

# CHAPTER 7. TOWN OF INDEX ANNEX

## 7.1 HAZARD MITIGATION PLAN POINT OF CONTACT

### Primary Point of Contact

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## 7.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—1898
- **Current Population**—155 as of April 1, 2009 (U.S. Census estimate)
- **Annual Population Growth Rate**—Population in the Town of Index has remained fairly constant throughout the past few decades (typically ranging from 147 to 159). Population growth for “full time” residents in the surrounding area has been generally growing during the same time period. The total ZIP-code population (served by the local post office) is 523, according to the 2000 census. Within the Town, the population grew by three people between 2000 and 2010, a 0.1-percent increase. The average annual change is about 0.25 percent.
- **Location and Description**—The Town of Index is located along the north bank of the North Fork Skykomish River, about seven miles east of Gold Bar and close to the southeastern border of Snohomish County. The Town has an approximate elevation of 500 to 540 feet above sea level and is surrounded by the Cascade Mountain Range to the east and north. Index has a total land area of 0.2 square miles.
- **Brief History**—The Town of Index was incorporated by Amos Gunn in 1898. Less than 25 percent of the platted lots have been built-out, with a high percentage of the remaining undeveloped lots defined as difficult to develop due to environmental conditions (steep slopes, poor soils and flood-prone areas). The original 1890s population was about 1,000 (with few families) and the Town’s primary industries were mining and logging. As the mining and logging industries declined in the late 1800s, Index’s population dropped to around 200.

The Town and surrounding area support an elementary school, a post office, a volunteer fire district (#28) and a general store. In the past 10 years the Town has lost two businesses that had been in operation for over 20 years; one of the buildings has since re-opened as a new business that is now two years old.

The population is split between young families with adults working outside of the general area, small “cottage business” with residents working at home, and retired individuals. About seven homes are used as second homes and are typically occupied only on weekends and holidays. Approximately four people are part-time employees working within the town limits.

- **Climate**—In the foothills of the Cascade Mountains, rainfall averages 180 inches per year. Index’s average temperature is moderate, ranging from 43°F to 59°F, with approximately 213 frost-free days.
- **Governing Body Format**—The Town of Index is governed by a mayor and a five-person council. There is also a planning commission made up of a five commissioners who review land use applications, update plans and regulations as needed, and provide recommendations to the Council. The Town employs three regular “part time” positions: a city clerk who is responsible for day-to-day operations within the town, a maintenance person who performs or oversees all maintenance work conducted within the town and a water distribution manager who is responsible for the drinking water system and provides assistance, as needed, to the clerk. Index also contracts or hires occasional assistance for maintenance, legal advice or special projects.

The Town of Index has interlocal agreements with Snohomish County to provide the Town with services that are beyond the rural community’s capabilities. These services include building inspection, fire inspection and land use advice.

- **Development Trends**—According to the Washington Office of Financial Management, there are only about 100 housing units in the Town of Index. With an estimated population of 155, Index is ranked the 8th smallest community by population in Washington State. The 1999 median household income in the Town was below \$50,000, with per capita income of \$22,023.

Due to physical and environmental limitations, there are minimal opportunities for further land development. While the Town of Index plat includes a number of undeveloped lots, many are likely to be unreasonable to develop. Index is bound by developmental constraints that include steep granite walls to the north, the designation of the Skykomish River as “Wild and Scenic River” to the south, and soil limitations for individual septic systems. Change in use and remodeling of existing structures is the primary opportunity for increased development for the future.

Revised population projections estimate that Index’s population will increase to 190 people by 2012. This growth, if realized, will likely be found with full time residents living in existing “recreational homes.”

Washington State law (RCW 36.70) requires all cities in counties that meet population criteria to adopt a comprehensive plan to guide community development. The plan must present goals, policies and implementation measures, and city actions relating to land use, annexations, zoning, subdivision, design review, redevelopment and capital improvements must be consistent with the plan. The Town of Index adopted its most recent general plan in 2003, in compliance with RCW 36.70. Future development will be managed as identified in the plan. The Town will review and amend its comprehensive plan in 2010.

### **7.3 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY**

Table 7-1 lists all significant past occurrences of natural hazards within the jurisdiction. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 1 (see Additional Comments section)
- Number of Repetitive Flood Loss Properties that have been mitigated: None

## **7.4 HAZARD RISK RANKING**

Table 7-2 presents the ranking of the hazards of concern.

## **7.5 CAPABILITY ASSESSMENT**

The assessment of the jurisdiction's legal and regulatory capabilities is presented in Table 7-3. The assessment of the jurisdiction's administrative and technical capabilities is presented in Table 7-4. The assessment of the jurisdiction's fiscal capabilities is presented in Table 7-5. Classifications under various community mitigation programs are presented in Table 7-6.

## **7.6 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES**

Table 7-7 lists the initiatives that make up the jurisdiction's hazard mitigation plan. Table 7-8 identifies the priority for each initiative. Table 7-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

## **7.7 STATUS OF PREVIOUS PLAN INITIATIVES**

Table 7-10 summarizes the initiatives that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

## **7.8 FUTURE NEEDS TO BETTER UNDERSTAND RISK**

The Town of Index would like to better define risks and vulnerability through the scientific study of geotechnical issues related to landslides, earthquakes and flood-prone areas (based on river modeling in the next 20 years). The Town would also benefit from an assessment of wildland fire risk based on the age of the nearby forests as well as drought conditions. The identification of responsible jurisdictions, such as the state Department of Natural Resources, state Department of Parks and U.S. Forest Service, would improve the community's ability to protect forests in the area.

## **7.9 ADDITIONAL COMMENTS**

The Town of Index has ongoing and historical incidences of flooding, which affects half of the Town's land area and about one-third to half of the homes occupied by full-time residents. Flood losses in the Town have not been accurately recorded, for a variety of reasons, primarily due to a lack of claims requests by residents for the full cost of recovery from flood damage. There is currently one repetitive loss structure in the floodplain, which was elevated during 2008/2009, though mitigation for that activity has not been addressed at this time. A higher value placed on the homes in the floodplain and the subsequent impact may have resulted in a higher number of repetitive loss properties identified. The Town estimates that three or four homes have been repeatedly flooded.

Flooding in the Town of Index was most dramatic (with loss of structures) during the 1980 flood events. Since then, shallow inundation has been the primary impact, resulting in loss of contents, such as personal valuables, as well as the associated costs of recovery.

Repetitive damage to riprap bank stabilization projects is ongoing, and repairs are funded as monies are available. Riprap maintenance is needed at this time in areas along the western portion of Avenue A. While nothing is degraded to the point of a high hazard, loss of toe integrity and slope condition may attribute to greater loss of property (primarily public streets) in the future under a high magnitude flood.

While changes and updates to building codes have, and will, alter the type and location of structures built in the floodplain; the presence of residential and business uses within the 100-year floodplain (including their increased value and maintenance) will not be eliminated within the next 20 years. Alternative flood protection, which exceeds the typical emergency response to an event, will be the only means by which the Town of Index addresses the continued effects of regular flooding.

Two other items that could affect the Town of Index, but are not clearly addressed in this natural hazard data gathering process, are as follows:

- **Railroad:** The Burlington Northern Railroad bisects the Town of Index; making passing from one side of town to the other impossible by automobile if a train is stopped on the single crossing or derailed at that location. In the past 30-plus years, there has been one derailment, which caused a blockage of traffic for two days although it did not result in significant damage. The railroad crossing is immediately adjacent to the school yard, one block from the Fire Hall (District 28) and Town Hall. Should a train derailment take place south of the river, it might sever any access into or out of the town from Highway 2 by blocking Index Galena Road. A derailment involving a chemical spill or other hazard would be a significant impact on the entire community, including the school, and could block remediation vehicles in more than one location.
- **Road/Bridge Access:** An additional area of concern is the potential for a disaster resulting in the inability of residents to travel west along Highway 2. The loss of High Bridge (East of Gold Bar) due to a variety of natural disasters (particularly landslides, which have occurred in the past) or human-made disasters blocking Highway 2 and/or Reiter Road could prevent residents from getting to work, seeking medical help or shopping for basic needs. Due to the limited make up of services at this time, the nearest grocery store, should Gold Bar be inaccessible, would require travel over the pass to Leavenworth. Mail comes to Index from Everett, telephone and other utilities are routed from Gold Bar east to Index. The Town of Index and the Town of Skykomish would only have limited fire district services available in this scenario.

## **7.10 HAZARD AREA EXTENT AND LOCATION**

Hazard area extent and location maps have been generated for the Town of Index and are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

<b>TABLE 7-1. NATURAL HAZARD EVENTS</b>			
Type of Event	FEMA Disaster #(if applicable)	Date	Preliminary Damage Assessment
Severe Winter Storm and Snow	1825-DR	12/2008	\$1,353 (Costs related to snow removal and loss of power)
Wind Storm	N/A	10/2007	No estimates available
Flood	1671-DR	11/2006	\$56,278
Wind Storm	1499-DR	10/2003	\$1,391
Earthquake (Nisqually)	1361-DR	2/2001	No estimates available
Earthquake (Duvall)	N/A	5/1996	No estimates available
Flood and Landslide	1100-DR	11/1995-2/1996	No estimates available
Severe Winter Storm - Ice	1079-DR	12/1995	No estimates available
Flood	883-DR	11/1990	Street damage. No estimates available
Wind and Landslide	N/A	1/1990	No estimates available
Flood	N/A	12/1980	No estimates available
Storm	N/A	1975	No estimates available

<b>TABLE 7-2. HAZARD RISK RANKING</b>		
Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Severe Weather	54
2	Flood	39
3	Wildland Fire	36
4	Earthquake	36
5	Volcano/Lahar	18
6	Landslide	6
7	Tsunami	6
8	Dam Failure	4
9	Avalanche	1

**TABLE 7-3.  
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
<b>Codes, Ordinances &amp; Requirements</b>					
Building Code	Y	N	N	Y	International Building Code Ordinance 378 Nov 2004
Zonings	Y	N	N	Y	Title 17: Adopted 1996 by ordinance #324 and as amended through March 2004.
Subdivisions	N	N	N	N	N/A
Stormwater Management	Y	N	N	Y	Title 13 was adopted in 1995 Ord. #311
Post Disaster Recovery	N	N	N	N	N/A
Real Estate Disclosure	N	N	N	N	N/A
Growth Management	Y	N	N	Y	GMA compliant Comprehensive plan 1994 to 2014, and amended in March 2003 by Ord. #369
Site Plan Review	Y	N	N	N	Site plans are reviewed for technical approval by Town of Index staff and reviewed and approved by Planning Commission and Town Council
Special Purpose (flood management, critical areas)	Y	Y	N	Y	Title 16 (Adopted May 2002, Ord. #361-Critical Areas and Floodplain regulations.)  <i>State law prohibits residential construction in designated floodway.</i>
<b>Planning Documents</b>					
General or Comprehensive Plan	Y	N	N	Y	GMA compliant Current version is 3/2003. Includes a Capital Facilities element and Critical Areas regulations. Update in progress (anticipated date 9/2010)
Floodplain or Basin Plan	N	N	N	N	N/A
Stormwater Plan	N	N	N	N	Title 13 was adopted in 1995 Ord. #311
Capital Improvement Plan	Y	N	N	N	Included in Comprehensive Plan
Habitat Conservation Plan	N	N	N	N	The City has critical areas regulations to protect critical habitat as mandated by State GMA and all required laws and Codes of the State and federal Government
Economic Development Plan	Y	N	N	Y	This is an element of the Comprehensive Plan.
Emergency Response Plan	Y	N	N	N	Currently has one

<b>TABLE 7-3 (continued). LEGAL AND REGULATORY CAPABILITY</b>					
	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
<b>Planning Documents (continued)</b>					
Shoreline Management Plan	Y	N	N	Y	Title 14 was adopted in January 1997 by Ord. #325 and amended by Ord. #336 in August 1998. Ecology accepted. Update in Progress (anticipated adoption 2014)
Post Disaster Recovery Plan	N	N	N	N	N/A
<b>Other</b>					
Other	N	N	N	N	The Town of Index has a Water Systems Plan, Ord. #20 in 1912. Ord. #63 adopted in 1960.

<b>TABLE 7-4. ADMINISTRATIVE AND TECHNICAL CAPABILITY</b>		
Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Y	Staff and contract positions with Snohomish County, State Assistance provided.
Engineers or professionals trained in building or infrastructure construction practices	Y	None on staff. However these are contract positions with Snohomish County.
Planners or engineers with an understanding of natural hazards	Y	None on staff. However these are contract positions with Snohomish County.
Staff with training in benefit/cost analysis	Y	None on staff. However these are contract positions with Snohomish County.
Floodplain manager	Y	Staff Water Manager for Town of Index
Surveyors	Y	None on staff. However these are contract positions with Snohomish County.
Personnel skilled or trained in GIS applications	Y	None on staff. However these are contract positions with Snohomish County.
Scientist familiar with natural hazards in local area	Y	None on staff. However these are contract positions with Snohomish County.
Emergency manager	Y	Staff and contract positions with Snohomish County.
Grant writers	Y	No on staff personnel have been trained in FEMA's Cost/Benefit analysis protocol. Staff and contract positions with Snohomish County

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
Withhold Public Expenditures in Hazard-Prone Areas	Yes
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	Real Estate Excise Tax and Salmon Recovery Funding.

