

Oregon City Geologic Hazard Community Forum

September 23, 2020

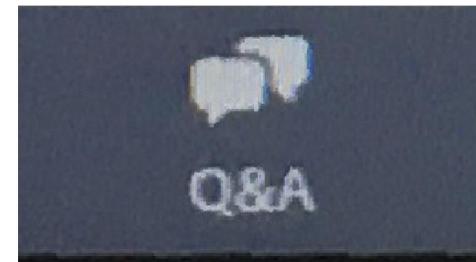
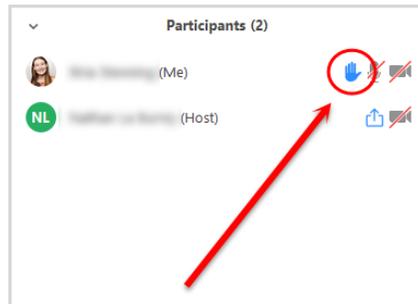


Zoom Basics

www.orcity.org



The Q&A and Raise Hand icon is located at the top or bottom of your screen.



Geologic Hazards Community Forum

Presenters

- Tricia Sears, Oregon Department of Land Conservation and Development
- Dr. Scott Burns, Portland State University, Department of Geology
- George Freitag, GRI
- Tim Pfeiffer, Foundation Engineering Inc.
- Josh Wheeler, City of Oregon City

- Assistance :
 - Dayna Webb, City Engineer - City of Oregon City
 - Christina Robertson-Gardiner, Senior Planner – City of Oregon City



Geologic Hazards Community Forum

Geologic Hazards Planning in Oregon

Oregon City Geologic Hazards Community Forum
September 9, 2020



Tricia R. Sears

Oregon Department of Land Conservation and Development

Landslides are among the most widespread, chronic, and damaging natural hazards in Oregon

In Oregon, DLCD and DOGAMI collaborate:

- To provide best available science,
- To provide tools and technical assistance to implement science and policy, and
- To recognize past hazard events such as landslides are fundamental to understanding the future.

The *Guide* is Available Online

- * **DLCD** <https://www.oregon.gov/lcd/NH/Pages/Natural-Hazards.aspx>
- * **DOGAMI** <https://www.oregongeology.org/Landslide/landslidehome.htm>
- The *Guide's* Quick Reference document and related webinar are also online.
- Local governments should consult with their legal counsel to ensure that proposals comply with applicable federal, state, and local requirements.
- Communities should consider their own strategies to reduce landslide hazard risk.

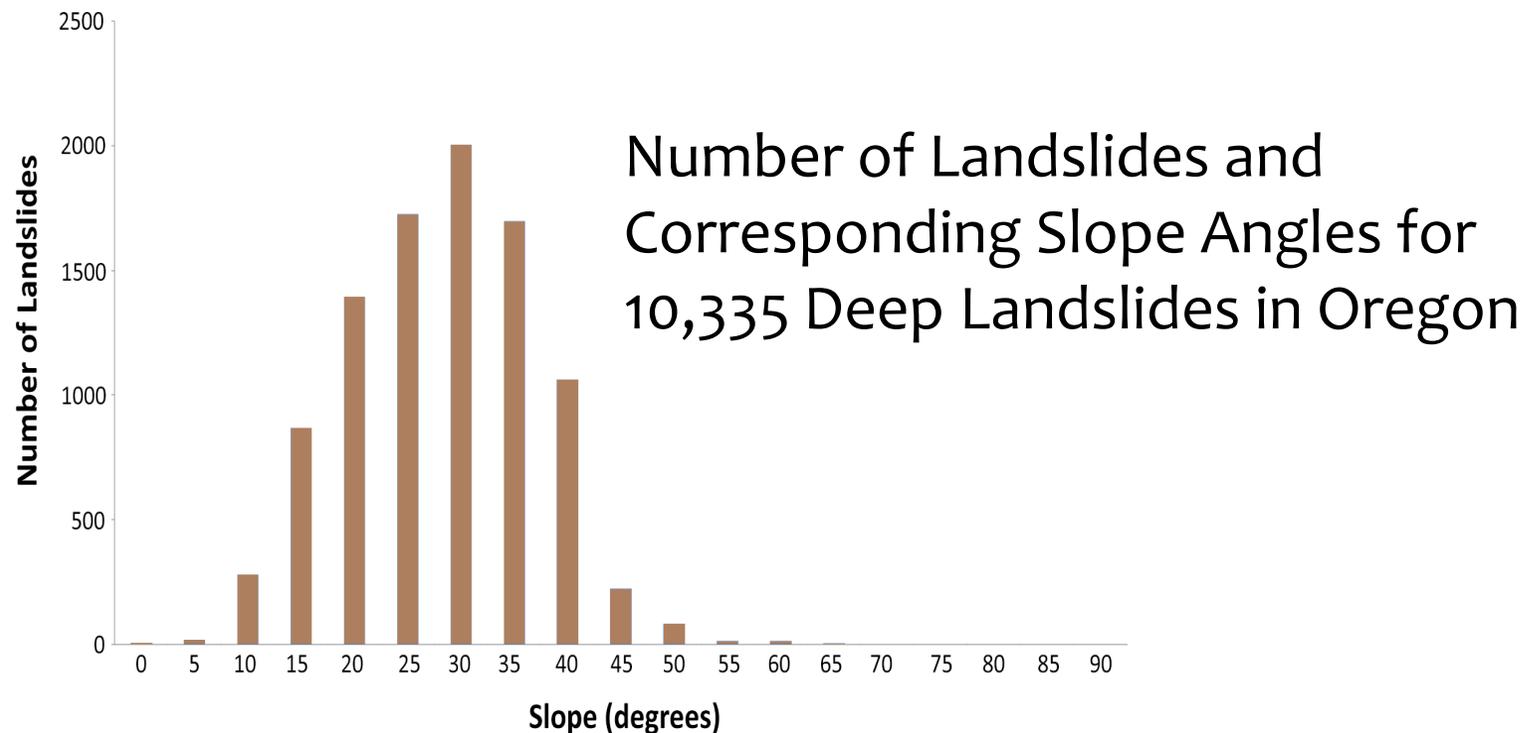
What Should We Do About Landslides?

- * Identify and map
- * Comprehensive plans
- * Implementation measures e.g. zoning codes, building codes, etc.
- * Raise public awareness
- * Avoid
- * Mitigate
- * Understand and be knowledgeable
- * Support and use current information



Slopes

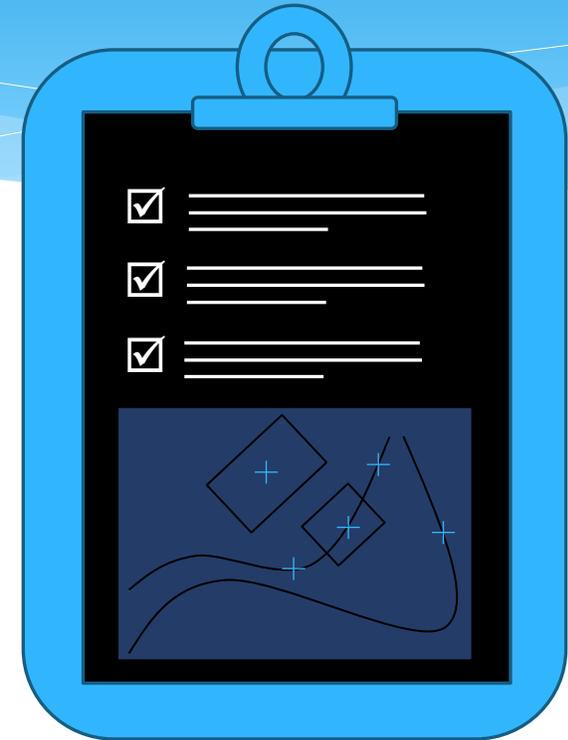
- * Slopes are generally a constructability issue first, because of matters like: erosion, water runoff, retaining walls, road grades, etc.
- * And slopes are sometimes associated to landslide hazard because they are presumed to be correlated with increased hazard.



Source: Burns, Calhoun, Franczyk, Koss, & Bordal (2017)

Non-Slope Factors to Consider in Codes

- * Water management
- * Grading
- * Erosion (natural and human)
- * Type of development
 - E.g. Residential, commercial
 - Vulnerable populations
 - Critical facilities
- * Size, extent, and scale of the development
- * Landslide Susceptibility Overview Map of Oregon & SLIDO
- * Geohazard information already on file



Recap of Ways to Reduce a Community's Risk

- Identify the hazard
- Assess the vulnerabilities
- Assess the level of risk
- Avoid the hazard
- Reduce the level of risk
- Evaluate development in landslide-prone areas
- Require geotechnical investigations
- Adopt land use policies and enact regulations
- Consider non-regulatory strategies
- Provide public outreach and education



Next speaker is Dr. Scott Burns

Tricia Sears
Natural Hazards Planner
503-934-0031
tricia.sears@state.or.us



OREGON

Department of
Land Conservation
& Development

Slopes and When to be Concerned: History of Oregon City

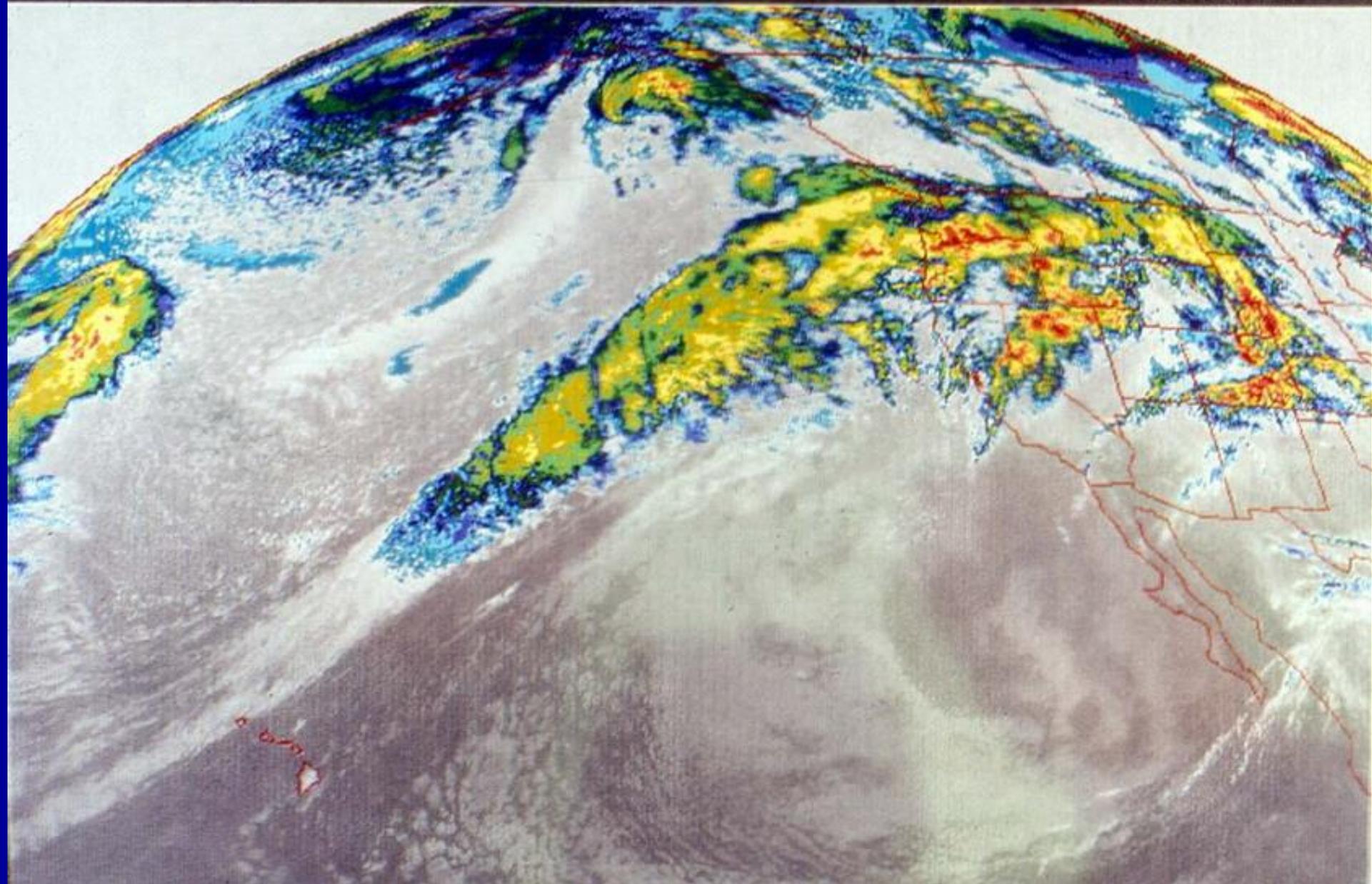
Dr. Scott Burns, Professor Emeritus
Department of Geology
Portland State University

