd, Corbett Neighborhood Emergency Response Team
- Craig Brooks, Oregon Trail School District Assistant Maintenance Supervisor
- Rita Ezard, Sandy Action Center Director
- Captain Scott Howland, Sandy Fire District
- Alice Lasher, Sandy Fire Public Education and Information Officer
- Chief Gary McQueen, Sandy Fire
- Martin Montgomery, City of Sandy Public Works
- Erika Palmer, City of Damascus Associate Planner
- Laurel Reimer, Clackamas County Emergency Management
- Kathleen Reiter, Corbett Neighborhood Emergency Response Team HAM Radio
- Jim Seipel, Oregon Trail School District Director of Facilities
- Chief Harold Skelton, Sandy Police Department
- Dan Thompson, Oregon Trail School District Safety Coordinator
- Helen Turner, Estacada Fire/Citizen Corps

The Sandy Emergency Operations Center Group is a standing committee comprised of emergency first responders, Community Emergency Response Team / Neighborhood Emergency Response Team members, city staff from Sandy and Damascus, and representatives from a number of citizen groups. Additionally, Damascus and Sandy share a number of common stakeholders due to their close proximity to one another. As such, natural hazards mitigation planning meetings for both Damascus and Sandy occurred in tandem via standing SOEC meetings.

Planning Process

The RARE Participant and Clackamas County Emergency Management developed and facilitated three plan development meetings with the Sandy Emergency Operations Center Group on January 16th, February 20th, and March 20th, 2009. Please see Appendix B for meeting agendas and minutes.

Introduction - January 16, 2009: the RARE Participant attended a regularly scheduled SEOC meeting to present a brief overview of the natural hazards mitigation planning process. The SEOC discussed a planning timeline, and additionally decided to serve as the steering committee for Damascus's and Sandy's planning processes.

Risk Assessment - February 20, 2009: Between January and February 2009, the RARE Participant developed the plan's Community Profile (see Section 2 below), and researched the causes and characteristics of natural hazards in Damascus, as well as past events. On February 20th, 2009 the RARE Participant facilitated the first of two plan development meetings with the SEOC. Group members identified and discussed past hazard events, vulnerable systems within the communities, and existing emergency management capabilities. Additionally, the group identified various public involvement activities to implement during the planning process, as well as continued public involvement strategies that could occur after the plan's completion. The SEOC also identified a future coordinating body for Sandy's Natural Hazards Mitigation Plan Addendum, as well as a plan convener.

March 20, 2009: Between February and March, 2009 the RARE Participant drafted the community's Risk Assessment (see Section 3 below), and developed a list of potential mitigation actions based on vulnerabilities identified at the February 20th plan development meeting. On March 20th, 2009 the RARE Participant facilitated the second of two plan development meetings with the SEOC. Group members discussed the RARE Participant's proposed mitigation actions, and developed a final list of actions. Additionally, the SEOC developed a future meeting schedule (see 1.3 Plan Implementation and Maintenance below).

Public Involvement

During the addendum development process, the SEOC sent meeting minutes to members that were unable to attend meetings, with requests for input. Additionally, the Partnership's website (www.OregonShowcase.org) hosted plan drafts for SEOC review. Following completion of the final draft, the city issued a press release on August 25th, 2009, that informed citizens about the addendum and requested public comments. The press release was sent to the local newspaper, and was posted on Sandy's website for two weeks (closing date, September 9, 2009). The press release requested that comments be directed to Seth Atkinson, Assistant City Manager (primary contact) or Alice Lasher, Sandy Fire Public Education and Information Officer. The city's website and the fire district's website hosted the addendum during the public comment period.

Additionally, SEOC representatives announced the public comment period at Chamber of Commerce meetings, and through Community Emergency Response Team (CERT)

volunteer emails. The city printed a hard copy of the draft plan to place in the library and fire department. Several comments were received and integrated into the final draft.

Adoption

The City of Sandy adopted the Clackamas County Natural Hazards Mitigation Plan via resolution on January 4, 2010.

1.2 Addendum Mission and Goals

Because this is an addendum to the Clackamas County Natural Hazards Mitigation Plan, The City of Sandy has chosen to adopt Clackamas County's Plan mission and goals. The city's Hazard Mitigation Task Force believes that Clackamas County's plan mission and goals accurately reflect those of Sandy as well. Likewise, adopting the county's mission and goals promotes cohesion between the two plans.

Mission

The mission of the Clackamas County Natural Hazards Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural hazards. This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more sustainable community.

Goals

Protect Life and Property

- Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to losses from natural hazards.
- Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.
- Improve hazard assessment information to make recommendations for discouraging new development and encouraging preventative measures for existing development in areas vulnerable to natural hazards.

Promote Public Awareness

- Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
- Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.

Enhance Natural Systems

- Balance watershed planning, natural resource management, and land use planning with natural hazard mitigation to protect life, property, and the environment.
- Preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.

Encourage Partnerships and Implementation

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation.
- Encourage leadership within public and private sector organizations to prioritize and implement local, county, and regional hazard mitigation activities.

Augment Emergency Services

- Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.
- Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry.
- Coordinate and integrate natural hazard mitigation activities, where appropriate, with emergency operations plans and procedures.

1.3 Plan Implementation and Maintenance

This section details the formal process that will ensure that the Sandy Addendum to the Clackamas County Natural Hazards Mitigation Plan remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the plan annually, as well as producing an updated plan every five years. Finally, this section describes how the city will integrate public participation throughout the plan maintenance and implementation process.

Implementing the Plan

After the plan is locally reviewed and deemed complete, the Sandy Fire Prevention Officer will submit the plan to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management submits the plan to the Federal Emergency Management Agency (FEMA--Region X) for review. This review addresses the federal criteria outlined in the 44 CFR Part 201. Upon acceptance by FEMA, the Sandy City Council will adopt the plan via resolution. At that point the city will gain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds.

Coordinating Body

The Sandy Emergency Operations Center Group (SEOC) will serve as the coordinating body for Sandy's Natural Hazards Mitigation Plan Addendum. The convener may assign additional representatives from appropriate city agencies to attend future SEOC meetings. In order to make this group as broad and useful as possible, the SEOC will engage relevant organizations and agencies as technical advisers when needed. Current SEOC members include:

- Chris Alfino, City of Damascus GIS Technician
- Seth Atkinson, City of Sandy Assistant to City Manager
- Carnetta Boyd, Corbett Neighborhood Emergency Response Team
- Craig Brooks, Oregon Trail School District Assistant Maintenance Supervisor
- Rita Ezard, Sandy Action Center Director
- Captain Scott Howland, Sandy Fire District

- Alice Lasher, Sandy Fire Public Education and Information Officer
- Chief Gary McQueen, Sandy Fire
- Martin Montgomery, City of Sandy Public Works
- Erika Palmer, City of Damascus Associate Planner
- Laurel Reimer, Clackamas County Emergency Management
- Kathleen Reiter, Corbett Neighborhood Emergency Response Team HAM Radio
- Jim Seipel, Oregon Trail School District Director of Facilities
- Chief Harold Skelton, Sandy Police Department
- Dan Thompson, Oregon Trail School District Safety Coordinator
- Helen Turner, Estacada Fire/Citizen Corps

Roles and responsibilities of the coordinating body include:

- Serving as the local evaluation committee for funding programs such as the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds;
- Prioritizing and recommending funding for natural hazard risk reduction projects;
- Encouraging stakeholders, and relevant hazard mitigation organizations and agencies to implement and/or report on implementation of the plan's identified action items;
- Evaluating and updating the Natural Hazards Mitigation Plan Addendum following a disaster;
- Evaluating and updating the Natural Hazards Mitigation Plan Addendum in accordance with the prescribed maintenance schedule; and
- Developing and coordinating ad hoc and/or standing subcommittees. The SEOC will engage relevant organizations, agencies, and/or neighboring communities as technical advisers in hazard mitigation as needed.

Convener

The Sandy Fire Prevention Officer will serve as a convener. The convener's roles and responsibilities include:

- Assigning additional stakeholders and representatives to the coordinating body as needed;
- Coordinating TST meeting dates, times, locations, agendas, and member notification;
- Documenting the outcomes of TST meetings;
- Serving as a communication conduit between the TST and the public and/or key plan stakeholders;
- Identifying emergency management-related funding sources for natural hazard mitigation projects;
- Facilitating the incorporation, maintenance, and update of the city's natural hazard risk GIS data elements;
- Utilizing the risk assessments as a tool for prioritizing proposed natural hazard risk reduction projects; and
- Facilitating and documenting the plan's five-year update.

Implementation through Existing Programs

This plan is strategic and non-regulatory in nature, meaning that it does not set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the city; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other city plans and programs including the Comprehensive Land Use Plan, Capital Improvements Plan, and Building Codes, as well as the Clackamas County Natural Hazards Mitigation Plan, and the State of Oregon Natural Hazards Mitigation Plan. The mitigation actions described in Section 4 below are intended to be implemented through existing plans and programs within the city. Implementation opportunities are further defined in action items (see Section 4) when applicable.

Plan Maintenance

Plan maintenance is a critical component of the natural hazard mitigation plan addendum. Proper maintenance of the plan ensures that this plan will maximize the city's efforts to reduce the risks posed by natural hazards. This section includes a process to ensure that regular review and update of the plan occurs. The SEOC and the Sandy Fire Prevention Officer will be responsible for maintaining the plan.

Monthly Meetings

The SEOC meets monthly and will devote time during two of these meetings per year to identify funding for the implementation of mitigation strategies, evaluate the effectiveness of the addendum, develop new mitigation strategies to reduce losses from natural hazards, and to document changes in land development or programs that may affect mitigation priorities. The SEOC meets the third Friday of every month and will discuss portions of the addendum as often as needed but at least twice a year. A new list of members will be generated at the beginning of each year to ensure the committee remains relevant.

Additionally, the SEOC will review the plan's goals and action items to determine their relevance to changing situations in the county, as well as changes in state or federal policy, and to ensure they are addressing current and expected conditions. The committee will also review the hazard assessment portion of the addendum to determine if this information should be updated or modified, given any new available data. The coordinating organizations responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered, successes in coordinating efforts, and strategies that should be revised.

Five-Year Review of Plan

Local mitigation plans must be updated and resubmitted to the Federal Emergency Management Agency (FEMA) for approval every five years in order to maintain eligibility for federal hazard mitigation assistance programs.¹ Plan updates must

¹ 44 CFR 201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

demonstrate that progress has been made in the past five years for local mitigation plans to fulfill commitments outlined in the previously approved plan.

Sandy's Natural Hazards Mitigation Plan Addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. Because this is an addendum to the Clackamas County Natural Hazards Mitigation Plan, the addendum must be updated in accordance with the county's five-year plan update schedule. As such, Sandy must update this addendum by September 2012 (and then again five years thereafter). Sufficient time should be allotted for plan update activities and FEMA review. All City of Sandy plans are reviewed in January, so the committee will begin working on the 5-year update in January of 2012 to ensure the addendum will be prepared and approved before the addendum expires. Additional time will be needed if the city intends to pursue application for mitigation planning grants, and/or contracting for technical or professional services.

During the five-year plan update, the city must review and revise its plan to reflect changes in development, progress in mitigation efforts, and changes in priorities. The following questions will be asked to determine what actions are necessary in updating the addendum:

- Have public involvement activities taken place since the plan was adopted?
- Are the plan goals still relevant?
- Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?
- Are there new hazards that should be addressed?
- Have there been hazard events in the community since the plan was adopted?
- Have new studies or previous events identified changes in any hazard's location or extent?
- Has vulnerability to any hazard changed?
- Have development patterns changed? Is there more development in hazard prone areas?
- Do future annexations include hazard prone areas?
- Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?
- Are there new high risk populations?
- Did the plan document and/or address National Flood Insurance Program repetitive loss properties?
- Is there an action dealing with continued compliance with the National Flood Insurance Program?
- Did the plan identify data limitations?
- Did the plan identify potential dollar losses for vulnerable structures?
- What is the status of each mitigation action?
- Are there completed mitigation actions that have decreased overall vulnerability?
- Are there new actions that should be added?
- Are changes to the action item prioritization, implementation, and/or administration processes needed?

- Do changes need to be made within the five year update schedule?
- Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?

The Sandy Fire Prevention Officer will be responsible for (1) organizing the SEOC to address plan update needs; (2) updating any deficiencies found in the plan; and (3) ensuring the plan meets the Disaster Mitigation Act of 2000's plan update requirements.

Continued Public Involvement & Participation

The City of Sandy is dedicated to involving the public directly in continual reshaping and updating of the Natural Hazards Mitigation Plan Addendum. Although members of the SEOC represent key community constituencies, the general public will have the opportunity to provide feedback on future plan amendments and updates.

During the plan development process public participation was incorporated into every stage. To ensure that these opportunities will continue, a number of city service websites, such as the fire department website, will have a link to the addendum. The addendum will additionally be available for viewing during the city's open house events. Public meetings regarding plan content will be scheduled when deemed necessary, such as after a natural hazard event, but no less than annually.

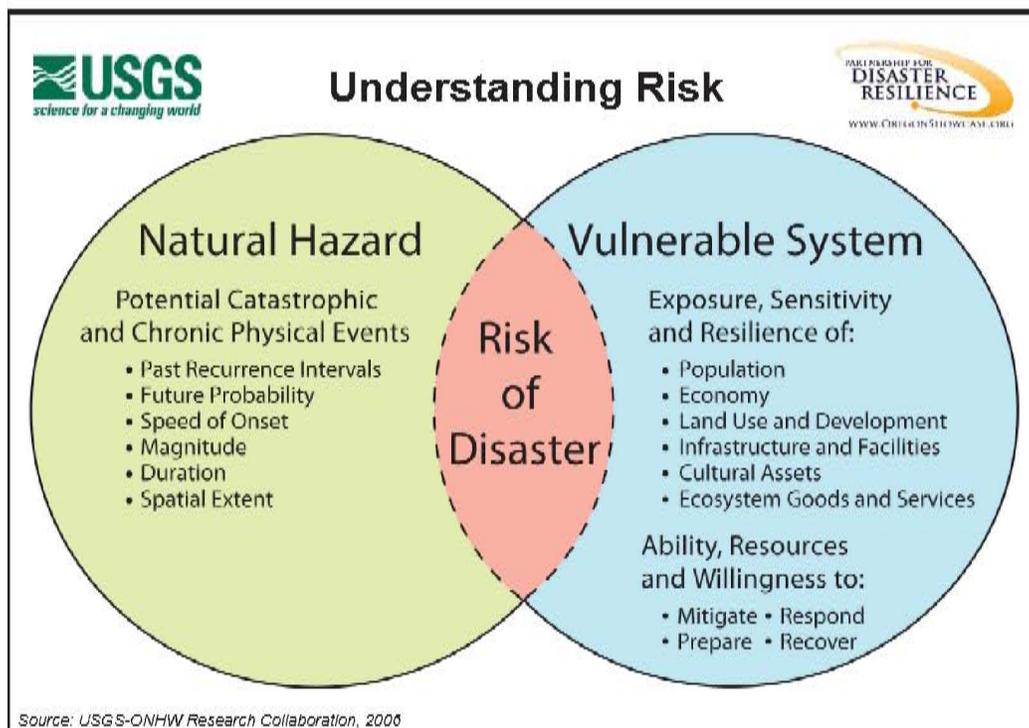
In addition to the involvement activities listed above, the city's Natural Hazards Mitigation Plan Addendum has been archived and posted on the University of Oregon Libraries' Scholar's Bank Digital Archive.² Contact information is posted on all plan copies.

² University of Oregon Scholars Bank, Natural Hazards Mitigation Plans:
<https://scholarsbank.uoregon.edu/xmlui/handle/1794/1930>

Section 2: Community Profile

The following section describes the City of Sandy from a number of perspectives in order to help define and understand the city's sensitivity and resilience to natural hazards. Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community's ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs). The information in this section represents a snapshot in time of the current sensitivity and resilience factors in Sandy when the addendum was developed. The information documented here, along with the risk assessments located in Section 3 below, should be used as the local level rationale for the risk reduction actions identified at the end of this addendum. The identification of actions that reduce the city's sensitivity and increase its resilience assist in reducing overall risk, or the area of overlap in Figure 2 below.

Figure 2 Understanding Risk



Source: USGS - Partnership for Disaster Resilience Research Collaborative, 2006.

2.1 Geography & Climate

Sandy is a scenic community with beautiful views and vast outdoor recreational opportunities, and serves as a gateway for tourists visiting Mount Hood and the Mount Hood National Forest. Sandy's residents enjoy a rural lifestyle while still having the urban amenities of Portland, located just 25 miles away.

Sandy’s largest body of water is the Sandy River. Smaller tributaries include Tickle Creek, Cedar Creek, and Badger Creek. The topography in Sandy is quite diverse, ranging from the steep Sandy River canyon to relatively flat farmland. The areas to the east and south of the city are mostly forested land, and areas to the north and west of the city are primarily farmland.

Sandy has a fairly mild climate with an average of 47.06 inches of precipitation each year. Monthly average temperatures range from a low of 35°F in January to a high of 82°F in August.

