

## Comprehensive Plan Update - Natural Hazards

Date for discussion: August 23, 2012

### Introduction

The Comprehensive Plan update offers an opportunity to examine the relationship between land use practices and the risks associated with natural hazards. Decisions about where to focus growth and how to design buildings, streets and other infrastructure will influence public safety and the long-term value private and public investments.

### Definition

Natural hazards are typically defined as naturally occurring phenomena that, because of their location, severity, and frequency, have the potential to adversely affect humans, their structures, or their activities (Organization of American States, 1990). Some of these phenomena are also integral to watershed health and ecological function in Portland, including flooding and wildfire.

The natural hazards identified in the City of Portland 2010 Natural Hazard Mitigation Plan are:

- Earthquake
- Severe weather
- Flood
- Landslide
- Erosion
- Wildland urban interface fire
- Invasive plant species
- Volcanic activity

### PEG Discussion Questions

1. Are the proposed Goals and Policies provided below appropriate and sufficient to address natural hazards in the Comprehensive Plan? Do they contribute positively or negatively to environmental justice and social equity?
2. What are the implications of directing future development away from hazard prone-areas given that much of the City is at risk for multiple hazards and the entire City is a seismic risk area (see draft policy 3.C. below)? Options might include different policies for different hazards, frequencies, or risk levels.
3. How should the policies address new development vs. redevelopment and alterations to existing development?
4. Should the City create a separate set of goals and policies to guide plans for reconstruction and recovery after a Cascadia Subduction Zone earthquake or other major disaster?

### Discussion

The impacts of natural hazards can be increased by human development or activity. Development in hazard-prone areas can increase the frequency, severity, and the impacts of such events. For example, development in the floodplain can increase flood levels and impacts on life and property. Development in and near wildfire hazard areas can increase the risk of wildfire from sparks caused by outdoor cooking, vehicles, home fireworks, etc. Development in landslide hazard areas can increase stormwater runoff and tree removal which can destabilize soil and steep slopes. Much of the city's most intensive land uses and energy facilities are located on liquefiable soils. Development on liquefiable soils can be prone to failure during a major earthquake.

Some natural hazards, such as flooding and wildfire are necessary and beneficial components of natural ecological processes. Flooding provides soil nutrients and groundwater recharge, while periodic wildfire helps forest health by removing unhealthful and invasive vegetation and controlling pests. However, the exacerbation of these naturally occurring events can negatively affect watershed health as well as human health and safety. Severe wildfire, flooding and landslide events can increase pollution and sedimentation in streams and wetlands, and can cause abnormally high plant, fish and wildlife mortality.

Efforts to prevent such events can also have negative results. For example, preventing normally occurring wildfires for long time periods can result in fuel buildup which increases the severity and impacts of wildfire when it inevitably occurs. Preventing flooding in one area can increase impacts of flooding downstream.

Natural hazards can raise equity and environmental justice issues. For example, people living near hazardous materials sites can be at greater risk of exposure to toxic chemicals during and after a flood, wildfire or earthquake.

The City's existing Comprehensive Plan includes policies to provide safe housing, appropriate emergency services, and consideration of density in landslide-prone areas and floodplains. The City's Zoning Code, Building Code, and Fire Code contain provisions that address natural hazards more directly. The Zoning code requires consideration of flood and landslide risk when reviewing proposed land divisions. The Building Code regulates building in floodplains and contains seismic safety requirements. The Fire Code regulates roofing materials in wildfire hazard zones. **A summary of the existing policies and codes is provided in Attachment A.**

However, the current Comprehensive Plan provides little guidance on how to proactively plan for and reduce the risk of impacts from natural hazards. The Comprehensive Plan does not reflect the direction provided in more recent plans such as the Portland Watershed Management Plan (2005), Climate Action Plan (2009), the adopted Natural Hazard Mitigation Plan (2010), or the Portland Plan (2012). **Guidance from these and other documents is provided in Attachments B and C.** In addition, existing Comprehensive Plan does not reflect lessons learned from events such as the Willamette bluff fire of 2001, or from programs such as the Johnson Creek Willing Seller Program which moves residents out of the flood prone areas, restores floodplain function, and reduces flooding impacts.