Geodisasters in Oregon City

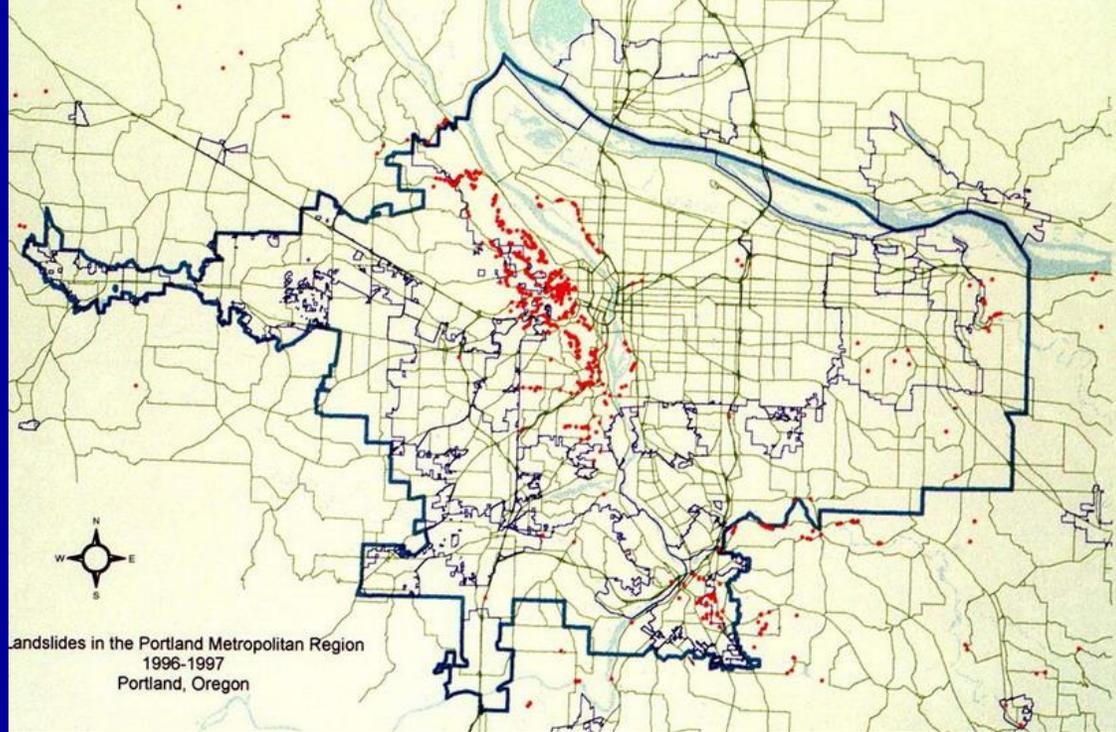
- **Landslides and floods are biggest problems other than the Big One— big problem**
- **Landslides in North America each year kill 25-50 and cost \$3.5 billion**
- **Landslides – “no” insurance coverage**
- **Fine-grained Troutdale Formation (stream sediments)
– worst areas plus rockfall in basalt cliffs**

RT IMGR IR NORM

1601Z 7 FEB 1996



1996 Pineapple Express hits Portland

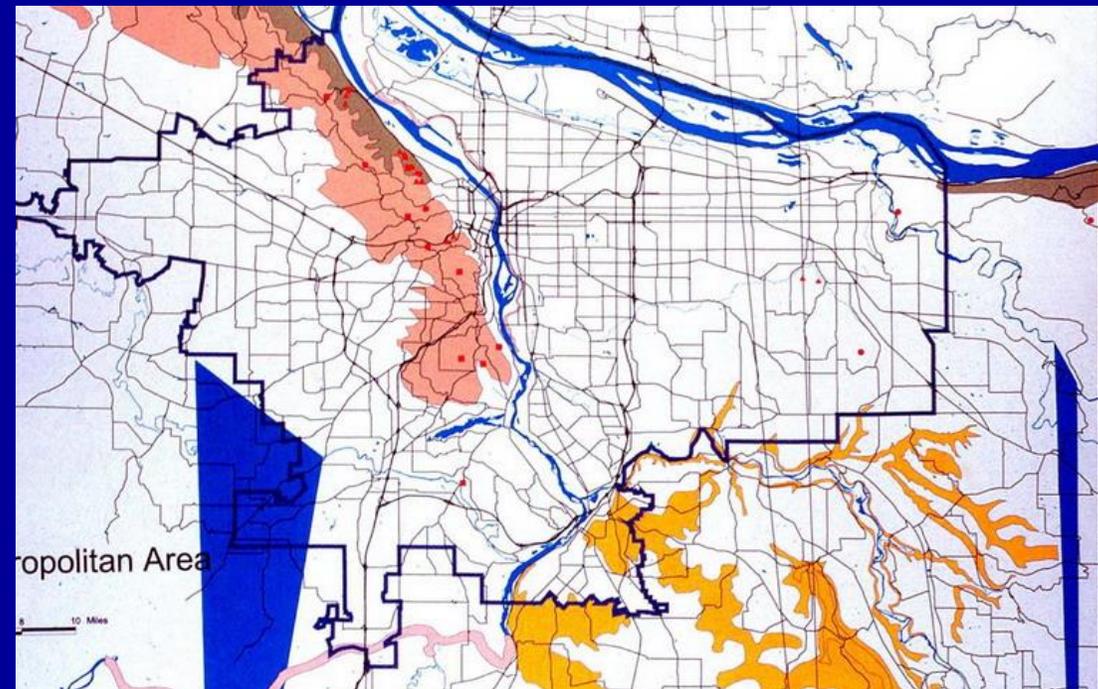


**Portland,
Oregon**

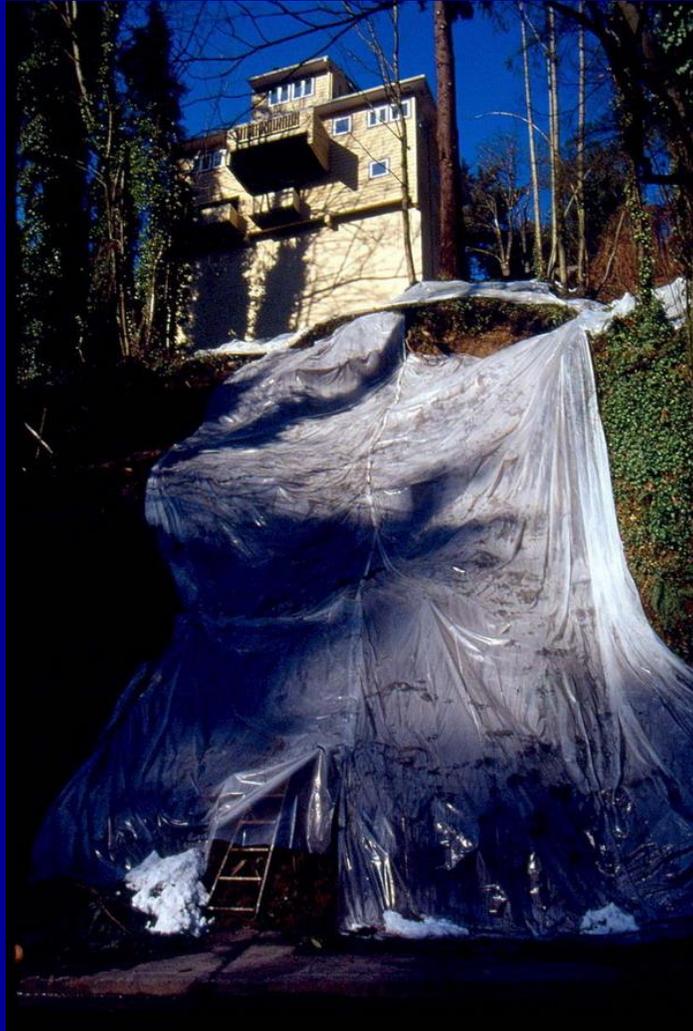
1996

**Landslides &
Floods: \$35 m**

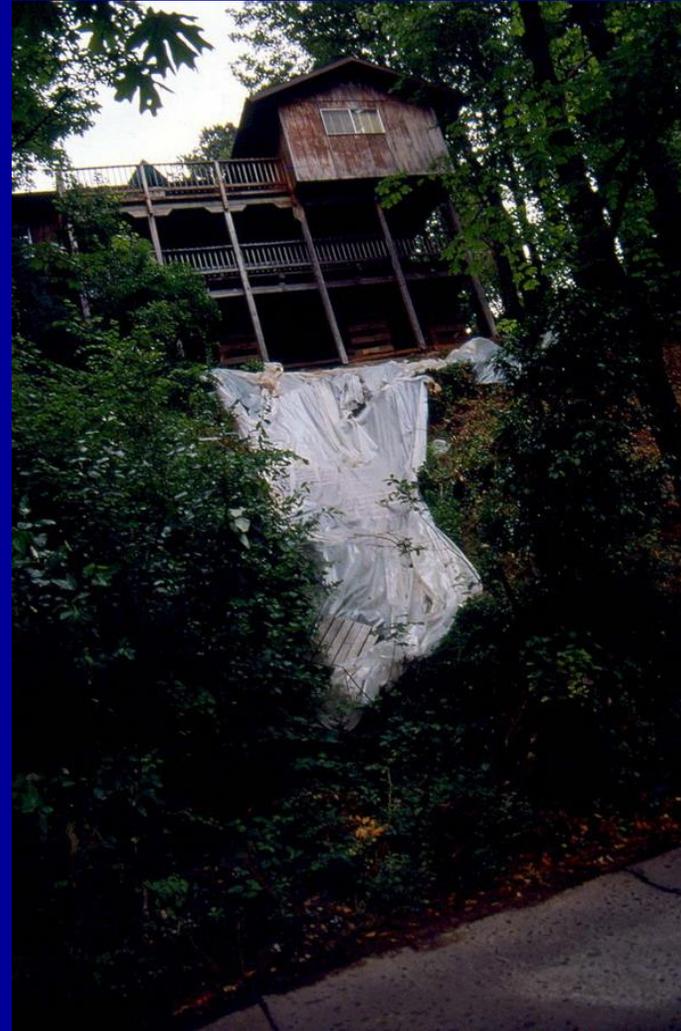
**Landslide
Distribution**
Geology is important



Human involvement can mitigate landslides



“City of Roses”
becomes city of plastic



The gutter resembled
Niagara Falls!

