

Hazard Mitigation Plan for the City of Auburn, Washington

Introduction

Hazard mitigation is defined as the “effort to reduce the loss of life and property, economic disruptions, human suffering, and disaster-assistance cost by lessening the impact of disasters” (FEMA, n.d.). The Disaster Mitigation Act 2000 (DMA) is an amendment of the Robert T Stafford Disaster Relief and Emergency Assistance Act of 1988. “This legislation is aimed primarily at controlling and streamlining the administration of federal disaster relief and mitigation programs, and places emphasis on pre-disaster mitigation planning to reduce the nation’s disaster losses” (Schwab, 2007).

In order for states to receive funding from FEMA, states must follow strict guidelines in creating their Hazard Mitigation Plan (HMP). First, any state activities must relate to hazard mitigation. Second, the state must plan, prepare, and submit a State Mitigation Plan. Third, the state must make grant funding available to local jurisdictions with hazard mitigation and planning projects. Last, the state must provide local jurisdictions with technical assistance and training to develop their hazard mitigation plans (FEMA, 2008). The expectation for local governments, on the other hand, is simpler. To receive federal funding, they are expected to prepare, plan, and adopt a Local or Multi-Jurisdictional Mitigation Plan, as well as, review and update the mitigation plan every five years.

This paper will focus on creating a local Hazards Mitigation Plan for the City of Auburn in Washington State. The plan will follow the DMA guidelines in *The Hazard Mitigation Planning Process* and FEMA’s *Developing the Mitigation Plan*, and focus on the areas of organizing resources, assessing risks, developing the mitigation plan, and implementing the plan and monitoring its progress (FEMA, 2003).

City of Auburn Profile

The City of Auburn, which lies 20 miles south of Seattle, is located in the southern part of the Puget Sound region in the western portion of Washington State. Auburn “has an area of approximately 29.83 square miles, with approximately 28.17 square miles located in King County, and approximately 1.66 square miles located in Pierce County” (Keippala, 2013). As of 2012, the population of Auburn was 73,505 which was an increase from the last census from 2000 with an increase change of 82.3% (City Data, n/d).

What was once a farming community, Auburn has become a mixture of residential neighborhoods, and commercial and industrial areas. Some of the major businesses that help support the Auburn community are Boeing, the Safeway Distribution Center, Auburn Municipal Airport, MultiCare Auburn Medical Center, the Auburn School District, the Muckleshoot Casino, Emerald Downs Racetrack, The Outlet Collection Mall, and the Burlington Northern Santa Fe (BNSF) Railway.

The city lies mostly in the Auburn-Kent river valley that is bordered by the Green and White rivers, as well as the Bowman, Mill and Olsen Creeks. Mount Rainier is located 55 miles south-east of the city with the Puget Sound is 14 miles to the west. With the geographically diverse area around the City of Auburn, and with major highways and railways that go through the city center, Auburn’s mitigation plan needs to consider the possibilities of natural and technological hazards.



Figure 1: Map and boundaries of the City of Auburn

Phase I: Organizing Resources

Since 2004, the City of Auburn has been an active participant in King County’s Regional Hazard Mitigation Planning Process. It has continued to support, coordinate and participate in the King County Regional Hazard Mitigation Plan (RHMP), and has used the hazard data and analyses to create and “identify long term strategies for reducing or eliminating the long-term risk to human life and property from hazards” (Keippala, 2013) in their own city’s mitigation plan. The focus for this portion of the Hazard Mitigation Plan (HMP) will be on how the City of Auburn will define the scope of the planning area, assess community support, establish a planning team, and engage the community.

Define the Planning Area

The City of Auburn’s HMP will encompass all within the city’s boundaries (see Figure 1). Although Auburn lies between two counties, King and Pierce, its HMP will follow the guidelines set by King County’s RHMP.

Assess Community Support

“Regulations of the DMA require that the public be invited to participate in at least two phases of the process: when the plan is in the draft stages, and prior to plan approval” (Schwab, 2007). Prior to beginning the planning process, the community would need to be informed about the drafting of the mitigation plan and the potential hazards that it is going to address. Inviting the community for feedback is a key element that is “necessary for successful planning and program development for knowledge, support and resources” (FEMA, 2006).

There are multiple ways and resources that the HMC can use to reach out to the community and sharing information about HMP. With the advancement of technology, the HMC can use the media, city or county websites, or social media to share information. Here in the state of Washington, King County’s Office of Emergency Management has their Regional Hazard Mitigation Plan (RHMP) and the City of Auburn have their HMP posted on their websites. It has a list of participating jurisdictions, frequently asked questions about hazard mitigation, and especially, how the public can be involved with the plan by filling out surveys, attending steering committee meetings, or where public reviews will be held (e.g. libraries, etc.).

Establish a Planning Team

At the beginning of the mitigation process, the planning team or Hazard Mitigation Committee (HMC) would need to be established. The HMC for the city of Auburn would consist of representatives from all city departments, including Auburn Police Department and Valley Regional Fire Authority (VRFA). Other representatives from outside the local government would include representatives from Boeing, the Muckleshoot Tribe, Auburn School District, Safeway Distribution, Green River Community College, Department of Public Health,

Department of Natural Resources, Army Corps of Engineers, BNSF and MultiCare Auburn Medical Center. The experience and expertise of each of these representatives and what department or corporation they represent would provide a better understanding of “how residents, businesses, infrastructure, and the environment may be affected by all hazard events” (Pierce County Department of Emergency Management, 2009).