	Participating?	Classification	Date Classified
Community Rating System	Yes	6	5/1/2008
Building Code Effectiveness Grading Schedule	Yes	3/3	5/1/2010
Public Protection	Yes	7	5/1/2010
Storm Ready	No	NA	NA
Firewise	No	NA	NA

**TABLE 7-7.  
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>I-1—Clear Storm Drains and Culverts for Stormwater Management</b>							
Existing	Flooding	1, 2, 4, 5, 11	Town	\$3,400	General Fund, FEMA Hazard Mitigation Grants	Short term	No
<b>I-2—Maintain and Retrofit Existing Localized Flood Control Structures</b>							
Existing	Flooding	1, 2, 4, 5, 11	Town	\$16,000	FEMA Hazard Mitigation Grants	Short term	No
<b>I-3—Feasibility Study of Alternative Flood Control Structures</b>							
New	Flooding	3, 6, 7, 11	Town	\$100,000	General Fund	Long term	No
<b>I-4—Elevate all residential structures within the 100-Year Floodplain</b>							
Existing	Flooding	4, 11, 14	Town	\$100,000	FEMA Hazard Mitigation Grants	Long term	No
<b>I-5—Undertake Earthquake Study for all “Critical Infrastructure”</b>							
New	Earthquake	1, 2, 4, 5, 11	Town	\$8,000	General Fund	Short term	No
<b>I-6—Update and Construct Local Stormwater Facilities</b>							
New & Existing	Flooding	1, 2, 4, 5, 1	Town	\$25,000	FEMA Hazard Mitigation Grants	Short term	No
<b>I-7—Retrofit all Town Infrastructure to Improve Resilience to Disasters</b>							
Existing	Flood, Earthquake, Wildland Fire	1, 2, 4, 5, 11	Town	\$50,000	FEMA Hazard Mitigation Grants	Short term	No
<b>I-8—Undertake of Wildland fire prevention and policy study for Town and consider participation in Firewise Program</b>							
New	Wildland Fire	1, 2, 4, 5, 11	Town	\$2,000	General Fund	Short term	Yes
<b>I-9—Acquisition of flood-prone structures and conversion of land to open space</b>							
New & Existing	Flooding	3, 4, 6, 7, 11, 12, 14	Town	\$300,000	FEMA Hazard Mitigation Grants	Long term	Yes
<b>I-10—Control land use in flood-prone areas (by zoning setbacks, greenways, and buffers)</b>							
New	Flooding	3, 4, 6, 7, 11, 12, 14	Town	\$60,000	FEMA Hazard Mitigation Grants	Long term	Yes

**TABLE 7-7 (continued).  
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>I-11—Re-vegetation of river banks in armored areas as part of vegetative management program</b>							
New & Existing	Flooding	3, 4, 6, 7, 11, 12, 14	Town	\$30,000	FEMA Hazard Mitigation Grants	Long term	Yes
<b>I-12—Seismic retrofit structures on NEHRP D and E soils</b>							
Existing	Earthquake	1, 2, 4, 9, 11	Town	\$200,000	FEMA Hazard Mitigation Grants	Long term	Yes
<b>I-13—Promote non-structural retrofitting of structures on NEHRP D and E soils</b>							
Existing	Earthquake	1, 2, 4, 5, 11	Town	\$10,000	FEMA Hazard Mitigation Grants	Long term	Yes
<b>I-14—Continue participation and improve class rating in ISO programs (Building Code Effectiveness Grading Schedule and Public Protection)</b>							
New	All Hazards	1, 2, 4, 5, 11	Town	\$2,000	General Fund	Long term	No
<b>I-15—Collect information and participate in programs which address emergency preparedness</b>							
New	All Hazards	1, 2, 4, 5, 11	Town	\$2,000	General Fund	Long term	No
<b>I-16—Retrofit Water Main in Floodplain</b>							
Existing	Flooding, Earthquake	1, 2, 4, 14	Town	\$190,000	General Fund, FEMA Hazard Mitigation Grants	Long term	No
<b>I-17—Promote “self sustainability” and disaster preparedness within the Town and neighboring communities on which the residents rely for work, health care and shopping</b>							
Existing	All Hazards	2, 5, 8, 10	Town	\$190,000	General Fund	Long term	No
<b>I-18—Support County-wide initiatives identified in Chapter 21 of Volume 1.</b>							
New and Existing	All Hazards	All	Town	Low	General fund	Short-term, ongoing	No
<b>I-19—Continue to maintain compliance and good standing under the National Flood Insurance Program (NFIP).</b>							
New and existing	Flooding	1, 2, 9, 10, 11	Town	Low	General Fund	Short-term, ongoing	No

<b>TABLE 7-7 (continued). HAZARD MITIGATION ACTION PLAN MATRIX</b>							
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>I-20</b> —Continue participation and improve class rating in Community Rating System (CRS)							
New and existing	Flooding	3, 5, 6, 7, 9, 10, 11, 13, 14	Town	Low	General Fund	Short-term, ongoing	Yes
<b>I-21</b> —Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority when applicable.							
Existing	All Hazards	6, 7, 11, 14	Town	High	FEMA Hazard Mitigation Grant funding with local match provided by property owner contribution	Long-term depends on funding	No
<b>I-22</b> —Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Chapter 7 of Volume 1.							
New and Existing	All Hazards	All	Town	Low	General Fund, FEMA Mitigation Grant Funding for 5-year update	Short-term, ongoing	No
<b>I-23</b> —Integrate, where appropriate, risk assessment information from the Snohomish County Hazard Mitigation Plan into other planning mechanisms available to the Town such as; the Capital Improvements Program, the Comprehensive planning process, and Shoreline Master planning.							
New and Existing	All Hazards	All	Town	Low	General Fund	Short-term ongoing	No

**TABLE 7-8.  
MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	#of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Priority <sup>a</sup>
I-1	5	High	Medium	Yes	Yes	No	High
I-2	5	High	High	Yes	Yes	No	High
I-3	5	High	High	Yes	No	No	Medium
I-4	4	High	High	Yes	Yes	No	High
I-5	5	High	Medium	Yes	No	No	Low
I-6	5	High	High	Yes	Yes	No	Medium
I-7	5	High	High	Yes	Yes	No	High
I-8	5	High	Low	Yes	No	Yes	High
I-9	7	High	High	Yes	Yes	No	High
I-10	7	High	Medium	Yes	Yes	No	Medium
I-11	8	High	Medium	Yes	Yes	No	Medium
I-12	5	High	High	Yes	Yes	No	Medium
I-13	5	High	Low	Yes	Yes	Yes	Medium
I-14	5	Low	Low	Yes	No	Yes	Medium
I-15	5	Medium	Low	Yes	No	Yes	High
I-16	4	High	High	Yes	Yes	No	High
I-17	4	High	Low	Yes	No	No	Medium
I-18	14	Medium	Low	Yes	No	Yes	High
I-19	5	Medium	Low	Yes	No	Yes	High
I-20	9	Medium	Low	Yes	No	Yes	High
I-21	4	High	High	Yes	Yes	No	Medium
I-22	14	Medium	Low	Yes	Yes	Yes	High
I-23	14	High	Low	Yes	No	Yes	High

a. Explanation of priorities

- High Priority: Project meets multiple plan objectives, benefits exceed cost, funding is secured under existing programs, or is grant eligible, and project can be completed in 1 to 5 years (i.e., short term project) once funded.
- Medium Priority: Project meets at least 1 plan objective, benefits exceed costs, requires special funding authorization under existing programs, grant eligibility is questionable, and project can be completed in 1 to 5 years once funded.
- Low Priority: Project will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, project is not grant eligible, and time line for completion is long term (5 to 10 years).

**TABLE 7-9.  
ANALYSIS OF MITIGATION INITIATIVES**

Hazard Type	Initiative Addressing Hazard, by Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Avalanche						
Dam Failure						
Earthquake	I-5, I-14, I-18, I-22, I-23	I-7, I-12, I-13, I-16, I-18, I-21	I-5, I-15, I-17, I-18, I-22	I-18	I-15, I-18	I-18
Flood	I-3, I-10, I-14, I-18, I-19, I-20, I-22, I-23	I-2, I-4, I-7, I-9, I-16, I-18, I-19, I-20, I-21	I-3, I-15, I-17, I-18, I-19, I-20, I-22	I-1, I-9, I-11, I-18, I-19, I-20	I-15, I-18, I-19, I-20	I-2, I-6, I-18, I-19, I-20
Landslide	I-14, I-18, I-22, I-23	I-7, I-18, I-21	I-15, I-17, I-18, I-22	I-18	I-15, I-18	I-18
Severe Weather	I-14, I-18, I-22, I-23	I-7, I-18, I-21	I-15, I-17, I-18, I-22	I-18	I-15, I-18	I-18
Tsunami						
Volcano/Lahar	I-14, I-18, I-22, I-23	I-7, I-18, I-21	I-15, I-17, I-18, I-22	I-18	I-15, I-18	I-18
Wildfire	I-8, I-14, I-18, I-22, I-23	I-7, I-18, I-21	I-8, I-15, I-17, I-18, I-22	I-18	I-15, I-18	I-18

Notes:

1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.













**TABLE 7-10.  
PREVIOUS ACTION PLAN IMPLEMENTATION STATUS**

Action #	Action Status			Comments
	Completed	Carry Over to Plan Update	Removed; No Longer Feasible	
1		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (I-9)
2		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (I-10)
3		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (I-11)
4		X		Ongoing action. Has been carried over to updated action plan (I-8). Continue to collect data and consider participation in the Wildland Firewise program.
5		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (I-12)
6		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (I-13)
7		X		Ongoing action. Has been carried over to updated action plan (I-20). Continue to participate and improve rating in the CRS program.

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## Map 7-1

### Critical Facilities

-  Bridge
-  Communication
-  Dam
-  Government
-  Hazmat
-  Medical
-  Power
-  Protective
-  School
-  Wastewater
-  Water
-  Other



## Snohomish County

Tetra Tech, Inc.  
May 2010

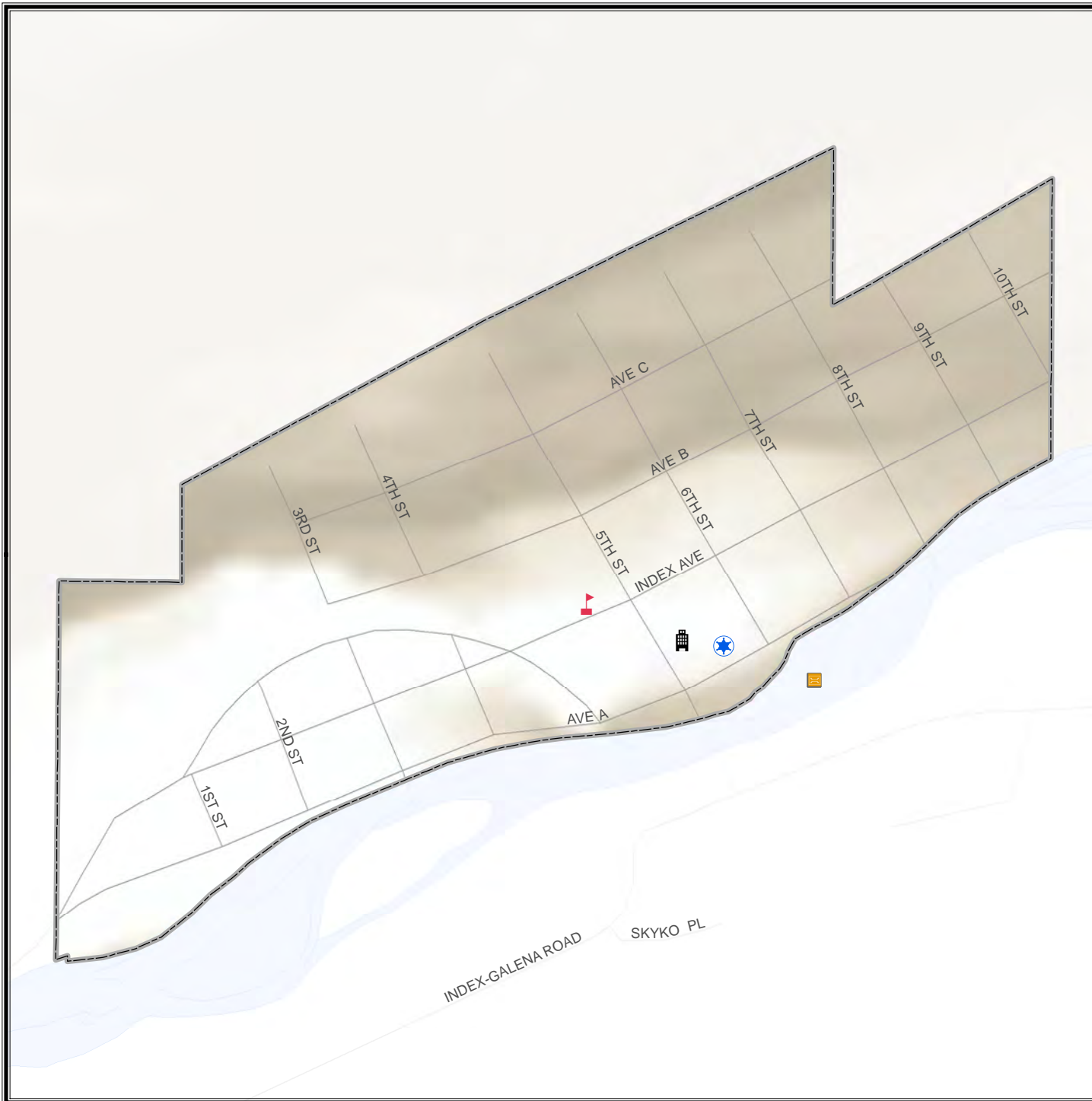
*Data Sources:*  
Snohomish County  
Project Planning Partners  
Washington State Department of  
Natural Resources, Division of Geology  
and Earth Resources

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# TOWN OF INDEX

## Map 7-2

### Earthquake Peak Ground Acceleration 100-year Probabilistic Scenario

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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May 2010

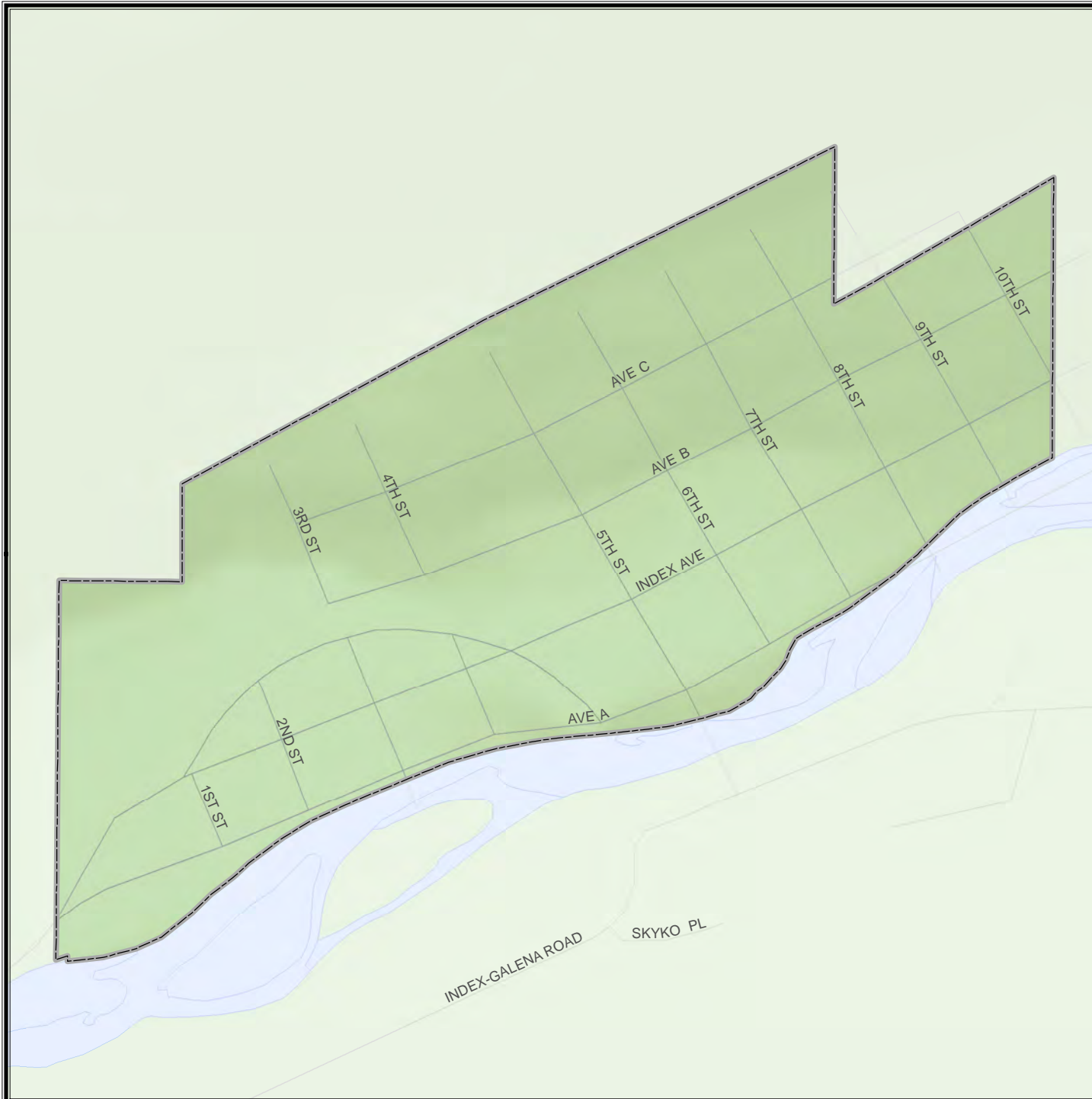
*Data Sources:*  
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# TOWN OF INDEX