The Portland Bureau of Emergency Management (PBEM), in partnership with the Office of Neighborhood Involvement (ONI) has produced maps series showing the array of natural hazards citywide and by neighborhood. The hazard maps also show where unreinforced masonry buildings exist for each neighborhood. PBEM and ONI also produced resource maps showing the location of facilities such as hospitals and clinics, shelters, police and fire stations, key transportation and emergency response routes. These resource maps also show the distribution or relative population density per square mile.

The updated Comprehensive Plan goals and policies should reflect guidance and assessment of these plans, recent experience and improved mapping, including how to meet multiple goals and avoid conflicts such as how to maintain trees and tree canopy while preventing conflicts with overhead utility lines and reducing wildfire risks and impacts. The updated Comprehensive Plan goals and policies should provide a basis for making land use planning decisions and for updating implementing tools such as the zoning code and the public facilities plan. And the Comprehensive Plan can also help inform updates to the building code, fire code, and investment priorities.

The Watershed Health/Environment PEG will be asked to help shape policies to reduce hazard risks while increasing overall community resiliency, and to discuss the implications of establishing broader and potentially stronger policies directing development away from hazard prone areas.

## PROPOSAL

The following draft goal and policies address natural hazards either directly or indirectly. This language has been excerpted from the draft goals and policies provided to the PEG at its first meeting. The language has been updated to reflect input received during the initial Watershed Health/Environment PEG meetings, and to focus more intentionally on addressing natural hazards.

## GOALS

1. Watersheds in Portland have hydrologic, habitat and water quality conditions suitable to protect human health and wellbeing, protect ecological functions and ecosystem services, sustain native aquatic and terrestrial species and biological communities, support cultural and spiritual fulfillment, and protect public and private property.
2. The built and natural environments in Portland are integrated so that they function as a cohesive system
3. Portland's environment is resilient in the face of climate change, natural hazards and other uncertainties including a major earthquake or other natural or man-made disasters.
4. All Portlanders have clean air and water, access to nature, and reasonable protections from landslides, flooding and other natural hazards.

## POLICIES

1. Land, Water and Wildlife
  - 1.A. Protect, enhance and restore:
    - 1.A.1. the quantity, quality, connectivity, complexity, and natural functions of rivers and streams, other open drainageways, wetlands, riparian corridors and floodplains;
    - 1.A.2. the quantity, quality, connectivity, complexity, and natural functions of upland natural resources;
    - 1.A.3. vegetation in and between riparian corridors, wetlands, floodplains and upland areas;
    - 1.A.4. native vegetation communities;
  - 1.B. Prevent:
    - 1.B.1. invasive plants, animals and insects from becoming widespread.
    - 1.B.2. pollutants from contaminating air, soil and water.
    - 1.B.3. human induced soil loss, erosion, and impairment of soil quality and function.

2. Design with Nature

2.A. Support development that preserves or enhances the capacity of natural systems to manage stormwater, maintain water quality, maintain slope stability, protect fish and wildlife and their habitats, and provide other infrastructure and ecosystem services.

2.B. Ensure that stormwater management systems are adequate to serve planned densities without creating negative off-site impacts including runoff, erosion, landslides, flooding or stream degradation.

3. Resiliency

3.A. Protect people, property, public facilities and infrastructure from the risks associated with natural hazards including landslide and erosion, flooding, and wildfires.

3.B. Reduce the threat and impacts of natural hazards using solutions that mimic the beneficial functions of nature.

3.C. Direct development away from natural hazard prone areas where practicable.

3.D. Encourage development that is resilient to and avoids exacerbating the impacts of natural hazards, including impacts on people, wildlife, natural resources, and public and private property.

3.E. Maintain a high rating in the National Flood Insurance Program.

