

The City of Yelm’s Annex to the Natural Hazards Mitigation Plan for the Thurston Region

Table of Contents

Title Page and Table of Contents.....	1
Adopting Resolution	3
Community Profile	5
City of Yelm Plan Development Process	7
City of Yelm Risk Assessment	9
City of Yelm Mitigation Initiatives	23
City of Yelm Implementation of the National Flood Insurance Program	28

This page left intentionally blank.

RESOLUTION NO. 504

A RESOLUTION adopting the “Natural Hazards Mitigation Plan for the Thurston Region.”

WHEREAS, the City of Yelm, its residents and property are vulnerable to natural disasters; and

WHEREAS, the City of Yelm City Council realizes the importance of reducing or eliminating those vulnerabilities for the overall good and welfare of the community; and

WHEREAS, the City of Yelm has been an active participant in the Hazard Mitigation Planning Workgroup, which has established a comprehensive, coordinated planning process to eliminate or decrease these vulnerabilities; and

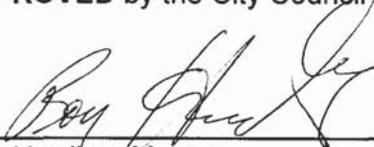
WHEREAS, City of Yelm staff have identified, justified and prioritized two initiatives intended to mitigate the vulnerabilities with the City of Yelm; and

WHEREAS, these proposed initiatives and projects have been incorporated into the second edition of the “Natural Hazards Mitigation Plan for the Thurston Region” that has been prepared and issued for consideration and implementation by the jurisdictions and organizations of Thurston County;

NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Yelm, Washington, as follows:

1. City of Yelm hereby approves and adopts the Natural Hazards Mitigation Plan for the Thurston Region” as its natural hazards mitigation plan and comprehensive flood hazard management plan.
2. City of Yelm staff are requested and instructed to pursue available funding opportunities for implementation of the mitigation initiatives designated by the City.
3. The City of Yelm will, upon receipt of such funding or other necessary resources, seek to implement the proposals contained in its section of the mitigation initiatives, and
4. The City of Yelm will continue to participate in the updating and expansion of the “Natural Hazards Mitigation Plan for the Thurston Region” in the years ahead, and
5. The City of Yelm will further seek to encourage the businesses, industries and community groups operating within Thurston County to also participate in the updating and expansion of the “Natural Hazards Mitigation Plan for the Thurston Region” in the years ahead.

APPROVED by the City Council of Yelm this 24th day of *November, 2009*



Ron Harding, Mayor

Attest: 

Janine Schnepf, City Clerk

This page left intentionally blank.

Community Profile City of Yelm

City info: (360) 458-3244
www.ci.yelm.wa.us

Demographics

Housing

Employment and Income

Development Activity

Population, 1990		1,337
Population, 2000		3,289
Population, 2008		5,150
Av. Ann. Pop. Growth, 1990-2000		9.4%
Av. Ann. Pop. Growth, 2000-2008		5.8%
Households, 2000		1,216
Average Household Size, 2000		2.67
Age Structure, 2000:		
19 and under	1,140	35%
20 - 64	1,795	55%
65 and over	354	11%
Median Age	31	--
Race and Ethnic Categories, 2000:		
White	2,834	86.2%
Black/African American	59	1.8%
American Indian & Alaska Native	73	2.2%
Asian	57	1.7%
Native Hawaiian & Other Pacific Islander	38	1.0%
Other Race	369	2.7%
Two or More Races	176	5.4%
Hispanic*	176	5.4%

The word “Yelm” comes from the Coastal Salish word “shelm” which means “shimmering heat waves from the sun.” Inhabited originally by members of the Nisqually Indian Tribe, first permanent American settlers came in 1853 to join the Hudson’s Bay Company sheep farmers who were already in the area.



With the coming of the Northern Pacific Railroad in 1873, Yelm began to prosper having found an outlet for its agricultural and forestry products.

Its economic base was further enhanced in the early 1900s when an irrigation company was formed in 1916, making Yelm a center for production of beans, cucumbers, and berries.

Housing Units, 2000:		
Single-Family		852
Multifamily		338
Manufactured Homes		127
Census Median House Value, 2000		\$117,400

Median Household Income:		
1989 (Census 1990 in 1999 \$'s)	\$24,333	
1999 (Census 2000)	\$39,453	
Households by Income Category, 1999:		
Less than \$14,999	222	18%
\$15,000 to \$24,999	147	12%
\$25,000 to \$49,999	403	33%
\$50,000 to \$74,999	300	25%
\$75,000 or more	134	11%

Taxable Retail Sales, 2007	\$155,255,457
Total Jobs, 2003:	
Manufacturing	360
Retail	900
Finance/Services	1,010
Federal, State, & Local Gov't	730
Tribal Gov't & Enterprises	<10
Other	340

Total New Permitted Residential Units, 2007:		Subdivision Activity, 2007:	# Appl.	# Lots
Single-Family	166	Short Plat	0	0
Multifamily	8	Long Plat	4	463
Manufactured Homes	2			
Total	176			

Explanation: *Person of Hispanic Origin can be of any race.
Source: TRPC, Profile 2008 (www.trpc.org).

This page left intentionally blank.

City of Yelm Plan Development Process

Hazard Mitigation Plan Workgroup

The following individuals served as the City of Yelm's hazards mitigation planning development workgroup:

Department/Title	Representative(s)
Police Chief	Todd Stancil
Director of Public Works	Tim Peterson
Director of Community Development	Grant Beck
Building Official	Gary Carlson

Hazard Mitigation Plan Development

The following activities supported the development of the City of Yelm's local hazard mitigation planning process:

Date	Location	Activity	Subject
April 2009	Public Safety Bldg	Meeting with Paul Brewster, Tim Peterson, and Todd Stancil	Plan Development
June 1, 2009	Public Safety Bldg.	Meeting with Grant Beck, Gary Carlson, and Todd Stancil	Mitigation Initiative
June 21, 2009	Public Safety Bldg.	Meeting with Tim Peterson and Todd Stancil	Plan Development

Mitigation Initiative Prioritization Process

The City of Yelm Hazard Mitigation Initiative Workgroup consisted of Todd Stancil, Yelm Police Chief; Emergency Management Director, Tim Peterson, Public Works Director; Gary Carlson, Building Official; and Grant Beck, Community Development Director. The group reviewed the original two mitigation initiatives and determined that one of the initiatives, Y-EH 1, was complete. Of the one remaining initiative, Y-EH 2, it was decided by the group to keep that as the second priority and rank the new initiative as the first priority.

The original second priority was to identify funding sources for structural and nonstructural retrofitting of publicly owned critical facilities listed in the City of Yelm's Emergency Disaster Plan that are identified as seismically vulnerable. Of the critical facilities listed were the Yelm Police Department and the Yelm City Hall. The City of Yelm constructed a brand new Public Safety Building in 2008, thus completing highest priority project, as well as eliminating a large portion of Y-EH 2, since the police department would no longer need retrofitting. The only building left to retrofit is the Yelm City Hall. City Hall is a one story, brick building and is less than 25 years old.

The building has gone through several remodels over the years which all met applicable building codes at the time. Because of the age and condition of the building the workgroup chose to place Y-EH 2 as the second ranked project.