Reactivation of landslide



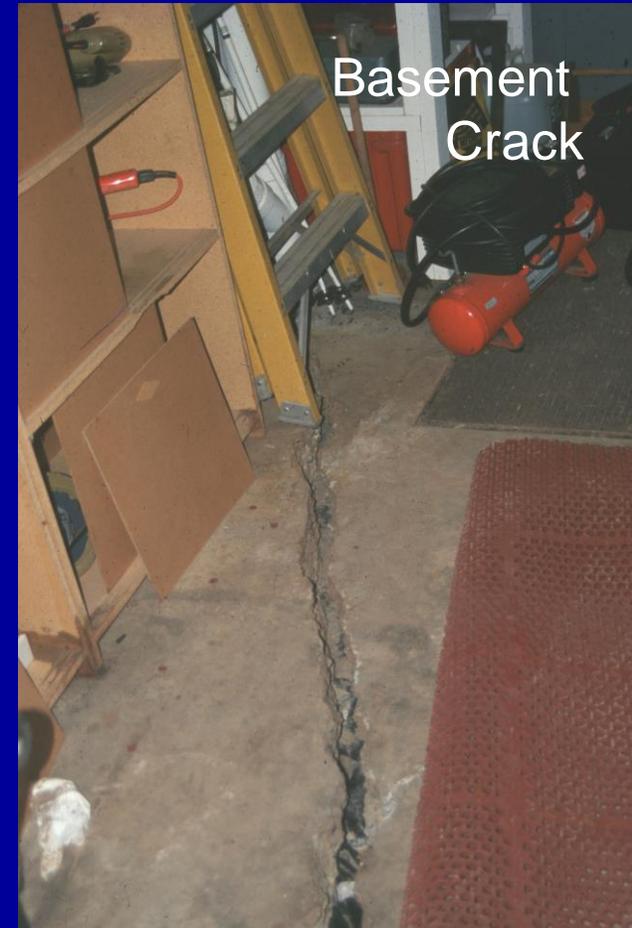
Matthew Court, Clackamas County

Troutdale Fm: Fluvial deposits



Holly Lane – Oregon City, Oregon

Reactivation of Landslides



**Holly Lane, Oregon City, Oregon, 1996-
1997**

Reactivation of old landslides can be significant

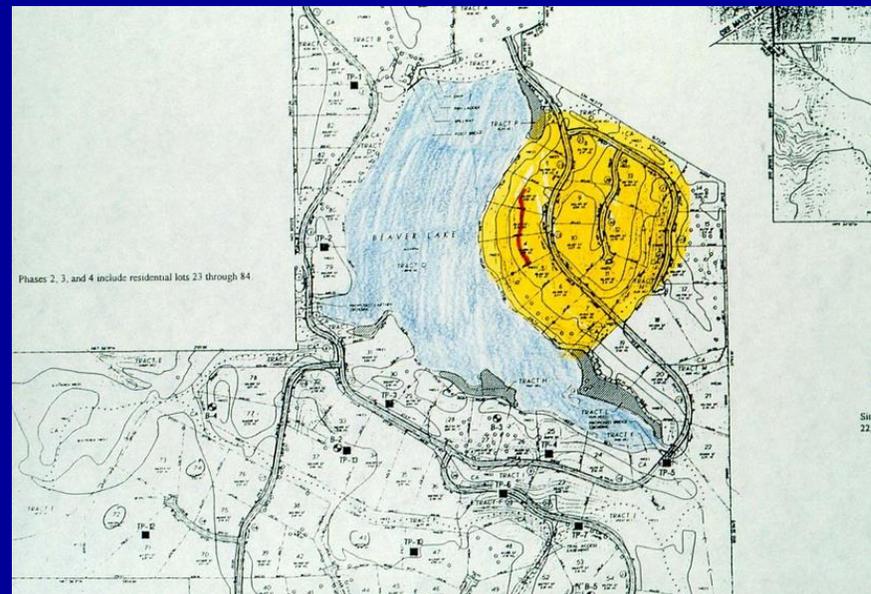


Building on the scarp



Building on the toe

Troutdale Fm: Fluvial Deposits



**Beaver Lake – Rural Clackamas
Country**

An aerial photograph showing several apartment complexes built in a wooded area. The buildings are multi-story with red-tiled roofs and are arranged around a winding road. The surrounding area is densely forested with trees in various shades of green and brown. In the upper right, there is a larger parking lot with many cars. The overall scene depicts a residential development integrated into a natural forest setting.

**2002: Newell
Creek Apts.
Now: Forest
Edge Apts**

Early History of Newell Creek Apartments

- 1991 – apply for 250 apartments
- 1992 – PSU study says it is an old
• landslide – not good idea
- 1993 – City Council asks CEG to
• evaluate – he says students ok!
- 1993 – permit for 125 apartments –
• none on scarps and toes
- 2006 - landslide reactivates



**Rainfall in one month
from 12/5/05-1/5/06 =
11 inches!**





Newell
Creek
Apts.

Jan 6, 2006





Newell Canyon

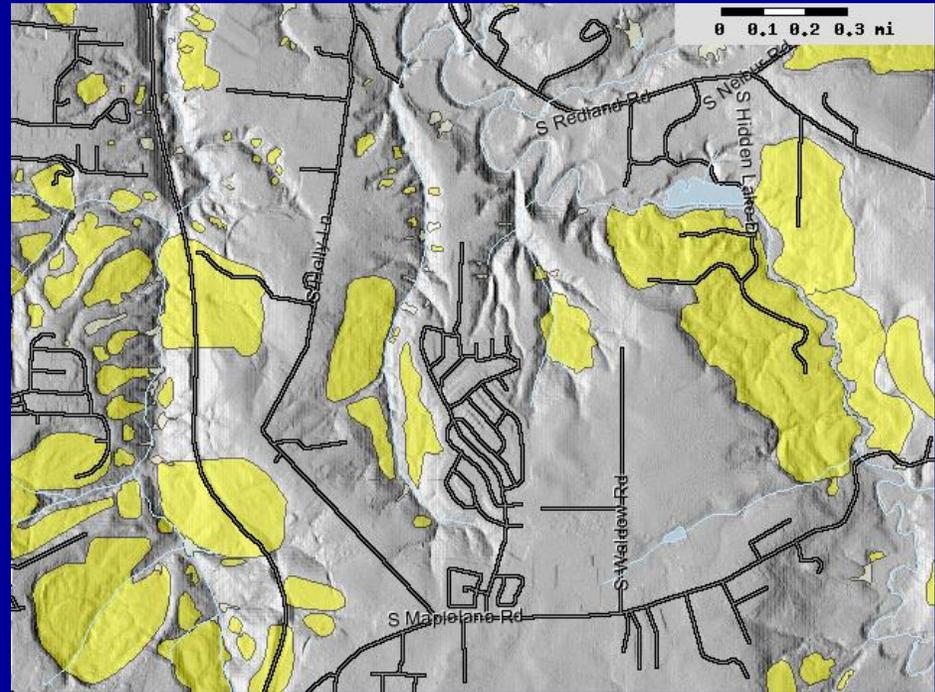
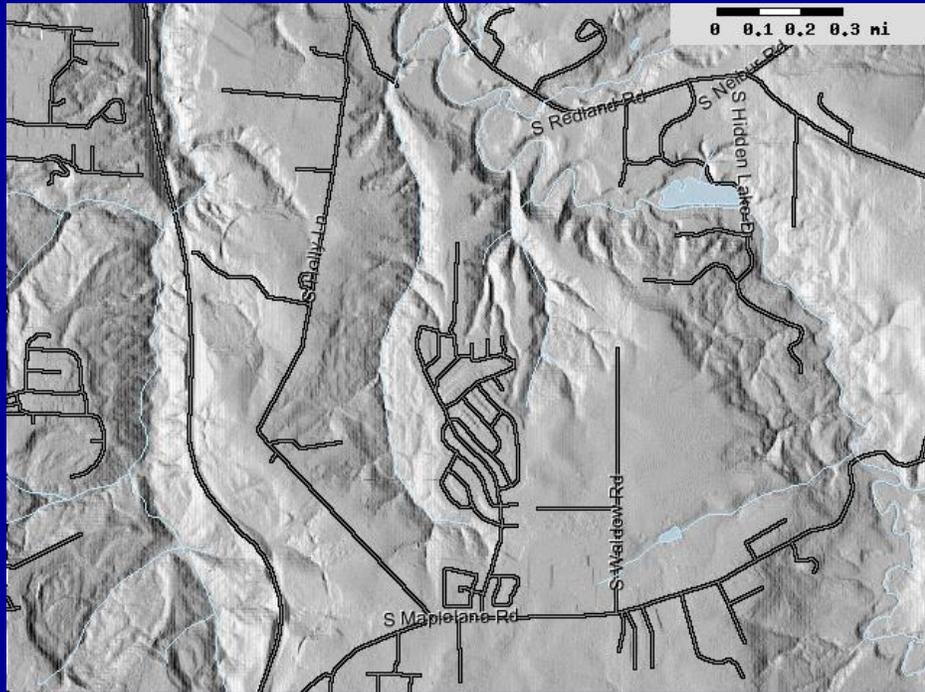


Old slide Jan. 6, 2006

Importance of Using LiDAR



Street of Dreams
Clack. County,
February, 2007



Yellow = landslide

February 17, 2007



February 17, 2007





February 17, 2007

February 17, 2007



February 17, 2007



Old Landfill, Oregon City, New Years, 2007



Conclusions

- **Need to prevent landslides – no home-owners insurance**
- **Map old landslides – if it has moved once, it has a high chance of moving again (DOGAMI map!)**
- **Do not build on old landslides**
- **Develop codes to prevent losses for homeowners!**