Once the HMC is established, they would need to be “officially recognized” from the local governing body, in this case, Auburn’s mayor and city council. The purpose to obtain official recognition is so that the HMC “planning efforts will be more successful if the team has official authority to develop and implement a hazard mitigation plan” (FEMA, 2006).

The HMC would also need to create a manageable timeline and meet throughout the year to begin drafting the HMP for the city. It is during these meetings that the HMC would discuss the DMA and the mitigation process, the hazards in the area and what risks they impose on the community and infrastructure, listing critical facilities (e.g. Reservoir earthquake retrofit and electronic and data enhancements and archives), deciding what mitigation is needed, what resources are available, and who would be responsible for each task.

Part of FEMA’s planning criteria is that the “planning process be fully documented, including the efforts of engaging the public” (Schwab, 2007). Providing thorough documentation on the planning process will allow FEMA and other state and local jurisdictions on *who* was involved in the planning process, *when* did they meet and how often, *what* discussions and information was shared during the meetings, and any drafts of the plan.

Engage the Community

“Public participation is a key component to strategic planning processes. Citizen participation offers citizens the opportunity to voice their ideas, interests, and opinions” (Pierce County Department of Emergency Management, 2009). By organizing public meetings, publishing media releases, posting a link on the city’s website, or even attend and share information at various council meetings, the HMT would have the opportunity to provide “disaster statistics and public safety within the area, economic costs and benefits, as well as, the benefits of hazard mitigation planning” (FEMA, 2006).

Encouraging public participation, gives them the chance to ask questions, make suggestions, and provide feedback on the mitigation plan while still in the drafting stage allows them to “engage in authentic dialogue and share what resources are available and identifying their needs” (FEMA, 2012).

Phase II: Assess Risks

The basis for effective hazard mitigation is through a thorough assessment of possible hazards within the community (FEMA, 2006). It is during this phase that the hazards are identified; the location and extent of each hazard, previous hazard events with this area, and the probability of the hazard occurring again.

Profiling Hazards

As part of a multi-jurisdictional partnership with King County, the City of Auburn reviewed the potential risks and vulnerabilities listed in other county plans and “utilized the data contained in them as a basis for its risk assessment: Regional Hazard Mitigation Plan of King

County (RHMP), King County Flood Control District Hazard Mitigation Plan, and Pierce County Natural Hazard Mitigation Plan” (Keippala, 2013). The data used in this section of the report is specific to the hazards and vulnerabilities in and around the city.

To help identify the probability of a hazard event and the potential impact on the community, the City of Auburn used a Vulnerability Matrix, in accordance with the King County’s (RHMP). The *probability of occurrence* is defined as the likelihood that a hazard will affect a specific area, in this case the City of Auburn. The *impact* is defined as how the hazard will affect the specific area in terms of the loss of life and property. The criteria used to rate the probability of a hazard occurrence and the potential impact were listed as high, moderate, and low probability (Keippala, 2013). The RHMP defines the risk ratings as:

High Probability and Risk: The possibility of the hazard happening once a year, and the risk is significantly higher for a larger portion of the population. It is during this rating that warrants a major effort to prepare for, respond to, recover from, and mitigate against the hazard.

Moderate Probability and Risk: The possibility of the hazard happening once every two to ten years, and only part of the population is at risk. It is during this rating that warrants a moderate effort to prepare for, respond to, recover from, and mitigate against the hazard.

Low Probability and Risk: The possibility of the hazard happening once every 50 to 1,000 years, and a smaller segment of the population is at risk. It is during these rating warrants a modest effort to prepare for, respond to, recover from, and mitigate against the hazard.

Table 1: The City of Auburn's Hazard Vulnerability Matrix 2013

Hazard	Frequency/Probability	Impact
Airport Incident	Low	Moderate

Avalanche ¹	Low	Low
Dams/Dam Safety	Low	High
Drought	Low	Moderate
Earthquake	Low	High
Excessive Heat	High	Low
Flood	High	Moderate
Hazardous Materials	Moderate	High
Landslide	High	Moderate
Seiche	Moderate	High
Severe Weather	High	Moderate
Volcano	Low	High
Fire Hazards/WUI Fires	Low	Moderate
Tsunami ²	Low	Low

Hazard Identification

Part of the creating the mitigation plan is to identify the hazards that the community may face. There are many resources where the HMC can retrieve hazard information; for example, by interviewing residents within the community or experts from the scientific community; research archived newspapers, historical records, or archived media sources. The Internet also provides credible resources from websites like FEMA, the U.S. Geological Survey (USGS), the National

^{1,2} Although the hazards of avalanche and tsunami are identified in this Hazard Vulnerability Matrix, they were included to maintain consistency with the original Multi-Jurisdictional Hazard Mitigation Plan created in 2004. The potential of the City of Auburn to be impacted by these hazards does not warrant further assessment of threat, vulnerability and severity (Keippala, 2013).

Oceanographic and Atmospheric Agency (NOAA), the U.S. Army Corps of Engineers (USACE), and the Department of Natural Resources (DNR).

The city of Auburn and its surrounding areas are at risk of various natural and technological hazards (see Table 1). It is important for the HMC to list and prioritize these hazards on their frequency, impact, the high risk of vulnerability, and mitigation efforts. Although there are fourteen various hazards that have the potential to impact this area, this report will only focus on two natural hazards (e.g. flooding, and landslides) and one technological hazard (e.g. hazardous materials).