The new initiative, Y-EH 3, to seismically retrofit the downtown water tower located next to the new public safety building, was deemed more critical for the following reasons:

1. The water tower is more than 50 years of age and is located next to several buildings which are occupied by dozens of employees. There are also several occupied residential units within the tower's vicinity.
2. The tower is also located directly next to the new Public Safety Building which is also serves as the SE Thurston Emergency Management Facility during an emergency.
3. During the earthquake of 2001 the water tower was witnessed swaying back and forth significantly and the decision was made shortly thereafter to empty the tower of its 50,000 gallons to make it more stable.

The city has differing views on what to do with the tower since it is considered a historical landmark. The cost to retrofit and stabilize the tower is approximately \$40,000.00. This amount is significantly less than initiative #2 and is a higher priority due to the impact of failure.

City of Yelm Risk Assessment

Introduction

The risk assessment provides information about the hazards that threaten the City of Yelm. This information provides the factual basis to identify and support a strategy that can effectively mitigate the effects of the hazards that threaten this jurisdiction's safety and challenge its ability to perform essential functions.

The content and structure of this plan's risk assessment was developed using the Federal Emergency Management Agency's (FEMA) 2008 "Local Multi-Hazard Mitigation Planning Guidance." Table 1 shows the Disaster Mitigation Act (DMA) Risk Assessment Planning Requirements that must be met in order for this plan to receive a "satisfactory" score. Each of these planning requirements is met through the information contained in both the regional risk assessment and in this local annex.

Table 1: Disaster Mitigation Act Risk Assessment Planning Requirements

DMA Section	Requirement
§201.6(c)(2)(i):	[The risk assessment shall include a] description of the type ... of all natural hazards that can affect the jurisdiction ...
§201.6(c)(2)(i):	[The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
§201.6(c)(2)(ii):	[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
§201.6(c)(2)(ii):	[The risk assessment in all] plans approved after October 1, 2008 must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.
§201.6(c)(2)(ii)(A):	The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas ...
§201.6(c)(2)(ii)(B):	[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate ...
§201.6(c)(2)(ii)(C):	[The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.
§201.6(c)(2)(iii):	For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

In general the Federal DMA planning requirements with the words "**shall**" and "**must**" indicate that the item is mandatory and must be included in the plan, otherwise it will not be approved by FEMA. Regulations with the word "**should**" indicate that the item is strongly recommended to be included in the plan, but its absence will not cause FEMA to disapprove the plan.

Hazard Analysis Definitions

The adjective descriptors (High, Moderate, and Low) for each hazard's probability of occurrence, vulnerability, and risk rating are consistent with the terms used in the regional assessment.

The following terms are used in this plan to analyze and summarize the risk of the hazards that threaten this jurisdiction:

Risk Rating:

An adjective description (High, Moderate, or Low) of the overall threat posed by a hazard is assessed for the next 25 years. Risk is the subjective estimate of the combination of any given hazard's probability of occurrence and vulnerability.

- High: There is strong potential for a disaster of major proportions during the next 25 years; or History suggests the occurrence of multiple disasters of moderate proportions during the next 25 years.
- Moderate: There is medium potential for a disaster of less than major proportions during the next 25 years.
- Low: There is little potential for a disaster during the next 25 years.

Probability of Occurrence:

An adjective description (High, Medium, or Low) of the probability of a hazard impacting the jurisdiction within the next 25 years.

- High: There is great likelihood that a hazardous event will occur within the next 25 years.
- Moderate: There is medium likelihood that a hazardous event will occur within the next 25 years.
- Low: There is little likelihood that a hazardous event will occur within the next 25 years.

Vulnerability:

Vulnerability can be expressed as combination of the severity of a natural hazard's effect and its consequential impacts to the community. An adjective description (High, Medium, or Low) of the potential impact a hazard could have on the community. It considers the population, property, commerce, infrastructure and services at risk relative to the entire jurisdiction.

- High: The total population, property, commerce, infrastructure and services of the community are uniformly exposed to the effects of a hazard of potentially great magnitude. In a worse case scenario, there could be a disaster of major to catastrophic proportions.
- Moderate: The total population, property, commerce, infrastructure, and services of the

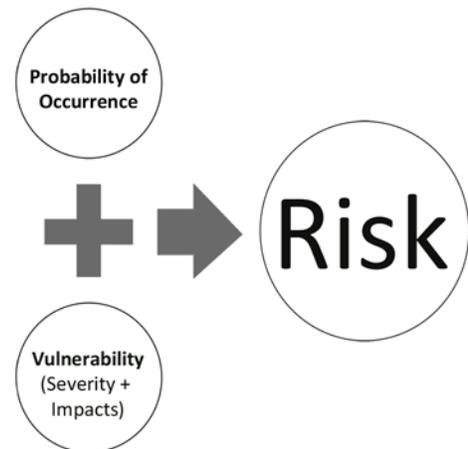


Figure 1: Risk is a subjective estimate of the combination of a hazard's probability of occurrence and a community's vulnerability.

community are exposed to the effects of a hazard of moderate influence; or the total population, property, commerce, infrastructure, and services of the community are exposed to the effects of a hazard of moderate influence, but not all to the same degree; or an important segment of population, property, commerce, infrastructure and services of the community are exposed to the effects of a hazard. In a worst case scenario there could be a disaster of moderate to major, though not catastrophic, proportions.

- Low: A limited area or segment of population, property, commerce, infrastructure, or service is exposed to the effects of a hazard. In a worst case scenario, there could be a disaster of minor to moderate proportions.

Summary Risk Assessment

Based on the regional risk assessment and the local risk assessment in the subsequent section, the following hazards pose the greatest threat to the City of Yelm.

Hazard	Probability of Occurrence	Vulnerability	Risk
Earthquake	High	Moderate	Moderate
Storm	High	High	High
Flood	High	Low	Low
Landslide	High	Low	Low
Wildland Fire	High	Moderate	Moderate
Volcanic Event	Low	Moderate	Moderate

Local Risk Assessment

A comprehensive risk assessment of the major natural hazards that threaten the City of Yelm was developed for this plan through the regional risk assessment process described in Chapter 4.0. The regional risk assessment and its hazard profiles serve as the foundation for this jurisdiction's risk assessment. A list of all of the potential natural hazards that could impact this jurisdiction is located in Chapter 4. Chapter 4 includes six natural hazard profiles for earthquake, storm, flood, landslide, wildland fire, and volcanic events. Each profile defines the hazard and describes its effects, severity, impacts, probability of occurrence, and historical occurrences. The regional profiles describe this jurisdiction's local vulnerabilities in terms of the portion of the jurisdictions land base or service area, population, employment, dwelling units, jurisdiction-owned assets, and critical facilities that are within each hazard zone.

This section of the plan provides additional details or explains differences where this jurisdiction's risks for each hazard vary from the risks facing the entire planning area. Maps of the hazards that affect the City of Yelm are scaled to local boundaries and are included in this section.

Earthquake

Severity

In general, the severity of earthquakes for the City of Yelm is the same as described in the regional risk assessment. According to the earthquake hazard map, the City of Yelm is unlikely to experience the effects of liquefaction. However, the city remains vulnerable to the effects of ground shaking. The Washington State Department of Natural Resources' Site Class Map for Thurston County shows that the city is situated on Class C soils, which have a moderate potential to amplify ground shaking near the surface.