Rainfall relationship to geologic hazards

George Freitag, CEG, LEG, LHG
GRI, Principal



Many landslides are associated with periods of prolonged, intense precipitation

Flash flooding, landslides, fallen trees reported after heavy rainfall

LOOP NEWS

CREATED : 8 AUGUST 2020

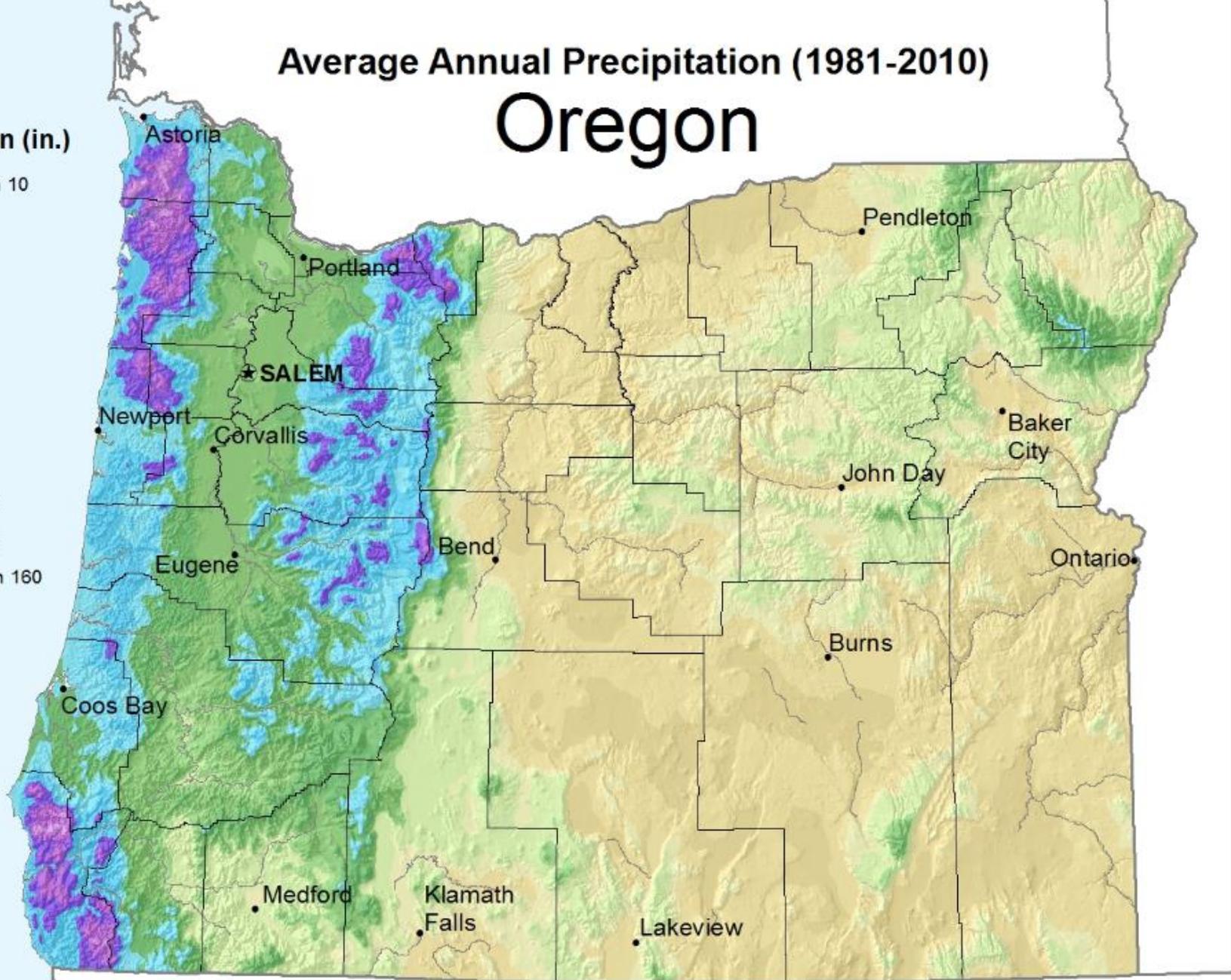
T&T NEWS



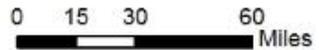
Average Annual Precipitation (1981-2010)

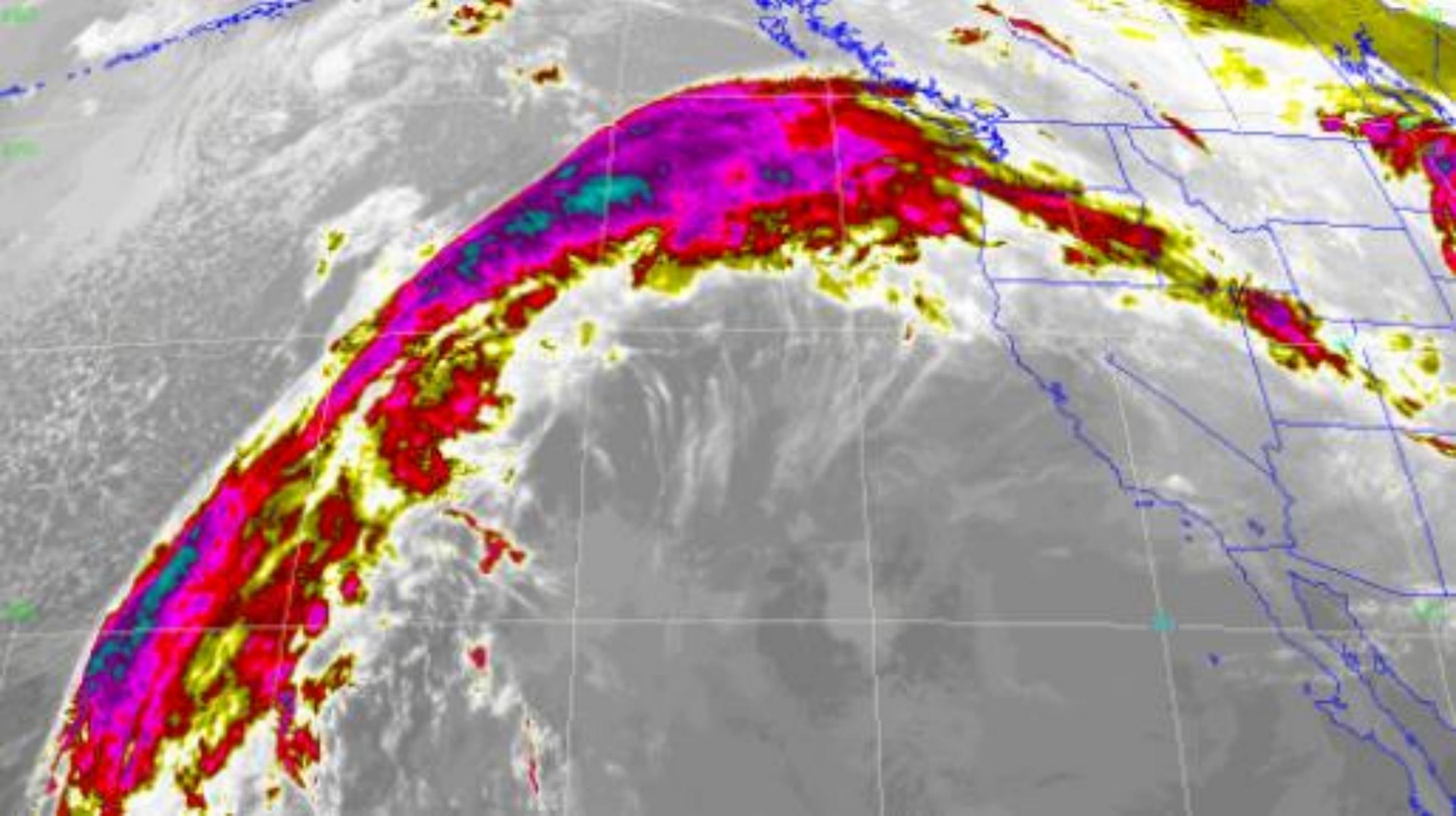
Oregon

Precipitation (in.)



Copyright © 2014
PRISM Climate Group
Oregon State University







**Landslides in the Portland, Oregon
Metropolitan Area Resulting from the Storm
of February 1996: Inventory Map, Database
and Evaluation**



**Dr. Scott F. Burns
William J. Burns
David H. James
Jason C. Hinkle**

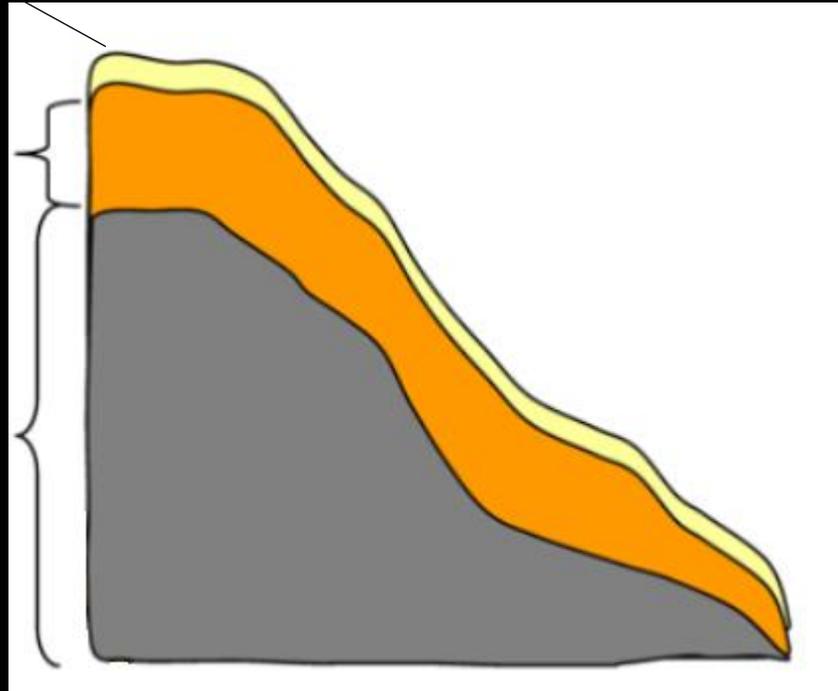
**Dept. of Geology
Portland State University**