2.2 Population & Demographics

In 2000 the City of Sandy had a population of 5,385 within city limits. According to the Portland State Population Research Center the estimated population of Sandy on July 1, 2008 was 8,005, a 48.7% change over the 2000 Census level.ⁱⁱⁱ The Sandy community extends beyond city boundaries to encompass Hoodland, Welches, Brightwood and areas in the community of Boring. These communities are also encompassed within the Oregon Trail School District and residents often shop in Sandy, as the city has the only large grocery store in the immediate vicinity. This extended Sandy community will accommodate an estimated population of 27,565 in 2010^{iv}.

Disaster impacts (in terms of loss and ability to recover) vary among population groups following a disaster. Historically, 80% of the disaster burden falls on the public. Of this number, a disproportionate burden is placed upon special needs groups, especially children, the elderly, the disabled, minorities, and low income persons. In Sandy, about 8.3% of the population was living below the federal poverty level in 2000. Elderly individuals require special consideration due to their sensitivities to heat and cold, their reliance upon public transportation resources for medical appointments and medications, and their comparative difficulty in making home modifications that reduce risk to hazards. In 2000, 8.9% of the population was 65 years of age or older, and 34.1% of the disabled population was 65 years or older.^v

Table 2.1 Estimated Population Change between 2000 and 2008

| Year | Estimated Population | Percent Change |
|-------------|-----------------------------|-----------------------|
| 2000 | 5,385 | |
| 2001 | 5,380 | -0.09% |
| 2002 | 5,780 | 7.43% |
| 2003 | 6,200 | 7.23% |
| 2004 | 6,360 | 2.58% |
| 2005 | 6,680 | 5.03% |
| 2006 | 7,070 | 5.84% |
| 2007 | 7,595 | 7.43% |
| 2008 | 8,005 | 5.40% |

Source: Portland State University Population Research Center

Table 2.2 Population by Race in 2000

| Race | Population |
|--------------------------------------------|-------------------|
| White | 4,961 |
| Hispanic or Latino | 220 |
| American Indian and Alaska Native | 53 |
| Asian | 40 |
| Native Hawaiian and Other Pacific Islander | 10 |
| Black or African American | 8 |
| Some other race | 2 |
| Population of two or more races: | 91 |

Source: US Census 2000

Table 2.3 Population Living with Disabilities

| | |
|--------------------------------------------|-------|
| Disabilities for people 5 to 15 years: | 110 |
| Disabilities for people 16 to 64 years: | 702 |
| Disabilities for people 65 years and over: | 421 |
| Total disabilities tallied: | 1,233 |

Source: US Census 2000

2.3 Employment & Economics

Sandy's heritage is logging and sawmilling. Today the nursery business is a major part of local economy. There are several nurseries and berry farms with millions of dollars of assets and inventory, providing many jobs. Sandy also has a number of light industries including construction and steel work, plastic injection molding, auto sales and service, and fuel facilities. Table 2.4 shows the number of Sandy residents employed in each industry in the year 2000.

Table 2.4 Employment by Industry in 2000

| Industry | Number of Workers |
|-------------------------------------------------------------------------------------|--------------------------|
| Educational, health and social services | 477 |
| Manufacturing | 330 |
| Retail trade | 292 |
| Arts, entertainment, recreation, accommodation and food services | 271 |
| Construction | 262 |
| Finance, insurance, real estate and rental and leasing | 207 |
| Professional, scientific, management, administrative, and waste management services | 181 |
| Transportation and warehousing, and utilities | 180 |
| Wholesale trade | 166 |
| Other services (except public administration) | 104 |
| Public administration | 79 |
| Agriculture, forestry, fishing and hunting, and mining | 42 |
| Information | 18 |

Source: Census 2000

Sandy is dominated by small businesses, with 83% of businesses employing fewer than 5 employees.^{vi} The five largest employers in the city are listed in table 2.5 below.

Table 2.5 Five Largest Employers in 2003

| 5 Largest Employers as of 2003 | Number of Employees |
|---------------------------------------------------------------|----------------------------|
| Oregon Trail School District #46 - Education | 250 |
| U.S. Forest Service - Forest Services | 200 |
| Safeway - Grocery Store | 100 |
| US Metal Works - Truck Bins, Air Pneumatic Systems, Conveyers | 99 |
| AEC Incorporated - Computer and Computer Software Stores | 99 |

Source: Oregon Economic and Community Development Department

Median income can be used as an indicator of the strength of the region's economic stability. In 1999, the median household income in Sandy was \$42,115. This is \$121 above the 2000 national median household income of \$41,994, and almost \$9,965 below the \$52,080 median household income for Clackamas County.^{vii} Although it can be used to compare areas as a whole, this number does not reflect how income is divided among area residents.

2.4 Housing

Housing type and year-built dates are important factors in mitigation planning. Certain housing types tend to be less disaster resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes (i.e. wood frame construction). Generally the older the home is, the greater the risk of damage from natural disasters. This is because stricter building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk. For example, structures built after the late 1960s in the Northwest and California use earthquake resistant designs and construction techniques. In addition, FEMA began assisting communities with floodplain mapping during the 1970s, and communities developed ordinances that required homes in the floodplain to be elevated to one foot above Base Flood Elevation.

The City of Sandy has 2,079 housing units, of which 1,963 (94.4%) are occupied and 116 (5.6%) are vacant. Of these housing units 1,346, or 68.6%, are owner-occupied and 617, or 31.4%, are renter occupied. The median value of an owner-occupied home in 2000 was \$150,800. The median year-built of current housing structures is 1983. Tables 2.6 and 2.7 show more detailed statistics on housing in Sandy.

Table 2.6 Housing Type

| Housing Type | Number | Percent |
|---------------------|---------------|----------------|
| Single Family Home | 1387 | 66.7% |
| Multi Family Home | 473 | 22.8% |
| Mobile Home | 219 | 10.5% |

Source: Census 2000

Table 2.7 Housing Structure Age

| Year Structure Built | Number of Structures | Percent of Structures |
|-----------------------------|-----------------------------|------------------------------|
| Built 1999 to March 2000 | 210 | 10.1% |
| Built 1995 to 1998 | 241 | 11.6% |
| Built 1990 to 1994 | 238 | 11.5% |
| Built 1980 to 1989 | 484 | 23.3% |
| Built 1970 to 1979 | 499 | 24.0% |
| Built 1960 to 1969 | 105 | 5.1% |
| Built 1950 to 1959 | 72 | 3.5% |
| Built 1940 to 1949 | 135 | 6.5% |
| Built 1939 or earlier | 95 | 4.3% |

Source: Census 2000

2.5 Land Use & Development

Downtown Sandy is a valuable asset to the community and the city has undertaken several urban renewal projects to increase the community’s prosperity by enabling an economically viable and vibrant city. The 3/4 mile stretch between Bluff Road and Ten Eyck Road is the heart of the city and offers shopping, dining and entertainment. Sandy's downtown is also home to a variety of city services including City Hall, Sandy Fire and Police, the City Library and Community Center.

Sandy’s commercial sector is centered along Highway 26. Industry is primarily located in the western portion of the city. The majority of Sandy’s residential properties are located in the southern part of town, although the northern part of town is also zoned for residential use.

Transportation is an important consideration when planning for emergency service provisions. Growth within the city will put pressure on both major and minor roads, especially if the main mode of travel is by single occupancy vehicles. How people travel to work is indicative of the prevalence of single occupancy vehicle travel, and can help predict the amount of traffic congestion and the potential for accidents. Table 2.8 shows the different methods city residents use to travel to work.

Table 2.8 Means of Transportation to Work

| Means of Travel | Number | Percent |
|------------------------|---------------|----------------|
| Drove alone | 2,152 | 84.13 |
| Carpooled | 259 | 10.13 |
| Worked at home | 52 | 2.03 |
| Walked | 50 | 1.95 |
| Public transportation: | 45 | 1.76 |

Source: Census 2000

2.6 Critical Facilities & Infrastructure

Critical facilities are those that support government and first responders’ ability to take action in an emergency. They are a top priority in any comprehensive hazard mitigation plan. Individual communities should inventory their critical facilities to include locally designated shelters and other essential assets, such as fire stations, and water and waste treatment facilities. The asterisk designates assets outside of Sandy city limits but within

the fire district. Emergency first responders attend to calls in these areas outside city limits.

Critical Facilities: Those facilities and infrastructure necessary for emergency response efforts.

- Sandy City Hall
- Sandy Fire District – Main Station
- Sandy Police Department
- City Maintenance Shops, Equipment
- Sandy Fire District – Dover Station*
- Sandy Fire District – Roslyn Lake Station*
- ODOT Maintenance Shops, Equipment*

Critical Infrastructure: Infrastructure that provides services for the city

- AT&T Cellular
- City of Sandy Water Reservoir
- City of Sandy Water Treatment Plant*
- State Highway 211
- Verizon Phone Switching Office
- Verizon Wireless Cellular Tower
- US Highway 26
- PGE Substation – Hwy 26 and Bluff Rd.
- Sprint/Nextel Cellular Tower
- Bull Run River Bridge*
- Dodge Park Bridges*
- Revenue Bridge*
- County Squire Airpark*
- McKinnonn Airport*
- Sandy River Airport*
- BPA Power Lines*
- Bull Run Waterworks*
- City of Sandy Watershed*
- PGE Substation – Dunn Rd & Bluff Rd*
- Portland Water Bridge – Pipeline Hole*
- Portland Water – Dodge Park Yard*
- Portland Water Mains*

Essential Facilities: Those facilities and infrastructure that supplement response efforts.

- Schools
 - Sandy Grade School
 - Cedar Ridge Middle School
 - Sandy High School
 - Bull Run School*
 - Cottrell Grade School*
 - Firwood Grade School*
 - Kelso Grade School*

- Sandy Head Start*
- Oregon Trail School District Offices*
- Churches
 - Assembly of God
 - Church of Christ
 - Church of Jesus Christ of Latter Day Saints
 - Community Presbyterian Church
 - Immanuel Lutheran Church
 - Jehovah's Witness Church
 - Living Way Fellowship
 - Seventh Day Adventist Church
 - St. Michael's Catholic Church
 - Aims Community Church*
 - Dover Community Church*
 - Orient Drive Baptist Church*
 - Sandy Baptist Church*
 - Sandy Church of Nazarene*
- U.S. Post Office
- Adventist Health Clinic
- Firwood Medical Clinic*
- Clackamas County Public Health
- Olin Bignal Aquatic Center
- Fred Meyer Store
- Grocery Outlet
- Safeway Store
- Firwood Medical Clinic*
- Clackamas County Linhart Radio Transmitter*
- Mt. Hood National Forest Headquarters*
- Bi-Mart

Vulnerable Populations: Locations serving populations that have special needs or require special consideration.

- Schools
- Medical Clinics
- Mt. Hood Hospice
- Senior Living Centers and Disabled Housing
 - Avamere Assisted Living
 - Cascadia Village
 - Cedar Park Garden Apartments
 - Country Garden Apartments
 - Evans Street Senior Apartments
 - Firwood Village Apartments
 - Haroldon Apartments
 - Hummingbird Apartments
 - Sandy Senior Center

- Mobile Home Parks
 - Hood Chalet Mobile Estates
 - Barlow Trail Mobile Court*
 - Big Valley Mobile Estates*
 - Bigfoot Lodge Trailer Court*
 - Pioneer Mobile Court*
- Sandy Vista Apartments (large Spanish speaking population)
- Best Western Sandy Inn
- Camp Howard*
- Camp Namanu*
- Oral Hull Foundation for the Blind*

Hazardous Materials Sites: Those locations that use, store, or produce hazardous materials.

- Fuel Storage
 - Chevron
 - Leathers Oil Co.
 - Mt. Hood Arco
 - Pacific Pride Fuel
 - Sandy Market and Shell
 - Amerigas*
 - Shorty's Corner gas station*
 - Sandy BP 76 Station
- Ace Heritage Hardware
- Advanced Plastics, Inc
- Cascade Screw
- G & L Screw Machine Products
- Hearth Classics
- Jiffy Lube
- Les Schwab Tire Center
- Champion Collision*
- Competition Paint*
- NAPA Auto Parts*
- Performance Auto Body*
- Sandy Auto Body
- Car Quest
- Metal Finishing
- US Metal*
- Web Steel*
- Mt. Hood Cleaners and Laundry
- Sandy Funeral Home
- Sandy Stone and Brick
- Ever Fresh Fruit*
- The Maiden Foundry*
- Oja Lumber*
- Sandy Farms*

- Sandy Fish Hatchery – Oregon Fish and Wildlife*
- Waste Management*
- Suburban Ford*
- Suburban Chevrolet*

2.7 Historic & Cultural Resources

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important.

Historical resources include:

- Sandy Historical Museum
- Doc Williams Practice
- Gerdes Store/Post Office
- The Sandy Hotel
- Clackamas County Bank
- The Revenue Hotel
- The Dew Drop Inn
- Lutheran School
- Evangelical Lutheran Church
- Junker Home
- Junker Building
- R.S. Smith Building
- Meining Park

Cultural Resources include:

- Barlow Ridge Park
- Bell Street Fields
- Cascadia Park
- Hamilton Ridge Park
- Jonsrud Viewpoint
- Meining Memorial Park
- Sandy Bluff Park
- Sandy Civic Plaza and Museum
- Sandy River Park
- Sandy River Trail
- Sandy Skate Park
- Tickle Creek Park/Trail
- Tupper Park
- Veterans Memorial Square

2.8 Government Structure

The governing body for the City of Sandy is the City Council. The Council is composed of the mayor and six City Council members. All Council members are elected at-large.

As with most Oregon cities, Sandy uses the "council-manager" form of government. The City Council members are unpaid volunteers who typically hold full time jobs in other areas. They are responsible for all city policies, legislation, and the city budget. The City Council appoints a city manager, who is assigned responsibility of day-to-day operation of the city, consistent with the policy direction set by the Council.

The Department of Planning and Development is responsible for long and short term planning, including review and approval of development projects. The department guides the city's land use development process. Planning and Development staff implements the city's comprehensive plan, ensuring that all development projects conform to the municipal code. The department also administers building, mechanical, and plumbing permits and inspections.

The Public Works Department is responsible for public services including water, sanitary sewer, stormwater, streets and traffic, and park maintenance.

The Building Department provides consultation, plan review, permit and inspection services to the construction industry and the public.

The Department of Community Services includes the Senior Center, Recreation Department, Sandy Transit and Park Planning.

The Police Department is responsible for public safety in the City of Sandy and as such responds to all types of emergency situations. It also provides code enforcement functions for the City of Sandy.

2.9 Existing Plans & Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from local residents, businesses and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can easily adapt to changing conditions and needs.^{viii}

Sandy's Addendum to the Clackamas County Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, will reduce the city's vulnerability to natural hazards (see Section 4 below). Many of these recommendations are consistent with the goals and objectives of the city's existing plans and policies. To the extent possible, Sandy will work to incorporate the recommended mitigation action items into existing plans, programs and policies. Linking existing plans and policies to the mitigation plan helps identify existing city resources that can be used to implement the plan's action items. Likewise implementing the mitigation plan's action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the city's resources.

The following are Sandy's existing plans and policies (specifically, those that directly relate to natural hazards mitigation):

Plan: City of Sandy Comprehensive Plan

Date of Last Revision: October 20, 1997

Author/Owner: City of Sandy

Description: The Comprehensive Plan is a set of maps, policies, and implementing measures affecting land use within the city limits, and ultimately within the Urban Growth Boundary. The plan is a guide for both public officials and the general public to define the direction, quality and quantity of future development and redevelopment and to evaluate decisions and weigh the possible effects on the future of the community.

Relation to Natural Hazard Mitigation:

- Goal 5 Open Spaces, Historic Resources, and Natural Areas: This goal is to establish policies for conservation of open space and protection of natural and scenic resources.
- Goal 6 Air, Water, and Land Resources: This goal is to establish policies to maintain and improve the quality of the air, water, and land resources of the state.
- Goal 7 Natural Hazards: This goal is to establish policies to protect life and property from natural disasters and hazards.
- Goal 8 Parks and Recreation: This goal is to establish policies to satisfy the recreational needs of the citizens of the state and visitors.
- Goal 14 Land Use and Urbanization: This goal is to establish policies to provide for an orderly and efficient transition from rural to urban land use.

Plan: City of Sandy Municipal Code

Date of Last Revision: August 18, 2008

Author/Owner: City of Sandy

Description: The purpose of the Municipal Code is to set rules and regulations on construction and activities within the city.

Relation to Natural Hazard Mitigation:

- Title 8 Health and Safety (Nuisances): This section covers nuisances including weeds and noxious growth (8.16.040), surface water drainage (8.16.080), and outdoor burning (8.36.010)
- Title 13 Water and Sewer: This section details stormwater management practices (13.18)
- Title 15 Building and Construction: This section details requirements for new construction, which includes undergrounding of utilities (15.20.010) and erosion control (15.44).
- Title 17 Building Code: This section details zoning within the city (17.30), hillside development (17.56), flood and slope hazard overlay district (17.60), cultural and historic resources (17.62), and planned development (17.64).

