City of Lebanon

Comprehensive Plan

Chapter 2:
NATURAL ENVIRONMENT

Adopted by City Council

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CHAPTER 2
Table of Contents

Protocol for Referring to a Goal or Policy from this Chapter

- Chapter 2 (Natural Environment) Natural Resource Goal G-x [x = Number of Goal Statement]
- Chapter 2 (Natural Environment) Natural Resource Policy P-x [x = Number of Policy Statement]
- Chapter 2 (Natural Environment) Natural Hazard Goal G-x [x = Number of Goal Statement]
- Chapter 2 (Natural Environment) Natural Hazard Policy P-x [x = Number of Policy Statement]

CHAPTER 2: NATURAL ENVIRONMENT

Part One: Narrative

1.0 Statewide Planning Goals and the Environment

Many of the LCDC goals have natural environmental implications. The main goals related to this Chapter of the Lebanon Comprehensive Plan are Goals No. 5, 6 and 7.

1.1 Statewide Planning Goal 5

Statewide Planning Goal 5 is: "to protect natural resources and conserve scenic and historic areas and open spaces." This Goal requires that "Local governments shall adopt programs that will protect natural resources and conserve scenic, historic, and open space resources for present and future generations" since these "resources promote a healthy environment and natural landscape that contributes to Oregon's livability."

Goal 5 mandates that the following resources shall be inventoried:

a. Riparian corridors, including water and riparian areas and fish habitat;
b. Wetlands;
c. Wildlife Habitat;
d. Federal Wild and Scenic Rivers;
e. State Scenic Waterways;
f. Groundwater Resources;
g. Approved Oregon Recreation Trails;
h. Natural Areas;
i. Wilderness Areas;
j. Mineral and Aggregate Resources;
k. Energy sources;
l. Cultural areas.

Goal 5 also states that "(l)ocal governments and state agencies are encouraged to maintain current inventories of the following resources: a. Historic Resources; b. Open Space; c. Scenic Views and Sites."

This Chapter of the Comprehensive Plan acknowledges that the City will over time establish and maintain inventories of the Goal 5 resources within Lebanon's UGB that are subject to the Goal 5 Administrative Rule. A number of these resources are not applicable to Lebanon: Natural Areas; Outstanding Views and Sites; Wilderness; Wild and Scenic Waterways. This Chapter includes policies that will help ensure the wise management of natural resources for future generations and to help avoid land use conflicts damaging to the natural environment. Chapter 7 includes a section on cultural and historic resources.

1.2 Statewide Planning Goal 6

Statewide Planning Goal 6 is "to maintain and improve the quality of air, water and land resources of the state." The Goal states that: *all waste and process discharges from future development, when combined with such discharges from existing developments shall not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards. With respect to the air, water and land resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, such discharges shall not (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources.* This Comprehensive Plan Chapter as well as Chapter 9 ("Public Facilities and Services") address Statewide Planning Goal 6.

1.3 Statewide Planning Goal 7

Statewide Planning Goal 7 provides the framework for jurisdictions in the state "to protect people and property from natural hazards." This Comprehensive Plan Chapter addresses the provisions of Goal 7 that pertain to all jurisdictions, such as:

A. Engaging in Natural Hazard Planning:

- *Local governments shall adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards.*
- *Natural hazards for purposes of this goal are: floods (coastal and riverine), landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfires. Local governments may identify and plan for other natural hazards.*

B. Responding to New Hazard Information as it becomes available.

2.0 Lebanon and the Natural Environment

2.1 Topography and Drainage

The topography of Lebanon and most of the surrounding area is flat or gently rolling terrain, dipping to the northwest. Notable nearby features include: Ridgeway Butte (inside City Limits (1,203 feet) to the east, and Peterson Butte (1,431 feet) to the southwest. These nearby buttes provide an attractive setting and, although largely outside the Urban Growth Boundary, offer contrasting open space to the developed area. Topography throughout most of the Urban Growth Boundary poses relatively few restrictions to development. Natural environmental conditions constraining urbanization include steep slopes and potential flood hazard areas. Ridgeway Butte has been identified by the State as having the potential for mass movement or landslide.

2.2 Soils and Geology

The underlying geology is significant for a number of reasons. Geologic and soil characteristics indicate load-bearing strength, drainage potential, erosion, and suitability for urban use including recreational, industrial, commercial, or residential development. The geologic characteristics can indicate specific hazards such as slippage problems, or specific valuable resources such as the presence of economically exploitable mineral resources.