**Over 700
documented
landslides in
Metro area due
to February 6-9,
1996
precipitation**

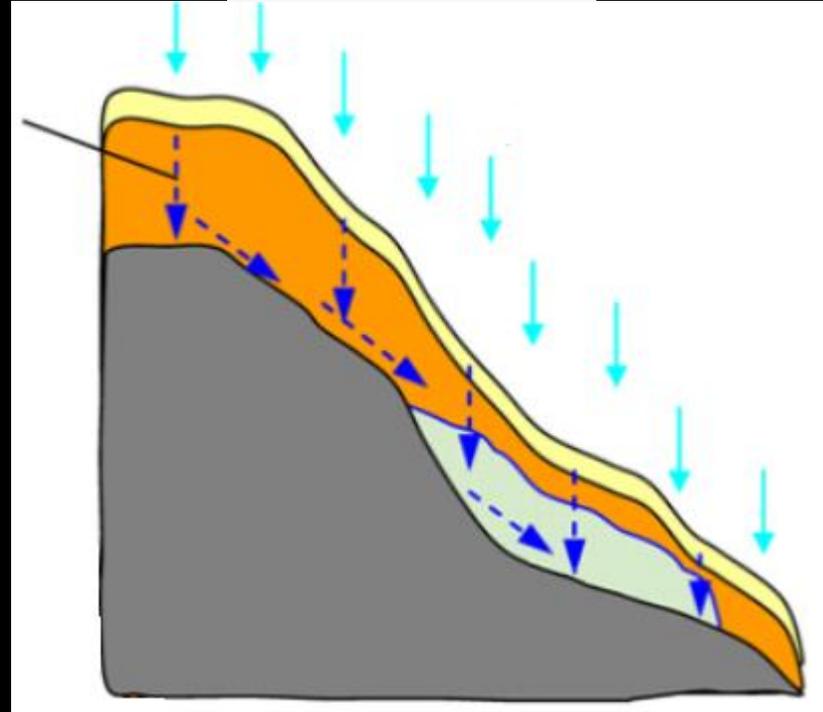
soil

permeable
rock

less
permeable
rock



Water infiltrates
soil and
permeable rock



Groundwater
rises...and
lowers forces
keeping soil and
rock on slope

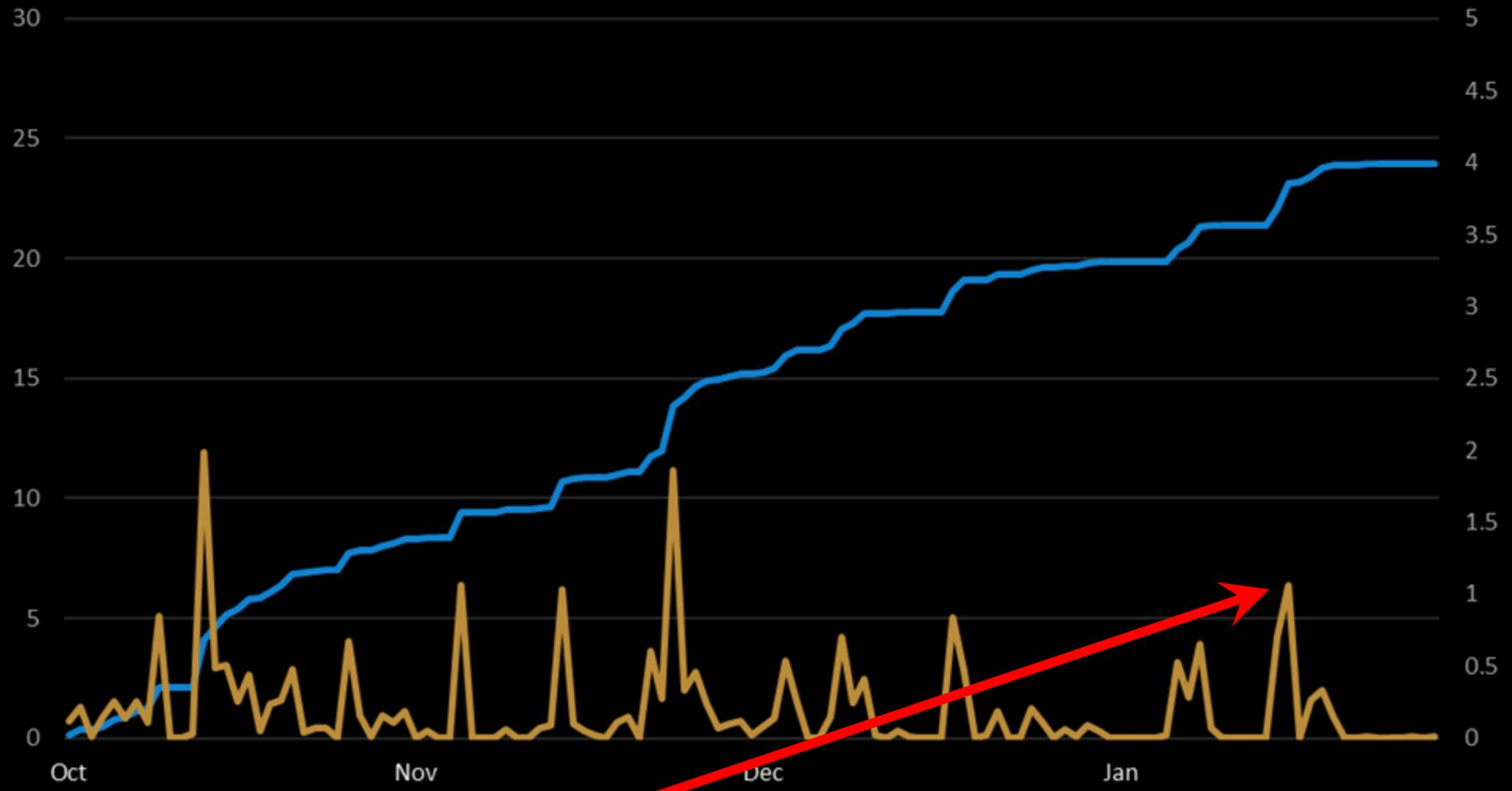


Trillium Park Avenue Landslide

PIEZOMETER SUMMARY

GRI Project 4450

Oct 2016 to Jan 2017 Precipitation Portland Airport



Jan 18 1.06 inches = DAILY RECORD

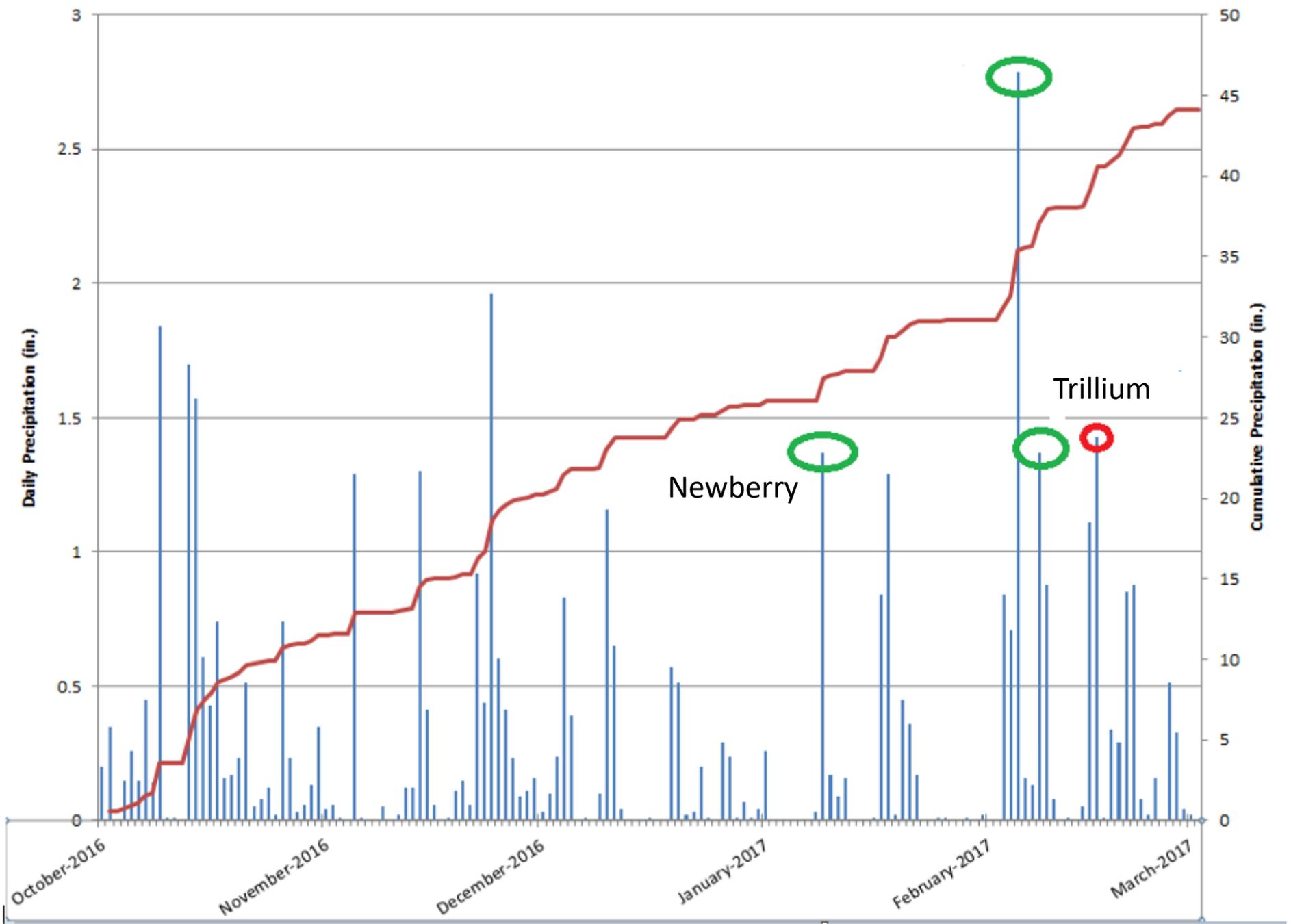
Landslide blocks NW Newberry Road in West Hills