3.F. Consider slopes, soil characteristics including liquefaction potential, and natural hazard risks when determining allowed densities, impervious area, development type.

3.G. Reduce the risk of catastrophic wildfire through land use planning and best management practices with a focus on wildfire-prone open space areas and the neighborhoods that abut them.

3.H. Encourage emergency preparedness and capacity in the community to respond to and recover from natural disasters.

3.I. Support the role of parks and open space areas as potential community gathering places and information/distribution centers during and after an emergency.

3.J. Protect and enhance natural systems as a way to adapt to the impacts of climate change.

3.K. Encourage innovative mitigation approaches, such as mitigation banks, to reduce the impacts of natural hazards and improve watershed health.

## **POLICIES FOR OTHER PEGS to CONSIDER**

- **Natural-hazard and climate change resilient development** policies could be woven into Comprehensive Plan policies for neighborhoods, housing, schools, etc.
- **Natural hazard and climate change resilient infrastructure** policies calling for priority emergency response streets and water service, and additional policies calling for infrastructure resiliency to major earthquake (e.g., bridges and roads, water, sewer, stormwater) and severe weather.
- **Public safety goals and policies could be broadened** to address equitable access to emergency services needed for a range of potential events, including multiple events occurring simultaneously (e.g., major earthquake, landslides, fire). School related goals and policies could call for seismic retrofits and could address the potential role of schools as community gathering places, shelters, and information centers during and after an earthquake or other disaster.

## **POTENTIAL FOLLOW UP ACTIONS**

The proposed goals and policies could support the following refinement projects and investments once the Comprehensive Plan is adopted:

- New or updated policy directions could support new or amended codes, programs or projects addressing removal of invasive plants, fire-resistant landscaping, maintaining defensible space around homes and businesses, and managing tree removal on steep slopes.
- Resource enhancement approaches that “mimic nature” such as controlled burns to reduce invasive species and fuel load.
- Development plans to guide reconstruction and recovery after disasters such as a major earthquake
- Investments to reinforce/retrofit existing infrastructure, critical facilities, schools and community centers, and hazardous materials sites to improve resiliency and support emergency preparedness and recovery.

## Appendix A. How do Portland's current Comprehensive Plan and codes address natural hazards?

Portland's current *Comprehensive Plan* addresses natural hazards as follows:

1. Under **Goal 4, Housing**, there is a policy to ensure a safe and healthy built environment and assist in the preservation of sound housing and neighborhood improvement. Objectives include ensuring safe housing for residents of all income levels. (Policy 4.4 Housing Safety)
2. Under **Goal 6, Transportation**, policies call for Emergency Response Streets to provide a street network that facilitates prompt emergency response. (Policy 6.10, Emergency Response Classification Descriptions and Policy 6.14, Emergency Response)
3. Under **Goal 8, Environment** there is a policy calling for controlling development density in natural hazard areas consistent with the City's floodplain and land division codes (Policy 8.13 Natural Hazards).
4. Under **Goal 11, Public Facilities**, the water service related goals and policies call for alternate sources for use during emergencies, and hydrants and sufficient flow to serve fire protection needs of city residents and businesses. Public safety goals and policies address service levels, mutual response agreements, and emergency access for fire only and do not mention any other natural hazards (e.g., major earthquake). Schools policies address support for program investments in redeveloping neighborhoods and traffic safety, but do not mention support for programs to improve the school safety (e.g., seismic retrofits).

The City must make findings that it has addressed these goals and policies during its planning projects. During the recent Linnton Plan process, the City recognized the presence of multiple hazards including landslide and wildfire hazard, as well as severe limitations on road access and water, sewer and stormwater infrastructure. The City changed the Comprehensive Plan designation in the Linnton Hillside area to reduce potential future density in the area, and also eliminated the ability to build on substandard historically platted lots and duplexes on corner lots. The City also recognized potential hazards associated with potential landslide material deposition in the Linnton Village area and maintained the current industrial Comprehensive Plan designation rather than shifting to allow future mixed use.