Plan: Sandy Fire District #72 Community Wildfire Protection Plan

Date of Last Revision: September 2005

Author/Owner: Sandy Fire District #72

Description: The purpose of the Community Wildfire Protection Plan is to protect human life and reduce property loss due to catastrophic wildland fire in the communities and surrounding areas of Sandy, Firwood-Wildcat, Bull Runn, Cottrell, Cherryville, and Sandy Ridge.

Relation to Natural Hazard Mitigation: A Community Wildfire Protection Plan can be used to implement mitigation activities related to emergency situations. The plan outlines a strategy, identifies priorities for action, and suggests immediate steps that can be taken to protect the communities from wildfire while simultaneously protecting other important social and ecological values.

Policy: Stormwater Management Incentive Program

Date of Last Revision: 2009

Author/Owner: City of Sandy

Description: The stormwater management incentive program encourages multi-family, commercial, and industrial property owners to reduce runoff by treating and disposing of stormwater on-site.

Relation to Natural Hazard Mitigation: The decrease in runoff entering the stormwater system will reduce capital and maintenance costs to the city and the decrease in runoff and pollution loading will improve the water quality of streams in and around Sandy. Potential projects include tree planting, vegetated swales, grassy swales, vegetated infiltration basins, sand filters, soakage trenches, eco-roofs, and pervious paving.

Section 3: Risk Assessment

The following hazards have been addressed in the Clackamas County Natural Hazards Mitigation Plan. The City of Sandy reviewed the county's plan on February 20, 2009 and assessed how Sandy's risks vary from the risks facing the entire planning area.

3.1 Flood

The Clackamas County Natural Hazards Mitigation Plan adequately describes the causes and characteristics of flooding hazards for the City of Sandy, as well as the location and extent of potential flooding events. The county's plan additionally documents all previous flooding events that have occurred within, or have affected Sandy in the past. (Please see pages 6-1 to 6-22 of the 2002 Clackamas County Natural Hazards Mitigation Plan and pages 25 to 29 of the 2007 update).

The main sources of flooding in Sandy are Tickle Creek, Cedar Creek, Badger Creek, and numerous drainage ways. Regionally, the Sandy River is a flooding source as well. From January 1-2, 2009 a winter storm event led to flooding throughout many of the smaller tributaries and drainage ways. Some homeowners rerouted the culverts and drainage ways near their homes to protect their property, but this resulted in more damage and flooding to neighbors downstream and to other parts of the city. Some Sandy residents depend on culverts to access their homes. A few of these culverts were washed out, and essentially cut citizens off from their homes. Two trailers were lost and many homes had crawlspace flooding. The SEOC believes the January, 2009 flooding event was worse than the 1996 flooding events (Please see Clackamas County's Natural Hazards Mitigation Plan for a full description of the 1996 flooding events).

The geographic location of the flooding hazard was determined using the designated FEMA NFIP 100-year and 500-year floodplain data, as well as the inundation line from the 1996 flood. The Sandy Natural Hazards Map, located at the end of Section 3 on page 36, shows less than 5% of the city in the floodplain. The only mapped floodplain hazard within city limits is the area surrounding Tickle Creek, which runs along the southern end of the city. A few homes are located within this mapped floodplain. A steep bluff protects the northern areas of the city from the Sandy River, but Revenue Bridge (northeast of the city) is in the Sandy River floodplain. The Sandy Fish Hatchery is very near the Cedar Creek floodplain as well.

The SEOC estimates that the probability of future flooding events in Sandy is 'high', meaning one event is likely to occur within a 10 to 35 year period. This estimate is the same as the county's 'high' probability estimate. The SEOC ranked the city's vulnerability to flooding events as 'moderate,' meaning 1-10% of the population and community assets could be affected in a major flood event. This is also in agreement with the county's 'moderate' probability estimate.

The SEOC identified Sandy's sewage treatment plant as a potential vulnerability in severe flooding situations. Portions of the road that lead to the sewage plant are in the

floodplain; as such, access to the sewage treatment plant could be isolated in a flooding event. Additionally, any transportation closures within the region will be difficult for Sandy's residents. The city is largely a bedroom community, and residents rely upon transportation routes for work. Please see Clackamas County's Natural Hazards Mitigation Plan for more information regarding potential flood-related impacts.

Sandy is a regular participant in the National Flood Insurance Program (NFIP) with 15 policies in place at a market value of \$3,428,000. One loss has been paid out totaling \$574.10, and there have been no repetitive losses in Sandy. The city's current Flood Insurance Rate Map (FIRM) is dated June 17, 2008 (initial FIRM 4/12/1974) and the most recent Community Assistance Visit date was April 28, 1994.

To mitigate the city's flooding issues, the city has installed storm water detention basins that store water for limited periods of time. The basins slowly release water into streams to avoid flooding. The stormwater utility has a detention facility planned for the upcoming biennium for Meining Park. This detention facility will prevent flooding on No Name Creek during seasons of heavy flow. The city is also developing a "disaster series" for the residents of east Clackamas County which will include a class focusing on flood mitigation practices.

3.2 Landslide

The Clackamas County Natural Hazards Mitigation Plan adequately describes the causes and characteristics of landslides hazards for the region, as well as the location and extent of previous and potential landslides. These descriptions are applicable to the City of Sandy as well. (Please see pages 7-1 to 7-13 of the 2002 Clackamas County Natural Hazards Mitigation Plan and pages 33 to 39 of the 2007 update).

Areas within Sandy that have experienced landslides in the past include Ten Eyck Road, Highway 26, Bluff Road, Barlow Trail, Laughing Water Road, Coalman Road, and Salmon River Road. In 1980, a landslide on Ten Eyck Road closed Highway 26 for 3-4 months. This was one of the biggest impacts that Sandy has experienced as a result of sliding activity. More recently landslides occurred on January 1 and 2, 2009. On the night of January 1st a large mudslide to the east of Sandy closed Highway 26 at milepost 35. At about 1:00am on January 2nd, a bank above Bill's Automotive on the south side of Highway 26 gave way and destroyed the building. The slide also damaged a fiber optic cable and took out 9-1-1 service for part of the early morning.

For the purposes of this planning process, Sandy's Geographic Information Systems (GIS) office mapped locations within the city that have 25% or greater slopes. Local slump, earthflow, mudflow and debris flow areas were identified using local knowledge. The Sandy Natural Hazards Map, on page 36 at the end of Section 3, shows no critical or essential facilities in landslide hazard areas, but Hood Hospice, Sandy High School, Verizon Wireless Cell Tower, Thrifty Auto Supply, and Pacific Pride Fuel are located near steep slopes. The local slump and earthflow hazards are located at the hill on Tupper Road between Sandy Heights Road and Strawbridge Parkway, and another hazard is on the Bluff Road hill between Nettie Connett Drive and the entrance to Hood Chalet Mobile Estates. The Hood Chalet Mobile Villa is located at the base of the hill and a

slide in this area could devastate a large portion of the mobile home park. The mudflow and debris flow hazard is located on the hill covering Dubarko Road, Melissa Ave, and Solso Drive.

The SEOC estimates that the future probability of landslides occurring within city limits is 'high,' meaning one event is likely to occur within a 10-35 year period. This estimate is in agreement with the county's 'high' probability ranking. Additionally, the SEOC estimates that the city has a 'moderate' vulnerability to landslide events, meaning 1-10% of the population and/or community assets could be affected in a major landslide event. This ranking is higher than the county's 'low' estimate due to the potential impacts that could occur within city limits.

Past landslide-incurred damages are proof that landslides can cause adverse effects upon residents, transportation systems, and local businesses. In the future, the SEOC expects that a slide could pollute the city water supply if sediment enters streams and rivers. Sandy's citizens are very dependent on Highway 26 for transporting to and from work, and Sandy's stores are similarly dependent on Highways 26 for inventory. If a large slide impacted this arterial Sandy could be cut off from neighboring communities.

Likewise, Park Street is built entirely on fill. While this area has not been impacted in the past, it could be the location of a future landslide, especially because areas built on fill are subject to liquefaction in an earthquake event. A water diversion dam located on Alder Creek is accessible only by helicopter or driving through Alder Creek. A slide could bring trees down into the dam and plug the diversion intake. It would be difficult to bring equipment to the area within a reasonable amount of time because the dam is so remote. Bluff Road has a few homes built on it and a slide could take out the water line to those homes. However, few customers live on Bluff Road so the impact would not be widely felt.

Lastly, tourism surrounding Mount Hood has a great impact on Sandy's economy. If roads leading to Mt. Hood are altered by a landslide, tourism would be severely impaired. In addition to skiing, Sandy is home to a large mountain biking and hiking community. A landslide could block access to these activities, or create an unsightly environment and reduce tourism in the area. Please see Clackamas County's Natural Hazards Mitigation Plan for more information regarding potential landslide-related impacts.

3.3 Wildfire

The Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan's descriptions of the causes and characteristics, location, extent and potential impacts of the wildfire hazard apply to the City of Sandy as well. The Clackamas County Community Wildfire Protection Plan details a limited history of wildfire in the county. In 1951 approximately 2,000 acres burned in Clackamas and Multnomah Counties. In 2001 lightning strikes started eight fires in eastern Clackamas County on US Forestry Service lands, burning about 80 acres. In 2002 the Bowl Fire burned over 300 acres just east of Estacada. No history of wildfires is reported for Sandy.^{ix}

Clackamas County has two major physiographic regions: the Willamette River Valley in western Clackamas County and the Cascade Range Mountains in eastern and southern Clackamas County. The Willamette River Valley is the most heavily populated portion of the county and is characterized by flat or gently hilly topography. The Cascade Range, which includes Sandy, has a relatively small population and is characterized by heavily forested slopes. Eastern Clackamas County is at higher risk to wildfire than western portions of the county due to the lack of dense forested land. Human caused fires are responsible for the majority of fires in Clackamas County, and in eastern Clackamas County the most common human induced wildfire source is debris burn escape. Homeless camps are another source of wildfires.

The SEOC estimates the probability of future wildfire events to be ‘moderate,’ meaning one event is likely within a 35 to 75 year period. This is in agreement with the county’s ‘moderate’ probability rating. The SEOC additionally ranked the city’s vulnerability to wildfires as ‘high,’ meaning more than 10% of the population and community assets would be affected by a major wildfire event. This is higher than the county’s ‘moderate’ rating. While the history of wildfires in Clackamas County is minimal, it does not provide a proper indication of the level of risk. According to the Clackamas County Community Wildfire Protection Plan (CWPP), the forests have accumulated an unnatural buildup of fuel as a result of decades of timber harvest and aggressive fire suppression. Additionally, residential development near the wildland urban interface has increased the community’s overall exposure to wildfire hazards. Many of the developments within the city have only one road in and one road out, and some areas of Sandy do not have evacuations plans. The potential for loss of life is great because of this accessibility issue.

Sandy uses a number of mitigation tools to reduce the city’s risk to wildfires. Nuisance ordinances prohibit the growth of tall grasses within city limits. Sandy Fire District #72 identifies homes with branch overhangs that create access issues for fire equipment and increase wildfire vulnerability to the structures. Homes with overhanging branches do not have defensible space, increasing their exposure to fuel sources. The district stays current on issues by participating in the Clackamas County Fire Prevention Cooperative, a group consisting of the fire districts within the county. The district also contributed in creating the Clackamas County Community Wildfire Protection Plan, and went a step further and created a Sandy Fire District #72 Community Wildfire Protection Plan. The fire district also purchased handheld GPS units that can be used for a fire risk assessment in the future.

Public outreach is a primary mitigation tool used by Sandy Fire District #72. A regular “Ask Alice” column appears in the local newspaper which provides citizens the opportunity to ask questions about fire and other hazards. The Sandy Fire District website includes ample information about fire safety and prevention. The district teaches fire safety in grade schools and hosts community safety fairs. Additionally, the Sandy Fire District offers classes on defensible land space, creates a media awareness campaign during fireworks season, and posts signs at nurseries to inform citizens of fire resistant plants and proper pruning techniques. The Sandy and Boring Fire Districts share a “fire safety house” trailer that serves as an education and outreach tool for fire-safe practices. The district brings the fire safety house to public events to educate children on safe

evacuations. Children enter the safety house to watch a movie about fire safety and then practice climbing out windows and down ladders. This provides kids with a safe and supervised environment to practice evacuation procedures.

3.4 Severe Storms: Wind and Winter

The Clackamas County Natural Hazards Mitigation Plan adequately describes the causes, characteristics, location, and extent of the severe storm hazard. Additionally, Clackamas County's history of events adequately describes the events that have impacted Sandy. A few incidents, however, require more explanation:

- From December 26, 2003 to January 14, 2004 a severe winter storm covered the city in three inches of ice and a fire broke out after a power line was pulled down.
- A windstorm from December 14th to 15th, 2006 toppled trees onto Highway 26, requiring the highway to be temporarily closed.
- From December 26, 2008 to January 2, 2009 Oregon experienced its worst winter storm in 40 years. City public works crews worked extended hours to clear arterials, but smaller roads could not be cleared quickly due to limited staff and equipment. The city hired private contractors to assist in snow removal efforts but some citizens could not get out of their homes to purchase food, refill prescriptions, or make medical appointments. Safety officials, city staff and citizens with four wheel drive vehicles and snowmobiles helped these citizens leave their homes to fulfill errands. In addition to creating access problems, the snow pack saturated soils with water and two mudslides occurred. The January 1st slide closed down Highway 26 at milepost 35 east of Sandy, and the January 2nd slide destroyed Bill's Automotive in the Pioneer Industrial Park. This slide also damaged a fiber optic cable, exposed and compromised a high pressure natural gas line, and disrupted 9-1-1 service for part of the early morning.

Additional severe storm information can be found on pages 9-1 to 10-7 of the 2002 Clackamas County Natural Hazards Mitigation Plan, and pages 46 to 50 in the 2007 plan update.

The SEOC estimates that the probability of severe wind and winter storm events is 'high,' meaning one event is likely to occur within a 10-35 year period. This estimate is the same as the county's 'high' winter storm probability estimate, but higher than the county's 'moderate' wind storm estimate. The history of wind storms in Sandy shows that they occur frequently enough to warrant the 'high' probability rating. The SEOC estimates a 'moderate' vulnerability to wind and winter storms, meaning 1-10% of the population and/or community assets could be affected by a severe storm event. This rating is in agreement with the county's 'moderate' winter storm vulnerability rating, but is higher than the county's 'low' vulnerability rating for wind storms. Sandy's wind storm vulnerability is greater than the county's rating because much of the city's utilities are still above ground and vulnerable to falling tree branches and debris. The city, for example, typically loses power to the water plant every year due to fallen trees. The water plant now has a back-up generator to reduce the impact of power outages.

Potential wind and winter-storm related impacts are adequately described on pages 9-7 and 9-8 in Clackamas County's Natural Hazards Mitigation Plan. Common vulnerabilities are also adequately described, and apply to the City of Sandy as well.

Because severe storms can affect all areas of a city, mitigation can be difficult. Sandy has made progress, however, in building the city's resilience to severe storm events. Sandy has begun work on undergrounding the overhead utility lines along Pioneer and Proctor Blvd in the city's downtown area, and all new construction is required to have utilities placed underground. The power company has a regular schedule for trimming trees around power lines, and the city has taken steps to improve response efforts during and after storm events. The Fire Department recently purchased two 4-wheel drive fire engines which maneuver well in ice and snow. The Transit Department also purchased a 4-wheel drive vehicle which was used to help transport citizens in the recent winter storm event. The city has a CERT team which could be utilized for response and public outreach efforts. Finally, Sandy has a database where citizens can register to volunteer and list resources they own and are willing to use in emergency events, such as snowmobiles.

3.5 Earthquake

The Clackamas County Multi-Jurisdictional Natural Hazards Mitigation Plan adequately describes the causes and characteristics of the earthquake hazard, as well as the history of earthquakes that have affected Sandy. Descriptions of the earthquake hazard can be found on pages 11-1 to 11-20 in the 2002 Clackamas County Natural Hazards Mitigation Plan, and pages 53 to 58 in the 2007 plan update.

Within the Northern Willamette Valley/Portland Metro Region, three potential faults and/or zones are capable of generating high-magnitude earthquakes. These include the Portland Hills Fault Zone, Gales Creek-Newberg-Mt. Angel Structural Zone, and the Cascadia Subduction Zone.