Impacts

In general, the effects of major earthquakes affect the City of Yelm in the same manner as described in the regional risk assessment, but damage to structures is likely less severe than in other parts of the county due to the absence of soils that are prone to the effects of liquefaction. The roads and bridges leading to and from the greater Yelm vicinity could be impacted. The Nisqually River Bridge near Mckenna on State Route 507 may be vulnerable to liquefaction and amplified ground shaking. Damage to or destruction of this bridge would create both local and regional transportation disruptions.

Probability of Occurrence

Same as regional assessment.

Historical Occurrences and Impacts Specific to this Jurisdiction

During the Nisqually Earthquake of 2001 the City of Yelm experienced minor damage in comparison with surrounding jurisdictions. .

Summary Assessment

Consistent with the regional risk assessment, the City of Yelm is likely to experience a major earthquake, of a similar magnitude or greater to the 2001 Nisqually Earthquake, in the next 25 years. The Nisqually Earthquake did not result in any noteworthy damage to city infrastructure or disrupt services for an extended period of time. A greater magnitude earthquake could cause more destruction, therefore a moderate vulnerability rating is assigned. Due to the high probability of occurrence and moderate vulnerability, the City of Yelm has assigned a moderate risk rating to earthquake hazards.

Summary Risk Assessment for Earthquake in the City of Yelm

Probability of Occurrence	Vulnerability	Risk
High	Moderate	Moderate

Storm

Severity

Similar to the regional assessment with the exception of wind events. Being located in the SE portion of Thurston County we are vulnerable to the winds coming through the Chehalis gap. Although not a frequent event these particular winds can and often exceed the stated wind projections on many wind events. In regards to the Chehalis gap as mentioned above the terrain from the SW of the Yelm area acts as a wind tunnel for particular wind events. When a surface low tracks further to the south than the usual Vancouver Island track, wind tends to flow through the Chehalis gap which flows eventually to the City of Yelm and areas south. In the past the National Weather Service has issued wind advisories and/or warnings specific to our area. This is very specific to the track of the surface low.

Impacts

Same as the regional assessment.

Probability of Occurrence

Similar to the regional assessment with the exception of the wind events as described above. The frequency of wind events is the same as the county assessment. With specific wind events it is not uncommon for the Yelm area to experience increased wind events as compared to the rest of the county.

Historical Occurrences and Impacts Specific to this Jurisdiction

Same as regional assessment

Summary Assessment

Same as the regional risk assessment

Summary Risk Assessment for Storm in the City of Yelm

Probability of Occurrence	Vulnerability	Risk
High	High	High

Flood

Severity

During the floods of 1996 the City of Yelm experienced high groundwater and extensive urban flooding due to runoff and the Yelm Creek that runs through the middle of the city. Since that time the city has taken measure to ensure that does not occur again. The creek has been dredged and the path of flow has been improved. Since the flooding of 96 the City has experienced very little urban street flooding.

Impacts

Same as regional assessment. The Nisqually River flows just outside city limits, however City of Yelm first responders would be the first there to assist. Canal operated by the city of Centralia borders the city limits and overflow event would impact homes within the city limits. If the Nisqually River rises to a level which would require the closure of the Mckenna bridge, traffic flow to and from the city would be significantly impacted.

Probability of Occurrence

Same as impact summary stated above.

Historical Occurrences and Impacts Specific to this Jurisdiction

During the flood of 1996 the Yelm Police Department was the first to respond to the area of Nisqually Pines located in Thurston County jurisdiction to evacuate homeowners. The flood of 96' required the police department to work dozens of hours of overtime to assist with traffic and evacuations. Of the areas affected by the flood, the City of Yelm experienced very little impact within the city limits, 95% of the work being done was in a supportive role for Thurston County. The bridge leading into Mckenna and Pierce County was closed for a period of time during this event. Alternate routes were designated, however the traffic congestion and confused drivers was significant.

Summary Assessment

As stated above the City of Yelm experiences minor impact during major flood events throughout the area. The most significant impact would be in a supportive role to assist in traffic control, road closures and evacuations in areas of Thurston County outside the city limits of Yelm.

Summary Risk Assessment for Flood in the City of Yelm

Probability of Occurrence	Vulnerability	Risk
Moderate	Low	Low

Landslide

Severity

The City of Yelm has experienced few landslides of any significance. Because the City of Yelm was built on a “Prairie”, hence the title “Pride of the Prairie” our city is rarely affected by landslide events.

Impacts

Same as regional assessment.

Probability of Occurrence

Probability of occurrence in the City of Yelm are low due to the terrain.

Historical Occurrences and Impacts Specific to this Jurisdiction

There are no historical occurrences to reference that are specific to our jurisdiction.

Summary Assessment

Lower than the regional assessment with a reduced risk of occurrence and impact.

Summary Risk Assessment for Landslide in the City of Yelm

Probability of Occurrence	Vulnerability	Risk
Low	Low	Low

Wildland Fire

Severity

Same as regional assessment.

Impacts

Same as regional assessment.

Probability of Occurrence

Same as regional assessment.

Historical Occurrences and Impacts Specific to this Jurisdiction

In recent history there have been few incidents of wildland fire within the city limits of Yelm. During extended periods of dry time and high heat the city has seen sporadic grass fires caused by lit cigarettes. Minor damage in all of these instances, all to property with no structural damage reported.

Summary Assessment

The City of Yelm is surrounded by Prairie land with tall grasses and trees. This acts as primary fuel for a wildland fire, similar to the regional assessment.

Summary Risk Assessment for Wildland Fire in the City of Yelm

Probability of Occurrence	Vulnerability	Risk
High	Moderate	Moderate

Volcanic Hazards

Severity

Same as the regional risk assessment.

Impacts

In a Lahar event the City of Yelm could experience an impact although outside of the city limits of Yelm. Should a Lahar event flow down the Nisqually River and a need to close the Nisqually River Bridge, the impact to traffic flow in and out of the City of Yelm would be significant.