Natural Hazards

Flooding

Definition

“Flooding is generally the result of the excessive precipitation that can occur during a hurricane, thunderstorm, or other torrential rainfall. Flooding can also be caused by a dam or levee failure” (Schwab, 2007). Here in the Pacific Northwest, flooding usually occurs in the winter months primarily from November to early March. It is usually during this time when the area is frequently impacted by warm, wet, weather systems, also known as the “Pineapple Express”. The most common cause of flooding is when the Cascades already have a substantial amount of snow accumulated, and combined with the warmer temperatures and increased rainfall, would create snow runoff that would fill the rivers over a period of days. With the differences in elevation in this area, the higher elevations may see some flooding along the streams and rivers, whereas the lower elevations will see more flooding along the valley floor.

Extent

Flooding around Auburn primarily occurs along the White and Green rivers, which border the city. River flooding is controlled along both rivers by dams, so any significant flooding would only be caused by a significant amount of rainfall. If a significant amount of rainfall occurs, the



Figure 2: FEMA Flood Hazard Map. Existing (blue) and Proposed (green)

dam operators would increase the spill flow of the rivers to prevent over-topping. During the winter months or during a significant amount of rainfall, flood levels are measured in cubic feet per second (cfs). Along the Green River, some minor flooding will occur upstream from Auburn around 7,000³ cfs; 9,000⁴ cfs would be considered moderate flooding and begin to flood in the river valley; however, if the output increases to 12,000⁵ cfs, there is the danger of levee failures along the river. Since the Green River runs through the northern portion of the city, that area would be more at risk of higher flood stages.

The White River, which runs along the south end of the city, will see some minor flooding around 8,000⁶ cfs. The City of Auburn will usually not be impacted by the flood levels

^{3,4,5,6}Source: Green River Flooding Information (<http://green.kingcounty.gov/rivergagedata/gage-data.aspx?r=green>)

of the White River; however, the City of Pacific, which is located downstream, will be affected by higher flood levels.

Probability

Since the flooding is controlled along the Green and White Rivers by the Howard Hanson and Mud Mountain dams, any considerable number of major flooding is kept to a low-moderate level. Auburn does get some arterial flooding which is caused by clogged storm drains or a significant amount of rainfall in a short period. The combination of both types of flooding, arterial and river, lists the probability at Moderate.

Vulnerability

Since the Howard Hanson Dam controls the flood levels along the Green River, the flood vulnerability is ranked from Low to Moderate. “If a moderate to severe flood were to occur along the Green River, approximately 10,000 residents might be directly impacted, along with more than 400 businesses” (Keippala, 2013). If the Green River flooded by the Auburn-Kent valley, and companies like Boeing, the Safeway Distribution Center, or BNSF railway were affected, it would not only severely impact the City of Auburn economically, but also the neighboring cities and region, as well.

History

Prior to the completion of the Howard Hanson Dam in 1961, flood water from the Green River would spread across the valley floor. “Over the past 70 years, the valley has flooded more than 30 times, heavily damaging lands and buildings” (U.S. Army Corps of Engineers, n/d). It

wasn't until 1955, when funding was made available by Congress, Washington State Government, and by King County totaling an estimated \$39 million⁷. The table below is an example of flooding in and around the City of Auburn from the last ten years.

Table 2: Significant Flooding Events in the City of Auburn

Date⁸	Incident	Impact	Est. Value
November 2-11, 2006	Severe Storms/Flooding Presidential Disaster Declaration 1671-DR-WA	Blocked storm drains; arterial flooding; emergency generators at seven sewer lift stations.	\$26,362
December 1-7, 2007	Severe Storms/Flooding Presidential Disaster Declaration 1734-DR-WA	Weather event resulted in water over roadways at 37 th Street NW, A Street SE, West Valley Highway, and 116 th Avenue SE. Various Roadways were closed and parking lots were flooded.	\$3,289
January 6-16, 2009	Severe Winter Storm/ Flooding Presidential Disaster Declaration 1817-DR-WA	Minor flooding impacts due to heavy precipitation: roads, parks, and golf course. Channel of the White River was altered, causing a washout upstream. Sewer system damage, causing sewage to backup into homes. Provided mutual aid to the City of Pacific due to extensive flooding there. This specific storm caused damage to the Howard Hanson Dam, which controls the Green River. This caused ongoing emergency protective actions, including protective measures as well as extensive planning with multiple jurisdictions and agencies in case the Dam failed.	Initial expenses \$87,851 Ongoing expenses totaling an estimated \$4 Million
December 8-18, 2010	Rain Event	Heavy rain throughout the area caused minor flooding.	\$1500
January 11-21, 2011	Severe Winter Storm/Flooding	A severe winter storm brought heavy rain to the area, elevating the level of the Green River. Minor flooding occurred in an Auburn park as well as the backyards of a	\$93,954

⁷ Source: U.S. Army Corps of Engineers
(<http://www.nws.usace.army.mil/Missions/CivilWorks/LocksandDams/HowardHansonDam.aspx>)

⁸ Source: King County Regional Hazard Mitigation Plan – City of Auburn Annex
(<http://www.auburnwa.gov/Assets/EM/AuburnWA/Docs/hazmit2013.pdf>)

		mobile home park. Sandbagging was required.	
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Mitigation

The Howard Hanson and Mud Mountain dams continue to provide mitigation measures for the Green and White Rivers. Both are flood control dams that are managed by the U.S. Army Corps of Engineers. In addition to the dams, the City of Auburn along with other jurisdictions, have engaged in flood mitigation projects especially in regards to the Green River. The City has supported and benefited from the actions of the King County Flood Control District which has made improvements by creating setbacks, replacement structures, and upgrading the levee system along the river. “All of these actions include some level of state funding, running into the tens of millions of dollars” (Tassoni, 2013).