by KATU Staff

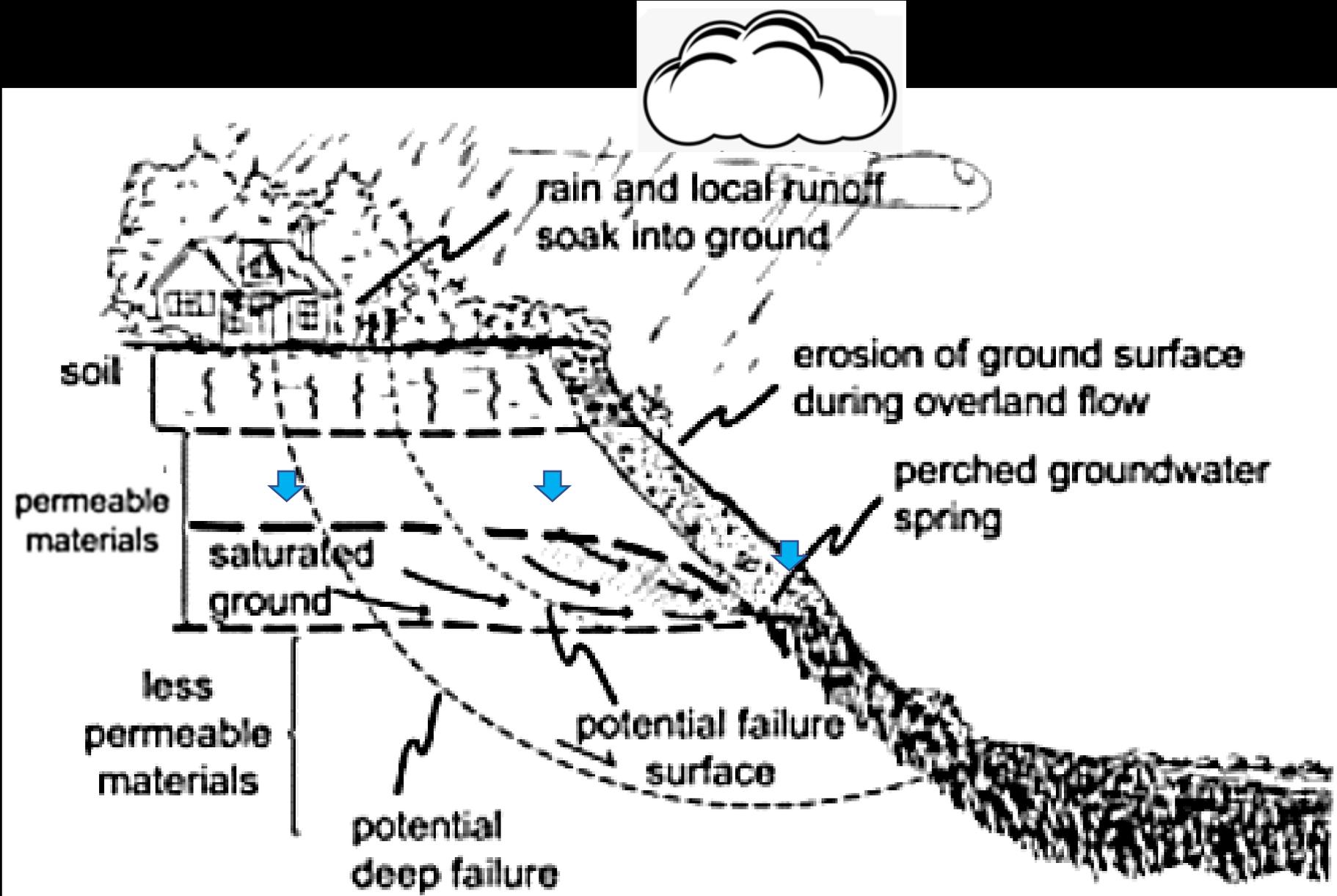
Wednesday, January 18th 2017



MULTNOMAH COUNTY, Ore. — A landslide has shut down a section of NW Nerberry Road in the West Hills Wednesday.









Geologic and Geotechnical Basis for The City of Oregon City Geologic Hazards Code

Timothy J. Pfeiffer, P.E., G.E.



FOUNDATION ENGINEERING, INC.
Professional Geotechnical Services

A Homeowner's Guide to Landslides

- Landslides are one of the most common and devastating natural hazards in the Pacific Northwest. The damage they cause is almost never covered by insurance.
- You and your neighbors share more than fences. You all share the responsibility of keeping your slopes safe.

17.44.10 - Intent and purpose.

The intent and purpose of the provisions of this chapter are:

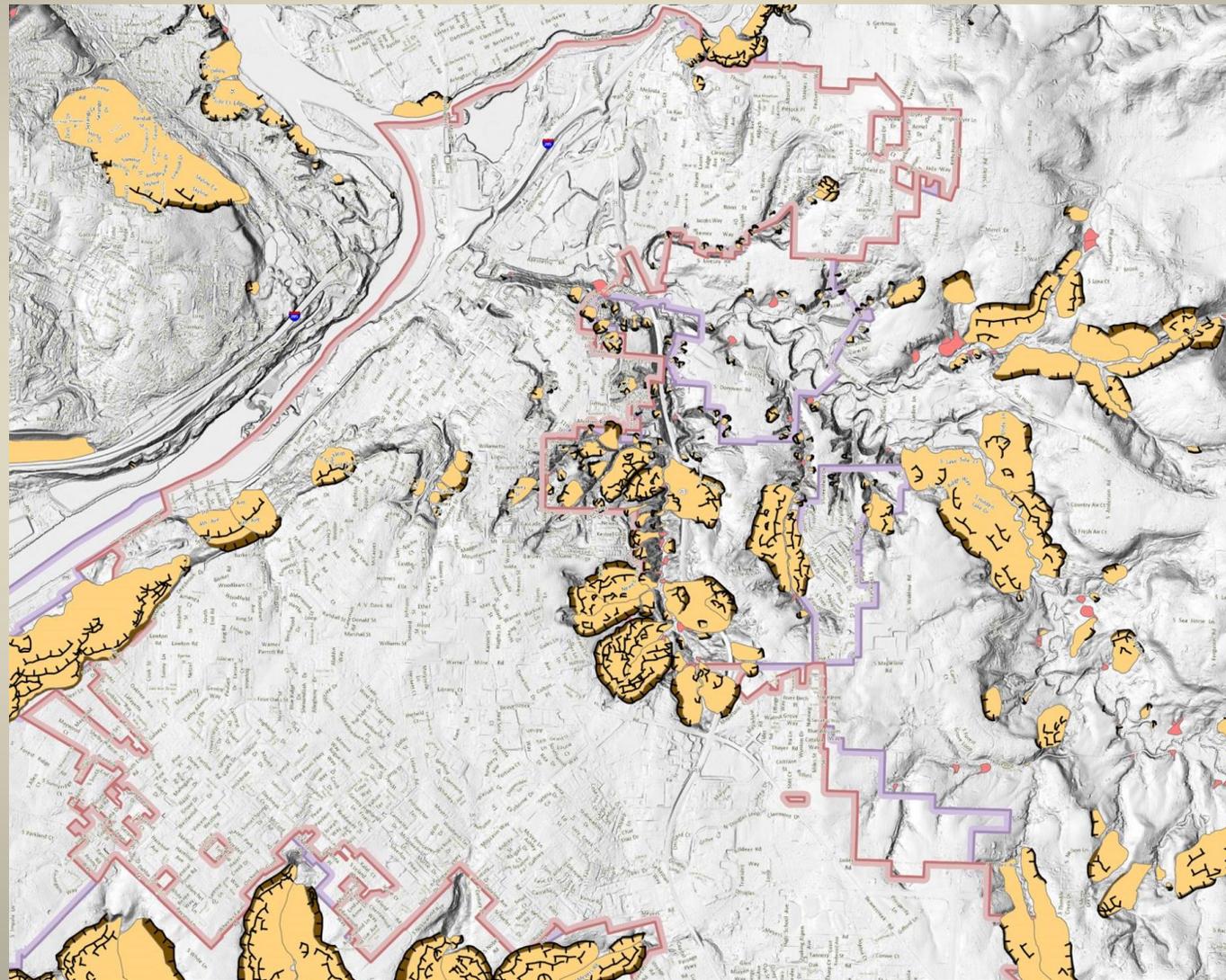
- A. To ensure that activities in geologic hazard areas are designed based on detailed knowledge of site conditions in order to **reduce the risk of private and public losses**;
- B. To **establish standards** and requirements for the use of lands within geologic hazard areas;
- C. To provide safeguards to **prevent undue hazards to property, the environment, and public health, welfare, and safety** in connection with use of lands within geologic hazard areas;
- D. To **mitigate risk associated with geologic hazard areas**, not to act as a guarantee that the hazard risk will be eliminated, nor as a guarantee that there is a higher hazard risk at any location. Unless otherwise provided, the geologic hazards regulations are in addition to generally applicable standards provided elsewhere in the Oregon City Municipal Code.

17.44.25 **When required**; regulated activities; permit and approval requirements

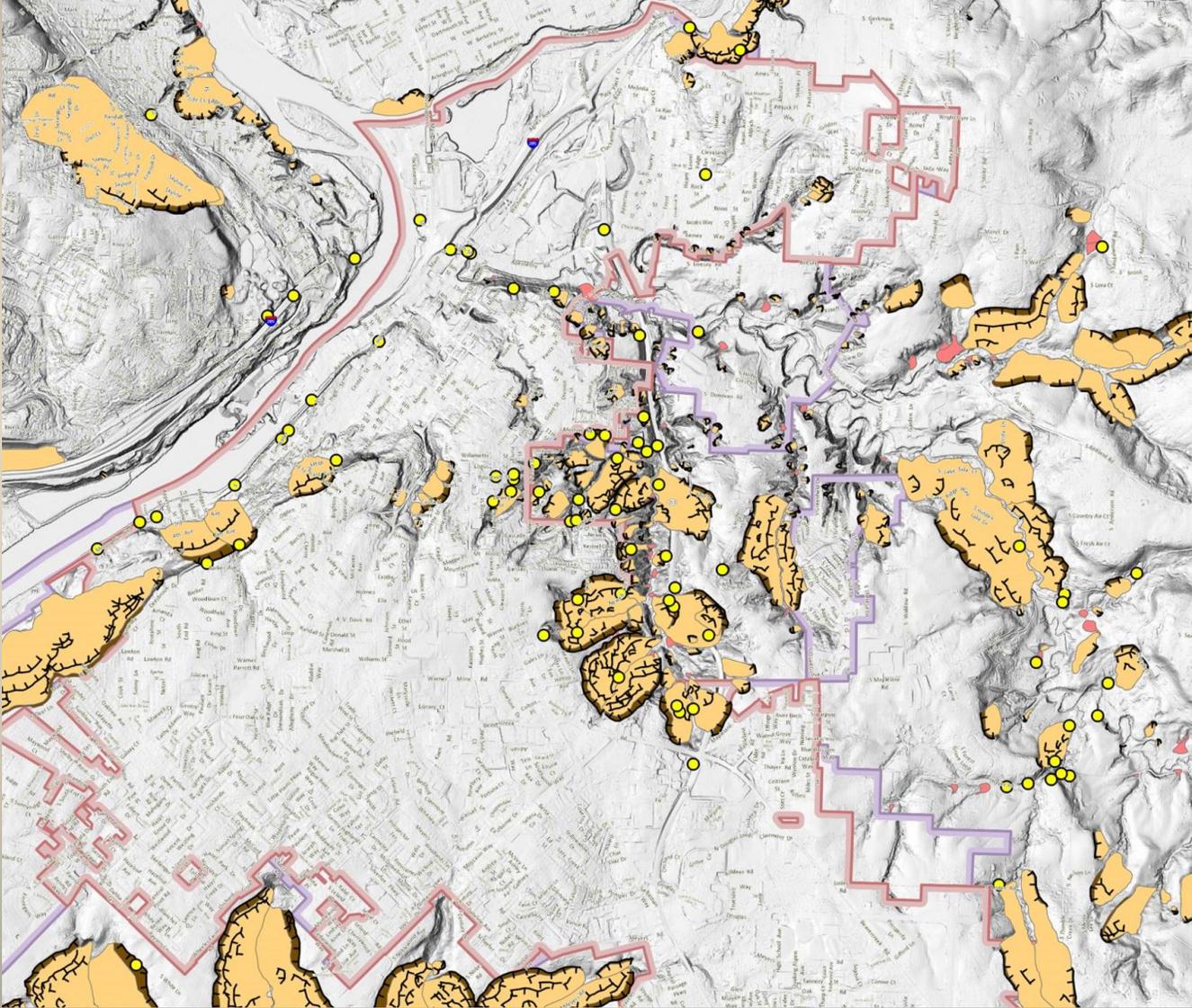
No person shall engage in any of the following regulated activities on areas mapped within the adopted **Oregon City Geologic Hazards Overlay Zone** as defined in section 17.04.515 of the Oregon City Municipal Code without first obtaining permits or approvals as required by this chapter