Most of the Lebanon area lies on an alluvial plain created from sediments deposited during the late Pleistocene Epoch. The more recent alluvial deposits occur along the South Santiam River in the form of broad sandbars and flood plains. Soils along the River are generally well drained and historically have developed with on site facilities (i.e., wells for potable water, and septic systems). Such soils usually require minimal fill and/or wetlands mitigation in order to be developed. Soils farther from the River are generally less well drained, and thus present greater challenges for development and are more likely to have jurisdictional wetlands that require mitigation.

2.3 Water Resources

The major surface water feature in the Lebanon area is the South Santiam River and its slough system. The South Santiam undergoes a marked change in the Lebanon area. From a fast flowing river above Lebanon, the South Santiam becomes slower and more meandering immediately downstream from the City.

The sloughs and channels north of Lebanon are susceptible to shifting (over geologic time or as the result of major flooding), due to the low stream gradient and the soil composition. The sloughs, ponds and marshes provide habitat for local wildlife.

The riverbanks in the vicinity of the sewage treatment plant and the former sanitary landfill (now Recycling Transfer Station) are subject to stream bank erosion. Numerous sections further downstream have been protected by rip-rap placed to control the erosion.

The South Santiam River is the only perennial stream or river in the Urban Growth Boundary (UGB). All other streams are intermittent streams. There are no flow records for these streams.

Ground water is usually plentiful in the Lebanon area. The availability of ground water is in part a function of geology. Most of the Lebanon area is underlain by alluvium, consisting largely of gravel, sand and silt. These yield moderate to large quantities of water for area wells.

The South Santiam River is the City's source of municipal water supply which is conveyed to the water treatment plant via the Albany-Santiam Canal which initiates at the diversion dam on the River about a mile upstream of the Urban Growth Boundary. The Canal continues on to Albany and emptying eventually into the Calapooia and Willamette River.

2.4 Natural Vegetation, Fish and Wildlife

2.4.1 Natural Vegetation Values

Vegetation provides important natural values for the community. In addition to the economic value of timber harvesting, woodlands, forests and other areas of natural vegetation serve to conserve, protect and enhance other resources. On steep slopes, the natural vegetative cover helps stabilize the soil and thereby protects water resources from excessive sedimentation. The protection of water quality by natural vegetation also helps protect fish resources and provides habitat for a wide variety of wildlife. Natural vegetation supports outdoor recreation activities, provides an open space resource for the urban environment, and generally enhances the aesthetic quality of the community.

The City's 1998 Riparian Protection Ordinance (Lebanon Municipal Code Chapter 17.27) created a Riparian Protection Subzone (or RPZ) along the South Santiam River, Oak Creek, and Cheadle Lake corridors to maintain and enhance water quality, prevent property damage during floods and storms, limit development activity in designated riparian corridors, protect native plant species, maintain and enhance fish and wildlife habitats, and conserve scenic and recreational values of riparian areas. The associated greenways have been designated by the City in the Parks Master Plan to be managed for not only natural vegetation protection, but also for pedestrian and bike trails.

Nearly all natural areas can provide some habitat for non-game wildlife of some kind. Some species can adapt to a variety of habitats, but others are restricted to specific habitat types. To ensure an abundance and variety of wildlife, development proposals should be reviewed to ensure the maximum practical preservation of habitat types. Preservation of riparian zones, particularly along major streams, is of outstanding importance for both fish and wildlife. Provision and preservation of parks, open space and water areas are of high importance for both recreation and the maintenance of natural habitats.

All rivers, streams and lakes and adjacent riparian zones are considered sensitive areas for protection of fish and wildlife values. As noted above, the City has established a Riparian Protection Zone (RPZ) to protect these critical habitats.

2.4.2 Wildlife and Plant Species

In protecting wildlife and plant species in urban areas, the main concern is Threatened and Endangered species, and second Sensitive Species, and third all other species. Current listings can be found in publications from the Oregon Department of Fish and Wildlife (ODFW) and the US Fish and Wildlife Service. A key publication that was produced by a cooperative effort on the part of many public and private agencies and organizations is the ***Rare, Threatened and Endangered Plants and Animals of Oregon*** (Oregon Natural Heritage Program. 2001: 1322 S.E. Morrison St., Portland, OR 97214-2531, (503) 731-3070, www.heritage.tnc.org/nhp/us/or).