**Portland regulations** that apply to development in hazard-prone areas include.

- Title 33 Planning and Zoning (Zoning Code) contains overlay zones regulations to protect identified natural resources, specifically Environmental Overlay Zones, the Pleasant Valley Natural Resource Area Overlay Zone and the Greenway Overlay Zones. Often these resources coincide with areas prone to landslides, wildfire and flooding.
- The Zoning Code also requires that landslide risk be addressed during land division reviews. The following approval criterion applies to land division proposals where any portion of the site is within a Potential Landslide Hazard Area: "Locate the lots, buildings, services and utilities on the safest part of the site so that the risk of a landslide affecting the site, adjacent sites and sites directly across a street or alley from the site, is reasonably limited." In addition, "Determination of whether the proposed layout and design reasonably limit the risk of a landslide will include evaluation of the Landslide Hazard Study and will take into consideration accepted industry standards for safety. Alternative development options including alternative housing types and reduced density may be required in order to limit the risk to a reasonable level."

The zoning code also allows developers to deduct the cost of seismic retrofits from project cost calculations required to determine non-conforming upgrade requirements. T

- Title 24, Building Code and the Zoning Code contain requirements for geotechnical analysis of development proposed in mapped landslide hazard areas.
- The Building Code also contains seismic code requirements.
- The City building code contains a flood ordinance that applies to development in flood-prone areas. Where development is proposed in the 100-year floodplain buildings must be constructed at specified elevations, and balanced cut and fill is required except in certain areas that are exempt from this requirement.
- Title 10, Erosion Control and the Erosion Control Manual prohibit erosion from leaving a site.
- The City has adopted a Wildfire Hazard Zone within which certain materials may not be used for new roofs or roof replacement.

## **Attachment B - Recent Guidance to Address Natural Hazards in the Comprehensive Plan**

During the last five years or so the City as produced a number of plans and maps that can inform the development of new Comprehensive Plan goals and policies for natural hazards.

### **Portland Watershed Management Plan (2005)**

The *Portland Watershed Management Plan* establishes a goals and objectives to protect and improve watershed health. The plan states:

“A healthy urban watershed has hydrologic, habitat, and water quality conditions suitable to protect human health, maintain viable ecological functions and processes, and support self-sustaining populations of native fish and wildlife species whose natural ranges include the Portland area.”

The PWMP Hydrology goal relates directly to natural hazards, specifically, flooding. This goal calls for moving toward “normative stream flow conditions to protect and improve watershed and stream health, channel functions, and public health and safety”. A key objective under this goal relates to channel and floodplain function. This objective calls for protecting and restoring the extent, connectivity, and function of streams, other open drainageways, wetlands, riparian areas and floodplains to improve bank stability and natural hydrologic functions and reduce risk to development and human safety.

Strategies outlined in the PWMP also help reduce the impacts of natural hazards. For example, stormwater management and revegetation strategies reduce the risk and impacts of flooding and landslides.

### **Climate Action Plan (2009)**

Portland’s *Climate Action Plan* recognizes the role of trees, natural systems, and healthy watershed in mitigating climate change and in providing resiliency to the impacts of climate change. The plan outlines urban tree canopy and water temperature objectives as indicators of watershed health. The plan also includes a number of actions to preserve and enhance urban tree canopy and natural resources, and to control the spread of invasive species.

The Climate action plan also establishes objectives to ensure that new buildings and major remodels can adapt to the changing climate, including higher temperatures and more severe storms.

### **Natural Hazard Mitigation Plan (2010)**

Portland’s 2010 *Natural Hazard Mitigation Plan* identifies and priorities numerous actions the City could take to reduce the risk and impacts of each of the identified natural hazards. Some of these actions specifically call for changes to the Comprehensive Plan and implementing tools (e.g., ordinances, maps). For example, one of the high priority actions identified in the plan is to:

“Revise Portland’s Comprehensive Plan to address and implement Citywide policies, land use improvements and mapping changes to natural hazards including, but not limited to, earthquakes, erosion, floods, invasive plants, landslides, volcano, severe weather and wildfires.”