## Map 7-3

### Earthquake

### Peak Ground Acceleration

### 500-year Probabilistic

### Scenario

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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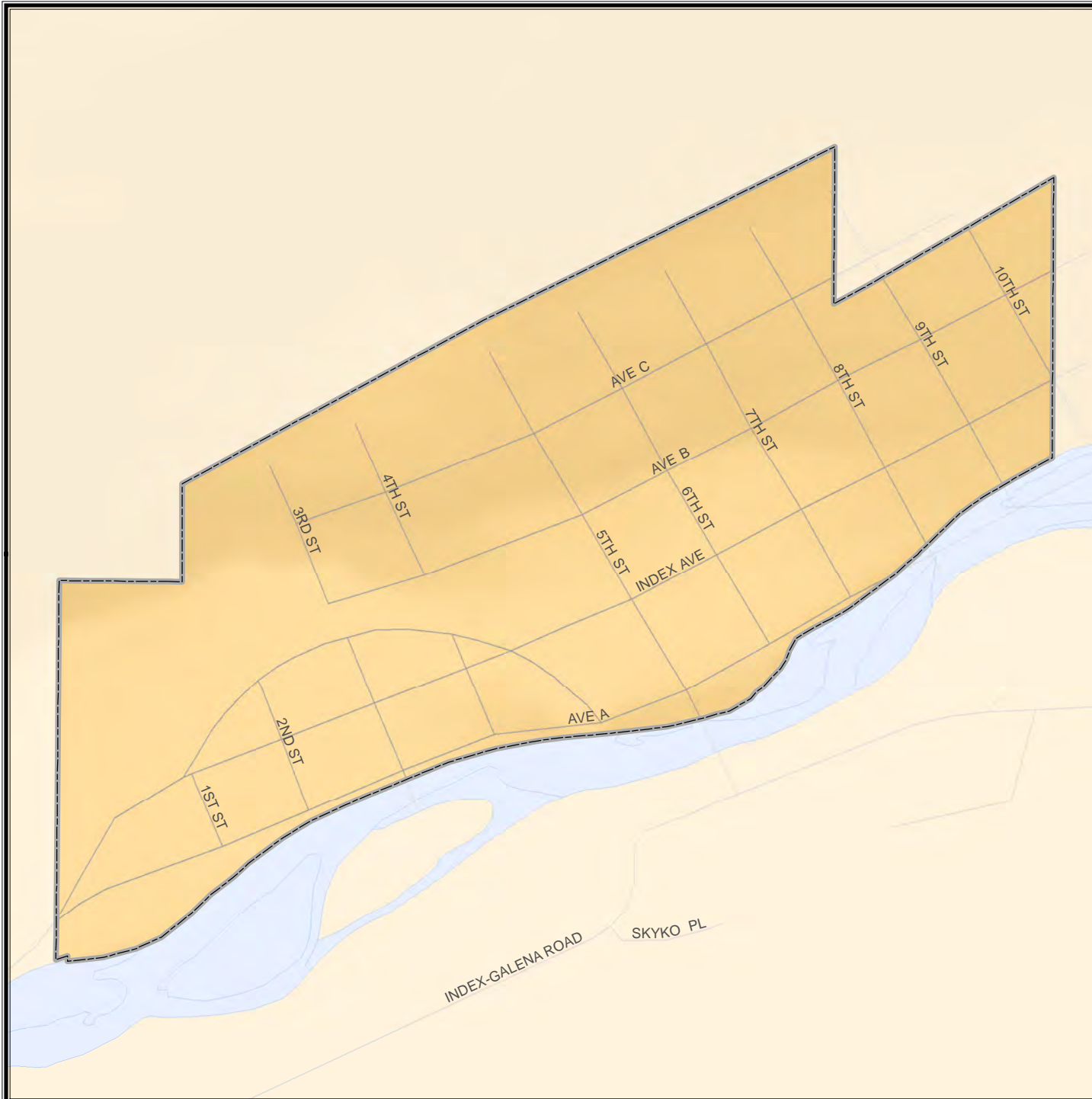
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# TOWN OF INDEX

## Map 7-4

### Devil's Mountain Fault Peak Ground Acceleration 7.1-Magnitude Scenario Shake Map

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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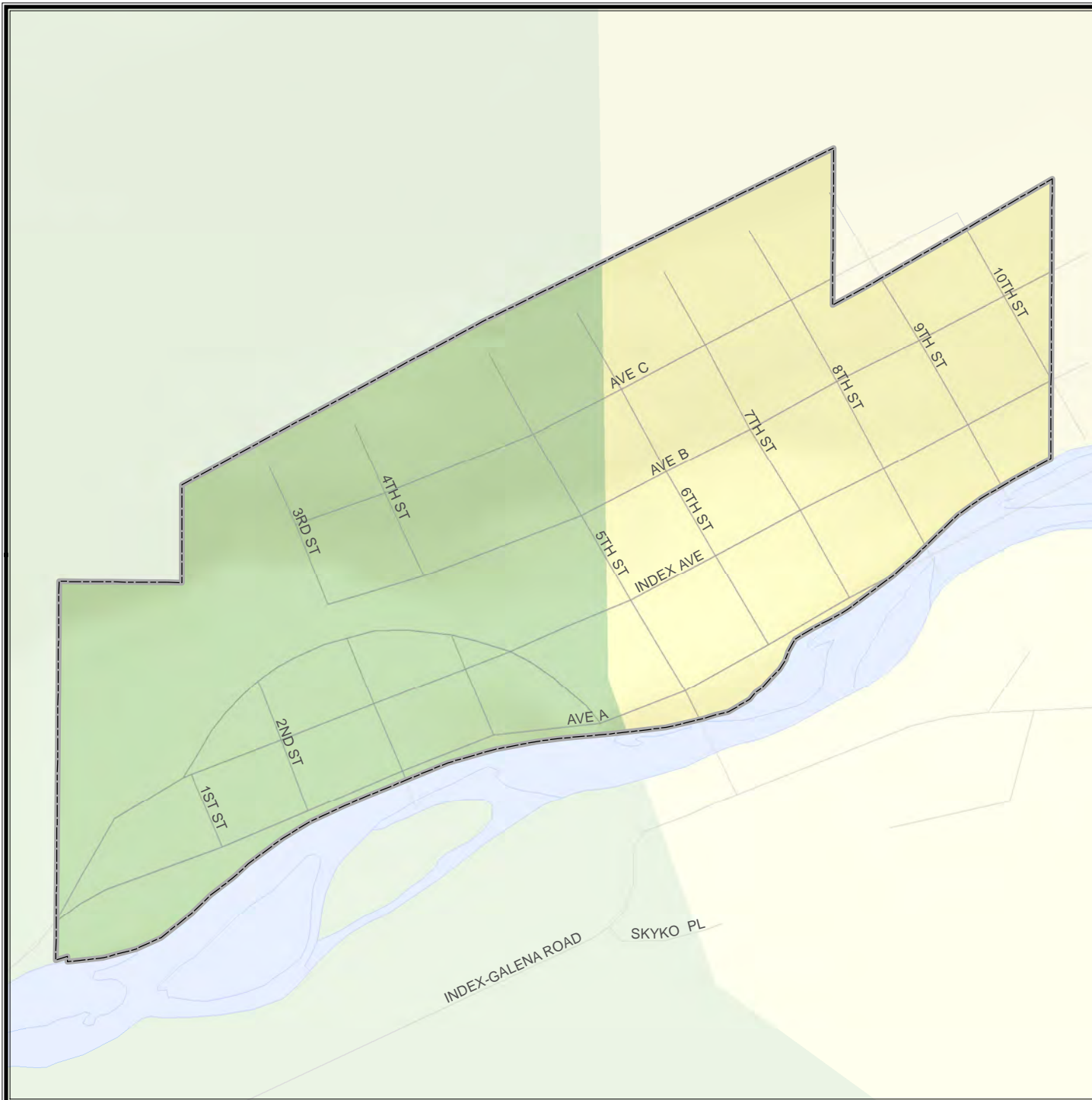
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# TOWN OF INDEX

## Map 7-5

South Whidbey Fault  
Peak Ground Acceleration  
7.4-Magnitude Scenario  
Shake Map

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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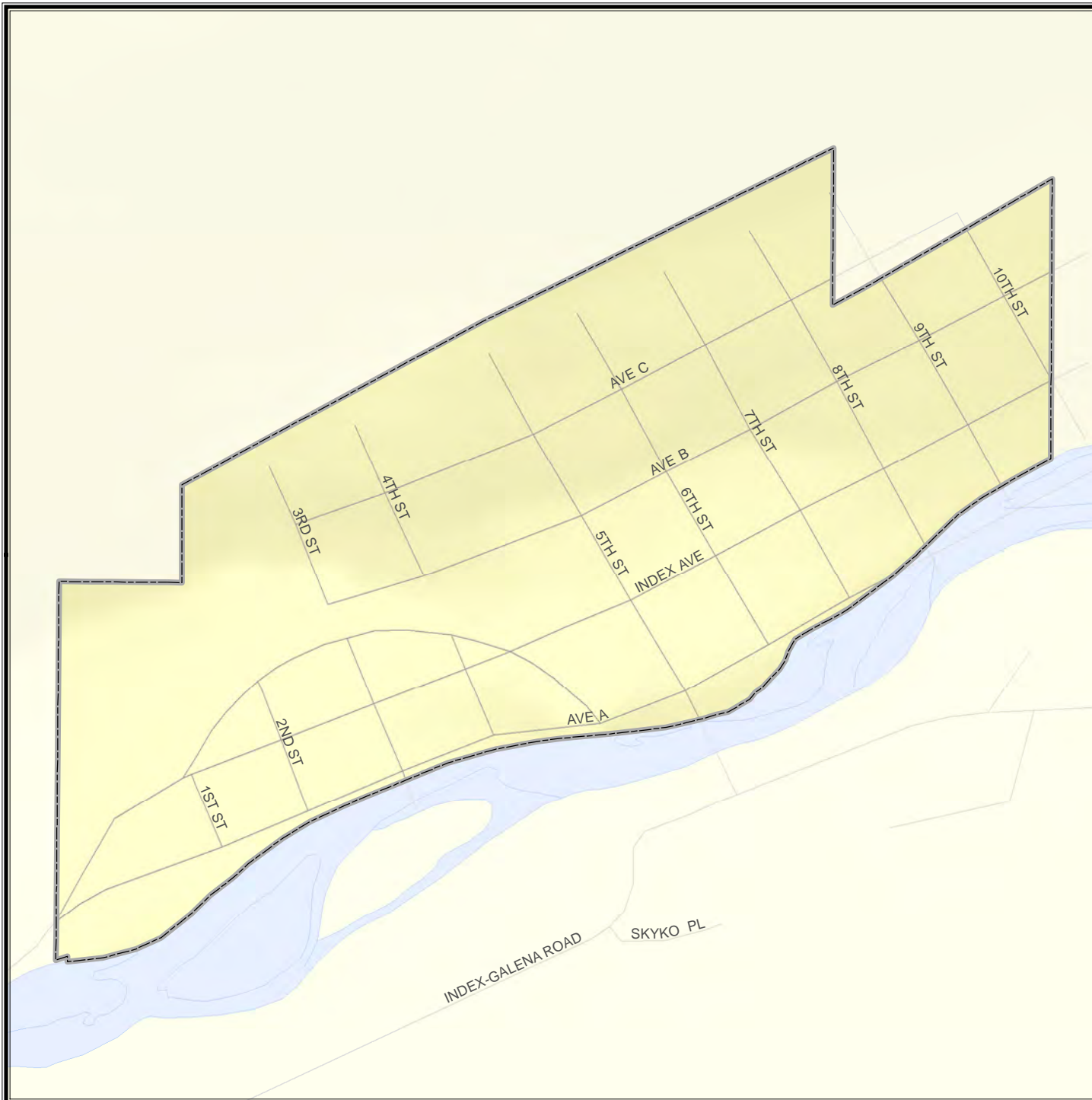
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# TOWN OF INDEX

## Map 7-6

### National Earthquake Hazard Reduction Program (NEHRP)

#### Soil Site Classes

-  Site Class F - Requires site-specific investigation
-  Site Class E - Soft Soil
-  Site Class D - Stiff Soil
-  Site Class C - Very Dense Soil and Soft Rock
-  Site Class B - Rock
-  Water
-  Ice