Probability of Occurrence

Same as regional assessment

Historical Occurrences and Impacts Specific to this Jurisdiction

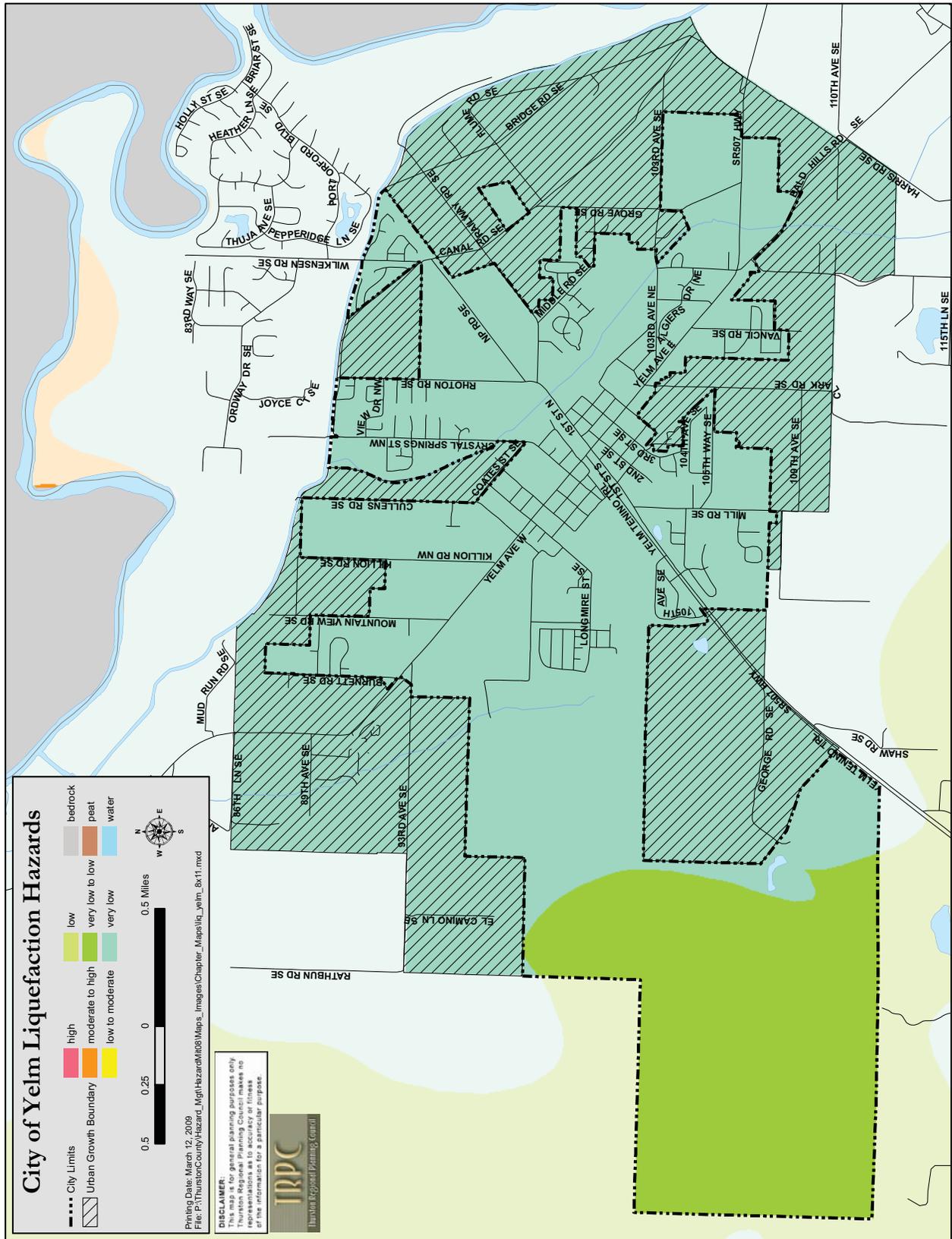
Same as the regional risk assessment.

Summary Assessment

Consistent with the regional risk assessment. Although a low possibility of occurrence, the risk is moderate to the proximity of the Nisqually River to the City of Yelm.

Summary Risk Assessment for Volcanic Events in the City of Yelm

Probability of Occurrence	Vulnerability	Risk
Low	Moderate	Moderate



City of Yelm Liquefaction Hazards

- City Limits
- Urban Growth Boundary
- high
- moderate to high
- low to moderate
- low
- very low to low
- very low
- bedrock
- peat
- water