2.4.3 Fish Species

The South Santiam River is an important fisheries resource. The river provides spawning areas for anadromous salmonoids and habitat for resident trout. ODFW has ongoing projects to inventory all streams and rivers, and sub-basins. Current information can be found on the following website: www.StreamNet.org.

While winter and summer Steelhead and spring Chinook have been known to usually spawn in cooler waters upstream from the Lebanon Dam, the fall Chinook spawn in the lower part of the river from the confluence with the Willamette River to the mouth to the Santiam Canal diversion dam upstream from the Urban Growth Boundary. According to current data and maps from ODFW winter and summer Steelhead and spring Chinook use the South Santiam for rearing and migration, and fall Chinook use the South Santiam for "spawning and rearing" from roughly October 15th to May 15th (see www.StreamNet.org).

2.4.4 River Access

Assuring adequate river access is important for recreational purposes and sport fishing (to utilize fishery resources). Presently, bank access is limited. As a result, drift boating is a common method used for fishing the South Santiam River.

A particularly high-use area is the stretch of water downstream from the Santiam Canal diversion dam to the Lebanon sewage treatment plant which is located approximately 1/3 mile downstream from the Grant Street Bridge. A boat ramp at Gill's Landing, adjacent to River Park, presently provides River access at this location. The Linn County Parks Department has also proposed a boat ramp at the Santiam Canal diversion dam.

2.4.5 Development and Wildlife Habitats

Development of vacant land often results in the loss of wildlife habitats. Among the activities and land uses that have the most widespread adverse effects on fish and wildlife are:

A. Filling or draining of aquatic habitats.
B. Water pollution.
C. Clearing of riparian zones.
D. High density development in or adjacent to sensitive habitats.
E. Practices that remove vegetation from roadsides, fence rows, and other unused areas.

The area within Lebanon's Urban Growth Boundary (UGB) has not been designated as a wildlife habitat area. However, when appropriate and warranted, the City considers wildlife habitat management issues during the development review process.

2.5 Mineral and Aggregate Resources

Historic aggregate extraction activity has occurred on the floodplain (e.g., Morse Bros. *pre-law*[1] gravel pit) and upland areas around the City of Lebanon. Additionally, in-stream mining likely has occurred historically in the area. Oregon's Department of Geology and Mining Industries (DOGAMI) database indicates that there are currently four active mining Operating Permits, one *Grant of Limited Exemption*[1], and five closed sites within the local area. Although DOGAMI cannot release company specific production data (only County–wide production data), therefore there are not any records or other data indicating the presence of active extraction operations in the Urban Growth Boundary at this time.

2.6 Energy Sources

With respect to oil and gas resources, according to DOGAMI's division of Mineral Land Regulation and Reclamation (MLRR) in Albany, Oregon, three wells have been drilled since 1958 within the Lebanon area. All three wells reported oil or gas *shows*[1]. A gas well drilled in 1981 by American Quasar Petroleum Company produced gas for five months prior to its abandonment in 1981. This well was located just outside the northwest corner of the City's Urban Growth Boundary.

[1] ***Pre-law*** is mining a disturbance that was identified on a 1972 aerial photo prior to July 1, 1972, and prior to ORS 517 that became effective on that date. Prior to this time mine sites were not regulated at the state level; ***Grant of Limited Exemption*** is the permit for only pre law sites as outlined on a 1972 aerial photo that exempts mines from regulations and reclamation within the disturbance footprint shown on a 1972 (circa) aerial photo; ***Show*** is a trace of oil or gas detected in a core, cuttings or circulated drilling fluid, or interpreted from the electrical or geophysical logs run in a well.

3.0 Unique Natural Features and Opportunities for Environmentally Friendly Development

3.1 Cheadle Lake

Cheadle Lake is approximately a 150 acre water body that is a modified oxbow lake formed by meanderings of the South Santiam River that once functioned as the largest log pond in the State. This former industrial area contains a designated riparian corridor and protection zone, as well as identified wetlands. The Lake also currently supports a variety of fish species and wildlife habitats. The Albany-Santiam Canal abuts the east boundary of Cheadle Lake.

Given the readily available accessibility to this site and considering that heavy industrial activities are no longer being conducted at the mill or in this vicinity, the City has identified future Mixed Use development including recreational and commercial components as the most appropriate Comprehensive Plan Map redesignation and development scenario for this important redevelopment area.