Development Trends

Since the 1970’s the area along the Green River had started to see rapid growth, especially with the towns of Covington, Black Diamond, and Enumclaw. “Land development estimates that the largest areas of future development will be in the Lower and Middle Green River areas” (Gibbs, 2010).

Most of the White River flows through unincorporated King County, with a small portion flowing through the Muckleshoot Indian Tribe Reservation and the cities of Auburn and Pacific. The development along the White River is primarily commercial, industrial and residential, mostly located in the Auburn and Pacific area.

Land Use Plans

The land use around the Green River varies from the upper, middle and lower sections of the river. The upper section of the river is primarily forestland, whereas the middle section mostly consists of farmland and rural and urban residential neighborhoods. Land use in the upper and middle section of the river is estimated to be 50% residential, 27% forestries, and 12% for agricultural use. The lower section of the river consists mostly of urban residential neighborhoods, commercial and industrial businesses, schools, and major highways. Land use along the lower section of the river is estimated to be 50% residential, 17% industrial and 10% is zoned for commercial development. Some land along the river is also zoned for parkland.

The upper section of the White River is owned and managed by the Mount Baker-Snoqualmie National Forest and Mount Rainier National Forest. The upper portion of this river is mostly undeveloped. However, land use along the lower section of the White River has specific policies and guidelines pertaining to growth and development. The King County Comprehensive Plan (KCCP) “favors protection and conservation of the natural resources in the river corridor through regulations, incentives, and acquisition” (Laurel, 2002). Land ownership varies from the Enumclaw Agricultural Production District (APD), Muckleshoot Indian Tribe Reservation, Puget Sound Energy, and private landowners; however the only undeveloped parcel that lay within the Auburn city limits was acquired by King County was valued at \$14,000 for 13.90 acres (Laurel, 2002).

Repetitive Loss Properties

Along the Green River, there are three repetitive loss properties that have been identified by FEMA. All three properties are single-family residential; “one property is located at the south

end of Horseshoe Land, and the other two are in the 100-year floodplain of the Green River” (Gibbs, 2010). Neither of these properties and have not been mitigated at this time.

Currently, there are no unmitigated repetitive loss properties along the White River. However, in 2000, there was “a single repetitive loss property with the most flood insurance claims of any property in King County. This was mitigated through a property acquisition by the County” (Gibbs, 2010).

Flood Exposure: Economic Impact for the City of Auburn

The data used to identify the flood hazards for the Green and White Rivers were compiled by King County’s RHMP. The tool they used to perform a risk assessment on these two rivers was FEMA’s Hazard U.S. Multi-Hazard (HAZUS-MH) version MR-3. The table below shows the exposure and economic impact of flooding from the Green and White Rivers for the City of Auburn. Also listed in the Table 3, is the acronym GBS which stands for General Building Stock. GBS is aggregated data that inventories buildings by Occupancy and Building Type.

Table 4: Projected Flood Impact for the Green and White Rivers

	Estimated Population from 2009	Building Count	GBS Value Structure in \$ Exposed to a 100-Year Flood Event	GBS Value Contents in \$ Exposed to a 100-Year Flood Event	GBS Value Total Structures and Contents in \$ Exposed by a 100-Year Flood	% of Exposed GBS Value
Auburn	60,820	346	\$244,168,500	\$260,659,350	\$504,827,850	5.44%

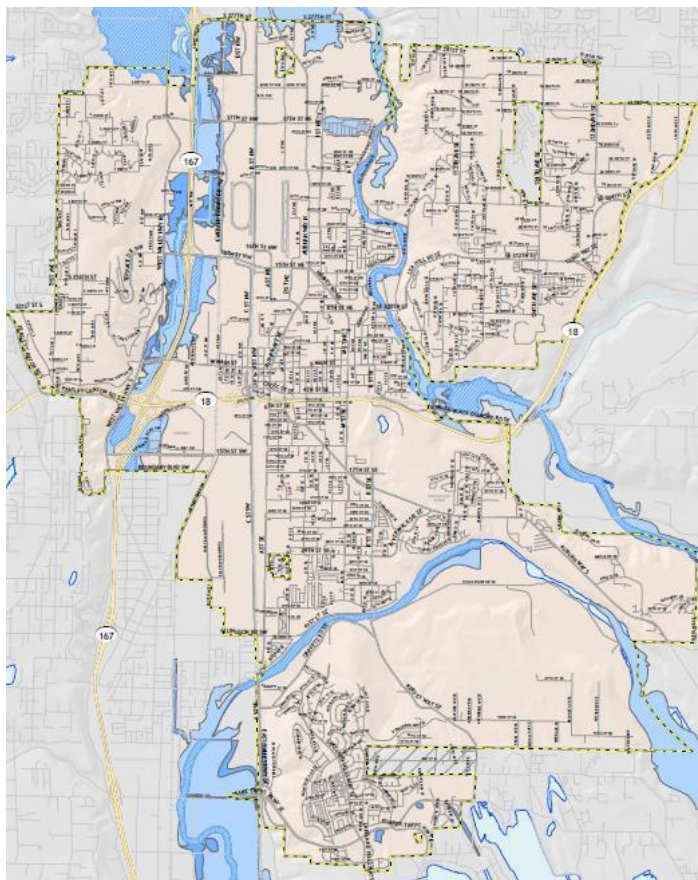


Figure 3: 1995 FEMA Flood Plain Map

identified floodplain areas.