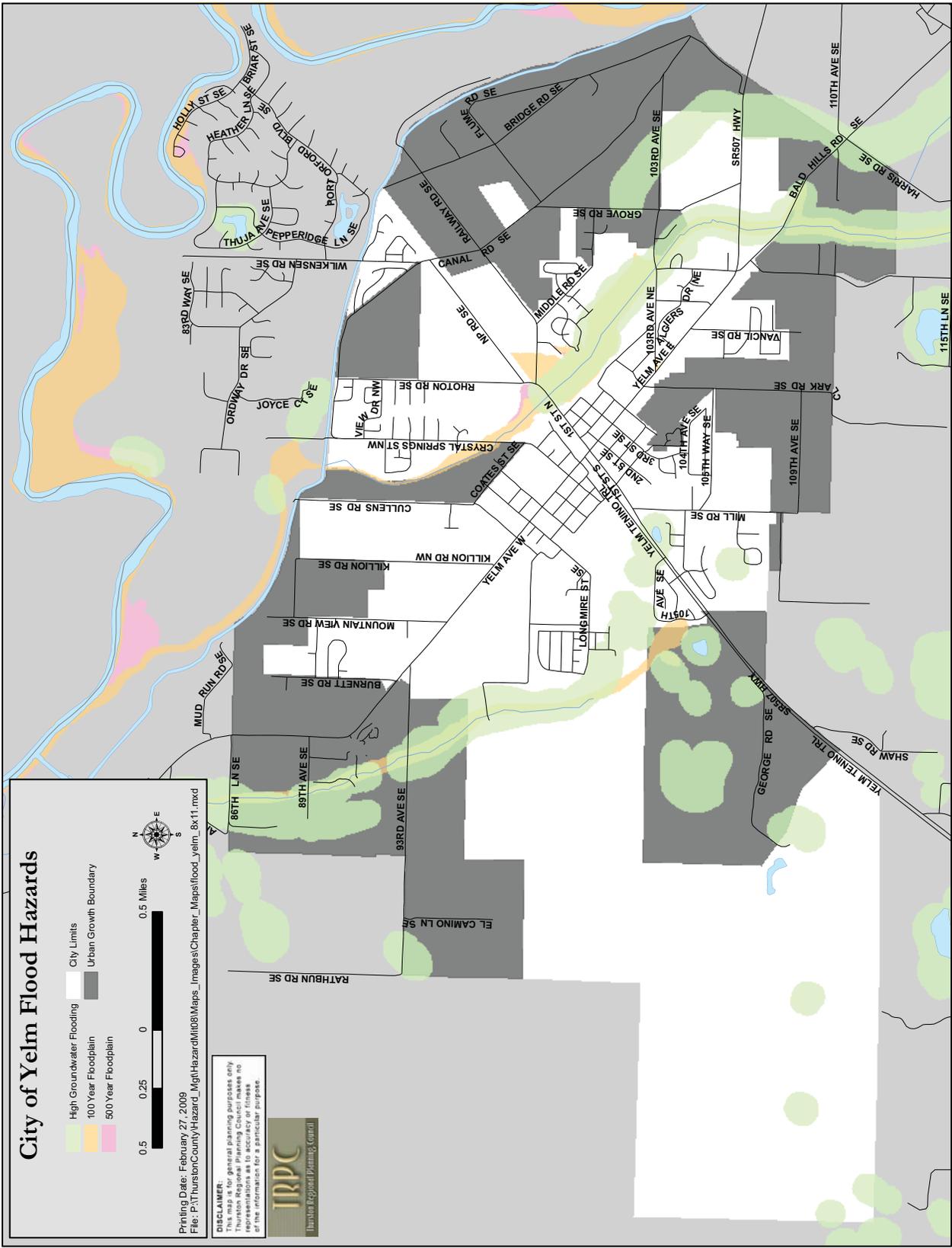
0.5 Miles

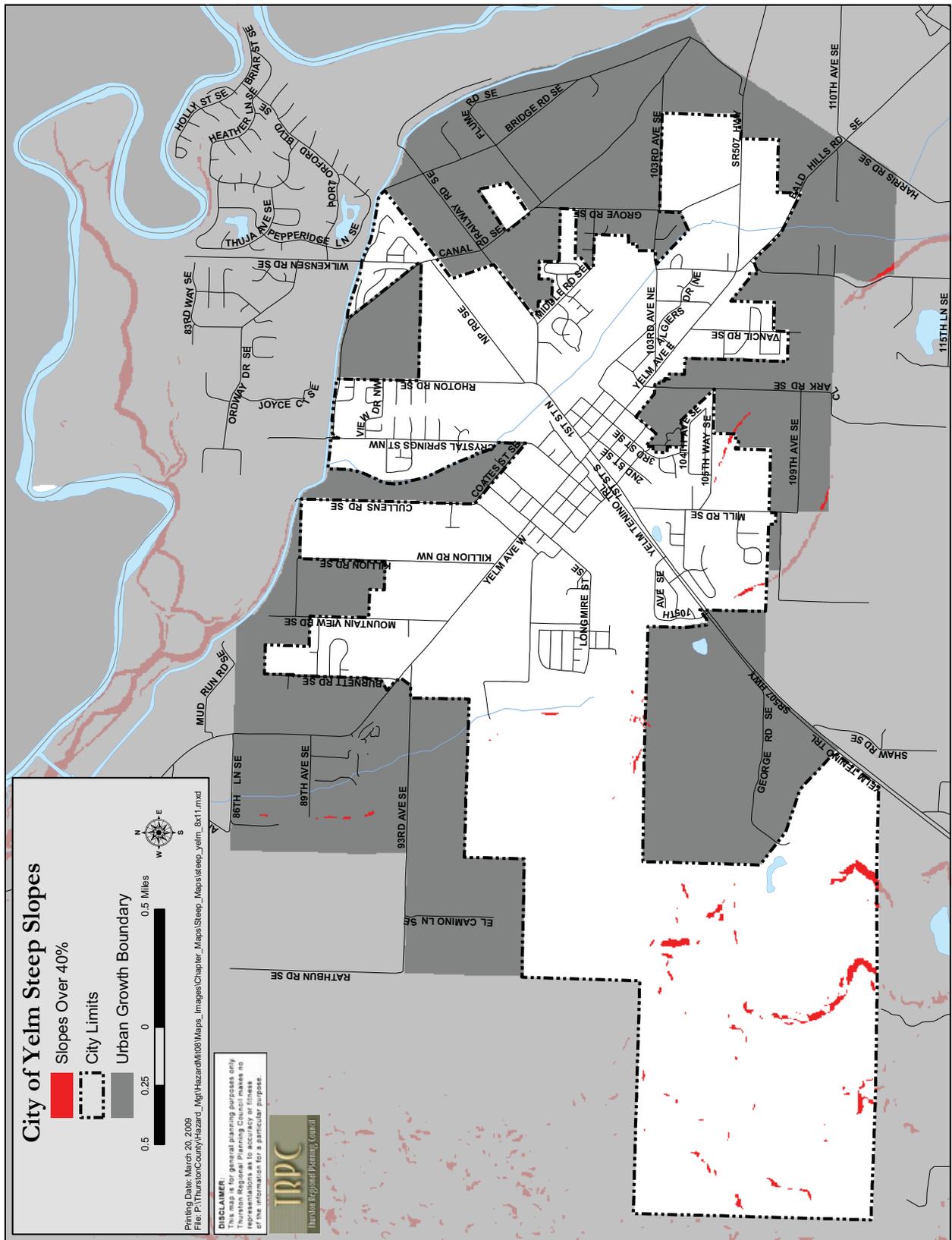
0.25 0 0.25 0.5

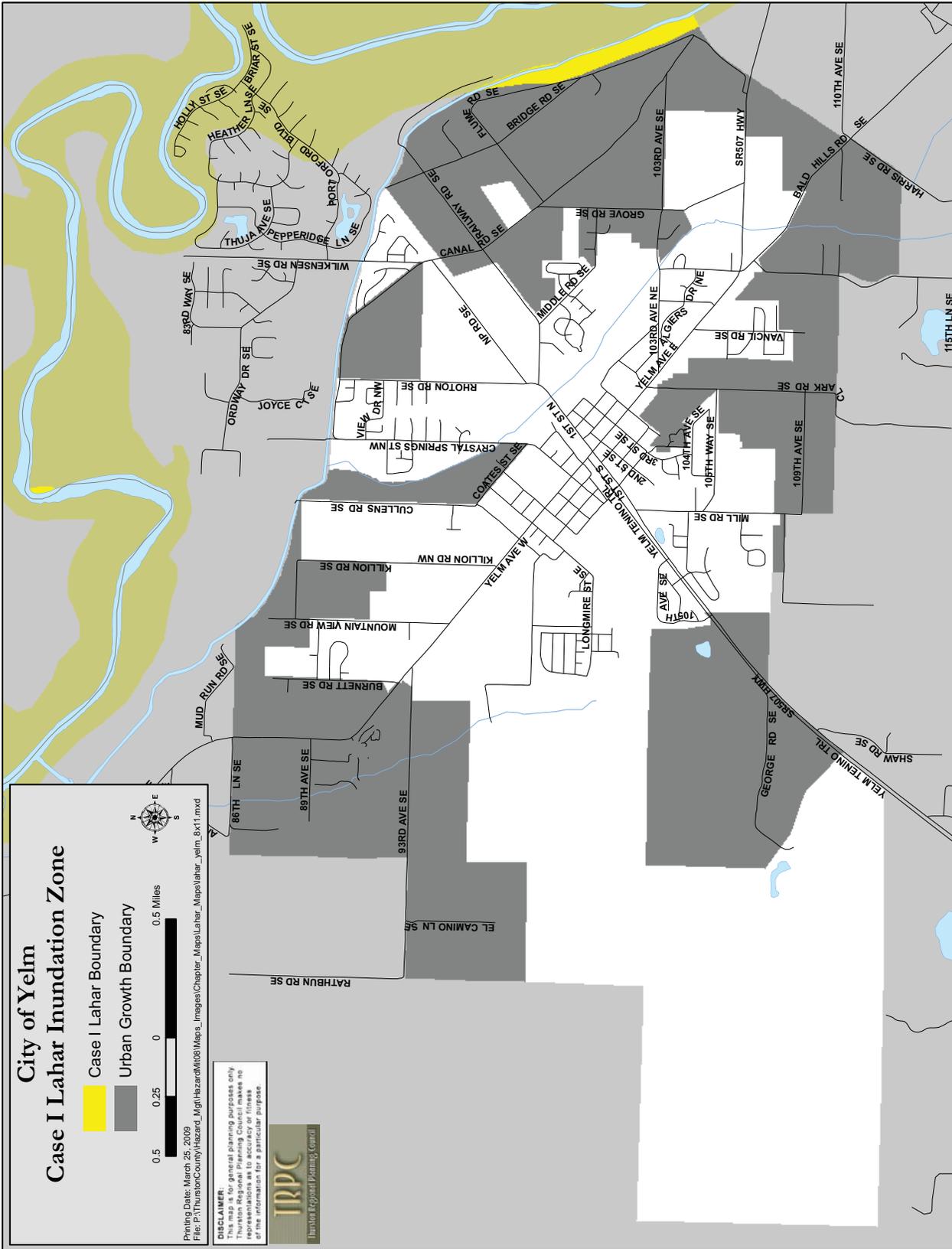
Printing Date: March 12, 2009
 File: P:\ThurstonCounty\Hazard_Mgt\HazardM08\Maps_Images\Chapter_Map\liq_yelm_8x11.mxd

DISCLAIMER:
 This map is for general planning purposes only. It is not intended to be used as a basis for any legal or financial decisions. The City of Yelm makes no representations as to accuracy or fitness of the information for a particular purpose.