- Portland Hills Fault Zone
The Portland Hills Fault Zone is a series of NW-trending faults that vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years ago) sediment.^x The fault zone extends along the eastern margin of the Portland Hills for a distance of 25 miles, and lies about 2 miles northeast of Oregon City.
- Gales Creek-Newberg-Mount Angel Structural Zone
The Gales Creek-Newberg-Mount Angel Structural Zone is a 50-mile-long zone of discontinuous, NW trending faults that lies about 17 miles southwest of Oregon City. These faults are recognized in the subsurface by vertical separation of the Columbia River Basalt and offset seismic reflectors in the overlying basin sediment.^{xi}
- Cascadia Subduction Zone
The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year.^{xii} Paleoseismic studies along the Oregon coast indicate that the state has experienced seven Cascadia

Subduction Zone (CSZ) events possibly as large as M9 in the last 3,500 years. These events are estimated to have an average recurrence interval between 500 and 600 years, although the time interval between individual events ranges from 150 to 1000 years. Scientists estimate that the chance in the next 50 years of a great subduction zone earthquake is between 10 and 20 percent assuming that the recurrence is on the order of 400 ± 200 years.^{xiii}

The SEOC ranks the probability of future earthquake events as ‘high,’ meaning one event is likely within a 10 to 35 year period. This estimate is the same as the county’s ‘high’ probability estimate. The SEOC additionally ranked the city’s vulnerability to earthquakes as ‘high,’ meaning more than 10% of the city’s population and/or community assets would likely be affected in a major event. This is also in agreement with the county’s ‘high’ vulnerability estimate.

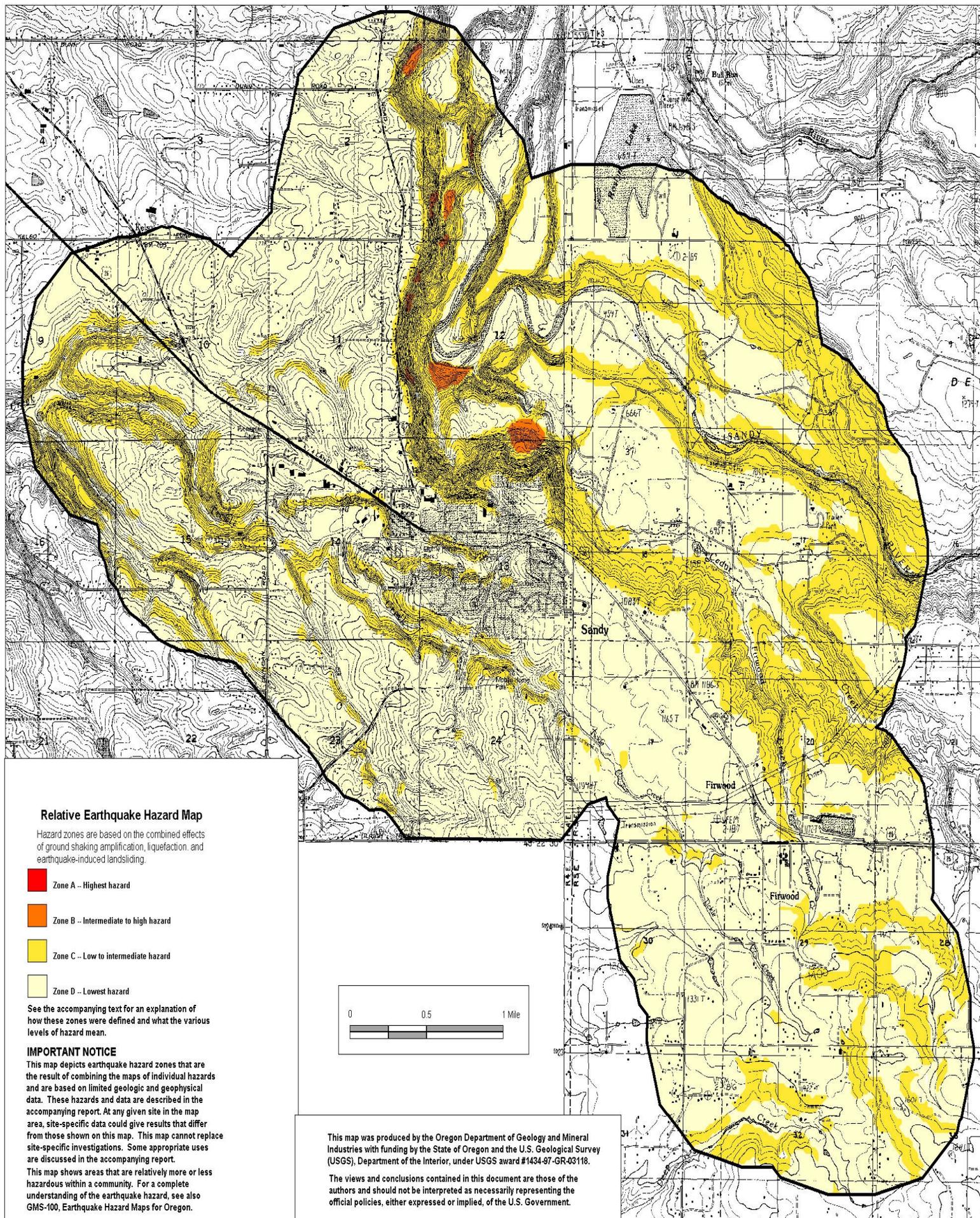
Additionally, the earthquake hazard maps on pages 29 to 32 below were developed by the Department of Geology and Mineral Industries (DOGAMI). The maps illustrate the location of the amplification, liquefaction, earthquake induced landslide, and relative earthquake hazards in the Sandy area. The majority of the city is in the lowest hazard zone. Areas in the low to intermediate hazard zone and earthquake-induced hazard zone primarily mirror the steep slope hazards areas. The only areas of intermediate to high hazard are located outside city limits. The entire area has a low amplification hazard and no liquefaction hazard.

Despite the city’s relatively low risk of experiencing secondary effects of an earthquake (i.e., amplification, liquefaction), a high magnitude earthquake could have big impacts on Sandy. The city has a number of older structures built before stricter seismic building codes were implemented. One such building was the Molalla High School junior and senior campus building. The March 25, 1993 Scotts Mills quake severely damaged the building, resulting in its demolition.

Furthermore, the Sandy Main Fire Station and Roslyn Lake Fire Station are not seismically sound and could sustain major damages in a large earthquake. Sandy’s water treatment building is constructed of cinder blocks and could also be damaged. Park Street is built entirely on fill, and areas built on fill are subject to liquefaction in an earthquake event. Bluff Road is another area where homes could be impacted.

In 2007 DOGAMI released the results of the Statewide Seismic Needs Assessment, which evaluated the collapse potential of education and emergency services buildings. The Sandy High School North Building was the only building determined to have a ‘very high’ collapse potential. Additional information and findings from this report can be found at <http://www.oregongeology.org/sub/projects/rvs/OFR-O-07-02-SNAA-onscreen.pdf>.

Sandy Urban Area



Relative Earthquake Hazard Map

Hazard zones are based on the combined effects of ground shaking amplification, liquefaction, and earthquake-induced landsliding.

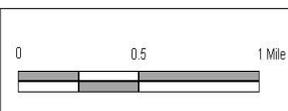
- Zone A -- Highest hazard
- Zone B -- Intermediate to high hazard
- Zone C -- Low to intermediate hazard
- Zone D -- Lowest hazard

See the accompanying text for an explanation of how these zones were defined and what the various levels of hazard mean.

IMPORTANT NOTICE

This map depicts earthquake hazard zones that are the result of combining the maps of individual hazards and are based on limited geologic and geophysical data. These hazards and data are described in the accompanying report. At any given site in the map area, site-specific data could give results that differ from those shown on this map. This map cannot replace site-specific investigations. Some appropriate uses are discussed in the accompanying report.

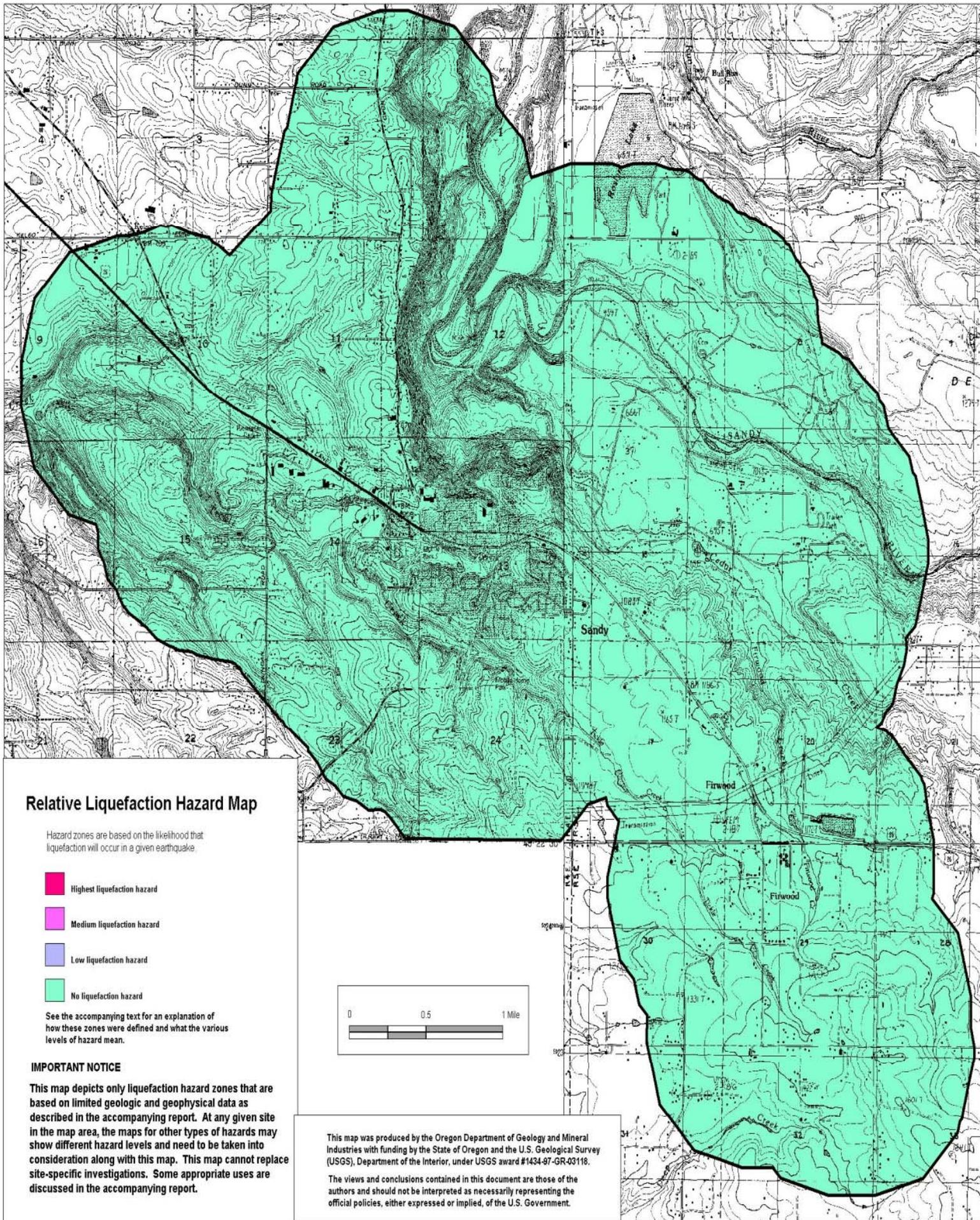
This map shows areas that are relatively more or less hazardous within a community. For a complete understanding of the earthquake hazard, see also GMS-100, Earthquake Hazard Maps for Oregon.



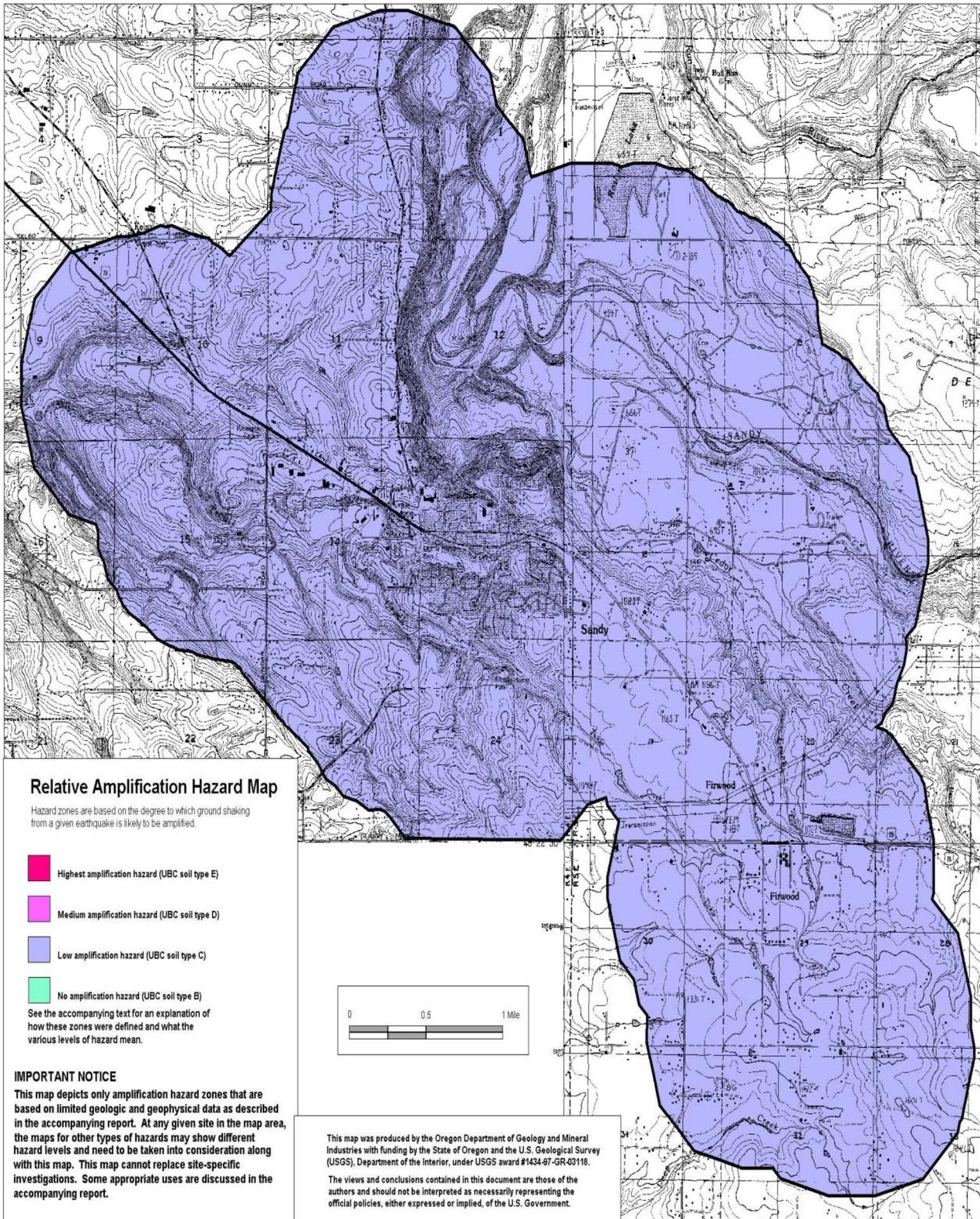
This map was produced by the Oregon Department of Geology and Mineral Industries with funding by the State of Oregon and the U.S. Geological Survey (USGS), Department of the Interior, under USGS award #1434-97-GR-03118.

The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

Sandy Urban Area



Sandy Urban Area

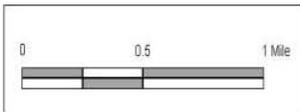


Relative Amplification Hazard Map

Hazard zones are based on the degree to which ground shaking from a given earthquake is likely to be amplified.

- Highest amplification hazard (UBC soil type E)
- Medium amplification hazard (UBC soil type D)
- Low amplification hazard (UBC soil type C)
- No amplification hazard (UBC soil type B)

See the accompanying text for an explanation of how these zones were defined and what the various levels of hazard mean.