Since 1989, the City of Auburn has participated in the NFIP program. Auburn is listed as NFIP Community #530073. “According to FEMA records, the City of Auburn held 1,509 NFIP policies as of June 2012, with a total premium of \$789,440 and a total coverage of \$419,033,000” (Keippala, 2013). At this time, the most current flood plain map by FEMA is from 1995. Looking at the information from this outdated source, there are approximately 345 residential structures and 165 businesses located on an identified flood plain.

In 2004, FEMA has produced Preliminary Digital Flood Insurance Rate Maps (DFIRMS) and a Flood Insurance Study (FIS) for the City of Auburn which focused on the potential

National Flood Insurance Plan (NFIP)

The National Flood Insurance Plan (NFIP) is a “federal program that allows residents in participating communities to purchase flood insurance, for their homes and businesses” (Schwab, 2007). A community that participates in the NFIP program helps regulate land use and development by enacting ordinances and zoning to help prevent building in

flooding impact from the Green and White Rivers. What these maps indicate is that the 100-year flood plain for the Green River was considerably larger than what the 1995 indicated.

By August 2012, the City of Auburn compiled information gathered from a recent Geographic Information System (GIS) analysis. This map showed that there were a “total of 314 structures located in the Green River and Mill Creek Floodways, including 275 residential, 20 commercial and 19 other/unclassified. No structures were identified along the White River Floodplain” (Keippala, 2013). Using this information, the City is planning for future mitigation construction projects that would modify current levee heights and increase levee setbacks.

The Community Rating System (CRS) is a “voluntary program for NFIP-participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of NFIP, and encourage a comprehensive approach to floodplain management” (FEMA, 2013). Using the CRS, the City of Auburn was given a Class 5 rating, which means that premiums for residents in high-risk communities are reduced by at least 25 percent.

Landslides

Definition

Landslides are defined as “the downward displacement of rock or soil because of gravitational forces” (Lindell et al., 2007). Landslides can be caused by many different factors, including excessive soil saturation, geological hazards (e.g. earthquakes), logging, or human development or modifications to the landscape. Landslides can vary in size and speed, but can pose a serious threat to communities, businesses, transportation systems, and critical facilities that may lie in its path. Landslide prone areas are usually from “existing old landslides, the bases of steep slopes,

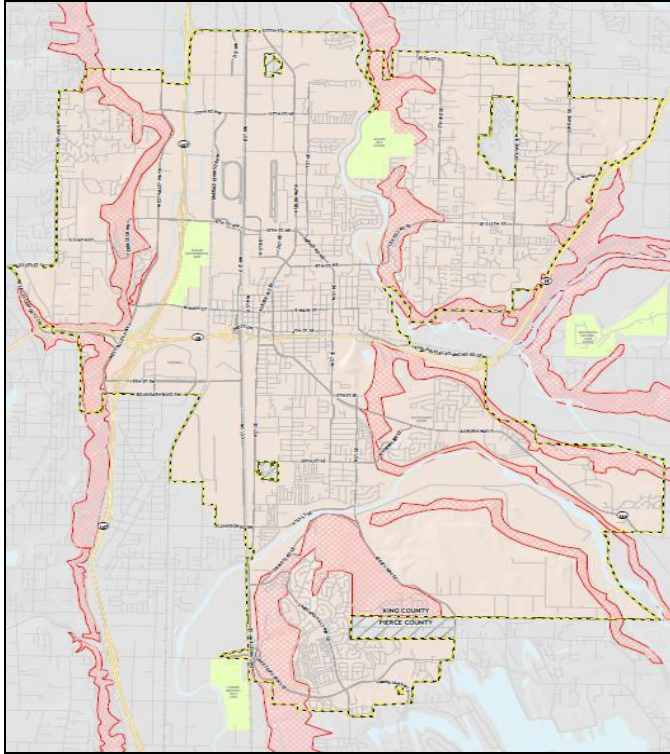


Figure 4: Landslide Hazard Map

consists of sand, gravel and silt which lay on top of layers of clay. Excessive amounts of rainfall and ground saturation combined with the soil composition and steepness of the slopes are areas where landslides may occur more often.

Probability

During the winter months, when there is a typically heavy rain event, the area around the City of Auburn usually has several small landslides a year. Since the probability of landslides occurring every year, this hazard would be rated as High.

Vulnerability

Landslide prone areas around the City lay along heavily used transportation routes; for example, the East and West Valley Highways, Peasley Canyon Road, Lea Hill Road SE and Kersey Way SE. Residents who rely on using these routes to get to or from work would need to

the bases of drainage channels, and developed hillsides where leach field septic systems are used” (Schwab, 2007).

Extent

The topography around the City of Auburn varies in elevation; for example the valley floor is mostly flat and level whereas the surrounding hillsides have steep slopes. Most of the soil in this area

find other ways around the affected area, possibly driving many miles to find another route to their destination. If there is a landslide blocking a major road, residents who live along or near these landslide prone areas, may often find themselves cut off from any outside help if there are no other accessible routes available.

History

Although the City of Auburn does have small landslides, there is no history of any major slides that have impacted the area. Annually, there is usually a small slide that may close a roadway, specifically the West Valley Highway, but only on a short-term basis and until the debris is cleared away.

Mitigation

Most mitigation efforts focused on landslide hazards are mostly “centered on land clearing and grading regulations and land use planning and zoning regulations” (Keippala, 2013).