IRPC
 Thurston Regional Planning Council







City of Yelm Mitigation Initiatives

Current Adopted Mitigation Initiatives

Current Mitigation Initiatives consist of actions that have not yet begun or require additional work. They consist of new initiatives identified by the City of Yelm during the plan update process. They also consist of existing initiatives that were carried over in their original form from the first edition of this plan or other plans, or modified from their original form to reflect present needs.

Priority	I.D. Number	Category	Action	Status
1 of 2	Y-EH 3	Hazard Damage Reduction	Seismically retrofit the downtown water tower, located at Washington and 2 nd Street	New
2 of 2	Y-EH 2	Hazard Damage Reduction	Identify funding sources for structural and nonstructural retrofitting of publicly owned critical facilities listed in the City of Yelm's Emergency Disaster Plan that are identified as seismically vulnerable	Existing

Hazard Category Codes are as follows: EH=Earthquake Hazard; FH=Flood Hazard; LH=Landslide Hazard; MH=Multi Hazard; SH=Storm Hazard; WH=Wildland Fire Hazard; and VH=Volcanic Hazard.

Completed or Removed Mitigation Initiatives

Initiatives that were completed in the last five years are included in this plan to provide evidence of progress made. These initiatives are no longer relevant and no longer part of the City of Yelm's adopted mitigation strategy. These initiatives are not ranked as they are no longer relevant.

I.D. Number	Category	Action	Status
Y-EH 1	Critical Facilities Replacement/Retrofit	Replace the Yelm Police Station with a seismically safe structure	Completed

Hazard Category Codes are as follows: EH=Earthquake Hazard; FH=Flood Hazard; LH=Landslide Hazard; MH=Multi Hazard; SH=Storm Hazard; WH=Wildland Fire Hazard; and VH=Volcanic Hazard.

Priority: 1 of 2**Status: New****Hazard Addressed: Earthquake Hazard**
Category: Hazard Damage Reduction**Y-EH 3: Seismically retrofit the downtown water tower, located at Washington and 2nd St.**

Rationale: The downtown water tower located at 2nd and Washington has been a pronounced symbol in Yelm for more than 50 years. It is a landmark that most long time Yelm residents don't want to see go. Due to the age of the structure and the fact the City of Yelm has recently built a new high capacity water tower on the North side of the city, the downtown water tower no longer holds water in the 50,000 gallon tank. The height of the water tower is approximately 100 feet. During the earthquake in 2001 the water tower experienced no damage however was witnessed swaying from side to side rather significantly. Since 2001 the City of Yelm has built a new police station which also serves as the SE Thurston County Emergency Operations Center. The new police stations is located directly next to the downtown water tower and is directly in the extreme hazard zone as identified in the City of Yelm Emergency Operations Manual. In addition to the police department there are four residential structures identified in the extreme hazard zone in the case of a structural collapse. Outside of buildings the downtown water tower sits only feet from the city well heads which are housed in a concrete structure next to the water tower. Should these well heads be affected by a structural collapse the entire City of Yelm would be without water for an extended period of time.

Relates to Plan Goal(s) and Objectives: 3B, 4C, 7B**Implementer:** City of Yelm

Estimated Cost: Estimated cost to seismically retrofit the downtown water tower is \$40,500.00. Cost estimate provided in 2004 was \$30,000.00. Price has been adjusted for inflation over the last 5 years.

Time Period: 2009 - 2014**Funding Source:** City of Yelm tax revenue**Source and Date:** N/A**Adopted Plan Number:** Y-EH-3

Reference Page: Refers to the identifiers of the initiative within the adopted document. If not applicable, please enter N/A.

Initiative and Implementation Status: New initiative.

Priority: 2 of 2**Status: Existing****Hazard Addressed: Earthquake Hazard**
Category: Hazard Damage Reduction**Y-EH 2: Identify funding sources for structural and nonstructural retrofitting of publicly owned critical facilities listed in the City of Yelm's Emergency Disaster Plan that are identified as seismically vulnerable.****Rationale:** Critical facilities will play a major role in the response and recovery phases of a disaster and community assistance will be dependent on these facilities being able to operate.**Relates to Plan Goal(s) and Objectives:** 3, 4, 3B, 3C, 4B, 4C, 4D**Implementer:** City of Yelm**Estimated Cost:** \$250,000.00**Time Period:** 2015**Funding Source:** Unknown**Source and Date:** N/A**Adopted Plan Number:** Y-EH-2**Reference Page:** V-279

Initiative and Implementation Status: The estimated cost for this action has been reduced from 3.5 million to \$250,000.00. A significant portion of the original cost estimate was directly related to the Yelm Police Station. Through a bond issued in 2007 the City of Yelm was able to build a new police station that is built with current codes to include earthquake resistance. The only other critical facility listed in the Emergency Operations Manual not to current code is the Yelm City Hall. This is a 4,000 square foot building that has been through multiple remodels within the past ten years. All other critical facilities have been built within the past 10 years and therefore are structurally sound. The new estimate would be the amount necessary to retrofit the Yelm City Hall.

Priority: N/A**Status: Completed****Hazard Addressed: Earthquake Hazard****Category: Critical Facilities Replacement/Retrofit****Y-EH 1: Replace the Yelm Police Station with a seismically safe structure.**

Rationale: The Yelm Police Station is identified as a critical facility in the City of Yelm Emergency Disaster Policy Manual. The facility is also designated as the primary Emergency Operations Center for SE Thurston County. The loss of this structure or the ability to operate out of this structure in the event of an emergency would significantly impact the ability to deliver emergency services in the Yelm area.

Relates to Plan Goal(s) and Objectives: 3, 3C**Implementer:** City of Yelm**Estimated Cost:** \$1,250,000.00/Actual completion cost: 4.8 million**Time Period:** Completed April 2008

Funding Source: City of Yelm was granted a bond in the amount of 5.2 million dollars in 2007 to construct a new police station.

Source and Date: N/A**Adopted Plan Number:** Y-EH-1**Reference Page:** V-277

Initiative and Implementation Status: The construction of the Yelm Police Department was completed in April of 2008. The replacement of this structure was placed as a number one priority for the City of Yelm in the 2003 Hazard Mitigation Plan.

City of Yelm Implementation of the National Flood Insurance Program

Introduction

All Local Mitigation Plans approved by FEMA after October 1, 2008 **must** describe each jurisdiction's participation in the NFIP and **must** identify, analyze and prioritize actions related to continued compliance with the NFIP. Basic compliance NFIP actions could include, but are not limited to:

- Adoption and enforcement of floodplain management requirements, including regulating all and substantially improved construction in Special Flood Hazard Areas (SFHAs);
- Floodplain identification and mapping, including any local requests for map updates, if needed; or
- Description of community assistance and monitoring activities.