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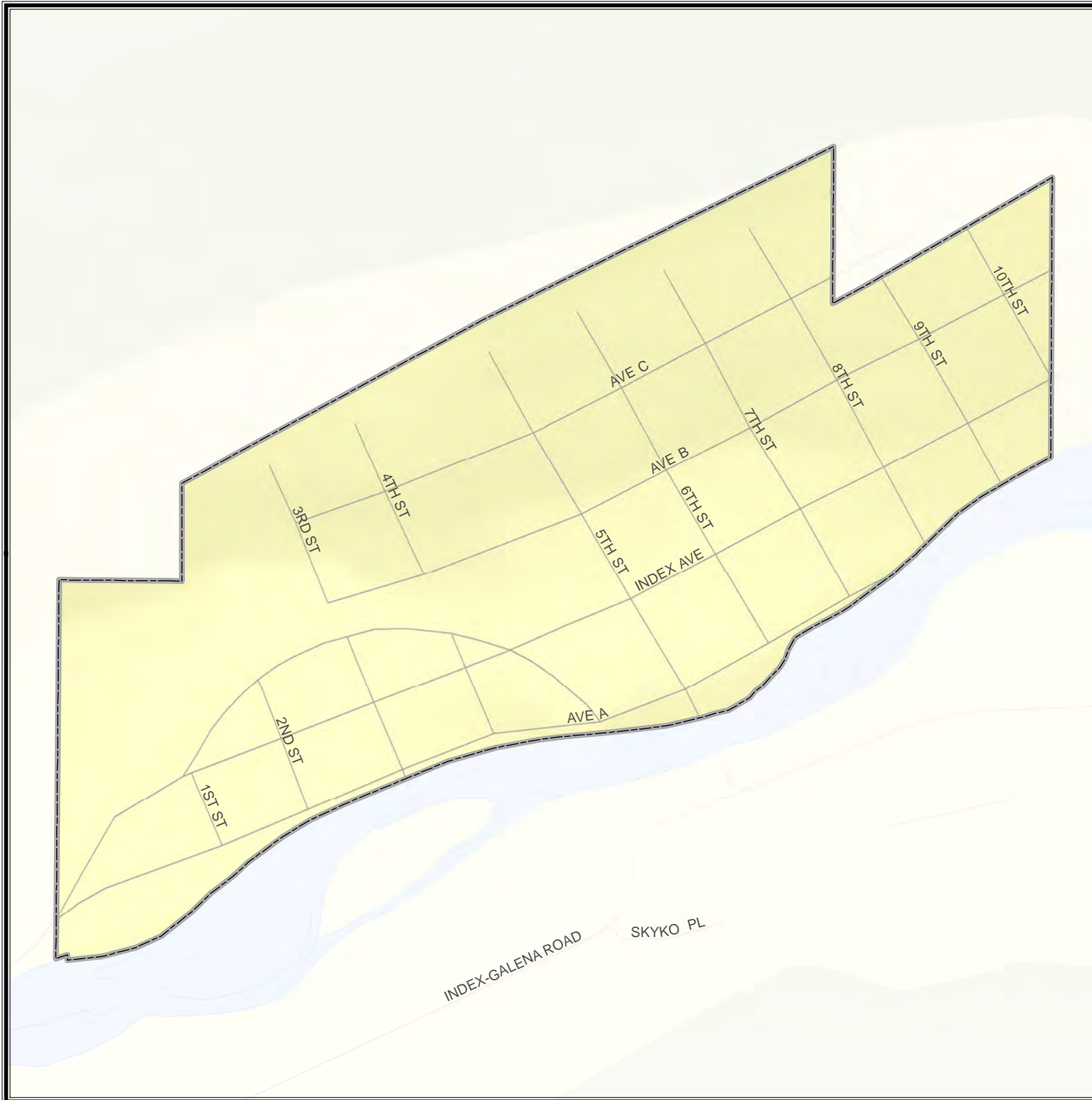
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# TOWN OF INDEX

## Map 7-7

### Liquefaction Susceptibility

#### Liquefaction Susceptibility

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

#### Not Susceptible to Liquefaction

-  Bedrock
-  Peat
-  Water
-  Ice



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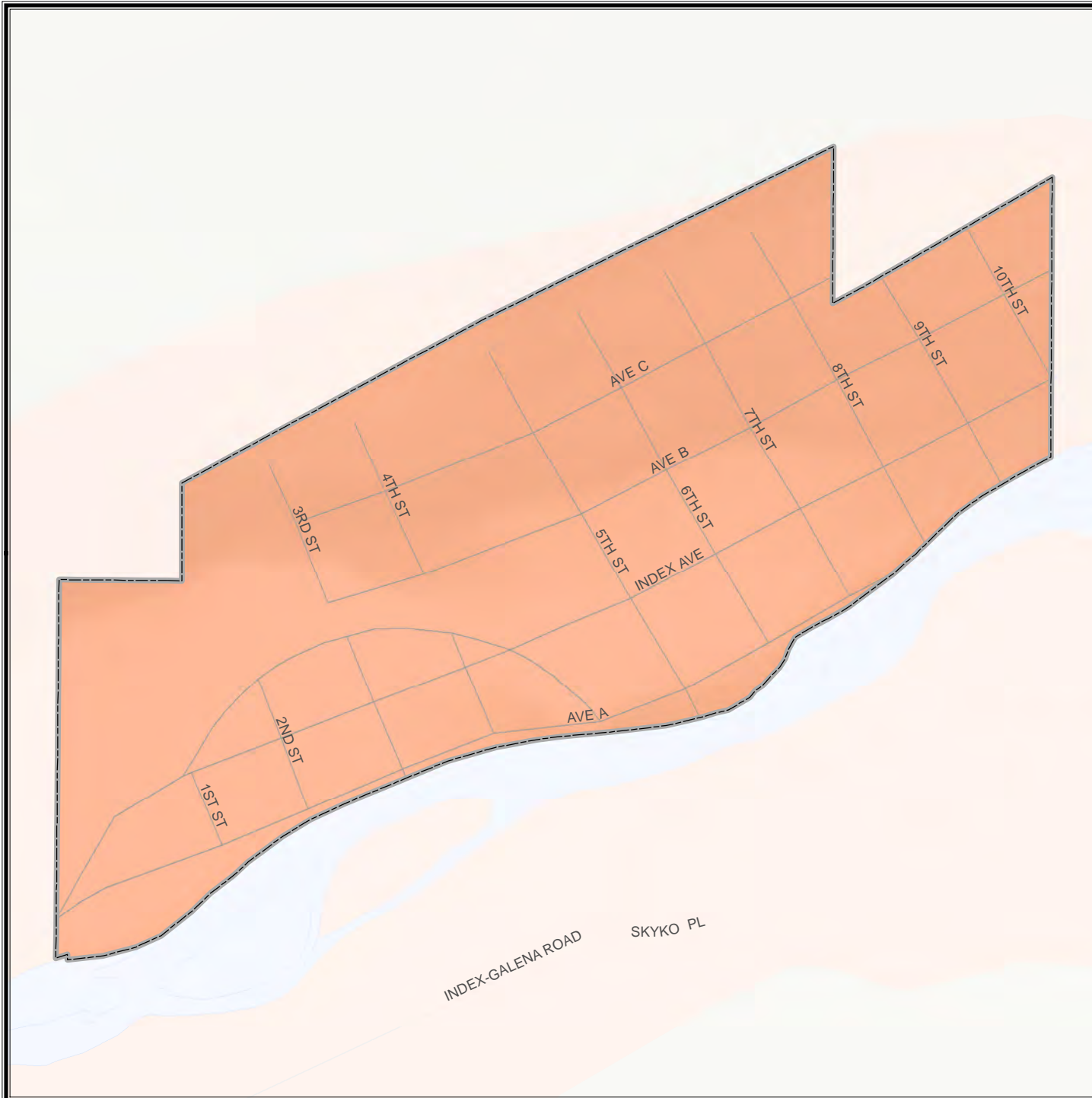
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# TOWN OF INDEX

## Map 7-8

### Flood Hazard Areas

-  Special Flood Hazard Area (100 Year)
-  Special Flood Hazard Area (500 Year)
-  Special Flood Hazard Area (Floodway)



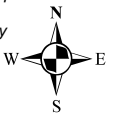
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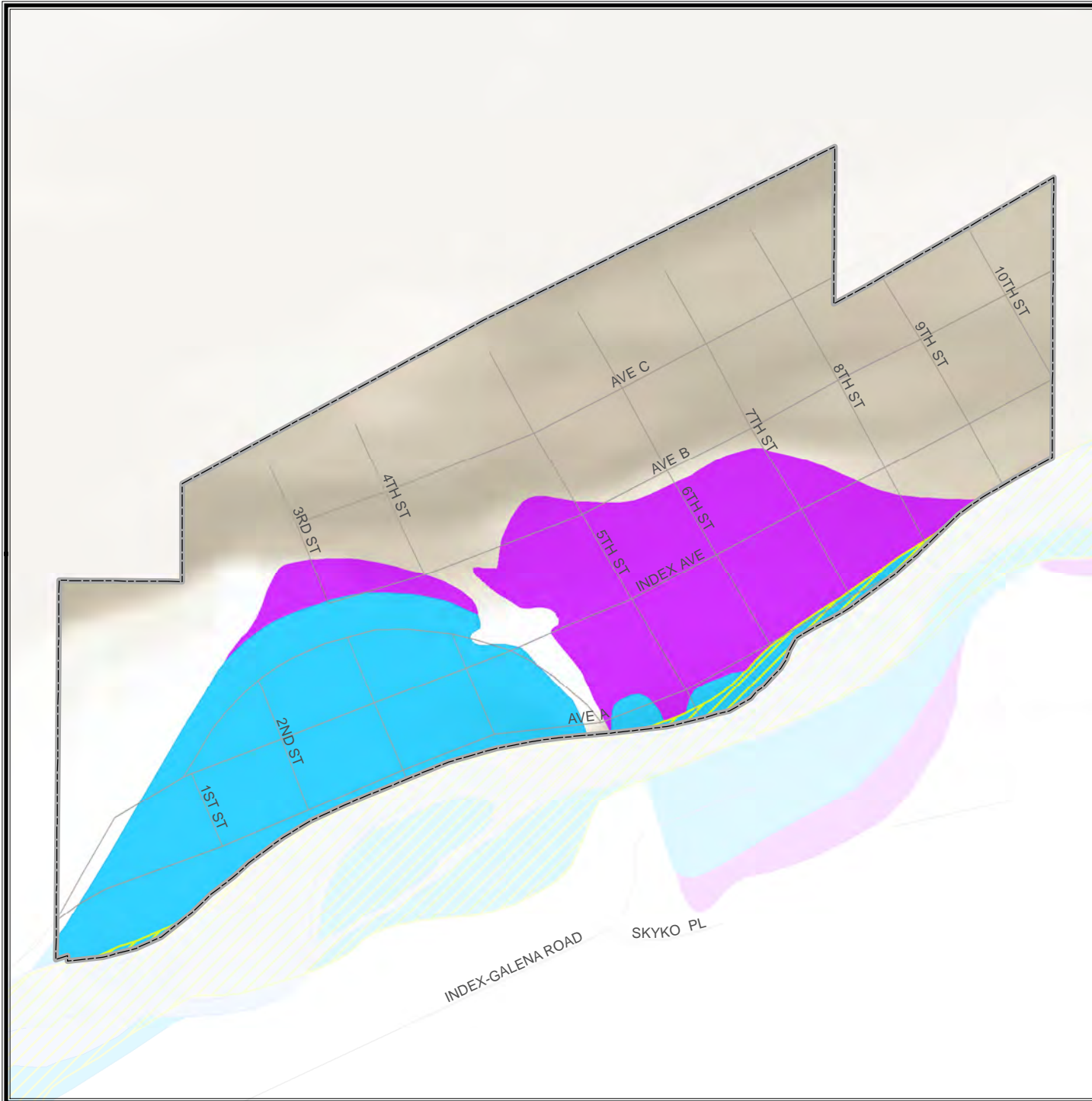
*Data Sources:*  
Snohomish County  
FEMA Digital Flood Insurance Rate Maps  
Washington State Department of  
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# TOWN OF INDEX

## Map 7-9

### Landslide Hazard Areas

 **Landslide Potential Areas**  
 Slope Greater than 33% and elevation change greater than or equal to 10 feet, intersecting soft and stiff soils.



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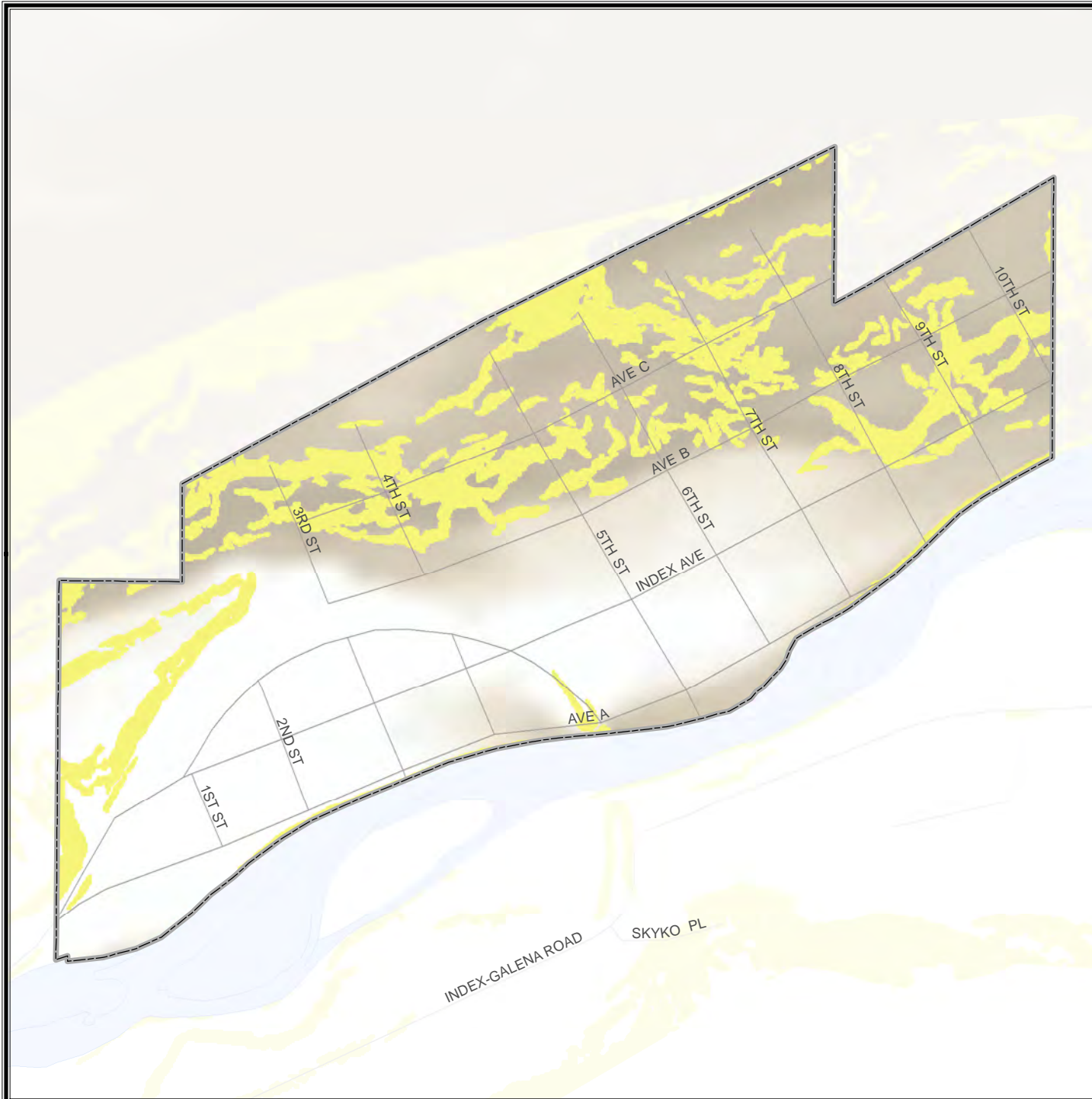
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# TOWN OF INDEX

## Map 7-10

### Wildland Urban Interface (WUI) High Risk Communities

 DNR Wildfire Hazard -  
Wildland Urban Interface (WUI)  
High Risk Communities

 DNR Wildfire Hazard -  
Areas updated by Snohomish  
County Fire District Planning  
Partners to better represent  
Wildfire Risk in Snohomish  
County