Additional actions are provided in Attachment A.

### **Local Energy Assurance Plan LEAP (2012)**

Energy assurance is a confidence that energy will be available when needed. The LEAP process looked at Portland's reliance on energy and the vulnerability of the energy supply, and developed recommendations on what the city and community should do to ensure greater energy assurance in the face of future energy disruptions.

The products of this process are two-fold:

1. An energy emergency plan for the City of Portland referred to as the *Energy Annex*, that provides an understanding of the roles and responsibilities of emergency response agencies, energy providers and distributors, and the community.
2. An *Improvement Plan* with recommendations to guide next steps in addressing Portland's dependency on energy before, during and after an emergency.

The Portland LEAP links to, and builds upon, existing plans including the Oregon State Energy Assurance Plan, Portland's Natural Hazard Mitigation Plan (Risk Reduction Strategy) and the Portland Urban Area's Critical Infrastructure Protection Plan. It is also informed by the city's Climate Action Plan and the recommendations proposed by the Portland Peak Oil Task Force.

Recommendations in the LEAP could inform the Comprehensive Plan, such as policies for resilient energy facilities, continued energy efficiencies and reduced reliance on centralized energy sources, and maintenance of mutual aid agreements between the City energy providers, service providers, and others.

### **Portland Plan (2012)**

The recently adopted *Portland Plan* (2012) also recognizes natural hazards including the prospect of a major earthquake, and highlights the importance of community resiliency and emergency preparedness. The Portland Plan establishes objectives calling for emergency preparedness and a robust system of neighborhood gathering places, information centers, shelters, and food and water distribution centers is established, and facilities are strategically retrofitted.

A Guiding Policy of the Healthy Connected City strategy states: "Reduce the risk of social, economic and environmental losses from hazards and ensure effective emergency and disaster response. Do this through investments in environmental protection, asset management, and community preparedness and maintenance of critical infrastructure, including emergency routes and water supply." 5-year actions include:

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**Community safety centers:** Coordinate and co-locate public safety and other services in neighborhood centers to ensure a safe, resilient and peaceful community.

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**Resiliency planning:** Complete and implement key hazard and resiliency plans, including the Portland Natural Hazard Mitigation Plan, Local Energy Assurance Plan and the Climate Adaptation Plan to sustain and improve resiliency in infrastructure, public health and natural systems. Identify priorities for next steps, and initiate implementation and monitoring.

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**Disaster planning and management:** Support seismic retrofits in older homes and underserved neighborhoods and identify potential financing tools.

### **Regional Urban Growth Management Functional Plan**

Regional policy can also inform the comprehensive plan. In 1992, the Portland region adopted the Metro charter and a Regional Framework Plan. The charter directs Metro to address regional transportation and mass transit systems, protection of lands outside the urban growth boundary for natural resource, future urban or other uses, housing densities, urban design and settlement patterns, parks, open spaces and recreational facilities and water sources and storage. Metro Council Resolution Number 99-2820 “encourages all local jurisdictions in the Metro region to actively protect environmentally sensitive areas, even if they include Urban Growth Boundary inventory lands that Metro is required by state law to classify as ‘buildable.’” Metro has established specific requirements to address flood hazard management areas, erosion, and significant natural resources (Titles 3 and 13 of the Urban Growth Management Functional Plan. By natural hazard policies in the Comprehensive Plan, the City will be taking steps to assure that hazard and risk analysis are a part of the criteria for development decisions in the next 25 years.

**Buildable Lands Inventory Hazard Constraint Maps** – The City has recently completed a new Buildable Lands Inventory (BLI) which is a snapshot of the City’s capacity to meet forecasted demand for housing and jobs. The BLI considers constraints including hazard prone lands. The BLI modeling reducing housing capacity by 15 percent for lands in shown on the Oregon Department of Geology and Mineral Industries (DOGAMI) Rapidly Moving Landslides map and maps of historical landslides, and for land in the floodplain. The BLI modeling assumed a 25 to 50 percent reduction in employment capacity for land in the floodplain. No capacity reductions were assumed for land within the City’s Wildfire Hazard Zone or identified earthquake hazard areas.