Requirement §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

National Flood Insurance Program Participation

Summary of National Flood Insurance Program Premiums, Policies, and Claims

Community	Total	Number of Policies			Total	Total	Total Paid	Repetitive	Severe
	Premium	V Zone	A Zone	Total	Coverage	Claims Since 1978	Since 1978	Losses	Losses
Bucoda	\$55,051	0	64	74	\$10,033,700	42	\$249,262	0	0
Lacey	\$4,652	0	0	14	\$3,871,000	3	\$8,088	0	0
Olympia	\$90,555	0	31	82	\$25,265,400	16	\$347,006	0	0
Rainier	\$326	0	0	1	\$280,000	0	\$0	0	0
Tenino	\$1,327	0	0	4	\$633,700	7	\$105,233	0	0
Tumwater	\$2,707	0	0	6	\$1,482,000	2	\$12,515	0	0
Yelm	\$17,617	0	11	28	\$7,313,400	2	\$7,603	0	0
Thurston County	\$316,352	3	281	663	\$141,785,400	215	\$3,389,280	10	0
County Total :	\$488,587	3	387	872	\$190,664,600	287	\$4,118,987	10	0

Source: FEMA NFIP Insurance Report, Washington, May 5, 2009.

The City of Yelm has participated in the National Flood Insurance Program (NFIP) since 1999. There are currently no repetitive loss properties within the City of Yelm

Flood Plans, Ordinances, and Regulations

On August 10, 2005 the City of Yelm Washington adopted Ordinance Number 833 which updates the Yelm Critical Areas Code, Chapter 140.08 Yelm Municipal Code.

A requirement of the Growth Management Act, as amended by the Washington Legislature, is that jurisdictions required to plan under the GMA update their Critical Areas Codes in order to utilize best available science.

Prior to adoption of the Ordinance Number 833 the Yelm Community Development Department and the Planning Commission had been working towards an updated Critical Areas Code. The major action points in the process included:

March 18	Community Development	Published 'Review Draft'
April 4	Planning Commission	Open House
April 18	Planning Commission	Review comments received at open house
May 3	Subcommittee	Reviewed and responded to comments received at open house
May 16	Planning Commission	Reviewed subcommittee recommendations and authorized publication of Public Hearing Draft
May 17	Community Development	Published 'Public Hearing Draft'
June 20	Planning Commission	Public Hearing
July 14	Subcommittee	Reviewed and responded to comments received at the public hearing
July 18	Planning Commission	Adopted 'Council Draft'

The review draft was published on the City's web site on the same date it was published and was also emailed parties who had previously expressed interest in the GMA consistency review. The email list of interested parties presently consists of almost 25 people. All public notices, staff reports, and updated drafts have been forwarded to this same email list as well as being posted on the City's web site.

The open house that the Planning Commission held on April 4, 2005, was an informal meeting in which Planning Commission members spoke one on one with interested parties. Materials available for public review included:

- Presentation size maps of each type of critical area (wetlands, frequently flooded areas, geologic hazard areas, and priority habitats and species).
- Letter size maps of each type of critical area, including a summary of existing and proposed restrictions.
- Proposed regulations for each type of critical area, including critical aquifer recharge areas.
- The entire 'Review Draft'.
- Best Available Science citations.

The open house started at 6:00 PM and all participants had left by the time the Planning Commission adjourned at 8:00 PM. The event was well attended with over 35 members of the public attending.

At the next Planning Commission meeting, each member reported the key points that had been raised with them during the open house. Based on this input, and written comments received at the open house, the Commission referred the matter to a subcommittee in order to recommend any changes back to the full commission.

The subcommittee, comprised of John Graver, Norm Allard, and Carlos Perez, met and reviewed all the written comments received and made appropriate changes to the 'Review Draft'. The subcommittee forwarded a recommendation to the full commission to publish a 'Public Hearing Draft'.

The 'Hearing Draft' was sent to the email list and posted on the web site the day after the Planning Commission reviewed the subcommittee's recommendation, May 17, 2005. This notice included a copy of the 'Hearing Draft' and the notice of public hearing attached to the email, and a link to the responses to written public comments.

No additional written public testimony was received until the public hearing before the Planning Commission, at which two people testified (one of whom supplemented his statement with a letter).

The Planning Commission referred the matter back to the Subcommittee, which met and again reviewed public comments and made two recommendations for changes to the draft code based on testimony.

The Commission adopted the Subcommittee's recommendation and recommended the Council adopt the updated Critical Areas Code as amended by the Planning Commission as the "Council Draft".

The purpose of this revised chapter is to designate and classify ecologically sensitive and hazardous areas and to protect these areas and their functions and values, while also allowing for reasonable use of private property.

This chapter is to implement the goals, policies, guidelines, and requirements of the Yelm comprehensive plan and the Growth Management Act, Chapter 36.70A RCW.

Critical areas provide a variety of valuable and beneficial biological and physical functions that benefit the city and its residents, and/or may pose a threat to human safety or to public and private property.

By limiting development and alteration of critical areas, this chapter seeks to:

- a. Protect members of the public and public resources and facilities from injury, loss of life, or property damage due to landslides and steep slope failures, erosion, seismic events, volcanic eruptions, or flooding;
- b. Maintain healthy, functioning ecosystems through the protection of unique, fragile, and valuable elements of the environment, including ground and surface waters, wetlands, and fish and wildlife and their habitats, and to conserve the biodiversity of plant and animal species;

- c. Direct activities not dependent on critical areas resources to less ecologically sensitive sites and mitigate unavoidable impacts to critical areas by regulating alterations in and adjacent to critical areas; and
- d. Prevent cumulative adverse environmental impacts to water quality, wetlands, and fish and wildlife habitat, and the overall net loss of wetlands, frequently flooded areas, and habitat conservation areas.

The regulations of this chapter are intended to protect critical areas in accordance with the Growth Management Act and through the application of the best available science, as determined according to WAC 365-195-900 through 365-195-925, and in consultation with state and federal agencies and other qualified professionals.

Chapter 14.08.120, YMC addresses frequently flooded areas. The designation of Areas Frequently flooded includes areas Identified on the Flood Insurance Map(s) and areas mapped by Thurston County as high ground water flood hazard areas. The Flood Insurance Maps and high ground water maps were adopted by reference, declared part of this Chapter, and are available for public review at the City.

When base flood elevation data is not available (A and V zones), the administrator shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, state, or other official source, in order to administer this Chapter.

Where base flood elevation data is provided through the Flood Insurance Study or required through this Chapter 14.08.120, YMC, the administrator shall obtain and record the flood elevation certificates of all new or substantially improved structures, and whether or not the structure contains a basement. The administrator shall also maintain for public inspection all records of floodplain hazards, certificates of flood proofing, and flood elevation data.

Performance Standards – General Requirements. The following standards shall be adhered to in all frequently flooded areas, except as otherwise provide for in Chapter 14.08.120, YMC.

1. Approval of work in a frequently flooded area. Prior to any clearing, grading, dumping, drilling, dredging, filling, or the construction or reconstruction of any structure, the City shall have approved through the underlying permit or through approval of a critical areas report that the standards for development within a frequently flooded area have been met.
2. No activity within a frequently flooded area shall increase the base flood elevation.

Performance Standards – General Requirements in FEMA designated 100 year floodplain.