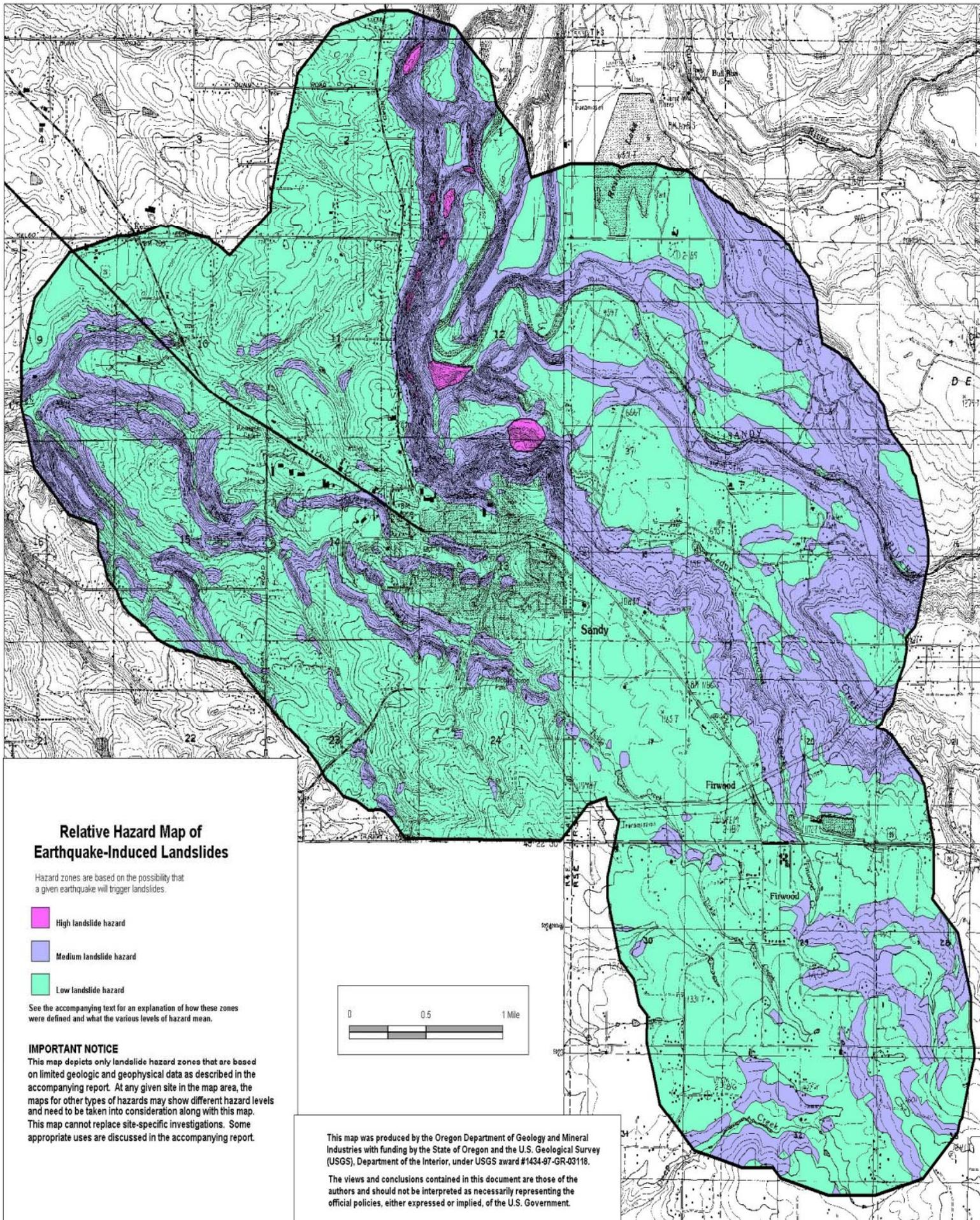
IMPORTANT NOTICE

This map depicts only amplification hazard zones that are based on limited geologic and geophysical data as described in the accompanying report. At any given site in the map area, the maps for other types of hazards may show different hazard levels and need to be taken into consideration along with this map. This map cannot replace site-specific investigations. Some appropriate uses are discussed in the accompanying report.

This map was produced by the Oregon Department of Geology and Mineral Industries with funding by the State of Oregon and the U.S. Geological Survey (USGS), Department of the Interior, under USGS award #1434-97-GR-03118.

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Sandy Urban Area



Relative Hazard Map of Earthquake-Induced Landslides

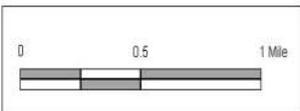
Hazard zones are based on the possibility that a given earthquake will trigger landslides.

- High landslide hazard
- Medium landslide hazard
- Low landslide hazard

See the accompanying text for an explanation of how these zones were defined and what the various levels of hazard mean.

IMPORTANT NOTICE

This map depicts only landslide hazard zones that are based on limited geologic and geophysical data as described in the accompanying report. At any given site in the map area, the maps for other types of hazards may show different hazard levels and need to be taken into consideration along with this map. This map cannot replace site-specific investigations. Some appropriate uses are discussed in the accompanying report.



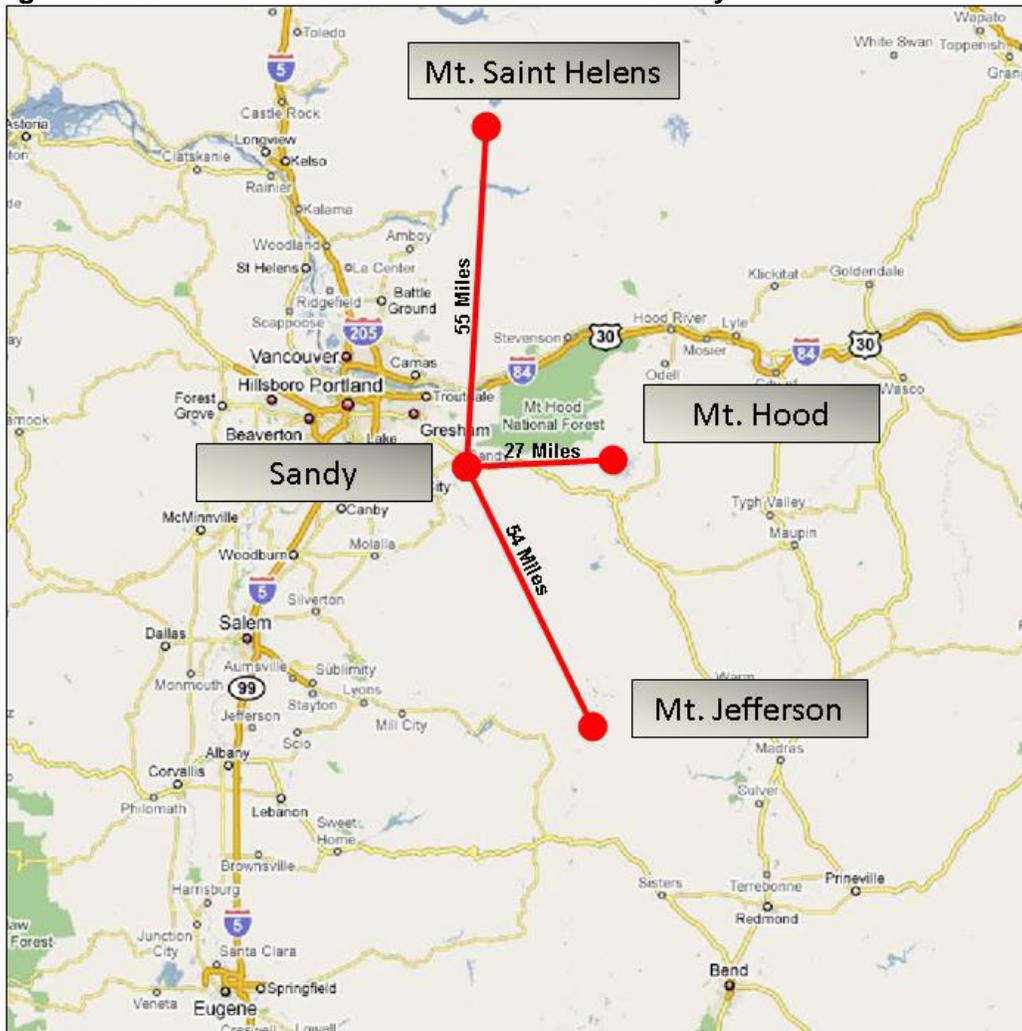
This map was produced by the Oregon Department of Geology and Mineral Industries with funding by the State of Oregon and the U.S. Geological Survey (USGS), Department of the Interior, under USGS award #1434-87-GR-03118.

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3.6 Volcano

Clackamas County’s Natural Hazards Mitigation Plan adequately describes the causes and characteristics of volcano-related hazards, as well as the location of volcanic areas and the extent of potential damages. Immediate danger areas for volcanic eruptions lie within a 20-mile radius of the blast site, and ashfall is likely to affect communities downwind of the eruption. Mount Hood, Mount Jefferson, and Mount Saint Helens are the closest of the cascade volcanoes to Sandy (see Figure 3 below). Additionally, Mount Adams is located north of Mount Hood; Mount Rainier is located north of Mount Saint Helens; and the Three Sisters lie to the south of Mount Jefferson.

Figure 3 Locations of Volcanoes in Relation to Sandy



Mount Hood’s last eruption ended shortly before the arrival of Lewis and Clark in 1805. When Mount Hood erupts again, it will severely affect areas on its flanks and far downstream in the major river valleys that head on the volcano. Due to Sandy’s location on the Sandy River and proximity to Mount Hood, the city is likely to experience some of the immediate effects that eruptions have on surrounding areas. It is estimated that Sandy will have two hours before a lahar reaches the city (see Figure 4 below), allowing time

for individuals to evacuate if needed. A steep bluff shields the city from the Sandy River so a lahar should not affect assets within city limits. Tephra is likely to fall in areas up to several hundred kilometers downwind.^{xiv}

Figure 4 Mount Hood Hazards Map



Source: USGS Mount Hood – History and Hazards of Oregon’s Most Recently Active Volcano. June 13, 2005

Clackamas County’s Natural Hazards Mitigation Plan adequately documents historic volcanic events for Mount Hood, Mount Saint Helens, Mount Rainier, Mount Adams, and Mount Saint Helens. Please refer to Section 12 of the Clackamas County Natural Hazards Mitigation Plan for more information regarding previous volcanic events.

The SEOC estimates a ‘low’ probability that volcano eruptions will occur in the future, meaning one events I likely to occur within a 75-100 year period. Additionally, the SEOC estimates that Sandy has a ‘high’ vulnerability to volcanic eruptions, which means that more than 10% of the population and/or community assets could be affected by a major volcanic event. Both ratings are in agreement with Clackamas County’s probability and vulnerability estimates.

Hazards related to volcanic eruptions (i.e., potential community impacts) are adequately described in the Clackamas County Natural Hazards Mitigation Plan. Although the City of Sandy is unlikely to experience lava flows, tephra (sand-sized or finer particles of volcanic rock that is ejected rapidly into the air from volcanic vents) drifts downwind from the explosions and can form a blanket-like deposit of ash. Tephra is a public health threat, and can damage agriculture and transportation systems (i.e., aircraft and on-the-ground vehicles). Protecting livestock from tephra will be difficult. Tephra can also clog drainage systems and create major debris management problems. Within Sandy, public health would be a primary concern, and keeping transportation routes open/accessible would be important as well. Please refer to Clackamas County's Natural Hazards Mitigation Plan for more information regarding potential volcano-related impacts within the community.

Sandy Natural Hazards

Legend

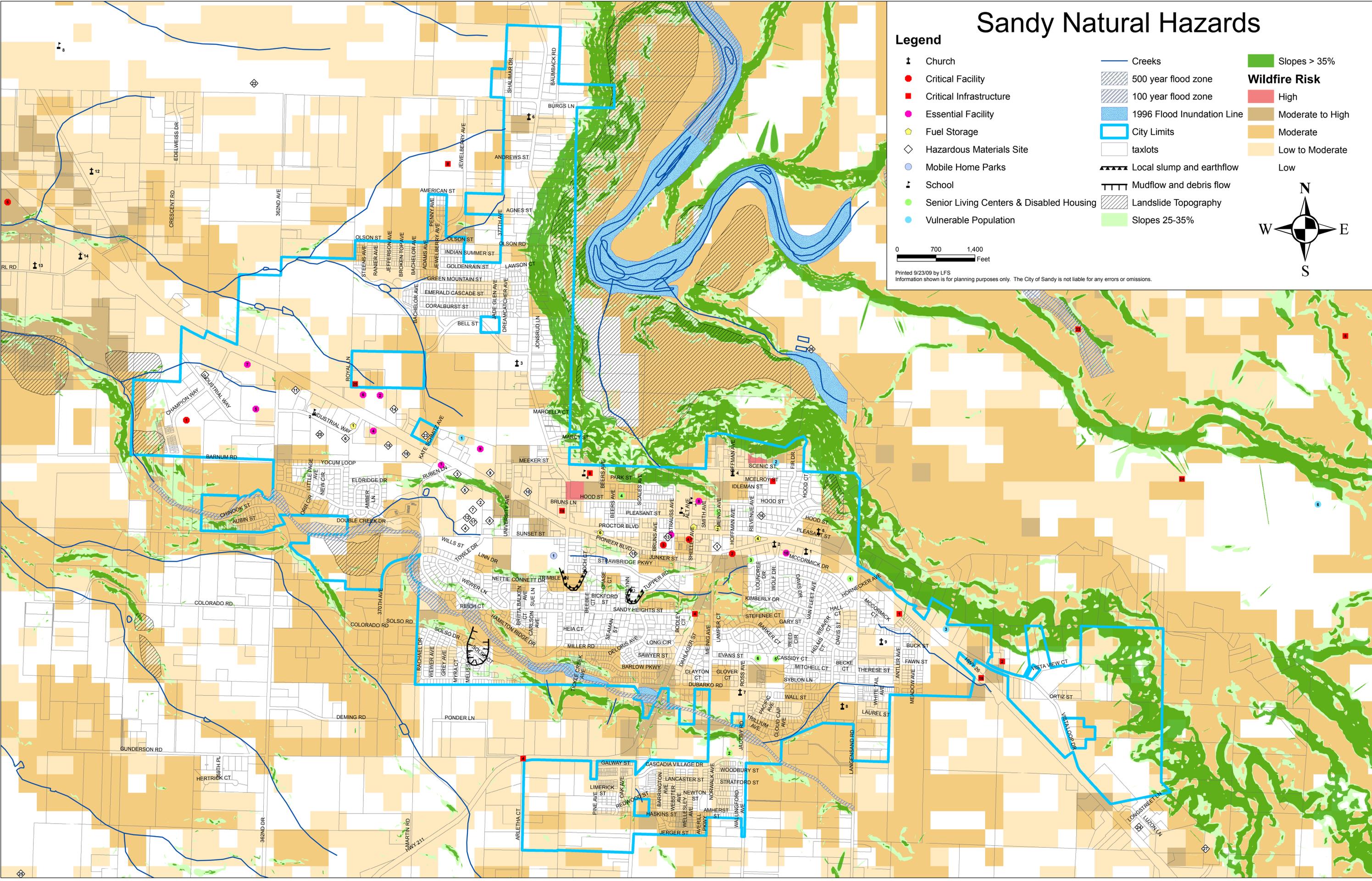
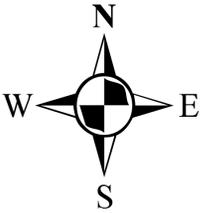
-  Church
-  Critical Facility
-  Critical Infrastructure
-  Essential Facility
-  Fuel Storage
-  Hazardous Materials Site
-  Mobile Home Parks
-  School
-  Senior Living Centers & Disabled Housing
-  Vulnerable Population
-  Creeks
-  500 year flood zone
-  100 year flood zone
-  1996 Flood Inundation Line
-  City Limits
-  taxlots
-  Local slump and earthflow
-  Mudflow and debris flow
-  Landslide Topography
-  Slopes 25-35%
-  Slopes > 35%

Wildfire Risk

-  High
-  Moderate to High
-  Moderate
-  Low to Moderate
-  Low

0 700 1,400 Feet

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Section 4: Action Items

4.1 Action Items

The following action items are detailed recommendations for activities that local departments, citizens, and others could engage in to reduce risk. Full action item worksheets are located at the end of the addendum in Appendix A.

- MH #1: Maintain public education programs to inform the public about methods of mitigating the impacts of natural hazards.
- MH #2: Integrate the goals and action items from the Natural Hazards Mitigation Plan into Existing regulatory documents and programs, where appropriate.
- MH #3: Identify and pursue funding opportunities to develop and implement hazard mitigation activities.
- MH #4: Continue to update and improve hazard assessments in the Natural Hazards Mitigation Plan as new information becomes available.
- MH #5: Improve vegetation management throughout the city.
- MH #6: Encourage structural mitigation practices in developments at risk to hazards.
- FL #1: Continue to implement and enhance the flood public education program designed to inform local residents about:
 - The causes of local drainage problems, flooding and landslides;
 - Why channels, ditches and swales should be created and maintained;
 - What owners can do to protect their properties;
 - The penalties for dumping in or altering watercourses;
 - Information regarding health and safety issues resulting from the flooding hazard (such as sewerage leakages);
 - Educating about types of flooding and benefits of flooding as a natural process; and
 - Educate about the benefits of vegetation in floodplains.
- FL #2: Ensure continued compliance in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances.
- FL #3: Explore participation in the NFIP's Community Rating System (CRS).
- FL #4: Promote and protect the use of naturally flood prone open space or wetlands as flood storage areas.
- LS #1: Maintain and update an inventory of streets and properties threatened by landslides.
- LS #2: Reduce the vulnerability of property owners in landslide-prone areas.
- WF #1: Promote fire-resistant strategies for existing and new developments.

- WF #2: Mitigate life loss due to wildfires.
- SS #1: Reduce negative effects from severe windstorm and severe winter storm events.
- EQ #1: Reduce negative impacts of earthquakes by performing seismic evaluations and retrofits.