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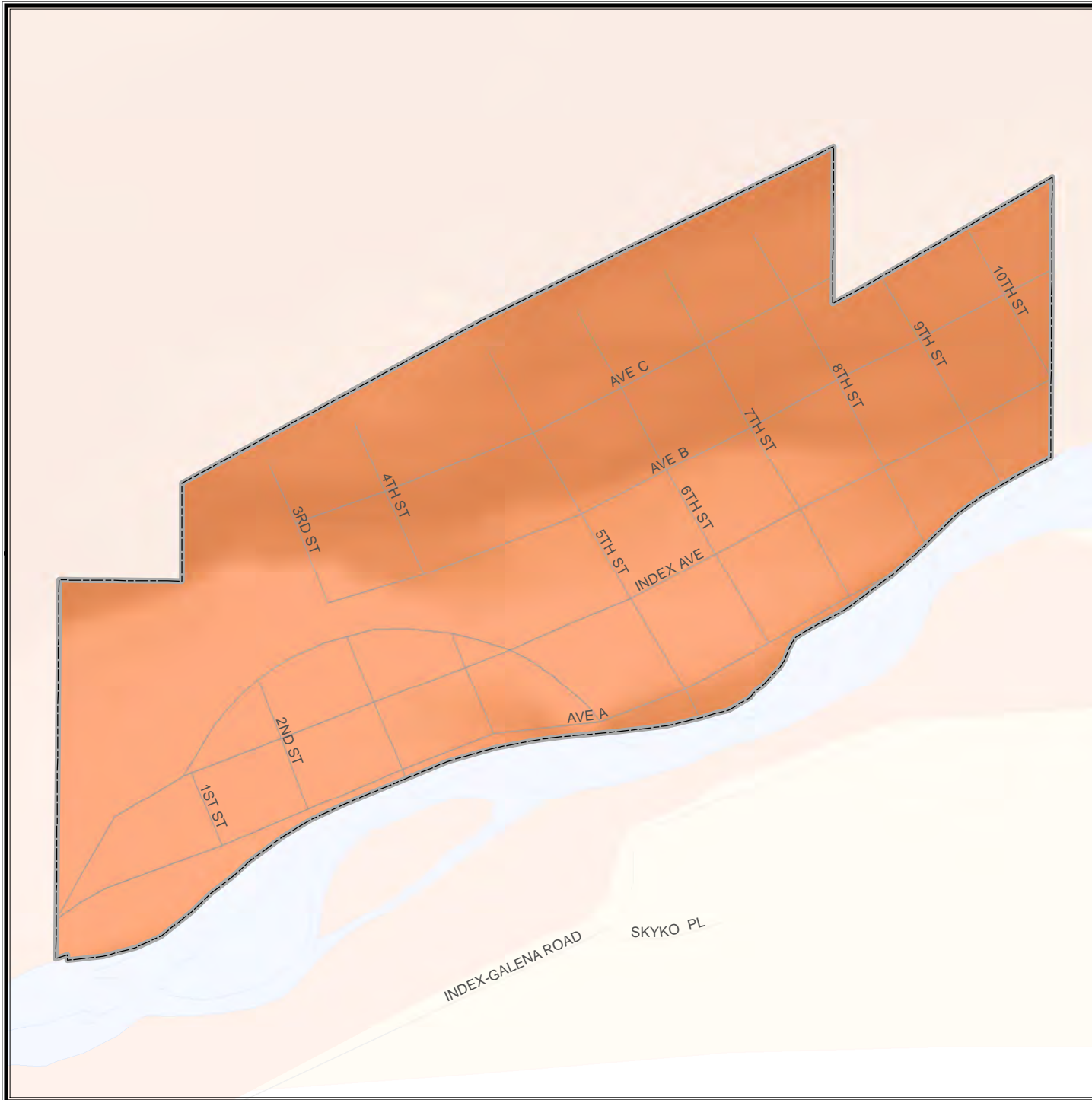
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# CHAPTER 8. CITY OF LAKE STEVENS ANNEX

## 8.1 HAZARD MITIGATION PLAN POINT OF CONTACT

### Primary Point of Contact

Mick Monken, P.E., Public Works Director  
1812 Main St.  
Lake Stevens, WA 98258-0257  
Telephone: 425-212-3237  
e-mail Address: mmonken@ci.lake-stevens.wa.us

### Alternate Point of Contact

None

## 8.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—November 29, 1960
- **Current Population**—25,674 as of January, 2010 (Census estimates)
- **Demographics**—According to the 2000 Census, there were 6,361 people, 2,139 households, and 1,683 families residing in the City of Lake Stevens. The population density was 2,951.8 people per square mile. There were 2,234 housing units at an average density of 1,036.7 per square mile. The racial makeup of the city was 92.31 percent White, 0.60 percent African American, 0.91 percent Native American, 1.10 percent Asian, 0.31 percent Pacific Islander, 0.90 percent from other races, and 3.87 percent from two or more races. Hispanic or Latino of any race were 3.55 percent of the population.

There were 2,139 households out of which 49.9 percent had children under the age of 18 living with them, 65.5 percent were married couples living together, 9.3 percent had a female householder with no husband present, and 21.3 percent were non-families. About 15.7 percent of all households were made up of individuals and 5.0 percent had someone living alone who was 65 years of age or older. The average household size was 2.96 and the average family size was 3.30.

Within Lake Stevens, the population was spread out with 33.9 percent under the age of 18, 6.5 percent from 18 to 24, 36.3 percent from 25 to 44, 17.6 percent from 45 to 64, and 5.7 percent who were 65 years of age or older. The median age was 32 years. For every 100 females there were 101.6 males. For every 100 females age 18 and over, there were 97.0 males.

The median income for a household in the city was \$65,231, and the median income for a family was \$68,250. Males had a median income of \$51,536 versus \$30,239 for females. The per capita income for the city was \$22,943. About 3.8 percent of families and 4.4 percent of the population were below the poverty line, including 3.9 percent of those under age 18 and 9.0 percent of those ages 65 or over.

- **Location and Description**—Lake Stevens is a city in Snohomish County, Washington, that surrounds a lake bearing the same name. It is southeast of Marysville, north of the city of Snohomish, and east of Everett.

- **Brief History**—Lake Stevens was officially incorporated on November 29, 1960. Believed to be named after Governor Isaac I. Stevens, Lake Stevens was first settled in 1886 on a 160-acre homestead along the east shore. By 1890 the first town in the area, “Ferry,” was established. Its name was later changed to “Hartford,” and it served as the main link from the famed Monte Cristo timber and mining resources to the world.

In 1905 a railroad spur was built by the Rucker Brothers Timber Company, linking Hartford with Lake Stevens. Two years later Rucker Mill was opened, located along and in the north cove of the lake (original pilings can still be seen in the old lake outflow area just south of the boat launch). In 1919, the mill, which became known as the “world’s largest sawmill,” burned and was partially rebuilt. When it burned a second time in 1925 the mill was dismantled and Lake Stevens lost the very industry which caused its founding. However, by then a flourishing town was established and continued under its own momentum.

From the 1920s to the 1950s Lake Stevens was primarily a resort community, with many public and private resort beaches scattered around the shore. In 1960 Lake Stevens incorporated as a City with a population of 900. Soon, its popularity and natural beauty, combined with changing commuter habits, attracted more and more residents, changing its character to that of a suburban community. By 2000 the City had grown to a population of 6,361 covering approximately 1.8 square miles. The lake remains the focal point of the greater Lake Stevens community for recreation and as “a symbol of our need to provide for a sustainable existence that will protect our natural environment”.

- **Climate**—Summer months in Lake Stevens are mild and warm (average daytime temperature in the 70s) and winters are comparatively mild (average daytime temperature in the mid-40s). The frost-free period for the City generally begins in April and ends near the first of October. Precipitation is in the form of rain and snow, averaging 39 inches annually (average low of 1.1 inches in August to an average high of 5.9 inches during the winter months of November through December). Relative humidity is fairly high due to the water influences. The prevailing wind is westerly or northwesterly most of the year.
- **Governing Body Format**—Government in Lake Stevens operates under the mayor-council system. The mayor serves as the executive of the city, whereas the council serves as the legislative body of the city.

Voters elect a mayor and seven council members to serve, each to four-year terms. All positions are non-partisan. Elections are staggered, meaning that not all positions are up for election in the same year. Elections for the Mayor and Positions 3, 4, and 5 are held in the same year (next cycle is 2011), whereas elections for Positions 1, 2, 6, and 7 are held two years after (2013, respectively).

In instances of vacation of a seat, the city council has the authority to fill the seat, including that of the Mayor. This most recently occurred in November 2009, when Position 1 became vacant in the final two months of that term, and was subsequently filled by the current office holder (who won that seat in the November 2009 election for the current term). Elections for appointed positions may be held for the unexpired portion of the term outside that position’s normal election cycle. This occurred in the 2007 election cycle for Position 6.

- **Development Trends**—The City’s urban form is largely that of a late 20th century suburban bedroom community, which belies its roots as an early 20th century logging and mill town. Amidst the newer subdivisions, shopping centers and schools, there are a few clues remaining of its earlier form. At the south end of downtown where the Rucker Mill was located in the first half of the 20th century are the remaining pilings that once supported the mill over the lake. Lakefront homes and public open space now cluster where the heavy industrial activity

once occurred. Most of the historic downtown is now gone, although a few of the buildings remain and are used for commercial and civic purposes.

Single family residences are the predominant land use in the City, with public use a distant second. There are two significant and distinct areas in which single family residences do not predominate. The first is the Central Business District and vicinity which is characterized by retail, offices, civic, parks and multi-family uses. The second is the industrial/planned district areas which encompass two planned business districts and industrial districts in the north and east portions of the City. The 2006 Plan calls for a closer integration of housing in the downtown area and a revitalization of the industrial area.

Large portions of the City have developed since its incorporation in 1960. Thus the housing stock is relatively new, with significant portions of the housing having been built in each of the subsequent decades.

Neighborhoods have developed at comparatively low densities, with typical lot sizes in excess of the 9,600 square feet. The 1990s saw construction of several hundred homes on smaller lots ranging in size from 4,000 to 7,500 square feet. This type of development is encouraged as a means of accommodating the projected future population. The decreasing lot sizes have not resulted in smaller homes. The opposite is in fact true where homes are typically larger than they those built in the 1970s and 1980s.

Multi-family residential uses are generally confined to the perimeter of the Central Business District, along Grade Road to the north and 16th Street NE to the south. Architecture is typical 1970s and '80s style. In the 1990s, multifamily development was steady.

Washington State Law (RCW 36.70) requires that counties that meet specified population criteria, and the cities within those counties, to prepare and adopt a comprehensive long-range plan to serve as a guide for community development. The plan must consist of an integrated and internally consistent set of goals, policies, and implementation measures. In addition, the plan must focus on issues of the greatest concern to the community and be written in a clear and concise manner. City actions, such as those relating to land use allocations, annexations, zoning, subdivision and design review, redevelopment, and capital improvements, must be consistent with such a plan. The City of Lake Stevens is in compliance and good standing with the provisions of RCW 36.70 and adopted its most recent general plan in 1994 and amended the plan in 2009. The City will review and amend its Comprehensive Plan as deemed necessary. Future growth and development will be managed as identified in this plan.

### **8.3 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY**

Table 8-1 lists all past occurrences of natural hazards within the jurisdiction. Repetitive loss records are as follows:

- Number of FEMA Identified Repetitive Flood Loss Properties: 1 (as of 2/28/2010)
- Number of Repetitive Flood Loss Properties that have been mitigated: None

### **8.4 HAZARD RISK RANKING**

Table 8-2 presents the ranking of the hazards of concern.

### **8.5 CAPABILITY ASSESSMENT**

The assessment of the jurisdiction's legal and regulatory capabilities is presented in Table 8-3. The assessment of the jurisdiction's administrative and technical capabilities is presented in Table 8-4. The

assessment of the jurisdiction’s fiscal capabilities is presented in Table 8-5. Classifications under various community mitigation programs are presented in Table 8-6.

## **8.6 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED INITIATIVES**

Table 8-7 lists the initiatives that make up the jurisdiction’s hazard mitigation plan. Table 8-8 identifies the priority for each initiative. Table 8-9 summarizes the mitigation initiatives by hazard of concern and the six mitigation types.

## **8.7 STATUS OF PREVIOUS PLAN INITIATIVES**

Table 8-10 summarizes the initiatives that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

## **8.8 FUTURE NEEDS TO BETTER UNDERSTAND RISK**

The following would improve future hazard management activities in the City of Lake Stevens:

- New or Updated Flood studies for creeks and rivers within Lake Stevens.
- Information Dissemination—As the City continues to grow and as technology advances, the City should evaluate and update the ways in which it disseminates information to the population.
- Special Needs Populations—The City has a large population of elderly citizens, with a significant amount of retirement residential developments and buildings. The City is also developing many low to very low income housing developments, which is new to the City’s demographics. It would be very beneficial for the City to begin exploring how we will deal with these two populations during a disaster and identify any future training in this area for City Staff.
- Obtain or develop accurate records (software, record-keeping) of hazard events in the city.

## **8.9 ADDITIONAL COMMENTS**

Due to its isolated nature, topography, climate, the City of Lake Stevens is prone to severe weather and flooding on an annual basis. Documentation and records are being collected in an effort to address concerns related to these types of disasters. Much emphasis is being placed on the NE portion of our City; where the lakes outflow channel runs along Hartford Rd. and discharges into the Pilchuck River. Water from the lake, in addition to urban stormwater runoff, increases the likelihood of annual flooding in this general area; which damages homes, habitat, and City infrastructure. The City is currently working on solutions to mitigate this matter.