## **Attachment C – Compilation of Planning-Related Actions from Portland’s Natural Hazard Mitigation Plan (2010)**

These actions are a subset of the actions listed in the 2010 Natural Hazard Mitigation Plan. These actions call for updates to the Comprehensive Plan or other actions that could inform the Comprehensive Plan update or updates to Comprehensive Plan implementing tools (e.g., Portland Zoning Code).

ST = Short-term

LT = Long-term

MH = Multi-hazard

EQ = Earthquake

FL = Flood

LS = Landslide

IS = Invasive Species

WF = Wildfire

### **LTMH #1, STMH#3**

Revise Portland’s Comprehensive Plan to address and implement Citywide policies, land use improvements and mapping changes to natural hazards including, but not limited to, earthquakes, erosion, floods, invasive plants, landslides, volcano, severe weather and wildfires (mapping, planning) (NFIP Compliance)

### **LTMH#4**

Develop citywide vegetation protection/planning goals, policies and plans and implementing tools. Coordinate with vegetation management strategy development for wildfire, flood and landslide hazard mitigation.

### **LTMH#8**

Review and amend City Code to require that all facilities that store or handle hazardous materials (including large tanks) and which are located in the 500-year floodplain or landslide hazard areas, develop a hazardous materials inventory statement. This statement will be made available for Fire Bureau review. Require that these storage tanks are either adequately protected or relocated outside of the 500 year floodplain (NFIP Compliance)

### **New MH**

Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement and land use plans, to demonstrate multiple bureau benefits and strengthen eligibility from multiple funding sources.

### **New Reworded MH**

Acquire (buy-out), demolish, or relocate structures from hazard prone areas (earthquake, erosion, flood, landslide, volcano and wildfire). Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas (NFIP compliance)

### **New MH**

Develop and incorporate building ordinances commensurate with building codes to reflect survivability from flood, fire, wind, seismic and other hazards to ensure occupant safety. (NFIP Compliance)

### **New MH**

Update the Infrastructure Master Plan and System Vulnerability Assessment, Sewer Failure Response Plan.

**LTEQ#8**

Study development regulations and policies to ascertain if regulations can be made to limit development of high risk facilities in known areas of earthquake hazards

**LT FL#8**

Develop goals, policies and implementation measures to manage the amount of new impervious surface and remove existing impervious surfaces where appropriate. These goals, policies and measures may be at the citywide, watershed, or sub-watershed level (NFIP Compliance)

**New LT FL**

Through the Comprehensive Plan or other plans Develop new zoning codes for the Holgate Lake area using data obtained from the 2009 USGS Holgate Lake Hydrology Study (obtained from LT FL #3) (NFIP Compliance)

**New LT FL**

Through the Comprehensive Plan or other plans consider limiting or restricting development in flood prone areas with poorly infiltrating soils and or high groundwater where stormwater cannot be retained onsite (NFIP Compliance)

Bureau of Planning and Sustainability New Implement

**FL**

Through the Comprehensive Plan update implement Citywide policies, land use improvements and mapping changes that reduce landslide, flood, earthquake and wildfire hazards (NFIP Compliance)

**LT LS#1**

Develop a comprehensive landslide map for the City of Portland to identify hazard areas and to improve communications with the public.  
(mapping)

**LT LS#4**

Review the effectiveness of existing regulations related to development in landslide hazard areas.

**IS #**

Coordinate with the Portland Plan project to help ensure that invasive species are addressed in the Comprehensive Plan update and Portland Plan work plan.

**ST WF#6**

Integrate, as appropriate, fire prevention goals and provisions into City policies, plans and codes. Identify and address ambiguities or conflicts among city requirements

**STWF#7**

Identify conditions of approval and mitigation strategies that could be applied to new development or redevelopment in high risk areas