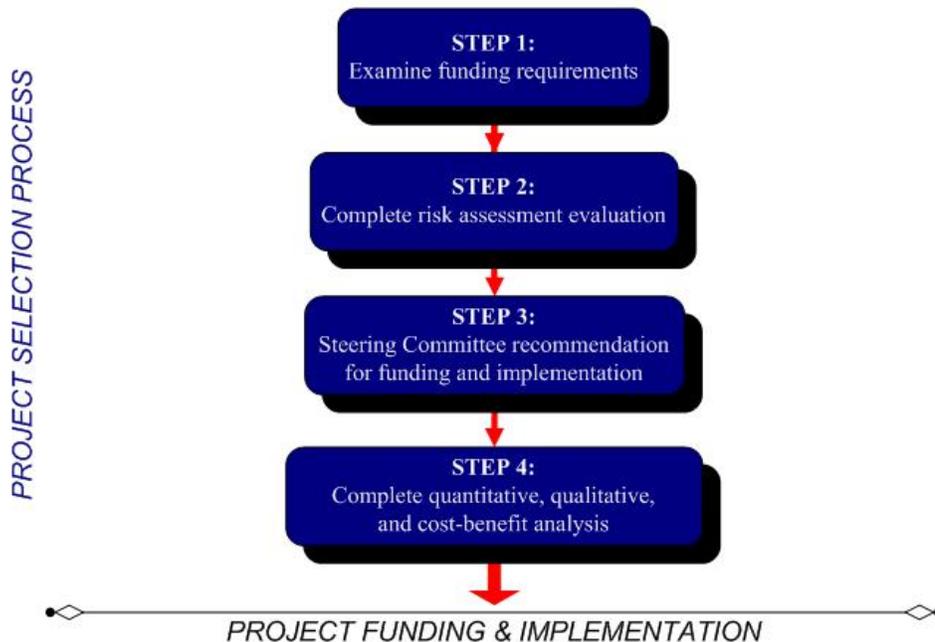
Note: the City of Sandy does not believe that implementing volcano-related mitigation activities will be cost-effective at this time. As such, the city has not identified volcanic-eruption mitigation action items. Sandy will partner with Clackamas County, however, on the implementation of mitigation strategies that benefit both jurisdictions.

4.2 Project Prioritization Process

The Disaster Mitigation Act of 2000 (via the Pre-Disaster Mitigation Program) requires that jurisdictions identify a process for prioritizing potential actions. Potential mitigation activities often come from a variety of sources; therefore the project prioritization process needs to be flexible. Projects may be identified by SEOC members, local government staff, other planning documents, or the risk assessment. Figure 5 illustrates the project prioritization process.

Figure 5 Project Prioritization Process

Action Item and Project Review Process



Source: Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2008.

Step 1: Examine funding requirements

The first step in prioritizing the plan's action items is to determine which funding sources are open for application. Several funding sources may be appropriate for the city's proposed mitigation projects. Examples of mitigation funding sources include but are not limited to: FEMA's Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance (FMA) program, Hazard Mitigation Grant Program (HMGP), National Fire Plan (NFP), Community Development Block Grants (CDBG), local general funds, and private foundations, among others.

Because grant programs open and close on differing schedules, the SEOC will examine upcoming funding streams' requirements to determine which mitigation activities would be eligible. The SEOC may consult with the funding entity, Oregon Emergency Management, or other appropriate state or regional organizations about project eligibility requirements. This examination of funding sources and requirements will happen during the SEOC's plan maintenance meetings.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the plan's action items is to examine which hazards the selected actions are associated with and where these hazards rank in terms of community risk. The SEOC will determine whether or not the plan's risk assessment supports the implementation of eligible mitigation activities. This determination will be based on the location of the potential activities, their proximity to known hazard areas, and whether community assets are at risk. The SEOC will additionally consider whether the selected actions mitigate hazards that are likely to occur in the future, or are likely to result in severe / catastrophic damages.

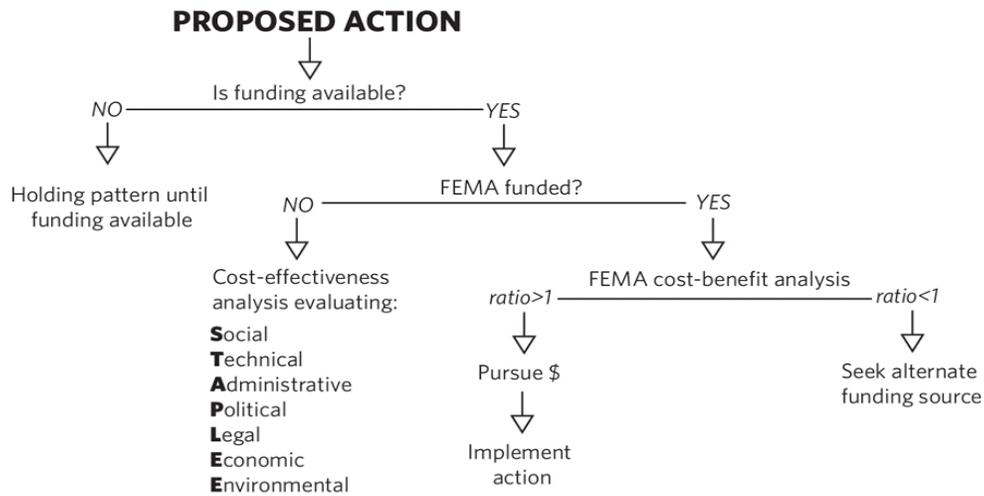
Step 3: Committee recommendation

Based on the steps above, the SEOC will recommend which mitigation activities should be moved forward. If the TST decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action and, if applicable, documenting success upon project completion. The SEOC will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or resources. This process will afford greater coordination and less competition for limited funds.

Step 4: Complete quantitative and qualitative assessment, and economic analysis

The fourth step is to identify the costs and benefits associated with the selected natural hazard mitigation strategies, measures or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity assists in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 6 shows decision criteria for selecting the appropriate method of analysis.

Figure 6 Benefit Cost Decision Criteria



Source: Community Service Center's Partnership for Disaster Resilience at the University of Oregon, 2006.

If the activity requires federal funding for a structural project, the SEOC will use a Federal Emergency Management Agency-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit/cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project's cost effectiveness. The SEOC will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project's qualitative cost effectiveness.

-
- ⁱ USGS - Partnership for Disaster Resilience Research Collaborative, 2006.
- ⁱⁱ National Institute of Building Science's Multi-hazard Mitigation Council. "Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities" 2005.
- ⁱⁱⁱ Portland State Population Research Center. March 2008. *2007 Oregon Population Report*.
<http://www.pdx.edu/media/p/r/PRC_2007_Population_Report2_rev.pdf>
- ^{iv} Portland State Population Research Center Forecasts, 2010 and 2020. Data aggregated to Oregon Trail School District boundaries.
- ^v Census 2000
- ^{vi} Sandy Business Climate Survey, 2005.
- ^{vii} United States Census Bureau. 2000. Fact Sheet: Clackamas County, Oregon. www.census.gov.
- ^{viii} Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities*.
- ^{ix} Clackamas County Community Wildfire Protection Plan, 2005. Page 16-18.
- ^x Madin, Ian, 1990. *Earthquake-hazard geology maps of the Portland metropolitan area, Oregon; text and map explanation: Portland, OR*. Oregon Department of Geology and Mineral Industries.
- ^{xi} Yeats, R.S., Graven, E.P., Werner, K.S., Goldfinger, C., and Popowski, T., 1996. *Tectonics of the Willamette Valley, Oregon*. U.S. Geological Survey Professional Paper 1560
- ^{xii} Goldfinger, C., L. D. Kulm, R. S. Yeats, C. Hummon, G. J. Huftile, A. R. Niem, C. G. Fox, and L. C. McNeill, 1996. *Oblique strike-slip faulting of the Cascadia submarine forearc: the Daisy Bank fault zone off central Oregon*, in Subduction Top to Bottom, G. E. Bebout, D. Scholl, S. Kirby and J. P. Platt (Editors), American Geophysical Monograph 96, 65–74.
- ^{xiii} NOAA, 1993. Tsunamis affecting the West Coast of the United States: 1806-1992.
- ^{xiv} United States Geological Survey, Mount Hood – History and Hazards of Oregon's Most Recently Active Volcano. <http://pubs.usgs.gov/fs/2000/fs060-00/>

Appendix A: Action Item Worksheets

Multi Hazard #1

| | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------|--|
| Proposed Action Item: | | Alignment with Plan Goals: | |
| Maintain public education programs to inform the public about methods of mitigating the impacts of natural hazards. | | <i>Protect Life and Property, Promote Public Awareness, Encourage Partnerships and Implementation</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> • Conducting public outreach campaigns raises awareness about natural hazards and helps illustrate what residents and businesses can do to reduce the impact of a natural disaster on their properties, thereby significantly reducing the impact of natural hazards on Damascus. • The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation would be a way to keep the public informed of, and involved in, the county's actions to mitigate hazards. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> • Maintain hazard related information and public information materials provided by Sandy Fire District #72. Disseminate through existing resources such as the city website, newsletter, Sandy Post, Sandy Time, brochures, and other mailings; • Partner with Clackamas County and other jurisdictions to develop education outreach for all hazards; • Conduct public education as hazard seasons approach. Provide information for earthquake awareness month in April, wildfire prevention in summer, and flood and severe storm information in winter; • Include hazard information on the Sandy Fire District website; • Identify property owners in flood and landslide hazard zones, and conduct a target mailing to disseminate information on all hazards; • Prepare and distribute an informational brochure on unstable slopes, historical landslide areas, and mitigation strategies. • Encourage individual homeowners to implement mitigation practices; • Include insurance information in public outreach and education materials; • Promote purchase of appropriate insurance coverage; • Educate the public about the resources available for hazard mitigation, response, and preparedness; ▪ Use faith based, civic and humanitarian, and business groups to affiliate volunteers; and • Create an unmet needs committee and long-term recovery committee to create a pool of volunteers that can take in needs requests during a small event. | | | |
| Coordinating Organization: | | SEOC | |
| Internal Partners: | | External Partners: | |
| Sandy Fire Department; Public Works Department | | Clackamas County, Oregon Partnership for Disaster Resilience, Community Organizations Active in Disaster (COAD) | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| Ongoing | | | |
| Form Submitted by: | | SEOC | |
| Status | | New Action, 2009. | |

Multi Hazard #2

| | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Proposed Action Item: | | Alignment with Plan Goals: | |
| Integrate the goals and action items from the Natural Hazards Mitigation Plan into existing regulatory documents and programs, where appropriate. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Incorporating natural hazards plans into comprehensive plans, local ordinances, and land-use regulations will ensure that communities implement the proper mitigation measures for their community. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Use the mitigation plan to help the City's Comprehensive Land Use Plan meet State Land Use Planning Goal 7, designed to protect life and property from natural disasters and hazards through planning strategies that restrict development in areas of known hazards; Use zoning codes to regulate development in hazard-prone areas; Integrate the city's mitigation actions into the current emergency operations plan and capital improvement plans (where appropriate); Partner with other organizations and agencies with similar goals to promote building codes that are more disaster resistant at the state level; Use citizen input for the creation of appropriate ordinances; and Use the natural hazard mitigation planning resources provided by the Oregon Partnership for Disaster Resilience to learn how to better integrate the NHMP into existing documents and programs. | | | |
| Coordinating Organization: | | Sandy Planning and Development Department | |
| Internal Partners: | | External Partners: | |
| Public Works Department | | OPDR | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Multi Hazard #3

| | | | |
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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Identify and pursue funding opportunities to develop and implement hazard mitigation activities. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> • Implementation cannot occur without proper funding. The switch from planning to implementation is the step that begins the reduction of risk. • The Pre-Disaster Mitigation Grant Program provides funds for hazard mitigation planning and project implementation prior to a disaster event. PDM grants are nationally competitive. • The Hazard Mitigation Grant Program provides funds to implement long-term hazard mitigation measures and projects after a major disaster declaration. HMGP funds are available to communities within states that have recently received Presidential Disaster Declarations. HMGP funds are prioritized for communities that are directly affected by a disaster, but communities outside of the disaster declaration are typically eligible as well. • Flood Mitigation Assistance helps communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> • Meetings will be held monthly to discuss, update, and implement actions in the NHMP. Funding opportunities should also be discussed at the meetings. • Develop incentives for special service districts, citizens, and businesses to pursue hazard mitigation projects; • Review mitigation projects during each city budget review cycle; • Allocate city resources and assistance to mitigation projects when possible; and • Partner with other organizations and agencies to identify grant programs and foundations that may support mitigation activities. | | | |
| Coordinating Organization: | | Sandy Planning and Development Department, Sandy/Boring Fire Prevention Division, SEOC, Sandy Engineering | |
| Internal Partners: | | External Partners: | |
| SEOC, Finance Department | | Oregon Emergency Management, FEMA Region X | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New action in 2009 | | |

Multi Hazard #4

| | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------------------------------|--|
| Proposed Action Item: | | Alignment with Plan Goals: | |
| Continue to update and improve hazard assessments in the Natural Hazards Mitigation Plan as new information becomes available. | | <i>Promote Public Awareness, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> • The city was unable to conduct a quantitative risk analysis for most hazards. • Oregon updates the state risk assessment once every three years. Communities are informed of new risk information if it affects areas in their jurisdiction. • New demographic data will become available after the 2010 census. Damascus incorporated in 2004, meaning the 2010 census will be the first time the city of Damascus will be represented. The new census information could alter the GIS maps. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> • Actively use data to update vulnerability assessment; • Update hazards maps; • Use new data to guide public outreach programs and update educational outreach pieces as new data becomes available; • Update codes and city policies when new data and information becomes available as required by state planning goal 7; and • Cooperate with participating agencies to secure funding needed to obtain data to perform a risk analysis. | | | |
| Coordinating Organization: | | SEOC | |
| Internal Partners: | | External Partners: | |
| Planning and Development Department | | Clackamas County, DOGAMI | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Multi Hazard #5

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Improve vegetation management throughout the city. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> Landscaping and vegetation make a difference in mitigating the impacts of natural hazards. Trees break the force of the wind and stabilize the soil. Wetlands absorb much of the overflow from stream channels. Fire-resistant vegetation can retard the spread of wildfires toward vulnerable buildings. Limiting or regulating the amount of vegetation cleared off a hillside lot reduces the risk of increasing the number of landslide-prone areas in a community. Planting vegetation or maintaining slope terraces can also reduce slope-runoff. Planners can use landscaping requirements to preserve or enhance the protection such natural features afford. These requirements may be part of site plan reviews or a separate set of zoning regulations and environmental performance standards. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Partner with Clackamas County, Oregon Department of Forestry, US Forestry Service, ODOT, and citizens to control vegetation along transportation corridors; Identify appropriate practices for eliminating invasive species; Maintain healthy urban canopy; Maintain vegetation coverage for slope stability; Identify hazardous trees for remediation or removal; Coordinate with watershed councils and others; Review and update existing ordinances to incorporate and improve vegetation management on private property; Develop mechanism to review vegetation on a case by case basis; Provide education to the public about justifications for, and benefits of vegetation mitigation practices; and Encourage fuels reduction on private property by providing education for pruning and remove trees and using native vegetation | | | |
| Coordinating Organization: | | Planning and Development Department | |
| Internal Partners: | | External Partners: | |
| EOC Group, Public Works, Code Enforcement | | Clackamas Soil and Water Conservation District, Fire Co-op, Oregon Department of Forestry, US Forestry Service, Clackamas County, Clackamas River Basin Council | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | | | |
| <u>Long Term</u> (2-4 or more years) | | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | | SEOC | |
| Status | | New Action, 2009. | |

Multi Hazard #6

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Encourage structural mitigation practices in developments at risk to hazards. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> • Strengthening facilities will improve recovery capacity and reduce risk and loss of life. • A hazard event may negatively impact a local economy, especially if a community's businesses are located in the floodplain, near steep slopes, in the wildland-urban interface, or in unreinforced masonry buildings. • Promoting structural mitigation can assist property owners in identifying their vulnerability to hazards and identifying mitigation activities. Encouraging property owners with this may increase the likelihood that property owners would share responsibility for mitigation on their properties and implement mitigation activities. • Incentive programs include a variety of benefits to building owners or developers that help to offset the cost of mitigation. Examples of possible incentive programs include: density bonuses, tax credits, property tax incentives or deferrals, real estate disclosures, property acquisition or purchase of development rights, increased funding of public infrastructure programs, and phasing retrofitting programs over a longer period of time. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> • Flood – construct retention ponds, swales, and dikes/ditches/culverts; elevated buildings • Landslide – construct retention ponds and retaining walls; enforce proper drainage; contract for geological studies • Wildfire – create defensible space; reduce fuels; construct streets wide enough to allow for easy emergency vehicle maneuverability • Earthquake – retrofit buildings to meet seismic standards • Severe Storms – encourage construction of sloped roofs; improve chimney bracing; store deicing agents • Volcano – encourage construction of sloped roofs • Boring Fire District is currently developing a disaster series to educate citizens about ways to prevent and prepare for disasters. | | | |
| Coordinating Organization: | | Planning and Development Department | |
| Internal Partners: | | External Partners: | |
| Sandy Fire District #72 | | Clackamas County | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| | <u>Ongoing</u> | | |
| Form Submitted by: | | SEOC | |
| Status | | New Action, 2009. | |