1. Structures Shall Be Located Outside the Floodplain. All structures, utilities, and other improvements shall be located on the buildable portion of the site out of the floodplain unless there is no buildable site area out of the floodplain. For sites with no buildable area out of the floodplain, structures, utilities, and other improvements shall be placed on the highest land on the site, oriented parallel to flow rather than perpendicular, and sited as far from the watercourse and other critical areas as possible. If the administrator detects any evidence of active hyporheic exchange on a site, the development shall be located to minimize disruption of such exchange.

2. **Methods That Minimize Flood Damage.** All new construction and substantial improvements shall be constructed using flood resistant materials and using methods and practices that minimize flood damage.
3. **Utility Protection.** Electrical, heating, ventilation, plumbing, air-conditioning equipment, and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
4. **Elevation Certificate Following Construction.** Following construction of a structure within the floodplain where the base flood elevation is provided, the applicant shall obtain an elevation certificate that records the elevation of the lowest floor. The elevation certificate shall be completed by a surveyor or engineer licensed in the state of Washington and shall be submitted to the City for recording.
5. **Anchoring**
 - a. **Anchoring Requirement.** All new construction and substantial improvements within the floodplain shall be anchored to prevent flotation, collapse, or lateral movement of the structure.
 - b. **Manufactured Homes.** All manufactured homes placed within the floodplain must be anchored to prevent flotation, collapse, or lateral movement and shall be installed using methods and practices that minimize flood damage. Anchoring methods may include, but are not limited to, use of over-the-top or frame ties to ground anchors.
6. **Fill and Grading.** Fill and grading with the floodplain shall only occur after a determination that the fill or grading will not block side channels, inhibit channel migration, increase the base flood elevation, or be within a channel migration zone.

Performance Standards – Specific Uses in the FEMA Designated 100 year floodplain. Specific uses shall adhere to the following relevant standards, in addition to the general standards.

1. **Divisions of Land.**
 - a. All new divisions of land, including subdivisions, short subdivisions, boundary line adjustments, binding site plans, and master planned communities shall not create any building lot for commercial or residential purposes with any portion within the floodplain.
 - b. Floodplain areas shall be dedicated as open space.
 - c. No infrastructure required for the subdivision with the exception of utility transport lines identified by the appropriate utility capital facilities plan shall be located within the floodplain.
 - d. Subdivisions and short subdivisions shall be designed to minimize or eliminate flood damage and impacts to floodplain functions and values. Public utilities and facilities that are installed as part of such subdivisions, such as sewer, gas, electrical, and water systems, shall be located and constructed to also minimize flood damage and impacts to floodplain functions and values. Subdivisions should be designed using natural features of the landscape and should not incorporate flood protection changes.

- e. Subdivisions and short subdivisions shall have adequate natural surface water drainage to reduce exposure to flood hazards; and
 - f. Subdivisions and short subdivisions shall show the 100-year floodplain, floodway, and channel migration zone on the preliminary and final plat and short plat maps and designate such areas as “no build,” when applicable.
2. Utilities
- a. Infiltration of Flood Waters. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the systems.
 - b. Sanitary Sewage Systems. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.
 - c. On-Site Waste Disposal Systems. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding. New on-site sewage disposal systems are prohibited within the floodplain.
3. Residential Construction on lots created prior to 1999.
- a. Must be Above Base Flood Elevation. New construction and substantial improvement of any residential structure shall have the lowest floor, including basement, elevated one (1) foot or more above the base flood elevation.
 - b. Areas Below the Lowest Floor. Fully enclosed areas below the lowest floor that are subject to flooding shall only be allowed when designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria:
 - i. A minimum of two (2) openings having a total net area of not less than one (1) square inch for every square foot of enclosed area subject to flooding shall be provided;
 - ii. The bottom of all openings shall be no higher than one (1) foot above grade; and
 - iii. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.
 - c. Manufactured Homes Must be Elevated. All manufactured homes to be placed or substantially improved shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated one (1) foot or more above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.
4. Nonresidential Construction on lots created prior to 1999.
- a. Above Base Flood Elevation. New construction and substantial improvement of any commercial, industrial, or other nonresidential structure shall either have the lowest floor, including basement, elevated one foot (1) or more above the base flood elevation, or, together with attendant utility and sanitary facilities, shall:

- i. Be floodproofed so that below one (1) foot or more above the base flood level the structure is watertight with walls substantially impermeable to the passage of water;
 - ii. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
 - iii. Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this Subsection based on their development and/or review of the structural design, specifications, and plans.
- b. Areas Below the Lowest Floor. Fully enclosed areas below the lowest floor that are not floodproofed shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect, or must meet or exceed the following minimum criteria:
- i. A minimum of two (2) openings having a total net area of not less than one (1) square inch for every square foot of enclosed area subject to flooding shall be provided;
 - ii. The bottom of all openings shall be no higher than one (1) foot above grade; and
 - iii. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

Performance Standards – General requirements in High Ground Water Hazard Areas.

1. Flood elevations. The base flood elevation for high ground water flood hazard areas corresponds to the elevation of the outer edge of the high ground water flood hazard area.
2. Delineation of the base flood elevation. Applicants shall submit to the approval authority hydrologic and hydrogeologic studies as necessary to delineate the high ground water flood hazard area and the base flood elevation.
3. No development shall locate within fifty feet, measured on a horizontal plane, from the outer edge of the high ground water hazard area or extending to a ground elevation two feet above the base flood elevation, whichever is less.
4. The bottom of any infiltration facility for stormwater discharge shall be located at least 6 feet above the base flood elevation.

Uses and Activities Prohibited From Frequently Flooded Areas

1. Critical Facilities. Critical facilities are prohibited from frequently flooded areas to prevent damage to such facilities, to avoid costs that will be incurred by the public, and to maintain functionality of such facilities during flood events. If such a prohibition is unreasonable, an allowance for critical facilities in frequently flooded areas with the following specific conditions:
 - a. Construction of new critical facilities shall be permissible within frequently flooded areas if no feasible alternative site is available.
 - b. Critical facilities constructed within frequently flooded areas shall have the lowest floor elevated three (3) feet or more above the level of the base flood elevation (100-year flood).

- c. Flood proofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into flood waters.
 - d. Access routes elevated to or above the level of the base flood elevation shall be provided to all critical facilities to the extent possible.
2. Wells Used for Potable Water. Water wells shall be located on high ground and are prohibited from being within the floodway.

On January 19, 2006, the Washington State Department of Ecology conducted a ‘Community Assistance Visit’ during which Ecology audited Yelm’s regulations for development within the floodplain as well as the process the Community Development Department utilizes to ensure that development is consistent with these adopted regulations.

The Department of Ecology found that Yelm’s flood damage prevention regulations, as codified at Chapter 15.32 YMC, are ‘significantly compliant with the rules established under 44 CFR’. The Code did need to be updated, however, to address several deficiencies which are ‘primarily minor in scope – word changes, definitions, etc.’

Significantly, the Department of Ecology noted that ‘a tour of the floodplains within the City did not result in identification of any specific development cases which would trigger a request for additional information. This, it could be assumed, is a good reflection as to the thoroughness of the reviews performed by your permitting staff.’ It is notable that the field inspection was conducted during the week of January 19, 2006, during a significant flood event.

After review and approval of the proposed amendments by the Washington State Department of Ecology, Ordinance 849 amended Chapter 15.32 YMC to conform to the Washington State Department of Ecology model Flood Damage Prevention Code.

This page left intentionally blank.