Development Trends

Since the majority of the landslides are in undeveloped areas, there are no records of development trends.

Land Use

Most areas that are at risk of landslides in or around the City of Auburn are undeveloped or are zoned to have buffers or setbacks from the slide area. Currently, slide areas are along transportation routes and not residential neighborhoods.

Hazardous Materials

Definition

Hazardous materials are defined as “materials which, because of their chemical, physical, or biological nature, pose a potential risk to life, health, or property when released” (WA Emergency Management Division, n.d.). The release of hazardous materials can be accidental, for example, an industrial or transportation incident, or intentional as an act of terrorism.”Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials, and can affect urban, suburban, and rural areas” (Keippala, 2013).

Extent

Hazardous materials are transported through the City of Auburn along railways, highways, and pipelines; whereas some hazardous materials are also stored throughout the City in fixed locations. Businesses like The Burlington Northern Santa Fe (BNSF) and the Union Pacific Railway, Boeing, Inc, Cenex, Inc., Ferrellgas, Inc., Small & Sons, Inc., and the vicinities around the Williams Pipeline are at a greater risk of a hazardous materials release within the City. Each of these businesses are required by state and federal laws to “maintain plans for warning, notification, evacuation, and site security to limit the exposure of a chemical release” (Keippala, 2013) into the community.

Probability

The probability of a hazard material release is difficult to predict. Understanding that a major hazardous materials event poses a serious risk to health, life and property, the most common events, like a gasoline spill, are considered minor. However, considering the types of

hazardous materials are used or transported within the city limits, the probability for a major or minor event is rated as Medium.

Vulnerability

Considering the types of hazardous materials that are transported or used at fixed facilities, rating vulnerability is a challenge. If there is an intentional or accidental release of materials during transport, the community and environment within that particular area are at risk. If the contaminant is airborne, the risk of exposure is more likely to affect individuals who may have pre-existing conditions like asthma or other persistent respiratory ailments.

History

Finding information about the history of hazardous materials releases within or in the surrounding area of the City is difficult to find because many incidents may be considered minor or go unreported. At this time, the only large release that is documented was in 1995. A toxic cloud was released from the Boeing facility, located in southwest Auburn. Twelve buildings were evacuated, and some individuals needed medical attention. There were no fatalities or serious injuries during this event.

Mitigation

Since the City of Auburn is part of King County's RHMP, it does not have its own Local Emergency Planning Committee (LEMC). The City will continue to rely on King County's LEPC for any issues concerning hazardous materials. The LEPC is designated to "conduct hazard identification, vulnerability analysis, risk assessment activities, as well as, develop

emergency response plans based on the volumes and types of substances found in, or transported through, their districts” (WA Emergency Management Division, n.d.).

In addition to the City’s mitigation plan, Boeing has its own Fire Department and Level A Hazmat response team trained to handle any hazardous materials events at their facility. If a release does occur at one of Boeing’s sites, “their internal resources will be the best equipped to function as primary responders for any event within their facility” (Keippala, 2013). Boeing and the City have a Memorandum of Understanding (MOU) that if there is a release outside of Boeing’s facility, their Hazmat team will be available for assisting.

Estimating Losses

Essential Facilities

Auburn Police Department – The City’s Police Department is located in downtown Auburn near City Hall. The Department consists of 101 commissioned staff and 19 non-commissioned staff.

Valley Regional Fire Authority (VRFA) – Established in 2007, the VRFA provides services to an estimated 80,000 citizens residing throughout the cities of Algona, Auburn, and Pacific.

MultiCare Auburn Medical Center – Located in Downtown Auburn, MultiCare Medical Center is a certified Level-III Trauma Center. It has 195 beds and 24-hour emergency services and has cared for 32,000 patients annually.

Emergency Operations Center – The City of Auburn established the Emergency Management Division in 2007 and was headed by the Chief of Police. An Emergency Preparedness Manager was hired to “direct, coordinate the development, implementation, and maintenance of the

Emergency Operations Plan (EOP) as the chair of the Emergency Management Committee” (Keippala, 2013).

Public Health – Since the northern portions of the City of Auburn is located in King County, and the southern portion is located in Pierce County, public health services are provided by both the Seattle-King County Health Department and the Tacoma-Pierce County Health Department.

Auburn School District – Auburn School District encompasses a 62-mile area and serves an estimated 14,970 students. It employs 849 certificated and 778 classified staff members. The District has three high schools, one alternative high school, four middle schools, and 14 elementary schools.

Transportation Systems

Auburn Airport – The City of Auburn owns the Auburn Municipal Airport. The majority of aircraft using this airport are single-engine planes. Most aircraft activity is attributed to general transient aviation; however, a smaller part of activity is from traffic services and military activity.

Highway Infrastructure – Major highways, state highways, and arterials comprise the highway system in and around Auburn. Highway 167 runs north-to-south through the valley linking major cities like Auburn, Kent, Puyallup, and Renton. “The Washington Department of Transportation, King County Department of Transportation and local municipalities construct and maintain the highways, roads, and bridges” (Keippala, 2013) throughout the city.

Lifeline Utility Systems

Potable Water – The City of Auburn’s water supply comes from deep well aquifers and springs. The City is responsible for managing, repairing, and maintaining water service lines throughout the community.

Sewer – The City of Auburn manages the City’s wastewater which flows to King County’s regional sewage system where it is treated under federal and state guidelines. The City is responsible for managing, repairing, and maintaining its sanitary sewer system.

Puget Sound Energy (PSE) – PSE provides natural gas and electric power to most counties in Western Washington, including the City of Auburn.