Flood #1

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| Proposed Action Item: | | Alignment with Plan Goals: |
| <p>Continue to implement and enhance the flood public education program designed to inform local residents about:</p> <ul style="list-style-type: none"> • The causes of local drainage problems, flooding and landslides; • Why channels, ditches and swales should be created and maintained; • What owners can do to protect their properties; • The penalties for dumping in or altering watercourses; • Information regarding health and safety issues resulting from the flooding hazard (such as sewerage leakages); • Educating about types of flooding and benefits of flooding as a natural process; and • Educate about the benefits of vegetation in floodplains | | <p><i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation,</i></p> |
| Rationale for Proposed Action Item: | | |
| <ul style="list-style-type: none"> • Conducting public outreach campaigns raises awareness about natural hazards and helps illustrate what residents and businesses can do to reduce the impact of a natural disaster on their properties, thereby significantly reducing the impact of natural hazards on the City of Damascus. • The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation would be a way to keep the public informed of, and involved in, the county's actions to mitigate hazards. | | |
| Ideas for Implementation: | | |
| <ul style="list-style-type: none"> • Community-wide dissemination of information through newsletters and websites; • Promote purchase of appropriate floodplain insurance coverage; • Use GIS database to identify property owners in flood prone areas, and target these people for a group mailing; and • Distribute flood preparedness information. | | |
| Coordinating Organization: | SEOC | |
| Internal Partners: | External Partners: | |
| GIS Coordinator; Planning and Development Department | Clackamas County | |
| Timeline: | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | |
| <u>Ongoing</u> | | |
| Form Submitted by: | SEOC | |
| Status | New Action, 2009. | |

Flood #2

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Ensure continued compliance in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> The National Flood Insurance Program provides communities with federally backed flood insurance to homeowners, renters, and business owners, provided that communities develop and enforce adequate floodplain management ordinances. The benefits of adopting NFIP standards for communities are a reduced level of flood damage in the community and stronger buildings that can withstand floods. According to the NFIP, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Continued participation in the NFIP will help reduce the level of flood damage to new and existing buildings in communities while providing homeowners, renters and business owners additional flood insurance protection. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Community Assistance Visits (CAV) are scheduled visits to communities participating in the NFIP for the purpose of: 1) conducting a comprehensive assessment of the community's floodplain management program; 2) assisting the community and its staff in understanding the NFIP and its requirements; and 3) assisting the community in implementing effective flood loss reduction measures when program deficiencies or violations are discovered. Actively participate with DLCD and FEMA during Community Assistance Visits. Conduct an assessment of the floodplain ordinances to ensure they reflect current flood hazards and situations, and meet NFIP requirements. Coordinate with the county to ensure that floodplain ordinances and NFIP regulations are maintained and enforced. Mitigate areas that are prone to flooding and/or have the potential to flood. These areas include properties along Tickle Creek. | | | |
| Coordinating Organization: | | Planning and Development Department | |
| Internal Partners: | | External Partners: | |
| SEOC | | FEMA, DLCD, Clackamas County Planning Department | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Flood #3

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Explore participation in the NFIP's Community Rating System (CRS). | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> The Community Rating System (CRS) is operated under the National Flood Insurance Program (NFIP). The NFIP provides flood insurance to homes and businesses located in floodplains at a reasonable cost, and encourages the movement of development away from the floodplain. The program is based upon mapping areas of flood risk, and requiring local implementation to reduce that risk, primarily through restrictions on new development in floodplains. CRS recognizes community efforts that go beyond the minimum standards of the NFIP. This recognition is in the form of reduced flood insurance premiums for communities that adopt such standards. CRS encourages community activities that reduce flood losses, facilitate accurate insurance rating, and promote flood insurance awareness. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Identify staff or community members to lead participation efforts; and Review CRS participation requirements and take steps towards reaching the first ranking. | | | |
| Coordinating Organization: | | Planning and Development Department | |
| Internal Partners: | | External Partners: | |
| SEOC | | FEMA, DLCD, OEM, Clackamas County Planning Department | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Flood #4

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Promote and protect the use of naturally flood prone open space or wetlands as flood storage areas. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> One of the goals of the National Flood Insurance Program is to protect the natural and beneficial functions of floodplains. Natural and beneficial floodplain functions include both the natural infiltration capacities of floodplains, as well as minimizing the pollutants that can enter waters from floodplain development activities. A number of options local governments can choose from are: 1) Prohibit all activities in the floodplain that may be hazardous to public health or water quality (e.g. septic systems, storage of hazardous materials) 2) Require new floodplain developments to avoid or minimize disruption to stream channels and stream banks 3) Adopt regulations pursuant to a Habitat Conservation Plan approved by the US Fish and Wildlife Service or the National Marine Fisheries Service. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Develop and implement flood protection alternatives for properties within and adjacent to the 100-year floodplain by taking into account city codes related to the floodplain. Gain support for protecting naturally flood prone open space by educating the public of its importance | | | |
| Coordinating Organization: | | Planning and Development Department | |
| Internal Partners: | | External Partners: | |
| SEOC, Public Works | | Clackamas Soil and Water Conservation District, Division of State Lands, Johnson Creek Watershed Council, Clackamas River Basin Council | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| | <u>Ongoing</u> | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Landslide #1

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Maintain and update an inventory of streets and properties threatened by landslides. | | <i>Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> • The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Developing an inventory of landslide areas can help a community identify which streets might be more vulnerable to damage. Such information can help a community in better identifying and prioritizing projects that can assist a community in mitigating its overall risk to landslides. • Areas that have experienced landslides in the past include: Ten Eyck Road, Highway 26, Bluff Road, Barlow Trail, Laughing Water Road, Coalman Road, and Salmon River Road. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> • Utilize technology, geologic resources, and other available data to identify areas of slope risk; • Identify areas where strategic planting could assist in soil stabilization; and • Coordinate with DOGAMI to receive LiDAR data for Damascus. | | | |
| Coordinating Organization: | | Sandy Engineering | |
| Internal Partners: | | External Partners: | |
| Planning and Development Department, GIS Coordinator, SEOC | | DOGAMI, Clackamas County GIS, Oregon Department of Transportation | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | | SEOC | |
| Status | | New Action, 2009. | |

Landslide #2

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|--|
| Proposed Action Item: | | Alignment with Plan Goals: | |
| Reduce the vulnerability of property owners in landslide-prone areas. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Developing and implementing programs to reduce the potential for landslides to cause damage can assist a community in mitigating its overall risk to landslide events. Areas that have experienced landslides in the past include: Ten Eyck Road, Highway 26, Bluff Road, Barlow Trail, Laughing Water Road, Coalman Road, and Salmon River Road. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Conduct a study to identify appropriate mitigation strategies for problem areas including buildings and infrastructure in the problem areas; Develop public information to emphasize economic risk when building on potential or historical landslide areas; Update the landslide hazard map when LIDAR data becomes available; and Review the planning and building codes and make updates or changes, if necessary. | | | |
| Coordinating Organization: | | Planning and Development Department | |
| Internal Partners: | | External Partners: | |
| SEOC | | DOGAMI, Clackamas County | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Wildfire #1

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Promote fire-resistant strategies for existing and new developments. | | <i>Protect Life and Property, Promote Public Awareness, Enhance Natural Systems, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on existing and new buildings and infrastructure [201.6(c)(3)(ii)]. Developing and implementing programs to improve fire-resiliency will reduce the potential for wildfires to cause damage and can assist a community in mitigating its overall risk to wildfire events. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Require fuel breaks in site plans, describe the procedures for ongoing maintenance, and place information on the city website for public view; Review roofing standards and develop recommendations for promoting non-combustible roofing; Encourage installation of double pane windows; Promote use of sprinkler systems in residential construction; Maintain awareness of potential city growth into the wild land urban interface; and Encourage defensible space creation and use of fire resistant landscaping. | | | |
| Coordinating Organization: | | Sandy/Boring Fire Prevention Division | |
| Internal Partners: | | External Partners: | |
| SEOC | | Boring Fire District, Clackamas County Fire Prevention Co-op, Firewise | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Wildfire #2

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Mitigate life loss due to wildfires. | | <i>Protect Life and Property, Promote Public Awareness, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> • The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Developing and implementing programs to mitigate life-loss will reduce the potential for wildfires to harm citizens and can assist a community in mitigating its overall risk to wildfire events. • The forests surrounding Sandy have accumulated an unnatural buildup of fuel as a result of decades of timber harvest and aggressive fire suppression. Additionally, residential development near the wildland urban interface has increased exposure to wildfire hazards. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> • Develop evacuation plans; • Ensure structural mitigation measures are met; • Equip and train first responders; • Ensure evacuation routes are well marked; and • Require street design that facilitates the movement of fire fighting equipment | | | |
| Coordinating Organization: | | Sandy/Boring Fire Prevention Division | |
| Internal Partners: | | External Partners: | |
| SEOC | | Clackamas County Fire Prevention Co-op | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| <u>Ongoing</u> | | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Severe Storm #1

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Reduce negative effects from severe windstorm and severe winter storm events. | | <i>Protect Life and Property, Promote Public Awareness, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> The Disaster Mitigation Act of 2000 requires communities to identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure[201.6(c)(3)(ii)]. Developing and implementing programs to reduce the potential for wind and winter storms to cause power outages can assist a community in mitigating its overall risk to wind and winter storms. | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> Reduce power outages by partnering with PGE to obtain funding to bury power lines subject to frequent failures; Encourage burial of power lines for existing development; Ensure that there are back up underground lines to major businesses & employers; Develop partnerships to implement programs to keep trees from threatening lives, property, and public infrastructure; Continue regular tree trimming practices; Partner with PGE to continue hazardous tree inventory and mitigation programs; Create sheltering programs; and Promote safe installation and use of generators. | | | |
| Coordinating Organization: | | SEOC | |
| Internal Partners: | | External Partners: | |
| Planning and Development Department, Public Works | | PGE | |
| Timeline: | | If available, estimated cost: | |
| Short Term (0-2 years) | Long Term (2-4 or more years) | | |
| | <u>Ongoing</u> | | |
| Form Submitted by: | SEOC | | |
| Status | New Action, 2009. | | |

Earthquake #1

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| Proposed Action Item: | | Alignment with Plan Goals: | |
| Reduce negative impacts of earthquakes by performing seismic evaluations and retrofits. | | <i>Protect Life and Property, Encourage Partnerships and Implementation, Augment Emergency Services</i> | |
| Rationale for Proposed Action Item: | | | |
| <ul style="list-style-type: none"> • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that are being considered by the community to reduce the effect that natural hazards will have on the community [201.6(c)(3)(ii)]. Developing and implementing programs to reduce the potential for earthquakes to cause damage can assist a community in mitigating its overall risk to earthquakes. • Pre-disaster mitigation strategies will reduce post-disaster response needs by lessening life loss, injury, damage, and disruption. • Refer to risk assessment, and DOGAMI's rapid visual assessment scores | | | |
| Ideas for Implementation: | | | |
| <ul style="list-style-type: none"> • Obtain funding to perform seismic evaluations; • Conduct seismic evaluations on identified community assets (including shelters) for implementing appropriate structural and non-structural mitigation strategies; • Prioritize seismic upgrades based on criticality of need and population served; • Seismically retrofit critical government facilities to guarantee continuous operation during and after a natural disaster; • Partner with appropriate organizations to implement seismic upgrades; • Update COOP plans; and • Create damage assessment procedures. | | | |
| Coordinating Organization: | | SEOC | |
| Internal Partners: | | External Partners: | |
| Planning and Development Department | | DOGAMI, Clackamas County | |
| Timeline: | | If available, estimated cost: | |
| <u>Short Term</u> (0-2 years) | <u>Long Term</u> (2-4 or more years) | | |
| | <u>Ongoing</u> | | |
| Form Submitted by: | | SEOC | |
| Status | | New Action, 2009. | |

Appendix B: Public Process



Meeting: Damascus/Sandy Natural Hazard Mitigation Plan Meeting 1
Date: February 20, 2009
Time: 9:00am to 1:00pm
Location: Sandy Main Fire Station

MINUTES

1. Meeting Attendees
 - a. Chris Alfino, City of Damascus
 - b. Seth Atkinson, City of Sandy
 - c. Carnetta Boyd, Corbett NERT
 - d. Craig Brooks, Oregon Trail School District
 - e. Megan Findley, Oregon Partnership for Disaster Resilience
 - f. Alice Lasher, Sandy Fire
 - g. Gary McQueen, Sandy Fire
 - h. Martin Montgomery, City of Sandy
 - i. Erika Palmer, City of Damascus
 - j. Laurel Reimer, Clackamas County Emergency Management
 - k. Kathleen Reiter, Corbett NERT HAM
 - l. Jim Seipel, Oregon Trail School District
 - m. Harold Skelton, Sandy Police Department
 - n. Helen Turner, Estacada Fire

2. Planning Process Discussion
 - a. Laurel provided a brief overview of the disaster cycle and emphasized that the Natural Hazard Mitigation Plan (NHMP) focuses on mitigation, not response, recovery, or preparedness.
 - b. Next Laurel provided an overview of the planning process and briefly explained each agenda item and an overview of the next meeting on action items.
 - c. Laurel asked the group to review the county's mission and goals. The committee adopted the county mission and goals
 - d. Laurel asked the group to identify a person to serve as convener
 - i. Alice Lasher will serve as Sandy's convener
 - ii. Erika Palmer will serve as Damascus' convener
 - e. Then Laurel asked each city who will serve as the NHMP coordinating body
 - i. The Sandy Emergency Operations Center Group (SEOCG) will serve as Sandy's coordinating body
 - ii. The Damascus Natural Features Topic Specific Team (TST) will serve as Damascus' coordinating body
 - f. Finally Laurel asked each city to identify ways the public will stay informed about the NHMP. Sandy and Damascus will do the following to inform and involve the public:
 - i. Meeting minutes will be sent out to the community organizations invited to attend the meetings so they can make comments. Many

of these community organizations were unable to attend the first meeting but their input would be valuable.

- ii. Once the plan has been finished, each city will present the plan to the public so they can comment on it before the City Council adopts it.
- iii. A press release will be sent to the local papers to inform the city the NHMP will be presented to the City Council
- iv. The NHMP will be available online at each city's website and hard copies in offices around the city
- v. The plan will be available during any city open house events
- vi. A link to the NHMP will be posted on numerous city websites, such as the fire department website
- vii. Each city's NHMP will be available online at the Oregon Partnership for Disaster Resilience site, and on the University of Oregon Scholars Bank site
- viii. Public meetings will be scheduled when deemed necessary, such as after a natural hazard event.

3. Critical/Essential Facilities & Infrastructure

- a. Laurel provided each city with a list of example critical and essential facilities and asked each city to come up with a list of assets in their own communities.
- b. Gary McQueen provided Laurel with a detailed list of Sandy's community assets from the Sandy Fire District #72 2008 Risk Assessment study. The list includes schools, special populations, mobile homes and hotels, churches, fuel/oil stations, hazardous materials locations, infrastructure and utilities, transportation networks, food/supply stores, and public facilities.
- c. The City of Damascus has similar lists of community assets but did not bring it to the meeting. Erika Palmer will update the Damascus list.
- d. Alice Lasher and Erika Palmer will sit down together and review each city's list to ensure all assets are listed. Once this list is created they will post it to each city's website to allow time for the public to comment on the list.
- e. Once the lists have been finalized they will be sent to Laurel for inclusion in each city's plan.

4. Hazard Identification

- a. Laurel created a handout detailing each of the following hazards: flood, landslide, wildfire, earthquake, severe storms, and volcano. The group went over each hazard and added information on causes and characteristics, history, location and extent, impacts, and mitigation efforts completed thus far. Finally the group compared each city's probability of future occurrence and vulnerability ratings to the county's ratings.



- b. Both cities noted that they have a fair amount of pre-existing, non-conforming developments in city limits.
- c. Both cities also noted they have large numbers of mobile homes. Manufactured homes are at a higher risk to damage than stick and mortar buildings.
- d. Flood
 - i. HISTORY:
 - 1. The flooding history in the county's NHMP accurately details the historical flooding events in Damascus and Sandy.
 - 2. The January 1-2, 2009 winter storm event led to flooding throughout Sandy and Damascus. Both cities agreed this flood event was worse than the 1996 floods. Interestingly the floodplains were not as impacted as areas outside of the traditional floodplain. This flood event mostly impacted each city's culverts and smaller tributaries. Many homeowners rerouted these smaller tributaries and caused more damage and flooding to their neighbors and other parts of the city.
 - ii. LOCATION AND EXTENT:
 - 1. The smaller tributaries in Sandy include Tickle Creek, Cedar Creek, Badger Creek, and numerous culverts alongside roads. The Sandy River is Sandy's main tributary.
 - 2. The smaller tributaries in Damascus include: Rock Creek, Richardson Creek, Sunshine Creek, Nover Creek and Deep Creek. Many of the city's creeks have their own local names or no names because they are so small. The Clackamas River is Damascus' main tributary.
 - iii. IMPACTS:
 - 1. Many citizens in Sandy and Damascus depend on culvert bridges to get to their homes and some of these culverts were washed out, cutting off citizens from their homes.
 - 2. The culvert along Hwy 212 (Damascus) eroded to the side of the pavement in some places.
 - 3. In Damascus one home is built in the natural stream bed so water rushed into their home during the Jan 2009 event. The tributaries leading to this house had to be rerouted to divert water away from the home.
 - 4. Other Damascus homes had basement flooding.
 - 5. Sandy lost two trailers and many homes experienced crawlspace flooding.
 - 6. Carver Mobile Home Ranch in Damascus is located in the floodplain and has flooded in the past.