Where is the hazard

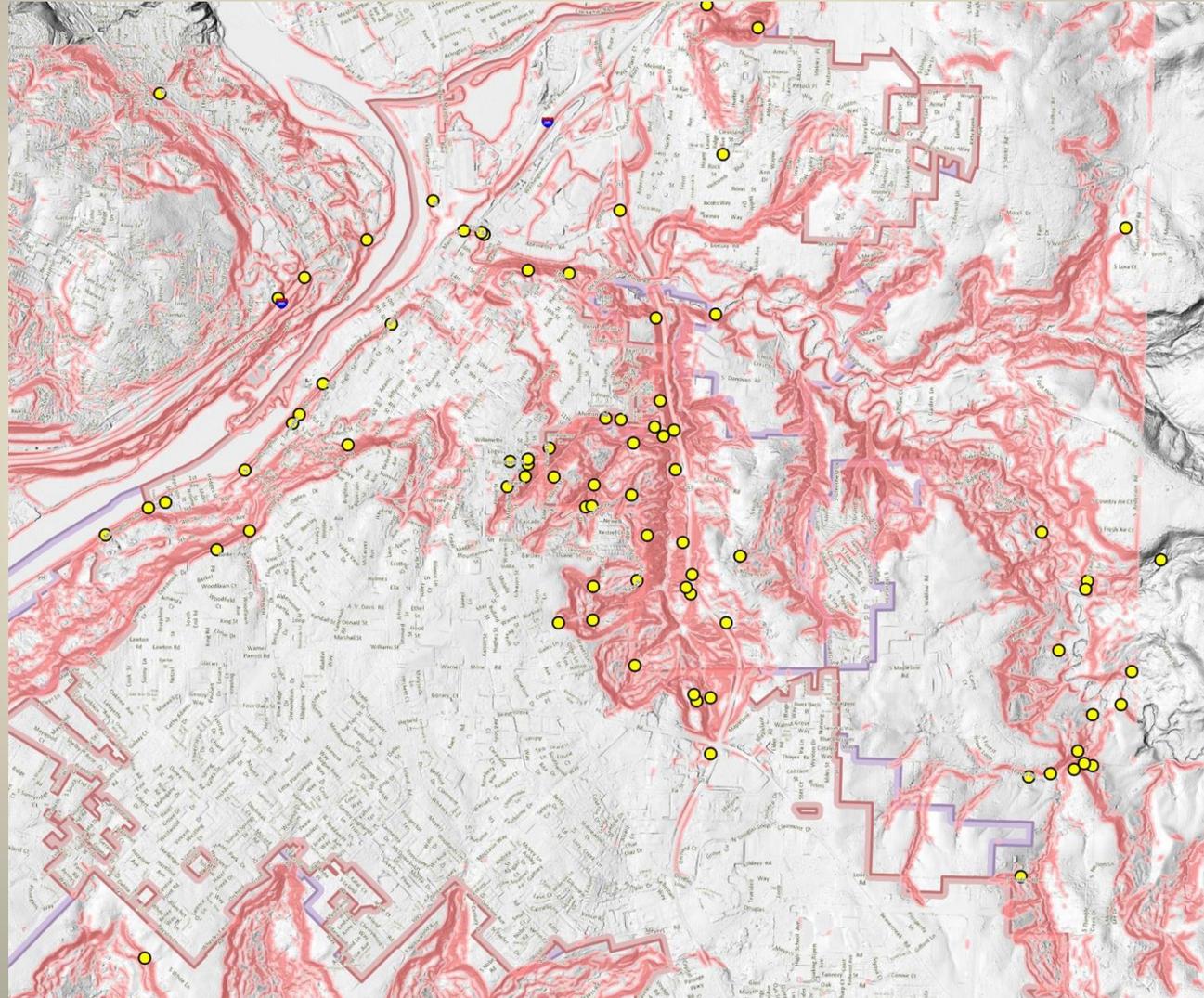
Mapped Landslides



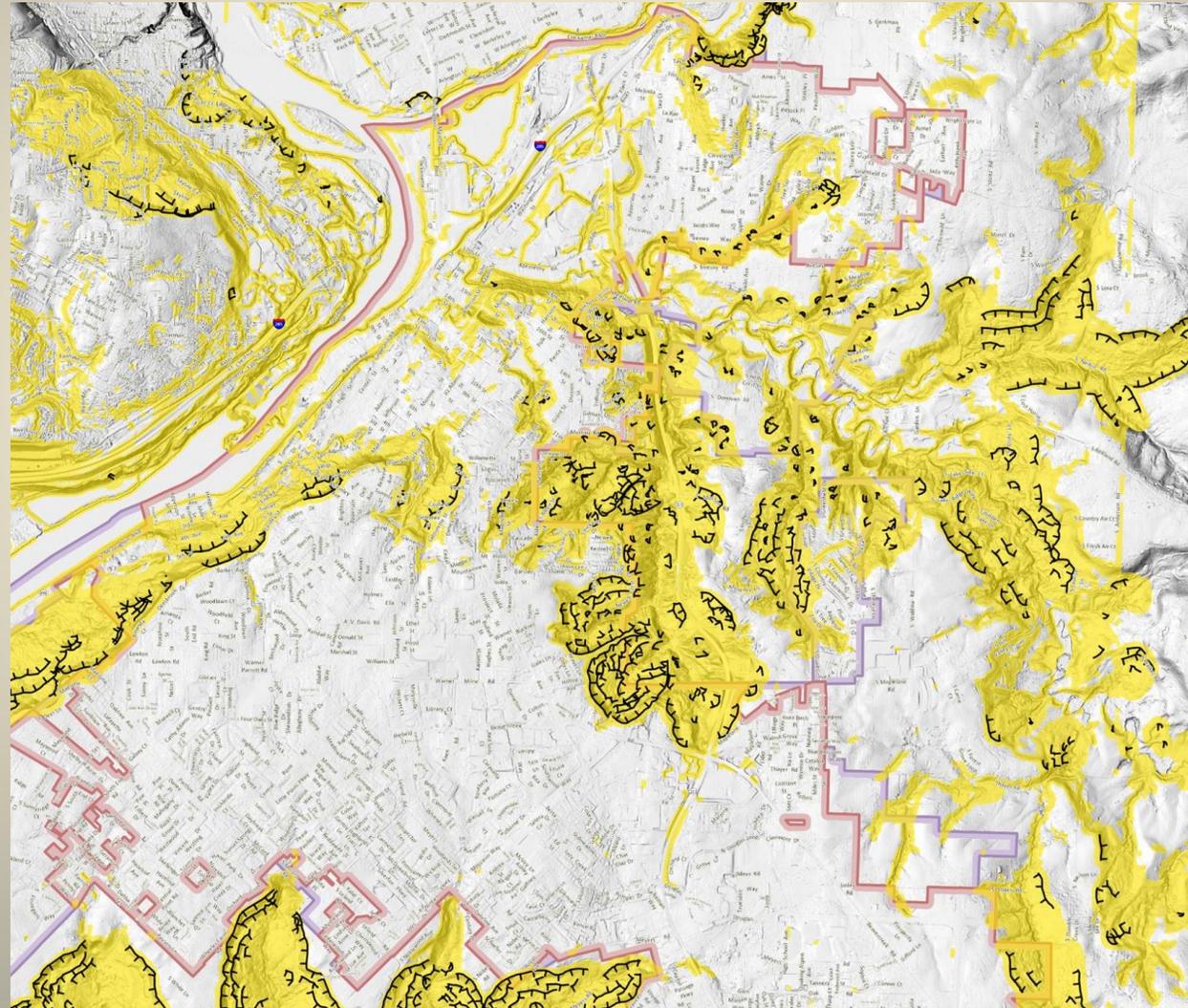
Historic Landslides



Steep Slopes



Geologic Hazard Overlay Zone

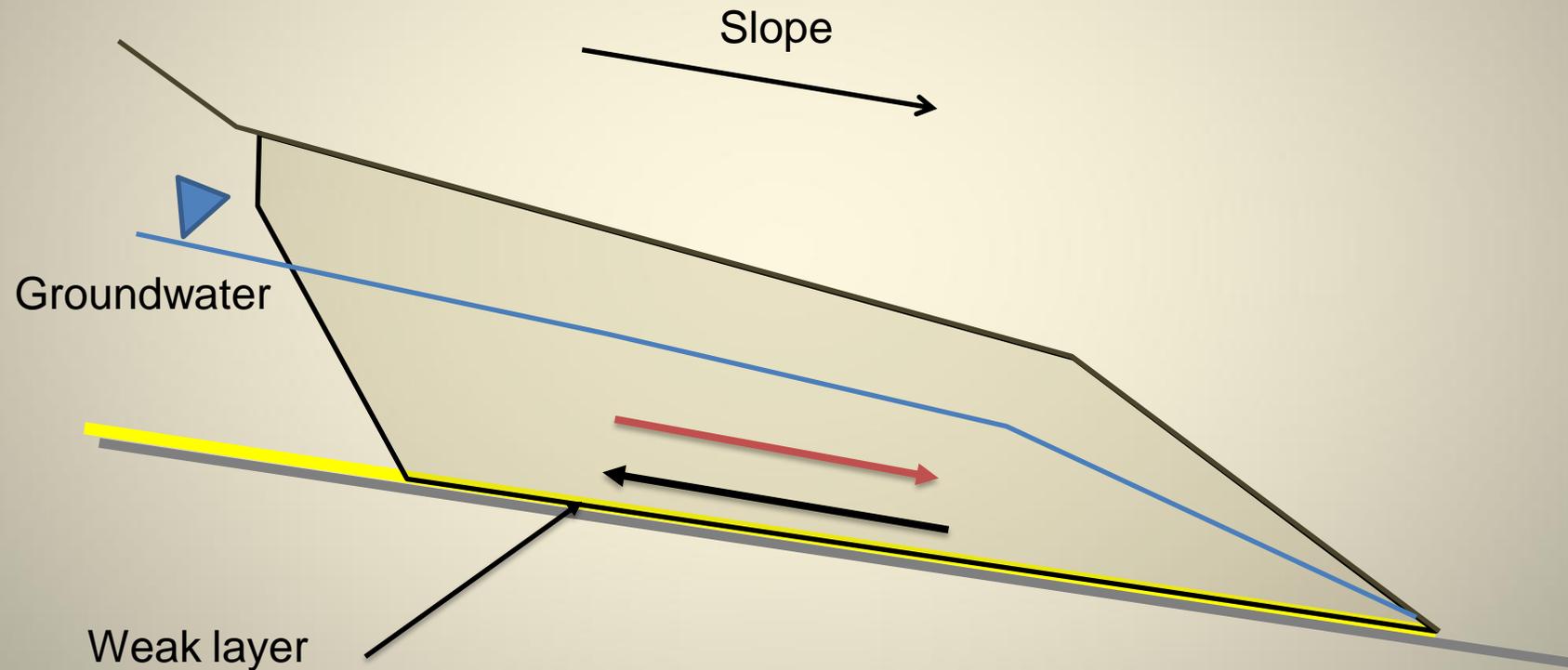


17.44.25 When required; **regulated activities**; permit and approval requirements

- 500 square feet of new development
- Cut or fill more than 2 feet deep
- Cut or fill more than 25 cubic yards
- Tree removal on slopes greater than 25%

Why these?