3.2 Santiam Special Planning Area

The Santiam Special Planning Area is an overlay zone that straddles the South Santiam River southeast of Lebanon's Downtown District. The area on the west side of the Santiam River is the former Willamette Industries Plywood Mill site that stretches from Grant Street on the north to Riverview School on the south, and west from the Harmony Street/Post Street neighborhoods to the Santiam River. On the east side of the River, this Planning Area includes the territory along the River west of Berlin Road at the foot of Ridgeway Butte from Grant Street/Brewster Road in the north to the City Limits and UGB Boundary on the South.

This area is of special importance to Lebanon because of its central location and its unique natural features and their juxtaposition with one another. The area is a focal point for many community interests and goals including those related to transportation, recreation, riparian zone protection, habitat management (threatened and endangered species), water quality, scenic views, and commercial and residential development that is not detrimental to these other concerns. Identification as a Special Planning Area will help assure that the City is able to successfully integrate these key values during the development review process for this area. Approval of development proposals in this Special Planning Area will require demonstration that plans are able to successfully coordinate with the City's special studies that pertain to this area relating to such things as transportation, recreation, riparian protection, and habitat management.

It has been determined that a future Comprehensive Plan Map designation of Mixed Use will enable the creation of development and redevelopment strategies that can maximize the potentials of the multitude of amenities associated with the natural features of this area and simultaneously protect them. While the former Willamette Industries Plywood Mill site has historically been designated as General Industrial on the Comprehensive Plan Map, the City has now identified Mixed Use Development that includes recreational and commercial components as appropriate future Comprehensive Plan Map redesignation for this important redevelopment area. This future redesignation will enable the realization of the highest and best benefits for the community that this site has to offer. This future redesignation would lead to "up-zoning" upon annexation.

3.3 Ridgeway Butte

Ridgeway Butte, an area designated as Residential Mixed Density, dominates Lebanon's viewshed to the east. Portions of the Butte are still covered by scattered stands of second-growth Douglas Fir. Larger old stands of Douglas Fir occur on the steep western and southern slopes of the butte, ranging in age from 70 to over 100 years. Portions of these slopes are also occupied by stands of Oak. Some upper ledges consist of grass and natural openings, while the westernmost part of the butte is covered with intermixed Douglas Fir and White Fir.

Ridgeway Butte functions as an important watershed for this section of the South Santiam River because of its vegetation cover and its slopes. However, these slopes also impose development constraints and challenges. Much of the slopes on the portion of Ridgeway Butte within the City and Urban Growth Area are over 25 percent slope. Most of this area has slopes over 50 percent, and in some areas the slope exceeds 75 percent. Portions of the west slope of Ridgeway Butte are constrained for development due to the degree of slope. There are, however, some "shelves" on the northern section of the butte that could be developed with appropriate development controls and detailed site specific studies and planning. The State has identified the steeply-sloped Ridgeway Butte hillside as a potential mass movement or landslide risk area, thereby requiring that future development proposals for this site address this potentially hazardous condition.

Part Two for Natural Resource Goals and Policies:

4.0 Natural Resource Goals

The City's Natural Resource Goals include the following:

G-1: Taking into account the cumulative waste and process discharges from proposed future development, when combined with such discharges from existing developments, so that new development will not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards.

G-2: Taking into account the cumulative waste and process discharges from proposed future development, when combined with such discharges from existing developments so that new development, with respect to the air, water and land resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, will not: (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources.

G-3: Maintaining and promoting a safe, healthful, and attractive environment for the citizens of the City.

G-4: Recognizing the opportunities and constraints posed by the natural environment; to protect the unique resources of the area; and to ensure that future development will not result in adverse impacts on the natural environment.

G-5: Complying with the provisions of a Statewide Planning Goal 5 pertaining to natural resources.

G-6: Inventorying the UGB to identify areas with significant wildlife habitat value; periodically update the inventory.

G-7: Developing and implementing regulations for riparian zones and flood plains that minimize or prevent loss of riparian vegetation and conflicting development.

G-8: Managing the identified open space, wildlife habitat, and ecological/scientific areas in order to preserve their unique qualities.

G-9: Preserving natural resource areas through such provisions as public acquisition or conservation easements.

G-10: Protecting sensitive environmental features such as steep slopes, wetlands, and riparian lands.

G-11: Protecting the Santiam River and its banks as a vital open space, fish and wildlife habitat and recreation resource of the community.

G-12: Securing and maintaining public access to rivers and stream areas when possible.

G-13: Establishing and maintaining a system of parks and open space in the City along the Santiam River to balance the needs of residence and the habitat and migratory needs of fish and wildlife.