7. Sandy's sewage treatment plant could be isolated in a bad flood because the road leading to the plant is in the floodplain and could be washed out.
8. In Damascus many roads have been cut off in past flooding events including Telford Road, Johnson Creek Road, Foster (Hwy 26), and Troge Road. Erika Palmer will provide Laurel with a list of these roads.

iv. **MITIGATION EFFORTS:**

1. Sandy has a stormwater management plan and Damascus is working on one. The Damascus stormwater management plan will include a comprehensive drainage assessment.
2. Damascus has hired people to clean out culverts.
3. Both cities are working on a "disaster series" for the residents in east Clackamas County. They would like to host classes on flood mitigation practices, including information on proper culvert maintenance.
4. Sandy would like to do more landslide assessments with relevant agencies and public involvement. This could be an action item for next meeting.
5. Both cities are participants in the National Flood Insurance Program
6. Damascus has a floodplain ordinance.
7. Damascus is in the process of implementing bio-soils.
8. Sandy has stormwater detention basins build into all systems which release water into streams slowly.

v. **PROBABILITY OF FUTURE OCCURRENCE**

1. Sandy and Damascus say the probability is high, which is in agreement with the county's rating.

vi. **VULNERABILITY ASSESSMENT**

1. Sandy and Damascus rate their vulnerability as medium, which is higher than the county's low rating. This is because Damascus and Sandy are largely bedroom communities so they depend on traveling out of the city for work. In large flooding events their transportation routes could be cut off.

e. **Landslide**

i. **HISTORY:**

1. The county plan lists landslides on the following streets in Damascus: Ridge Road, Gronlund Road, Lusted Road, Borges Road, Barton Park, Fabion Loop(might be in the Welches area), Hwy 26, Hwy 224. Erika will send Laurel the list of historic landslides in Damascus.
2. The county plan lists landslides on the following streets in Sandy: Gronlund Road (not in the sandy area), Lusted



Road, Fabion Loop (not in the sandy area), Ten Eyck Road, Hwy 26, Bluff Road, Barlow Trail, Laughing Water Road, Salmon River Road

3. Damascus has a map of all historical slides
4. Sandy - 1980 Ten Eyck Road slide left hwy 26 closed for 3 to 4 months
5. January 1-2, 2009 – the severe winter storm led to flooding and landslides. A landslide took out the 911 service in Sandy for some time due to a fiber optic cable being damaged.

ii. LOCATION AND EXTENT:

1. Hwy 26 and 224 have had historic slide events
2. Coalman Road in Sandy has steep slopes on the east end and saw minor activities in the January 2009 event
3. Laughing Water Road in Sandy has had some sliding activity
4. Bluff Road in Sandy is a potential slide area. Good vegetation is established along the road but it's a very steep slope and in some areas there isn't too much slope along the road.
5. Park Street in Sandy is built entirely on fill. Areas built on fill are subject to liquefaction in a earthquake event.
6. Kingswood Drive in Damascus has their own private water utility on top of a hill.

iii. IMPACTS:

1. If Bluff Road in Sandy slid it could take out the water line. There are not too many customers on Bluff Road so the impact would not be very great.
2. Park Street has houses built on it so a landslide event would greatly impact them.
3. Significant economic impacts are possible with local and/or regional landslides that impact transportation routes, especially when you take out the road to Mt. Hood (skiing).
4. Social impacts too (visually unappealing, etc).
5. Water quality and wildlife habitat could be impacted by a large slide. Sandy has an agreement with Portland to get water assistance. They will have two separate water sources when the agreement is done (Bull Run water).
6. Sandy and Damascus have a big mountain biking/hiking community so these could be impacted in addition to the ecosystem issues.
7. There is a water diversion dam on alder creek accessible by helicopter and going through the creek. They doubt a slide would plug the dam but if a lot of trees came down into the creek it could plug the diversion intake. It would be



unlikely they would be able to move equipment into this area within any reasonable amount of time.

iv. MITIGATION EFFORTS:

1. Damascus is in the works of putting together a steep slope development code to create steep slope overlays.

v. PROBABILITY OF FUTURE OCCURRENCE

1. Damascus and Sandy both agree with the county's high probability rating

vi. VULNERABILITY ASSESSMENT

1. Damascus and Sandy both say they have a moderate vulnerability to landslides. This is higher than the county's low rating because these cities rely on highways 26 and 224 so much. There have been many historical slides along these routes and cutting off the highways has a huge impact on the cities, and on tourism.

f. Wildfire

i. HISTORY:

1. While the history of wildfires is minimal, it doesn't provide a proper indication of the level of risk the cities are at. There is an unnatural buildup of fuels in the forests, creating a very high level of risk.
2. Debris burn escape is the biggest source of fire in eastern Clackamas County.

ii. LOCATION AND EXTENT:

iii. IMPACTS:

1. None of the benefits listed in the county's NHMP will actually be "benefits" because the forest is no longer in a natural state. The fires will completely destroy the soil due to the high amount of fuel buildup on the forest floor.
2. West of the cascades there is a much higher risk of catastrophic wildfire because the climate prevents frequent occurrence of wildfires.

iv. MITIGATION EFFORTS:

1. Sandy has a community wildfire protection plan but the risk assessment will need to be updated slightly.
2. Boring Fire District has a wildfire protection plan.
3. Both cities participated in the creation of the Clackamas County Community Wildfire Protection Plan.
4. Sandy Fire District #72 offers classes on defensible land space.
5. Sandy Fire posts signs at nurseries informing people of fire resistant plants, pruning classes.
6. Biomass utilization efforts going on in the county
7. The cities participate in the Fire Prevention Co-op.



8. Sandy has an “Ask Alice” column in their local newspaper which provides the citizens to ask Alice Lasher fire and emergency questions.
 9. Sandy has a media awareness campaign during fireworks season.
 10. Both cities have forms that identify access issues to houses with too many branch overhangs.
 11. Both cities have nuisance ordinances that prohibit tall grasses within city limits.
 12. Sandy Fire purchased Trimble units – handheld GPS units that can be used for a fire risk assessment. At this time they do not have the capability to do this.
- v. PROBABILITY OF FUTURE OCCURRENCE
1. Sandy and Damascus both agree their vulnerability is ‘moderate’, which is in agreement with the county’s plan.
- vi. VULNERABILITY ASSESSMENT
1. Sandy and Damascus both agree their vulnerability is ‘high’, higher than the county’s ‘moderate’ rating. This is because many areas in these cities do not have evacuation plans and they only have one way in and one way out. Loss of life is a huge potential because of this.
- g. Severe Storm: Wind and Winter
- i. Sandy isn’t always influenced by the cold air from the gorge.
 - ii. HISTORY:
 1. January 1980 – people were without power for about a week and a half
 2. December 2003 to January 2004 - 3 inches of ice covered the cities. A fire started in Sandy after a power line was pulled down. Many injuries occurred from people falling on the ice or getting their legs caught and twisted in the ice.
 3. November/December 2006 – trees fell onto Hwy 26 and it had to be closed
 4. January 1-2, 2009 – the snow levels were so high the fire hydrants were covered and difficult to find. Sandy lost 911 service for some time because of a landslide. Snowmobiles were needed to access some citizens on private access roads. Some people needed help getting out of their homes for medical appointments, food shopping, and prescription refills.
 - iii. LOCATION AND EXTENT: City-wide
 - iv. IMPACTS:
 1. Every year Sandy loses power to the water plant but they have a generator now. The power is often cut by falling trees.



2. A shelter was activated in Damascus for the winter storm of January 1-2, 2009

v. MITIGATION EFFORTS:

1. The utility company trims the trees around the power lines
2. Sandy Fire Department bought two 4-wheel drive fire engines so they could maneuver easier in the ice/snow
3. Sandy Transit Department bought a 4 wheel drive vehicle which was used to transport citizens to get supplies, etc
4. Sandy has a CERT Team
5. Volunteer Now is a database for citizens to register what resources they have

vi. PROBABILITY OF FUTURE OCCURRENCE

1. Sandy and Damascus say the probability of wind events is 'high', which is higher than the county's 'moderate' rating. The cities seem to have a wind event each year.
2. Sandy and Damascus agree with the county's 'high' rating for winter storm events

vii. VULNERABILITY ASSESSMENT

1. Sandy and Damascus agree with the county's 'moderate' vulnerability rating for winter storms.
2. Damascus and Sandy say the vulnerability to wind storms is 'moderate' because they get them every year and most of their utilities are above ground, making them more vulnerable to falling tree branches and wind debris.

h. Earthquake

i. HISTORY:

1. The county plan accurately details the earthquake events for Damascus and Sandy.
2. March 25, 1993 – Molalla high school had to tear down buildings because it was severely damaged

ii. LOCATION AND EXTENT: city-wide

iii. IMPACTS:

1. Sandy Main Fire Station, Damascus fire station, and Roslyn Lake fire stations are not seismically sound
2. Damascus has one older grocery store and the city sees this as a vulnerability.
3. Homes on Bluff Road could be impacted
4. Park Street in Sandy is built entirely on fill. Areas built on fill are subject to liquefaction in a earthquake event.
5. Both cities have a number of older structures build before the stricter building codes were implemented
6. Sandy's water treatment building is a cinder block building
7. In Damascus the Kingswood water facility could be impacted

iv. MITIGATION EFFORTS:



1. There are a number of educational outreach efforts for Damascus and Sandy about earthquake safety and ways of reducing losses to life and property.
 - v. PROBABILITY OF FUTURE OCCURRENCE
 1. Both cities agree with the county's 'high' rating
 - vi. VULNERABILITY ASSESSMENT
 1. Both cities agree with the county's 'high' rating
- i. Volcano
- i. HISTORY:
 1. The county plan accurately describes the historical volcanic events for Damascus and Sandy
 - ii. LOCATION AND EXTENT:
 1. Mt. Hood will shoot out lahar and potentially wipe out Troutdale.
 2. Both cities will be entirely coated in ash.
 - iii. IMPACTS:
 1. The dams would be affected. Bull run water will be impacted
 2. Dust and ash will cause breathing problems and create issues for engines.
 3. Roofs could collapse because of the heavy ash coating.
 4. Protecting livestock from the ash will be an issue
 - iv. MITIGATION EFFORTS:
 - v. PROBABILITY OF FUTURE OCCURRENCE
 1. Both cities agree with the county's 'low' rating
 - vi. VULNERABILITY ASSESSMENT
 1. Both cities agree with the county's 'high' rating
5. Next Time
- a. Laurel handed out the action item worksheet and asked the group to be thinking about action items to correspond with the identified vulnerabilities. At the next meeting we will discuss action items and the formal review process.
 - b. The next meeting is scheduled for Friday, March 20th from 9am to 1:00pm at Sandy Main Fire Station.

Natural Hazard Mitigation Plan Update Meeting #1

Cities of Damascus and Sandy
 February 20, 2009
 9:00am to 1:00pm

food \$30

| First | Last | Agency | Job Title | Email | Roundtrip Mileage |
|------------------------|------------|----------------------------------------------------------|-----------------------------------------------|-------------------------------------------------|-------------------|
| Jeth | Atkinson | City of Sandy | Finance Director | sathinson@ci.sandy.or.us | |
| MARTIN | MONTGOMERY | City of Sandy | Public Works | mmontgomery@ci.sandy.or.us | |
| Carnetta | Boyd | Corbett NERT | Logistics Trainer, section chief | Koalaty7@gmail.com | |
| Kathleen | Reiter | Corbett NERT HAM | ? Mult. Co. CERT Liaison | nreiter@zw.blackberry.com Brewkatrit@aol.com | |
| Alice Lasher | | Sandy Fire | ? | sfd72fmo@hotmail.com | |
| Gam McQueen | McQueen | Sandy FD | Chief | g.mcqueen@sandyfire.org | ⊗ |
| CRAIG | BROOKS | OTSD #46 | ASSISTANT FACILITIES SUPERVISOR | brooks c1@ortrail.k12.or.us | ⊗ |
| JIM | SEIPEL | OTSD 46 | DIRECTOR OF FACILITIES & ^{NUTRITION} | seipelj@ortrail.k12.or.us | |
| ENKA | Palmer | City of Damascus | Associate Planner | epalmer@ci.damascus.or.us | |
| CURIS | ALFINO | City of Damascus | GIS TECH | CALEFINO@CI.DAMASCUS.ORG.US | |
| HELEN | TURNER | ESTARADA FIRE | ? | h70hf@hotmail.com | |
| Harold | Skelton | Sandy PD | Police Chief | hskelton@ci.sandy.or.us | |
| Megan | Findley | Oregon Partnership for ^{Disaster} Resilience | PSM Program Manager | mfindley@uoregon.edu | NA |
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Meeting: Damascus & Sandy Natural Hazards Mitigation Plan Meeting 2
Date: March 20, 2009
Time: 9:00am to 1:00pm
Location: Sandy Main Fire Station

AGENDA

1. Meeting Attendees
 - a. Chris Alfino, City of Damascus
 - b. Seth Atkinson, City of Sandy
 - c. Carnetta Boyd, Corbett NERT
 - d. Alice Lasher, Sandy Fire Department
 - e. Gary McQueen, Sandy Fire Department
 - f. Erika Palmer, City of Damascus
 - g. Dennis Simons, Sandy Fire Department and Police Department
 - h. Harold Skelton, Sandy Police Department
 - i. Dan Thompson, Oregon Trail School District

2. Formal Review Process and Plan Maintenance
 - a. Laurel provided the committee with a handout of questions to answer for maintaining the plan.
 - b. The Sandy EOC Group decided they will assign representatives to the committee, not the City Council.
 - c. The Damascus City Council will assign representatives to the committee.
 - d. The Sandy EOC Group meets on the third Friday of every month, so they will continue to meet monthly and discuss the NHMP at each meeting.
 - e. The Damascus committee will meet twice a year, once in the spring and again in the fall
 - f. At each meeting the committee will identify funding for the implementation of mitigation strategies, evaluate the effectiveness of the plan, develop new mitigation strategies to reduce losses from natural hazards, and detail any new hazard events.
 - g. The NHMP will be formally evaluated every 5 years in conjunction with the county's update schedule. This puts the plan update at September, 2012.
 - h. The convener will be responsible for initiating the update process.
 - i. The convener or designee will be responsible for updating the NHMP.
 - j. All City of Sandy plans are reviewed in January so the Sandy NHMP will begin review in January 2012.
 - k. The Damascus plan will have a one-year timeline for update. The update process will begin one year before the update is due, meaning the plan will next be updated beginning in September 2011.

- l. Laurel included a list of questions the committee should ask for future meetings. This list will be included in addendum.
 - m. The convener will submit the updated addendum to OEM.
3. Review Anatomy of an Action Item
 - a. Laurel provided the committee with a handout that detailed the parts of an action item and explained ideas for implementation, coordinating organization, timeline, and internal/external partners.
 4. Brainstorm Action Items
 - a. Laurel provided the committee with a list of potential action items
 - b. The committee reviewed each action item and modified it to their liking.
 - c. The list of action items can be viewed in a separate attachment
 5. Next Steps
 - a. Finally, Laurel told the group how the rest of the update process will go. Laurel will create a draft and send it to the committee for review. Once the committee has reviewed it, the document will be sent to the Oregon Partnership for Disaster Resilience for review, and then returned for a second committee review if changes need to be made. Finally the document will be FEMA for pre-approval.
 - b. Once FEMA has pre-approved the addendum, it will come back to the city for adoption by the City Council. Once the plan is adopted it will be sent to FEMA for formal approval.
 6. Shameless Plug: “Open for Business” Business Continuity Planning
 - a. Finally, Laurel informed the group about “Open for Business” a free web-based program that allows businesses to create customized property protection and recovery plans
 - b. For more information contact:

Adam Crawford
Oregon Partnership for Disaster Resilience
Acrawfo1@uoregon.edu
541-346-7331

March 20, 2009

Sandy/Damascus NHMP Update Meeting #2

| <u>Name</u> | <u>Representing</u> | <u>Email</u> | <u>Miles traveled</u> |
|----------------|---------------------------|----------------------------|-----------------------|
| Carnetta Boyd | Corbett NERT | Koalaty7@gmail.com | 20 |
| Alice Lasher | SFD | sfd72fmo@hotmail.com | 2 |
| Dennis Simons | Sandy Fire/lobes | kelsimons@earthlink.net | |
| Harold Skelton | Sandy PD | hskelton@ci.sandy.or.us | 0 |
| DAN THOMPSON | OREGON TRAIL School DIST. | Thompson@ORTRAIL.K12.OR.US | |
| Gary McQueen | Sandy FD | g.mcqueen@sandyfire.org | |
| Elka Palmer | DAMASCUS | epalmer@ci.damascus.or.us | |
| Chris Altino | DAMASCUS | caltino@ci.damascus.or.us | |
| Seth Atkinson | Sandy | Satkinson@ci.sandy.or.us | |