Communication – There are many businesses that provide communication and information support throughout Auburn, including Comcast/Xfinity (cable/internet) and Century Link (telephone). For people who only use their cell phone for communication purposes, most major carriers (e.g. Sprint, Verizon, AT&T, etc.) are used.

High Potential Loss Facilities

Dams – The Howard Hanson and Mud Mountain Dams are used for flood control along the Green and White Rivers.

Hazardous Materials Facilities

Boeing – The Boeing Plant in Auburn fabricates parts, tools, and assemblies for commercial aircraft. By creating these products, Boeing generates hazardous waste at this facility. Through the federal Resource Conservation Recovery Act (RCRA), Boeing is required to have permits to

treat, store, or dispose of this waste.⁹ Boeing also has their own fire department and Hazmat Response Team on the site's premises.

Burlington Northern Santa Fe Railroad (BNSF) - The BNSF Railway runs north-to-south, and transports goods through major cities, including Auburn, in the Pacific Northwest. A rail line also runs west-to-east from Auburn to eastern Washington. "Revenues are generated primarily from the transportation of coal, grain, intermodal containers and trailers, chemicals, metals and minerals, forest products, automobiles and consumer goods" (Gibbs, 2010).

Phase III: Develop the Mitigation Plan

The direction of the hazard mitigation plan is determined by the results of the risk assessment and the community's current and potential capabilities. It is during this phase that the mitigation goals and objectives identify possible actions to reduce high priority risks, and develop a prioritized strategy (FEMA, 2006).

Goals and Objectives

As part of the King County RHMP, the City of Auburn's goals are in compliance with the RHMP, specifically:

- To Protect Life and Property
- Support Emergency Services
- Increase Public Awareness
- Preserve Natural Systems and Resources
- Encourage Partnerships
- Enhance Planning Activities¹⁰

⁹ Source: Department of Ecology (<http://www.ecy.wa.gov/programs/hwtr/CleanUpSites/boeing-fabn/site-history.html>)

To achieve these mitigation goals, the City must be committed to working with all departments, the community, other jurisdictions, as well as develop and complete mitigation projects locally.

Flood Hazards

Goal 1: To maintain and support mitigation activities that prevents losses to homes, businesses, and other properties to be more resistant to impact hazards.

Objective 1.1: Implement activities that pertain to repetitive loss properties due to flooding or other hazards.

Objective 1.2: To minimize damage to public facilities and utilities by continuing to implement land use and building regulations.

Objective 1.3: To continue participation in the National Flood Insurance Program, thus allowing the residents and businesses the opportunity to buy flood insurance.

Geological Hazards

Goal 2: To maintain and support mitigation activities and projects to protect the public from landslides.

Objective 2.1: To carefully monitor proposals of development in or near identified landslide prone areas.

Objective 2.2: When development is permitted, an evaluation of the site stability must be performed prior to approval.

¹⁰ Source: King County RHMP (<http://www.auburnwa.gov/Assets/EM/AuburnWA/Docs/hazmit2013.pdf>)

Technological Hazards

Goal 3: To support and implement mitigation plans that would protect the environment and community from the release of hazardous materials.

Objective 3.1: The treatment, storage, and hazardous waste disposal shall be monitored and held in strict compliance with local, state and federal laws.

Objective 3.2: To provide essential training for first responders in HAZMAT response.

Identify and Analyze Mitigation Actions

The Disaster Mitigation Act of 2000 (DMA) “requires that jurisdictions identify a process for prioritizing potential actions to reduce risk from natural hazards through mitigation planning” (Keippala, 2013). It is during this planning process that the Hazard Mitigation Committee (HMC) would need to be flexible while working with outside sources; for example, other governmental groups, businesses and the public. Every group will have identified their own needs and perception of risk, therefore the HMC’s prioritized mitigation project list may need to be adjusted or adapted.

To seek actions that would reduce the City’s vulnerability to hazards, the Hazard Mitigation Committee (HMC) would need to review the types of hazards, prioritize the hazards by impact on the community, and identify mitigation strategies. The HMC would also need to discuss what strategies and resources they would need to implement the plan, as well as, how to maintain and strengthen the plan from year-to-year. However, before the City of Auburn’s Hazard Mitigation Plan can be implemented, it must be formally adopted by the City Council, which is the governing body of the city.

Once mitigation strategies are reviewed for each hazard, the HMC would need to rank each project using “cost/benefit analysis, available funding, local regulatory requirements, environmental soundness, technological feasibility, and risk reduction” (Keippala, 2013). In the table below, each mitigation project is ranked from greatest priority to least, which department is responsible in completing the project, type of hazard, and a brief description.

Table 4: Sample of Ranked Hazard Mitigation Initiatives

Rank	Department	Project	Hazard	Description
1	Public Works	Storm Pond Retention	Flooding	Expand and configure storm water retention ponds on the West Hill to reduce flooding along the valley floor.
2	Planning (?)	Flood Hazard Mitigation	Flooding	Acquisition of repetitively damaged homes in the Green River Valley.
3	Public Works	Flood Hazard Mitigation: levee maintenance	Flooding	Repair and/or maintain damaged levees along the Green and White Rivers.
4	Planning	City Code – Limit Tree Removal	Landslide	Develop and adopt changes to City Code to limit tree removal within certain sloped or identified landslide hazard areas.
5	VRFD	HAZMAT training	Technological	Provide training for first responders on how to safely handle

Prioritize Mitigation Actions

“When devising selection criteria, first and foremost, every mitigation action must be technically capable of solving the problem it is intended to solve” (Schwab, 2007). The HMC must find out if they have the funding available to cover the cost of their mitigation projects. Usually, a cost-benefit analysis would need to be implemented to find out which mitigation projects will receive full funding, thus helping prioritize each plan.