G-14: Working with federal, state, and county agencies to establish nature trails and river access.

G-15: Requiring and assuring that the City's development review and approval process address state and federal erosion control standards.

G-16: Working with Linn County and appropriate state agencies to establish best management practices that minimize the introduction of pollutants into ground and surface water.

G-17: Developing and implementing improved stormwater management requirements to enhance water quality.

G-18: Creating Special Planning overlay zones for natural areas of community importance that assure environmentally friendly development and redevelopment by requiring project proposals to demonstrate that plans are able to successfully coordinate with the City's special studies that pertain to such areas relating to transportation, recreation, riparian protection, habitat management, and so on.

5.0 Natural Resource Policies

The City shall:

P-1: Take into consideration the cumulative waste and process discharges from proposed future development, when combined with such discharges from existing developments, so that new development will not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards.

P-2: Take into consideration cumulative waste and process discharges from proposed future development, when combined with such discharges from existing developments so that new development, with respect to the air, water and land resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, will not: (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources.

P-3: Require that waste and process discharges from future development (when combined with discharges from existing development) not violate, or threaten to violate, state or federal environmental quality statutes.

P-4: Require that waste and process discharges from future development (when combined with discharges from existing development) not exceed the carrying capacity, degrade, or threaten the availability of air, water, and land resources.

P-5: Protect fish and wildlife habitat along stream corridors by managing the riparian habitat and controlling erosion, and by requiring that areas of standing trees and natural vegetation along natural drainage courses and waterways be maintained to the maximum extent possible.

P-6: Use designated greenways along select water courses to protect natural vegetation and water resource values and provide public pedestrian/bicycle access where physically practical.

P-7: Protect designated riparian areas in the UGB through the implementation and enforcement of the Riparian Protection Zone (Lebanon Municipal Code chapter 17.27).

P-8: Restrict development of land that requires channelization, excessive removal of stream side vegetation, alteration of stream banks and filling of stream channels.

P-9: Protect in-channel vegetation (i.e., the bank vegetation between the water's edge and the topographic break at the level of the surrounding terrain) through the implementation of existing development standards and the City's project review procedures.

P-10: Protect natural ponds, sloughs, wetlands, rivers, and streams (including intermittent ones) to maintain existing surface water drainage patterns and to maintain the water quality benefits derived from such natural water bodies.

P-11: Encourage proper care and maintenance of trees by providing educational materials to property owners concerning tree health and maintenance.

P-12: Require, where practical, the use of open, naturally vegetated drainage ways to reduce stormwater runoff and improve water quality.

P-13: Require that development on slopes in excess of 15 percent maintain the maximum vegetative cover per the City's development code to protect soils and mitigate erosion and land-slippage problems.

P-14: Require that development proposals on slopes greater than 15 percent and less than 30 percent submit engineering investigations of the site for project review to ensure that environmental problems that result from development can be successfully mitigated.

P-15: Restrict development on steep-slope areas exceeding 30 percent. Limited development may be allowed when it can be shown through a detailed site specific study that environmental problems that result from development can be successfully mitigated.

P-16: Promote slope and soil stability and the use of natural drainage ways in areas with landslide potential by retaining existing vegetation in those areas to the greatest extent possible.

P-17: Enforce the provisions of the Uniform Building Code to safeguard life, limb, property, and the public welfare when reviewing development projects on sites considered to have steep slopes or geologic hazards or other environmental limitations

P-18: Require that development proposals recognize the value of existing on-site mature vegetation and preserve these resources to the maximum extent practical.

P-19: Preserve significant areas of natural vegetation to the maximum extent possible through the planning review process.

P-20: Require that development proposals in areas identified as posing a geologic hazard, such as land slippage, poor drainage, ponding and high water table submit engineering investigations of the site.

P-21: Establish special development standards and/or Special Planning overlay zones for areas with unique natural features and opportunities for environmentally friendly development or redevelopment to assure that development and redevelopment proposals demonstrate that plans are able to successfully coordinate with the City's special studies that pertain to such areas relating to transportation, recreation, riparian protection, habitat management, and so on. Such areas may include the Santiam Special Planning Area, the Cheadle Lake Area, and Ridgeway Butte.

P-22: Notify applicable state and federal natural resource protection agencies of development proposals potentially impacting endangered or listed plant and animal species.

P-23: Require compliance with all applicable federal, state, and county air quality protection requirements.