## **8.10 HAZARD AREA EXTENT AND LOCATION**

Hazard area extent and location maps have been generated for the City of Lake Stevens and are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

<b>TABLE 8-1. NATURAL HAZARD EVENTS</b>			
Type of Event	FEMA Disaster #(if applicable)	Date	Preliminary Damage Assessment
Winter Storm	1825-DR	12/21/2008	\$43,877
Severe Storm	1734-DR	12/03/2007	\$80,769
Flooding	1671-DR	11/04/2006	\$37,393
Winter Storm	1172-DR	12/28/1996	\$7,059
Severe Storm/Flooding	1100-DR	1/30/1996	\$24,345

<b>TABLE 8-2. HAZARD RISK RANKING</b>		
Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Severe Storm	54
2	Flood	18
3	Earthquake	12
4	Landslide	6
5	Wildland Fire	6
6	Avalanche	0
7	Dam Failure	0
8	Tsunami	0
9	Volcano/Lahar	0

**TABLE 8-3.  
LEGAL AND REGULATORY CAPABILITY**

	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
<b>Codes, Ordinances &amp; Requirements</b>					
Building Code	Y	N	N	Y	Title 14, Chapter 14.80 (adopted by Ord. #778 in 2008)
Zonings	Y	N	N	Y	Title 14, Chapter 14.36 (adopted by Ord. #811 in 2010)
Subdivisions	Y	N	N	Y	Title 14, Chapter 14.18 (adopted by Ord. #811 in 2010)
Stormwater Management	Y	Y	N	Y	NPDES Phase II Permit
Post Disaster Recovery	N	N	N	N	NA
Real Estate Disclosure	N	N	N	N	NA
Growth Management	Y	N	N	Y	GMA compliant comprehensive plan 1994-2014 adopted in 1994, Ord. #445, and amended through 2009.
Site Plan Review	Y	N	N	N	Title 14, Chapter 14.48 (adopted by Ord. #811 in 2010)
Special Purpose (flood management, critical areas)	Y	Y	N	Y	Title 14, Chapter 14.88 – Critical (adopted by Ord. #773 in 2008), Title 14, Chapter 14.64 – Floodways, Floodplains, Drainage and Erosion (Adopted by Ord. 808 in 2009)
<b>Planning Documents</b>					
General or Comprehensive Plan	Y	N	N	Y	Updated May 2009
Floodplain or Basin Plan	N	N	N	N	NA
Stormwater Plan	Y	N	N	Y	NPDES Phase II Permit
Capital Improvement Plan	Y	N	N	N	Lake Stevens Comprehensive Plan 2009, Ch. 8
Habitat Conservation Plan	Y	N	N	N	Lake Stevens Comprehensive Plan 2009, Ch. 10
Economic Development Plan	Y	N	N	Y	Lake Stevens Comprehensive Plan 2009, Ch. 9
Emergency Response Plan	N	N	N	N	Disaster Plan for the City of Lake Stevens (adopted by Res. #1993-12)
Shoreline Management Plan	Y	N	N	Y	The City has adopted the 1974 Snohomish County Master Program. Permit process regulations are contained in Title 14, Chapter 14.92 (adopted by Ord. #468 in 1995)
Post Disaster Recovery Plan	N	N	N	N	NA

**TABLE 8-4.  
ADMINISTRATIVE AND TECHNICAL CAPABILITY**

Staff/Personnel Resources	Available?	Department/Agency/Position	
Planners or engineers with knowledge of land development and land management practices	Y	Planning Department <ul style="list-style-type: none"> <li>• 1 Planning Director</li> <li>• 1 Long Range Planner</li> <li>• 1 Senior Building Official</li> <li>• 2 Senior Planners</li> <li>• 2 Permit Specialists</li> </ul>	Public Works Department <ul style="list-style-type: none"> <li>• 1 Public Works Director/City Engineer</li> <li>• 1 Public Works Crew Leader</li> <li>• 1 Project Engineer</li> <li>• 1 Project Manager/Stormwater Manager</li> <li>• 1 Engineering Aid</li> </ul>
Engineers or professionals trained in building or infrastructure construction practices	Y	Planning Department <ul style="list-style-type: none"> <li>• 1 Senior Building Official</li> <li>• 2 Permit Specialists</li> </ul>	Public Works Department <ul style="list-style-type: none"> <li>• 1 Public Works Director/City Engineer</li> <li>• 1 Public Works Crew Leader</li> <li>• 1 Project Engineer</li> <li>• 1 Project Manager/Stormwater Manager</li> </ul>
Planners or engineers with an understanding of natural hazards	Y	Planning Department <ul style="list-style-type: none"> <li>• 1 Planning Director</li> </ul>	Public Works Department <ul style="list-style-type: none"> <li>• 1 Public Works Director/City Engineer</li> <li>• 1 Public Works Crew Leader</li> <li>• 1 Project Engineer</li> <li>• 1 Project Manager/Stormwater Manager</li> </ul>
Staff with training in benefit/cost analysis	Y	Planning Department <ul style="list-style-type: none"> <li>• 1 Planning Director</li> </ul>	Public Works Department <ul style="list-style-type: none"> <li>• 1 Public Works Director/City Engineer</li> </ul>
Floodplain manager	Y	Public Works Department <ul style="list-style-type: none"> <li>• 1 Public Works Director/City Engineer</li> <li>• 1 Project Manager/Stormwater Manager</li> </ul>	
Surveyors	N	No designated staff assigned to this practice. City contracts with consultants.	
Personnel skilled or trained in GIS applications	Y	Planning Department <ul style="list-style-type: none"> <li>• No designated staff assigned to this practice. Department contracts with consultants.</li> </ul>	Public Works Department <ul style="list-style-type: none"> <li>• 1 Project Manager/Stormwater Manager</li> </ul>
Scientist familiar with natural hazards in local area	Y	Scientists are contracted and on call with the City to provide technical expertise.	
Emergency manager	Y	City of Lake Stevens Chief of Police	
Grant writers	Y	Planning Department <ul style="list-style-type: none"> <li>• 1 Planning Director</li> <li>• 1 Programs Planner</li> </ul>	Public Works Department <ul style="list-style-type: none"> <li>• 1 Public Works Director/City Engineer</li> <li>• 1 Project Engineer</li> <li>• 1 Project Manager/Stormwater Manager</li> </ul>

<b>TABLE 8-5. FISCAL CAPABILITY</b>	
<b>Financial Resources</b>	<b>Accessible or Eligible to Use?</b>
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	Yes
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	General Fund, Real Estate Excise Tax (REET)

<b>TABLE 8-6. COMMUNITY CLASSIFICATIONS</b>			
	<b>Participating?</b>	<b>Classification</b>	<b>Date Classified</b>
Community Rating System	No	NA	NA
Building Code Effectiveness Grading Schedule	Yes	3/3	5/1/2010
Public Protection	Yes	5	5/1/2010
Storm Ready	No	NA	NA
Firewise	No	NA	NA

**TABLE 8-7.  
HAZARD MITIGATION ACTION PLAN MATRIX**

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>LS-1—Provide Back-up power generation for critical infrastructure and facilities.</b>							
Existing	Severe Weather, Flood, Earthquake	1, 2, 5, 8, 11	Public Works	\$150,000	CIP	Short Term	Yes
<b>LS-2—Manage vegetation in City ROW.</b>							
Existing	Severe Weather, Wildland Fire	1, 2, 3, 5, 6	Public Works	Medium	General Fund	Short Term	Yes
<b>LS-3—Maintain City drainage facilities by developing a vegetation management program.</b>							
Existing	Severe Weather, Flood	1, 2, 3, 5, 6	Public Works	Medium	General Fund, Ecology Grants	Short Term	Yes
<b>LS-4—Develop a Regional Stormwater Plan and construct regional stormwater detention facilities.</b>							
New	Severe Weather, Flood	1, 2, 9, 12	Public Works	High	REET and IAC Funding, FEMA Hazard Mitigation Grants	Long Term	Yes
<b>LS-5—Upgrade and maintain stormwater drainage infrastructure in areas of reoccurring flooding.</b>							
Existing	Severe Weather, Flood	1, 2, 4, 9, 12	Public Works	High	General Fund	Short Term	Yes
<b>LS-6—Consider participation in Community Rating System (CRS) Program</b>							
New	Severe Weather, Flood	3, 6, 7, 8, 9, 10, 14	Public Works	Low	General Fund	Short Term	Yes
<b>LS-7—Obtain appropriate blanket permits from federal, state, and local authorities, and complete needed environmental requirements to perform annual and regular stormwater and vegetation maintenance activities.</b>							
New	Severe Weather, Flood	1, 2, 3, 4, 5	Public Works	Low	General Fund	Short Term	No
<b>LS-8—Mitigate repetitive flood loss properties.</b>							
Existing	Severe Weather, Flood	3, 4, 6, 7, 14	Public Works	High	General Fund, FEMA Hazard Mitigation Grants	Short Term	No
<b>LS-9—Develop a Post Disaster Recovery Plan and Process.</b>							
New	All Hazards	1, 5, 8, 9	Public Works	Medium	General Fund	Short Term	No

<b>TABLE 8-7 (continued). HAZARD MITIGATION ACTION PLAN MATRIX</b>							
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline	Included in Previous Plan?
<b>LS-10—Develop a Floodplain/Basin Plan.</b>							
New	Severe Weather, Flood	1, 3, 4, 9	Public Works	Medium	General Fund	Short Term	No
<b>LS-11—Support County-wide initiatives identified in Chapter 21 of Volume 1.</b>							
New and Existing	All Hazards	All	City	Low	General fund	Short-term ongoing	No
<b>LS-12—Continue to maintain compliance and good standing under the National Flood Insurance Program (NFIP).</b>							
New and existing	Flooding	1,2,9,10,11	City	Low	General Fund	Short-term ongoing	No
<b>LS-13—Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority when applicable.</b>							
Existing	All Hazards	6,7,11,14	City	High	FEMA Hazard Mitigation Grant funding with local match provided by property owner contribution	Long-term depends on funding	No
<b>LS-14—Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Chapter 7 of Volume 1.</b>							
New and Existing	All Hazards	All	City	Low	General Fund, FEMA Mitigation Grant Funding for 5-year update	Short-term ongoing	No
<b>LS-15—Integrate, where appropriate, risk assessment information from the Snohomish County Hazard Mitigation Plan into other planning mechanisms available to the City such as; the Capital Improvements Program, the Comprehensive planning process, and Shoreline Master planning.</b>							
New and Existing	All Hazards	All	City	Low	General Fund	Short-term ongoing	No

**TABLE 8-8.  
MITIGATION STRATEGY PRIORITY SCHEDULE**

Initiative #	#of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Priority <sup>a</sup>
LS-1	5	Low	Medium	No	Yes	Yes	Low
LS-2	5	Medium	Low	Yes	Yes	Yes	High
LS-3	5	Medium	Medium	Yes	Yes	Yes	Medium
LS-4	4	High	High	Yes	Yes	No	Medium
LS-5	5	High	Medium	Yes	Yes	Yes	High
LS-6	7	Low	Low	Yes	Yes	Yes	High
LS-7	5	Medium	Medium	Yes	Yes	No	Medium
LS-8	5	High	High	Yes	Yes	Yes	High
LS-9	4	High	High	Yes	Yes	Yes	High
LS-10	4	High	High	Yes	Yes	Yes	High
LS-11	14	Medium	Low	Yes	No	Yes	High
LS-12	5	Medium	Low	Yes	No	Yes	High
LS-13	4	High	High	Yes	Yes	No	Medium
LS-14	14	Medium	Low	Yes	Yes	Yes	High
LS-15	14	High	Low	Yes	No	Yes	High

a. Explanation of priorities

- High Priority: Project meets multiple plan objectives, benefits exceed cost, funding is secured under existing programs, or is grant eligible, and project can be completed in 1 to 5 years (i.e., short term project) once funded.
- Medium Priority: Project meets at least 1 plan objective, benefits exceed costs, requires special funding authorization under existing programs, grant eligibility is questionable, and project can be completed in 1 to 5 years once funded.
- Low Priority: Project will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, project is not grant eligible, and time line for completion is long term (5 to 10 years).

**TABLE 8-9.  
ANALYSIS OF MITIGATION INITIATIVES**

Hazard Type	Initiative Addressing Hazard, by Mitigation Type					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Severe Storm	2, 3, 4, 5, 10, 11, 14, 15	2, 3, 5, 11, 13	3, 11, 14	2, 3, 4, 5, 10, 11	1, 9, 11	4, 5, 7, 11
Flood	2, 3, 4, 5, 6, 7, 8, 11, 12, 14, 15	2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13	3, 6, 11, 12, 14	2, 3, 4, 5, 6, 7, 8, 10, 11, 12	1, 9, 11, 12	4, 5, 7, 11, 12
Earthquake	11, 14, 15	11, 13	11, 14	11	1, 9, 11	11
Landslide	4, 5, 7, 11, 14, 15	4, 5, 7, 11, 13	11, 14	4, 5, 7, 11	1, 9, 11	4, 5, 7, 11
Wildland Fire	2, 3, 11, 14, 15	2, 3, 11, 13	3, 11, 14	11	1, 9, 11	11
Avalanche						
Dam Failure						
Tsunami						
Volcano/Lahar						

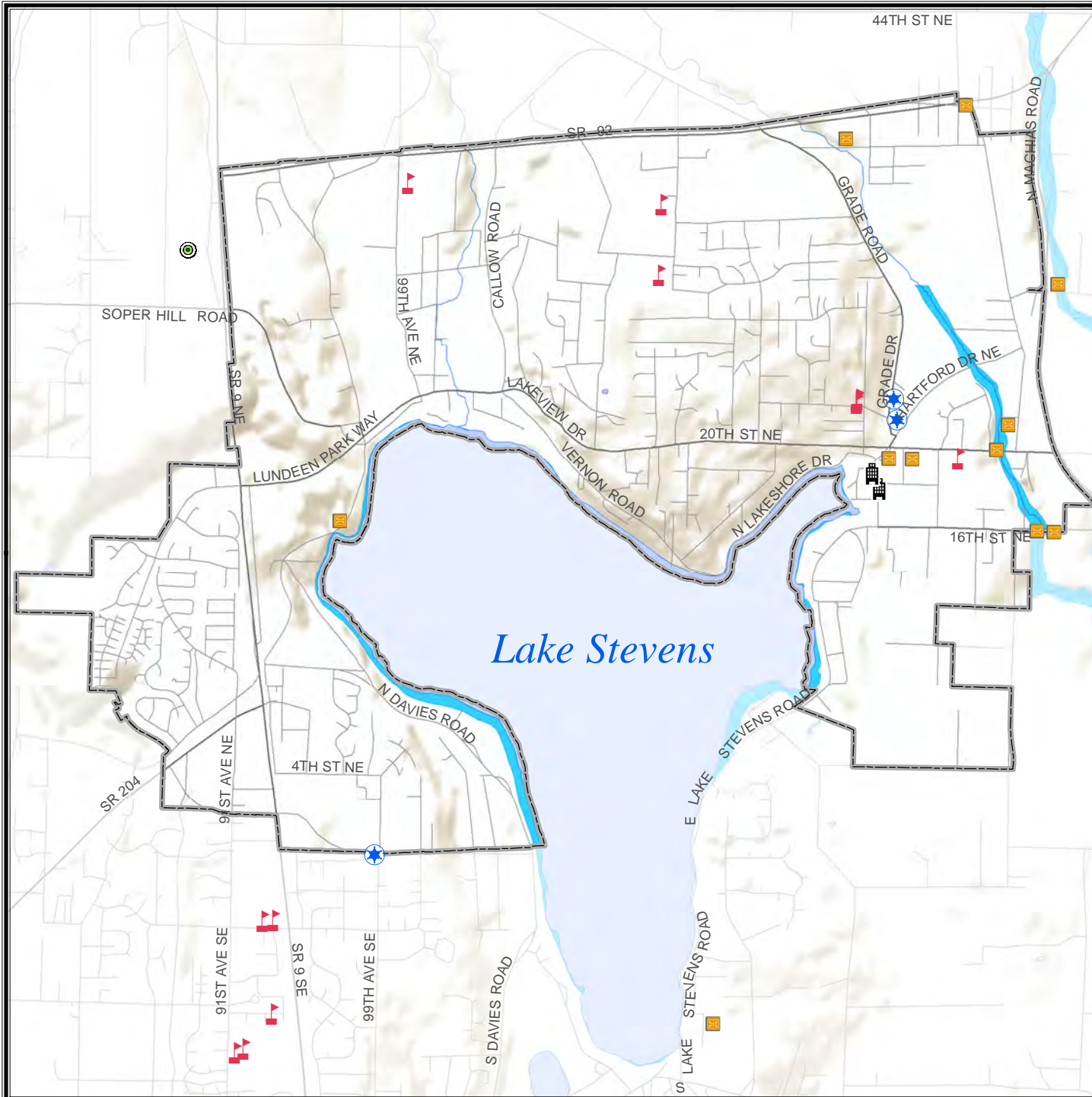
Notes:

1. Prevention: Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
2. Property Protection: Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
3. Public Education and Awareness: Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
4. Natural Resource Protection: Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
5. Emergency Services: Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

**TABLE 8-10.  
PREVIOUS ACTION PLAN IMPLEMENTATION STATUS**













Action #	Action Status			Comments
	Completed	Carry Over to Plan Update	Removed; No Longer Feasible	
1.		X		Ongoing action. Has been carried over to updated action plan (LS-1). Working with local districts (Police, Fire, Sewer, and School) to identify needs and establish EOCs.
2.		X		Ongoing action. Has been carried over to updated action plan (LS-2). Ongoing annual maintenance.
3.		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (LS-3)
4.		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (LS-4)
5.		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (LS-5)
6.		X		No action completed on this initiative during initial performance period. Act has been carried over to updated action plan (LS-6)





# CITY OF LAKE STEVENS

## Map 8-1 Critical Facilities

-  Bridge
-  Communication
-  Dam
-  Government
-  Hazmat
-  Medical
-  Power
-  Protective
-  School
-  Wastewater
-  Water
-  Other



### Snohomish County

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May 2010

Data Sources:  
Snohomish County  
Project Planning Partners  
Washington State Department of  
Natural Resources, Division of Geology  
and Earth Resources

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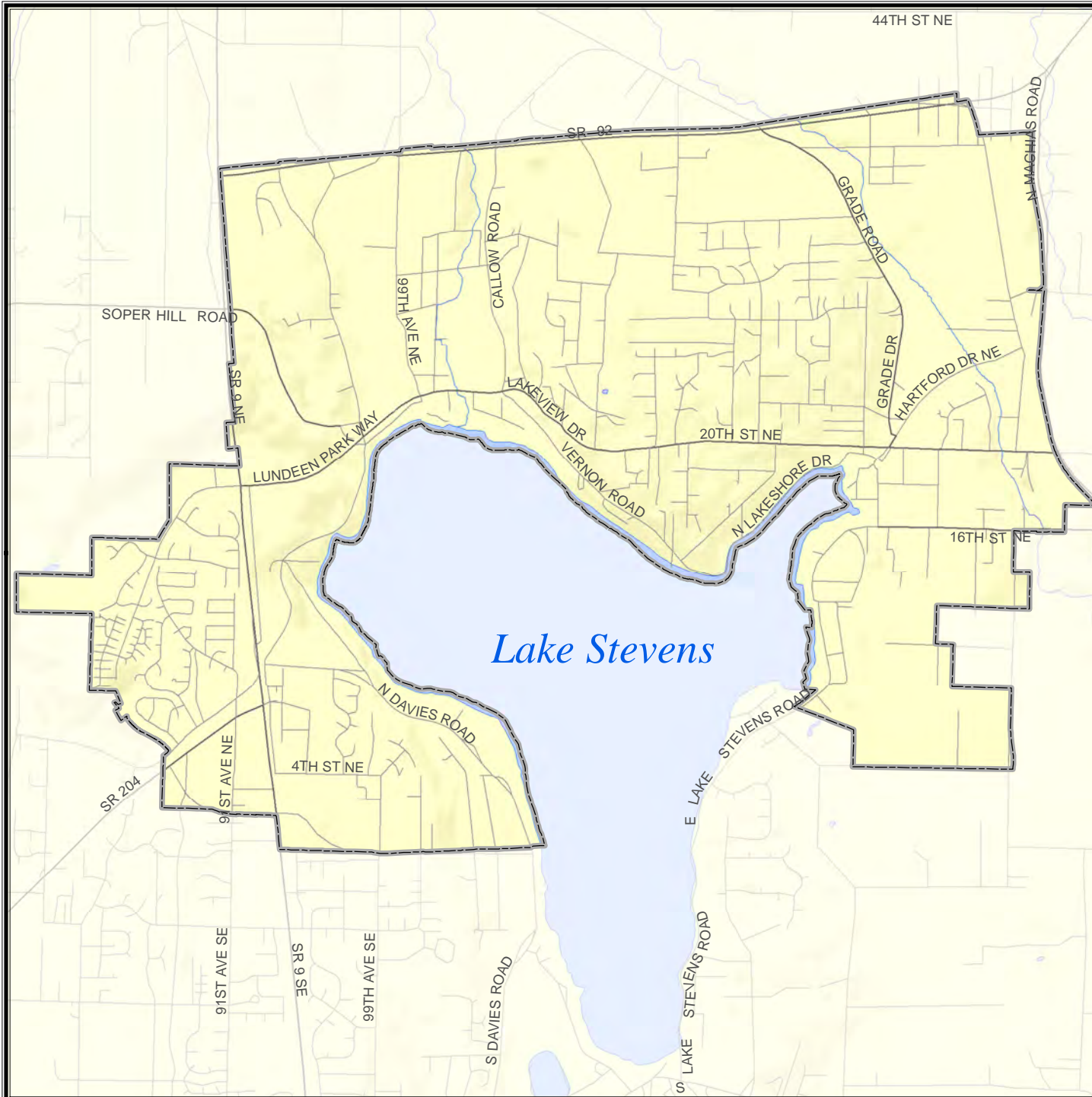
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# CITY OF LAKE STEVENS

## Map 8-2

### Earthquake Peak Ground Acceleration 100-year Probabilistic Scenario

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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Data Sources:  
Snohomish County  
HAZUS-MH MR4 Output,  
US Geological Survey  
Washington State Department of  
Natural Resources, Division of Geology  
and Earth Resources

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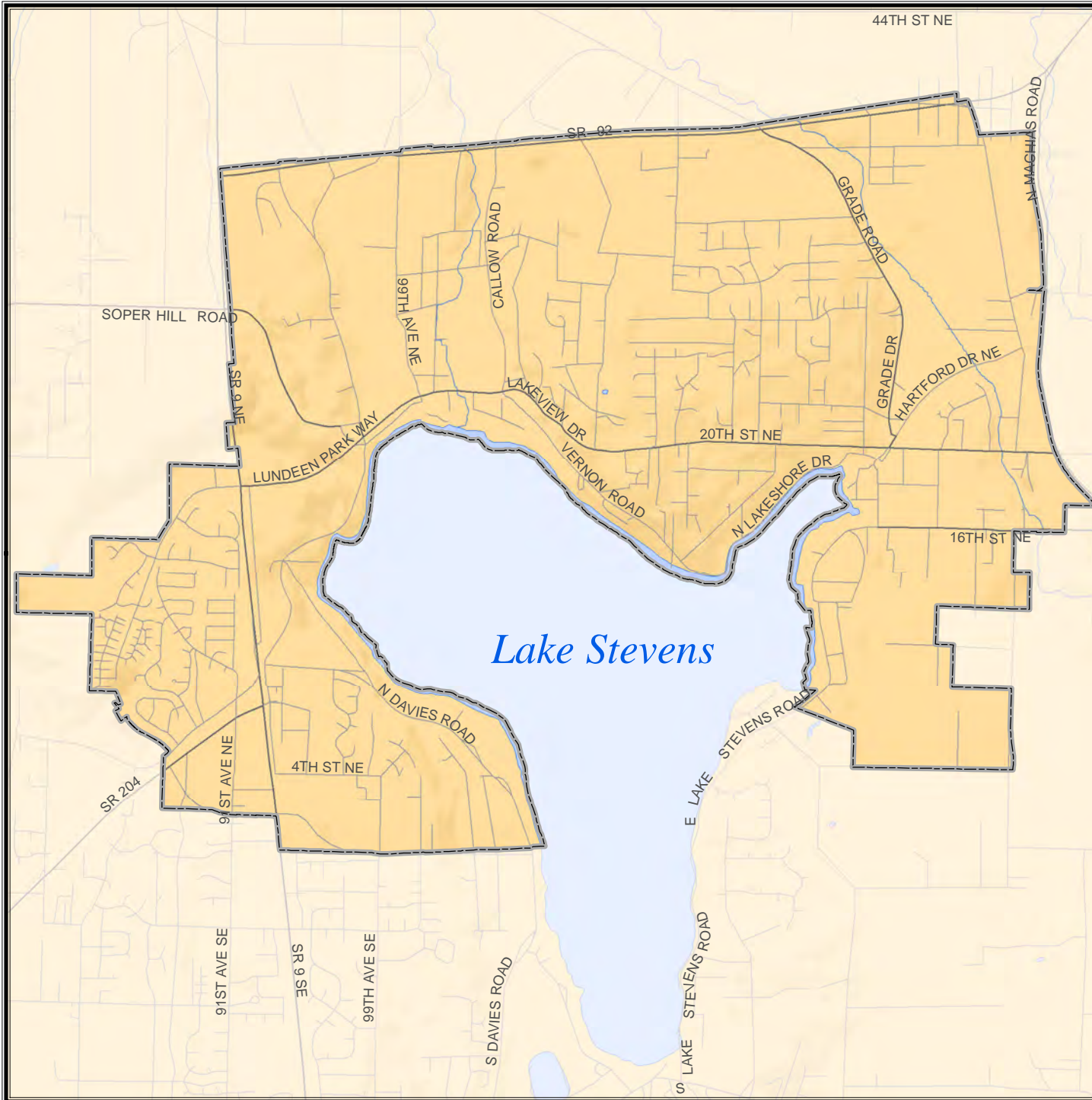
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# CITY OF LAKE STEVENS

## Map 8-3

### Earthquake Peak Ground Acceleration 500-year Probabilistic Scenario

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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Data Sources:  
Snohomish County  
HAZUS-MH MR4 Output,  
US Geological Survey  
Washington State Department of  
Natural Resources, Division of Geology  
and Earth Resources

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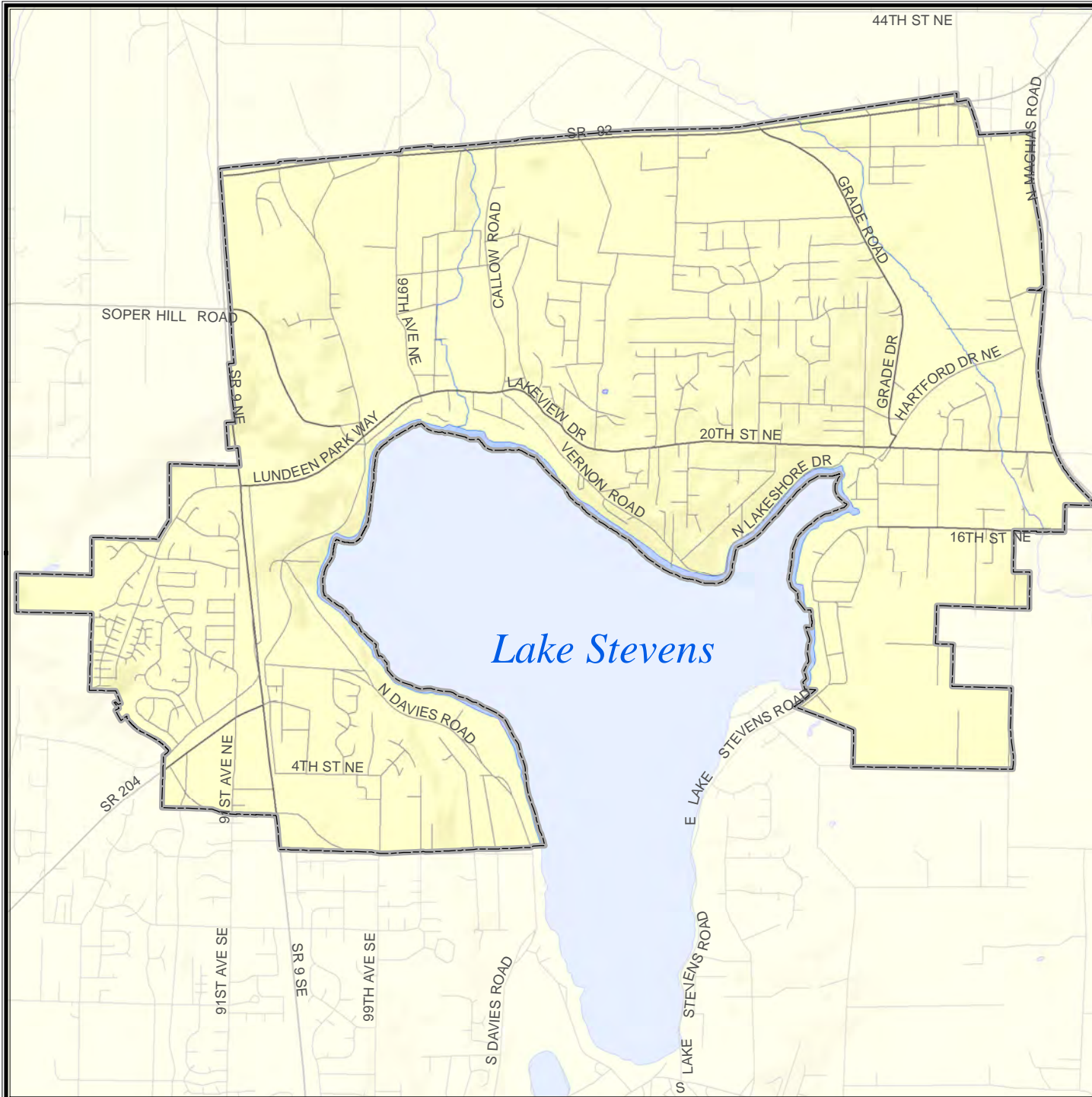
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Miles



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# CITY OF LAKE STEVENS

## Map 8-4

Devil's Mountain Fault  
Peak Ground Acceleration  
7.1-Magnitude Scenario  
Shake Map