Benefit-Cost Analysis

Benefit-cost analysis (BCA) is a “quantitative procedure that assesses the desirability of a hazard mitigation project by taking a long-term view of avoided future damages to insurable structures as compared to the cost of the project” (Schwab, 2007). Most jurisdictions participating in the planning of King County’s RHMP used the Mitigation 20/20 software, “to help generate a formula that will estimate the cost to implement a project, the estimated replacement cost of the infrastructure protected by the project and the population served by the services provided by agencies using the infrastructure” (Gibbs, 2010). Additional factors, like the valuation of human life, may also be a part of this formula.

The difficulty with the benefit-cost analysis is that while the monetary cost of damages and reconstruction is generated, data on economic loss, injuries and fatalities are harder to determine. Since there is no method to establishing the value of the loss of life, the “calculation of cost-benefit analysis for proposed mitigation projects could not be conducted” (Gibbs, 2010).

Simple Listing

Simple Listing is “a method evaluates an action by comparing its advantages and disadvantages, and is best used when it isn’t possible to quantitatively measure benefits and costs” (Islam, 2012). Using the information in Table 4, an example of how a Simple Listing would be documented. To clarify terminology used in this table, the term “short-term” in the timeline column represents the completion of a project in 1-5 years. Long-term would be any project that would be completed within 5 or more years.

Table 5: Sample Simple Listing

Actions	Timeline	Benefits (Pros)	Costs (Cons)	Priority
Expand and reconfigure storm retention ponds on West Hill.	Short term	• Avoid the loss of life and property. • Save monies on private and public property damage. • Save monies on road construction and repairs	• Need a year to implement • Construction costs	High
Acquisition of repetitively damaged homes in the Green River Valley.	Short Term	• Save lives • Save monies on rescue and recovery	• Current housing cost	Low
Repair and/or maintain damaged levees along the Green and White Rivers.	Long Term	• Save lives and property • Save monies for rescue and recovery of property	• High cost • Limited funding	High
Develop and adopt changes to City Code to limit tree removal within certain sloped or identified landslide hazard areas.	Short Term	• Saves lives and property • Saves monies for debris removal • Saves monies for road reconstruction	• Cost for road construction	Medium
Provide training for first responders on how to safely handle	Short Term	• Saves lives and property	• Cost for training and equipment • Cost for equipment storage • Limited funding	High

Mitigation Funding

The City of Auburn pulls monies from various resources to provide essential funding for mitigation efforts. Funding for City projects may include the general fund, storm water and utility funds, and Local Improvement Districts. However, since some larger projects may require the City to request additional funding from “grants, impact funds, low interest loans, and levies” (Keippala, 2013). When mitigation projects are paid for by the City, the amount of monies identified for the project, as well as the implementation and completion will be documented according to City policy and funding requirements.

Phase IV: Implement the Plan and Monitor Progress

It is during this phase where the implementation of the plan is put into action. By assigning a responsible party is assigned to monitoring its implementation, to see that funding is available, and to make sure that the projects are completed in a timely fashion.

Under the supervision of the Public Works Director, who is also the Director of Emergency Management, will maintain the City of Auburn’s HMP. Responsible departments or agencies will be required to keep the Director of the Emergency Management Division and the HMC updated on the development and implementation of mitigation projects, as well as inform him of any issues that may hinder its progress. The City’s Emergency Management Division, in turn, will be responsible for monitoring, evaluating and coordinating updates to the plan with the RHMP.

Throughout the planning cycle, the HMC would need to meet throughout the year to review the plan and determine if there are substantial changes to the development of the mitigation projects. Changes in land use and zoning, recent effects from natural hazards or the

addition of unincorporated lands, may affect the risk assessment portion of the plan. Mitigation actions and projects might also not go as planned, and need to be modified or discontinued if it poses a greater risk to the community.

Plan Review

Prior to Plan adoption and after the HMC had the opportunity to share the draft with the public, they would need to review, revise and submit their updated HMP to King County. This plan must be approved by representatives of the King County RHMP Committee, the State Emergency Management Department, and finally FEMA.

The Disaster Mitigation Act (DMA) requires local and regional jurisdictions to update their HMP every five years. During this cycle, participating jurisdictions, as well as other interested parties as fire and police departments, businesses, non-profit organizations and the public would once again be invited to the planning process. Each of these parties would assign a designated contact, or liaison, to serve on the planning team. These representatives will participate, provide updates or information on future proposals or developments, and monitor and maintain the progress of the Plan as well as beginning to plan and organize a new HMP for the next planning cycle.

Conclusion

The intention of creating a hazard mitigation plan is to determine how to prevent or reduce the loss of life and property damage from the results of natural or technological hazards. The plan must follow specific criteria: organizing resources, assess risks, develop a mitigation

plan, and finally, implement the plan and monitor its progress. These steps are crucial to follow if jurisdictions at the local, regional, and state level are to receive funding from FEMA.

Note: On a personal note, going through the steps of the mitigation process was an interesting experience. Reading through different mitigation plans, researching different how different hazards affect the community and how the City of Auburn is mitigating to reduce these effects was an eye-opening experience. Creating a mitigation plan is not a one-person job. I now have a better understanding of the mitigation process and how it works.

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