P-24: Require that development proposals with significant noise generating elements demonstrate compliance with City noise standards.

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Part Two for Natural Hazard Goals and Policies:

6.0 Natural Hazard Goals

The City's Natural Hazard Goals include the following:

G-1: Developing and coordinating a comprehensive all-hazard emergency management program and procedures in concert with Linn County Emergency Management, Oregon's Office of Consolidated Emergency Management (OCEM) [formerly OEM], neighboring jurisdictions, Federal Emergency Management Agency (FEMA), and other government agencies and organizations, as per the provisions of the community's current Basic Emergency Management Plan.

G-2: Encouraging projects that will protect, maintain, enhance, and restore the natural functions and values of stream corridors. This includes maintenance of water quality, storm runoff and flood water conveyance, wildlife habitat, open space, recreation, and aesthetic values.

G-3: Managing land within the River's 100-year flood plain to achieve compliance with floodplain development standards.

G-4: Working with other jurisdictions to coordinate efforts related to watershed planning to mitigate the impacts of flooding.

G-5: Updating the City's flood hazard maps with new information on flood hazard boundaries provided by the Army Corps of Engineers, FEMA, the State, county, and other agencies.

G-6: Providing current earthquake information and Oregon Structural Specialty Code seismic requirements to developers and other interested citizens.

G-7: Working with other jurisdictions to coordinate efforts related to mapping and planning for Wildfire Hazard zones (i.e., geographic areas that have a combination of hazard factors that result in a significant hazard of catastrophic fire over relatively long periods of each year).

G-8: Maintaining a map of constrained lands within the City and UGB that generally identifies lands with known physical limitations and hazards.

G-9: Encouraging a hazards public information program, and develop and/or supply information brochures on comprehensive hazard preparedness to residents, schools, and civic groups and make information publicly available.

G-10: Integrating earthquake safety planning into all City operations.

7.0 Natural Hazard Policies

The City shall:

P-1: Develop and maintain an all hazard emergency management program to effectively deal with natural disasters.

P-2: Develop and implement City/Community Emergency Management Program and periodic Emergency Coordination Center (ECC) training and exercises as per the provisions of the community's Basic Emergency Management Plan.

P-3: Participate in the Oregon Emergency Response System (OERS).

P-4: Include evacuation and recovery plans for use during all applicable disasters, such as floods or earthquakes, in the Lebanon Emergency Management Plan and Program.

P-5: Require compliance with all Oregon Building and Fire Codes and, when applicable, with the guidelines and requirements in Oregon Revised Statutes relating to Wildfire Hazard Zones.

P-6: Require that development within identified flood zone areas conform to the standards of the Federal Emergency Management Agency's National Flood Insurance Program.

P-7: Require that if development is proposed on land designated as flood plain, development standards will be implemented consistent with the Federal Emergency Management Agency (FEMA) regulations to minimize impacts on the flood flows and flood levels to allow for construction of safe structures that comply with FEMA and state standards for areas that are affected by flooding.

P-8: Regulate development within floodways according to applicable Municipal, County, State, and Federal requirements so as to not significantly alter the patterns of flood water flows.

P-9: Continue participation in the Federal Emergency Management Agency (FEMA) National Flood Insurance Program in order to help make the community a safer place to live and to lower residents' insurance premiums.

P-10: Regulate development in flood-prone areas of the community to mitigate the problem of flooding and to prevent an increased flood hazard in other areas.

P-11: When possible, continue acquiring open space areas and access easements along the Santiam River and on Oak and Burkhart Creek drainage ways as both a part of the City's flood mitigation efforts and Open Space program

P-12: Work to facilitate solutions to flooding problems in existing neighborhoods.

P-13: Require that development on slopes in excess of 15 percent maintain the maximum vegetative cover to protect soils and prevent land-slippage problems.

P-14: Restrict or prohibit development on steep-slope areas exceeding 30 percent, unless it can be shown through a detailed site specific study that environmental problems or significant adverse impacts that result from development can be successfully mitigated. The capacity for development is restricted by the degree to which the significant impacts can be mitigated.

P-15: Use DOGAMI research results, and relevant information available from other agencies, to review the City's Emergency Management Plan as necessary to mitigate loss of life, personal injury, and property damage in the event of earthquakes.

P-16: Assess seismic damage potential to City sewer and water systems, bridges, and other City facilities, and develop a mitigation plan.

P-17: Require that developments not be located in known areas of natural hazards without appropriate safeguards.

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