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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Data Sources:  
Snohomish County  
US Geological Survey  
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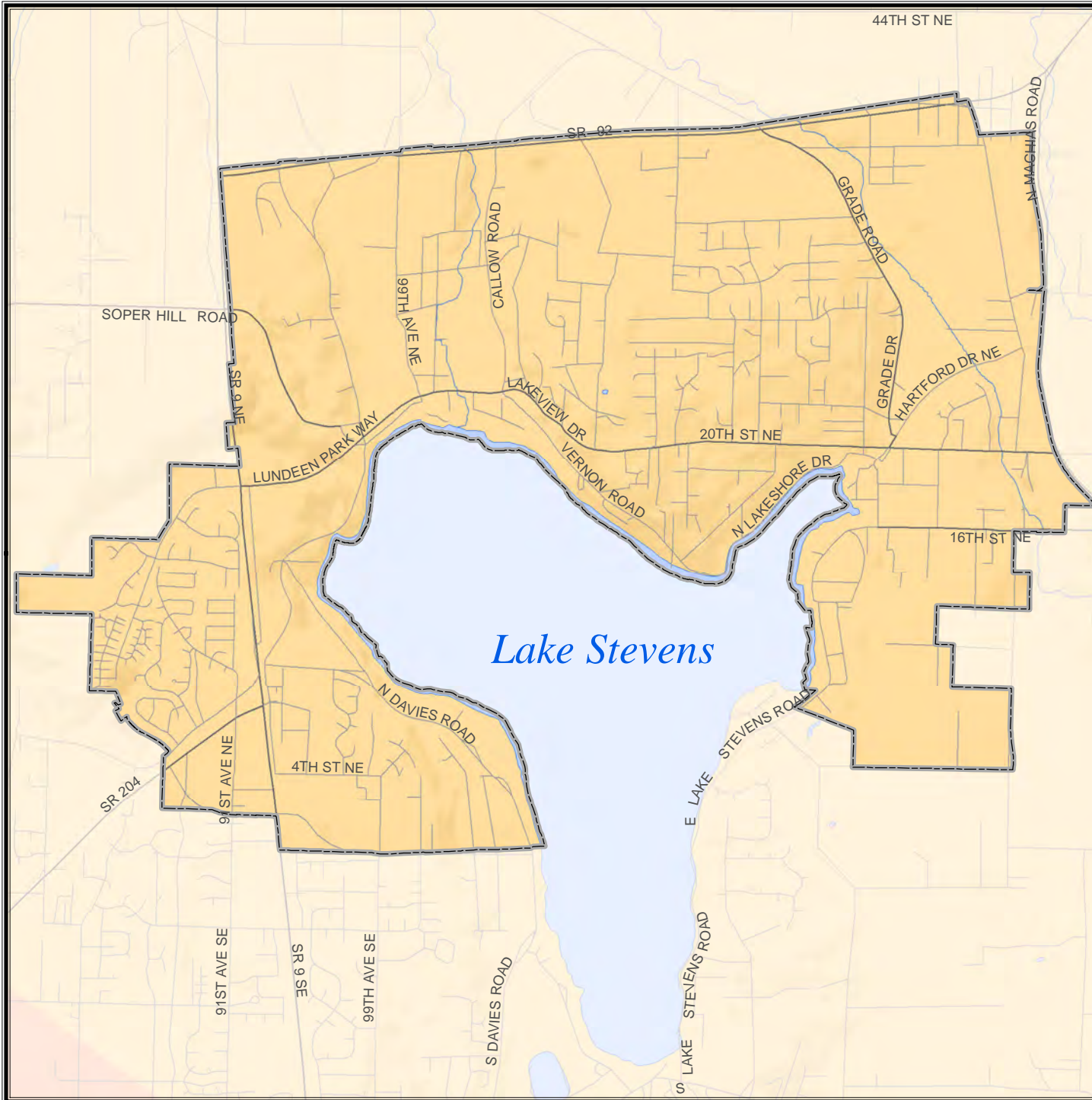
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# CITY OF LAKE STEVENS

## Map 8-5

South Whidbey Fault  
 Peak Ground Acceleration  
 7.4-Magnitude Scenario  
 Shake Map

Mercalli Scale, Potential Damage

- IV, None
- V, Very Light
- VI, Light
- VII, Moderate
- VIII, Moderate-Heavy
- IX, Heavy



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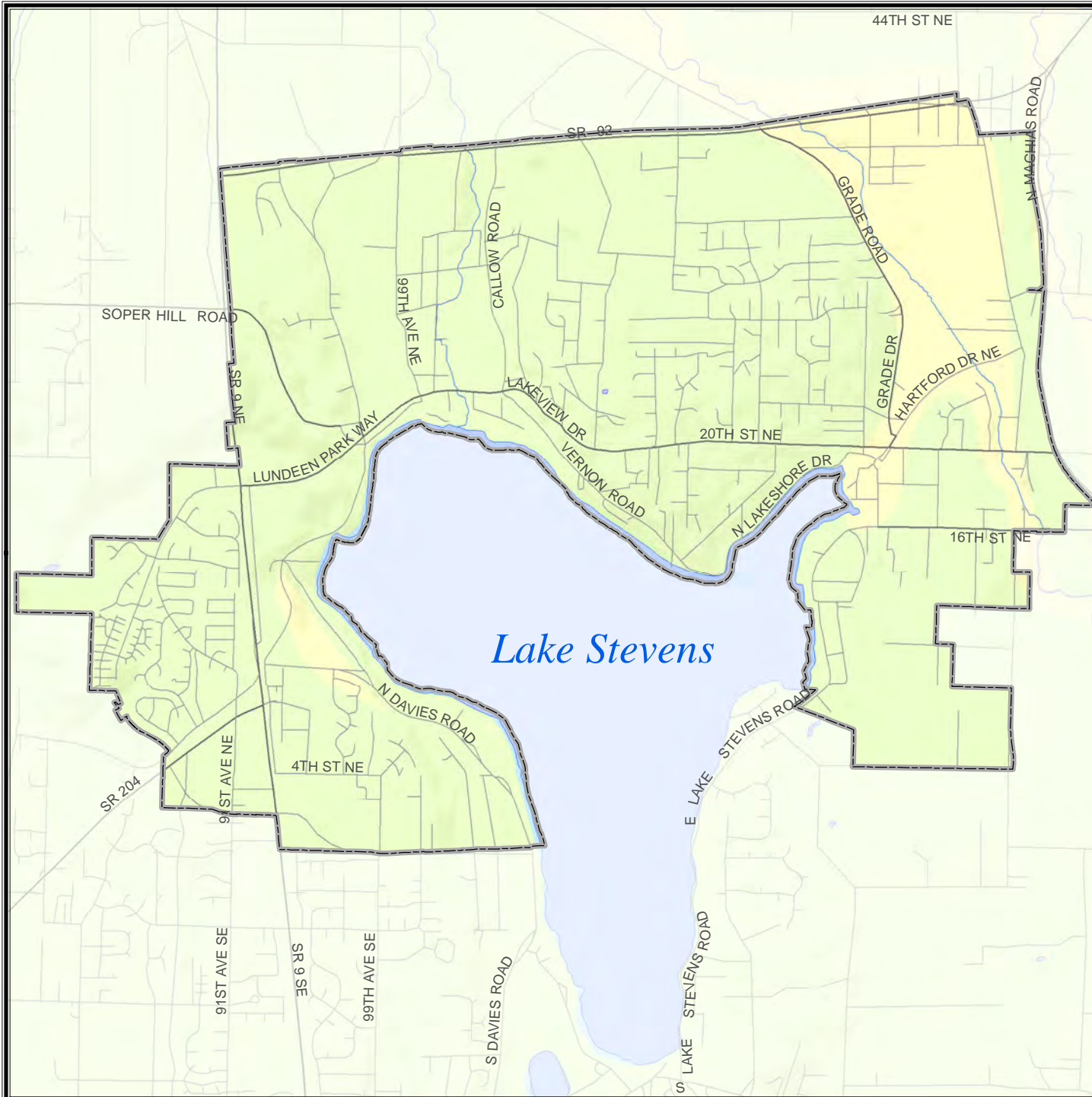
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# CITY OF LAKE STEVENS

## Map 8-6

### National Earthquake Hazard Reduction Program (NEHRP)

#### Soil Site Classes

-  Site Class F - Requires site-specific investigation
-  Site Class E - Soft Soil
-  Site Class D - Stiff Soil
-  Site Class C - Very Dense Soil and Soft Rock
-  Site Class B - Rock
-  Water
-  Ice



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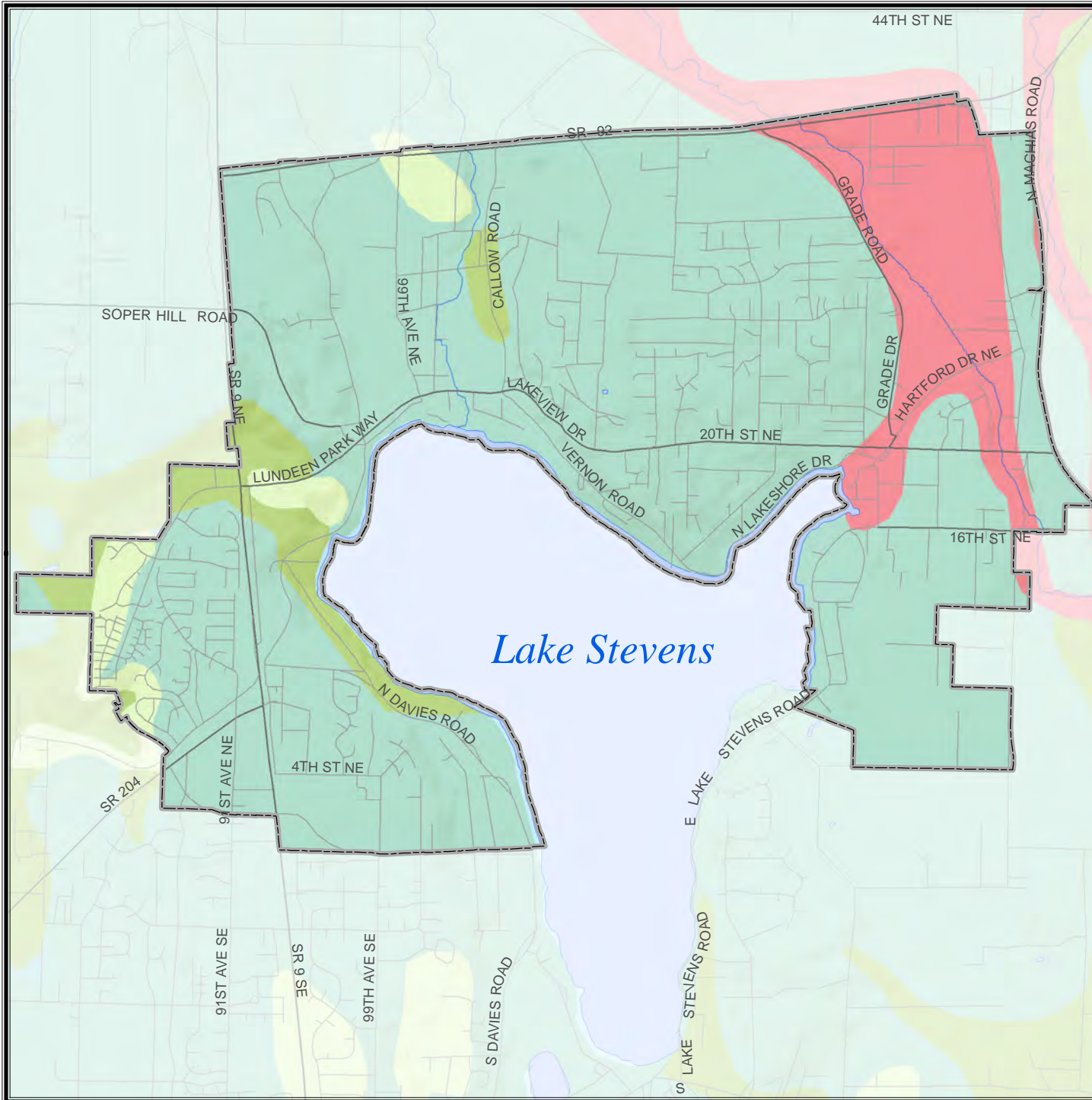
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# CITY OF LAKE STEVENS

## Map 8-7

### Liquefaction Susceptibility

#### Liquefaction Susceptibility

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

#### Not Susceptible to Liquefaction

-  Bedrock
-  Peat
-  Water
-  Ice



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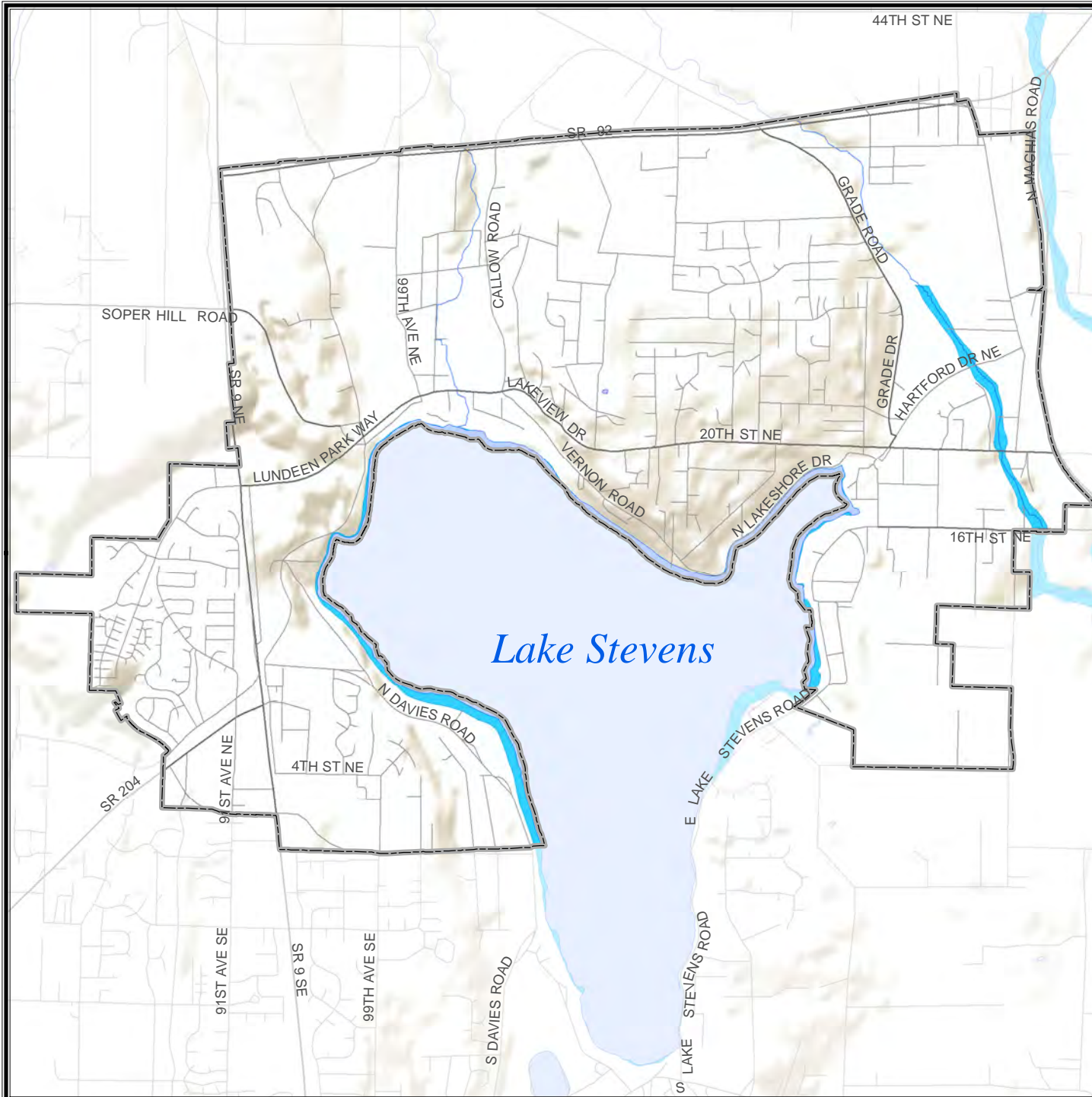
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# CITY OF LAKE STEVENS

## Map 8-8

### Flood Hazard Areas

-  Special Flood Hazard Area (100 Year)
-  Special Flood Hazard Area (500 Year)
-  Special Flood Hazard Area (Floodway)



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Data Sources:  
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FEMA Digital Flood Insurance Rate Maps  
Washington State Department of  
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 Miles

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