Elements of Slope Stability

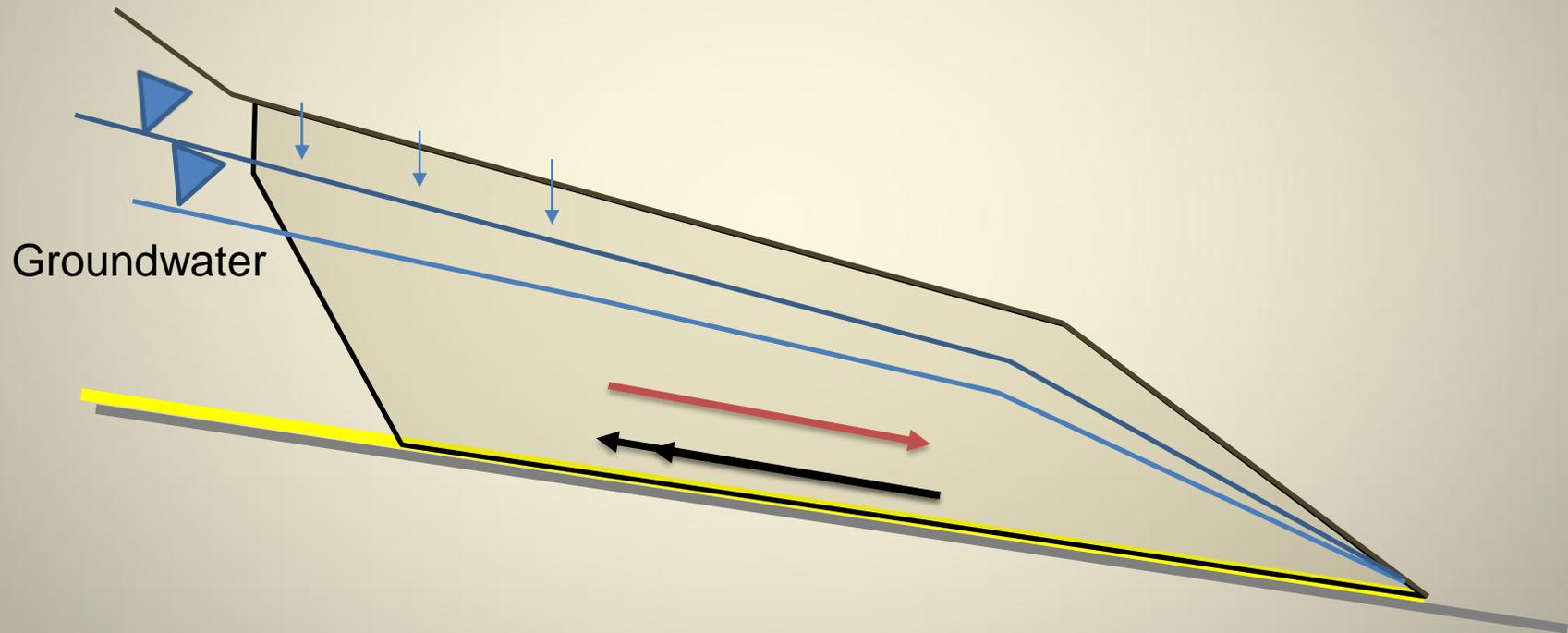




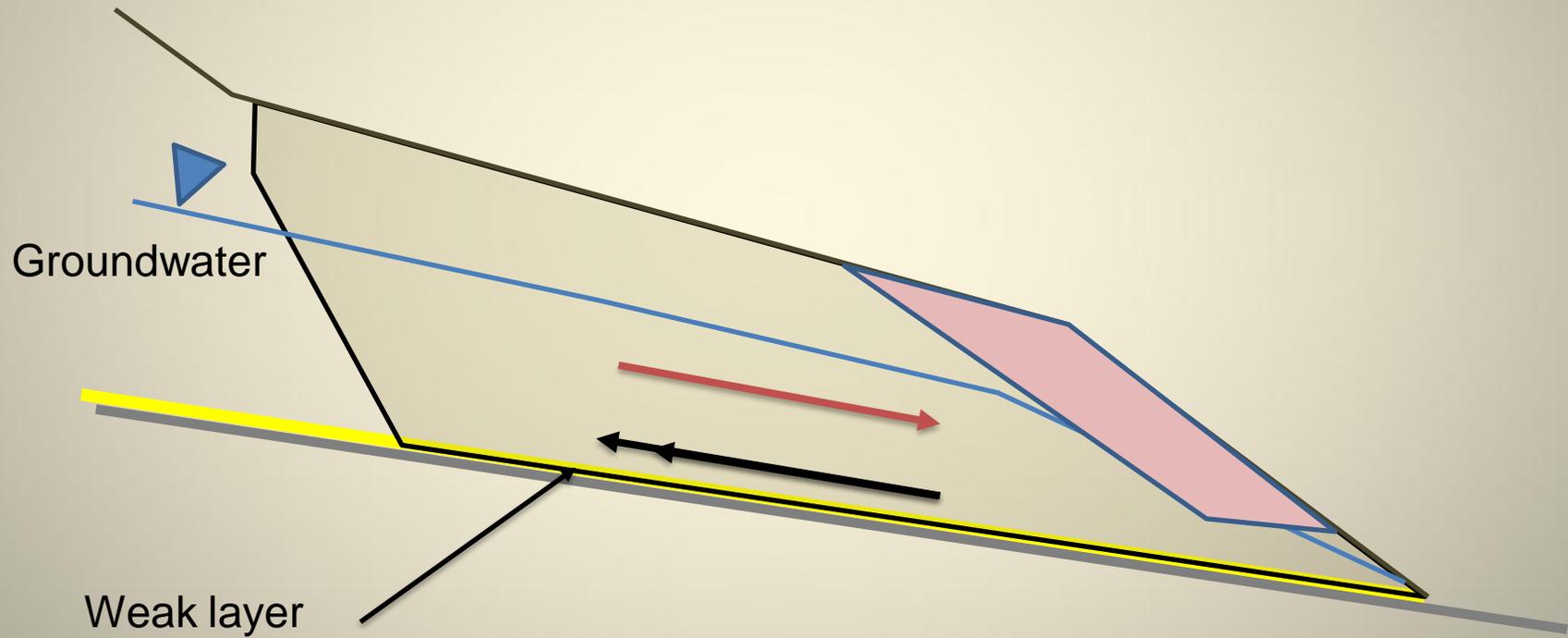
Slide surface

02.14.2011 00:39

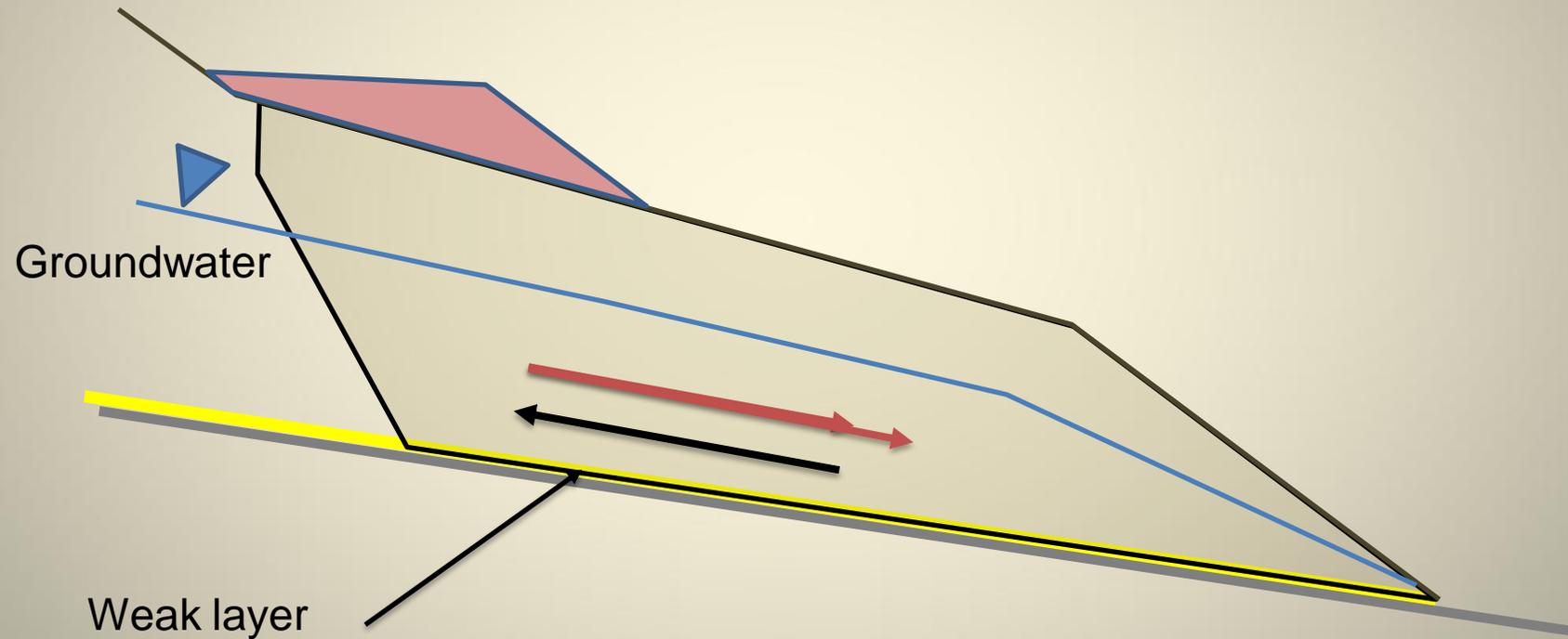
Impact of drainage on Slope Stability



Impact of Excavation on Slope Stability



Impact of Fill on Slope Stability



Area of suspected geologic hazard

Geohazard Overlay Zone

+

Development that may impact geologic hazard

Regulated Activity

=

Detailed Study and specific
design for site conditions

17.44.50 Geological Assessment and Geotechnical Report

- Professional with education and experience specific to geologic hazards and slope stability
- Investigation and evaluation of site conditions and slope stability
- Professional opinion of the project impacts and adequacy
- Recommendations for mitigation and risk reduction

The answer may be – No the site is not suitable for development

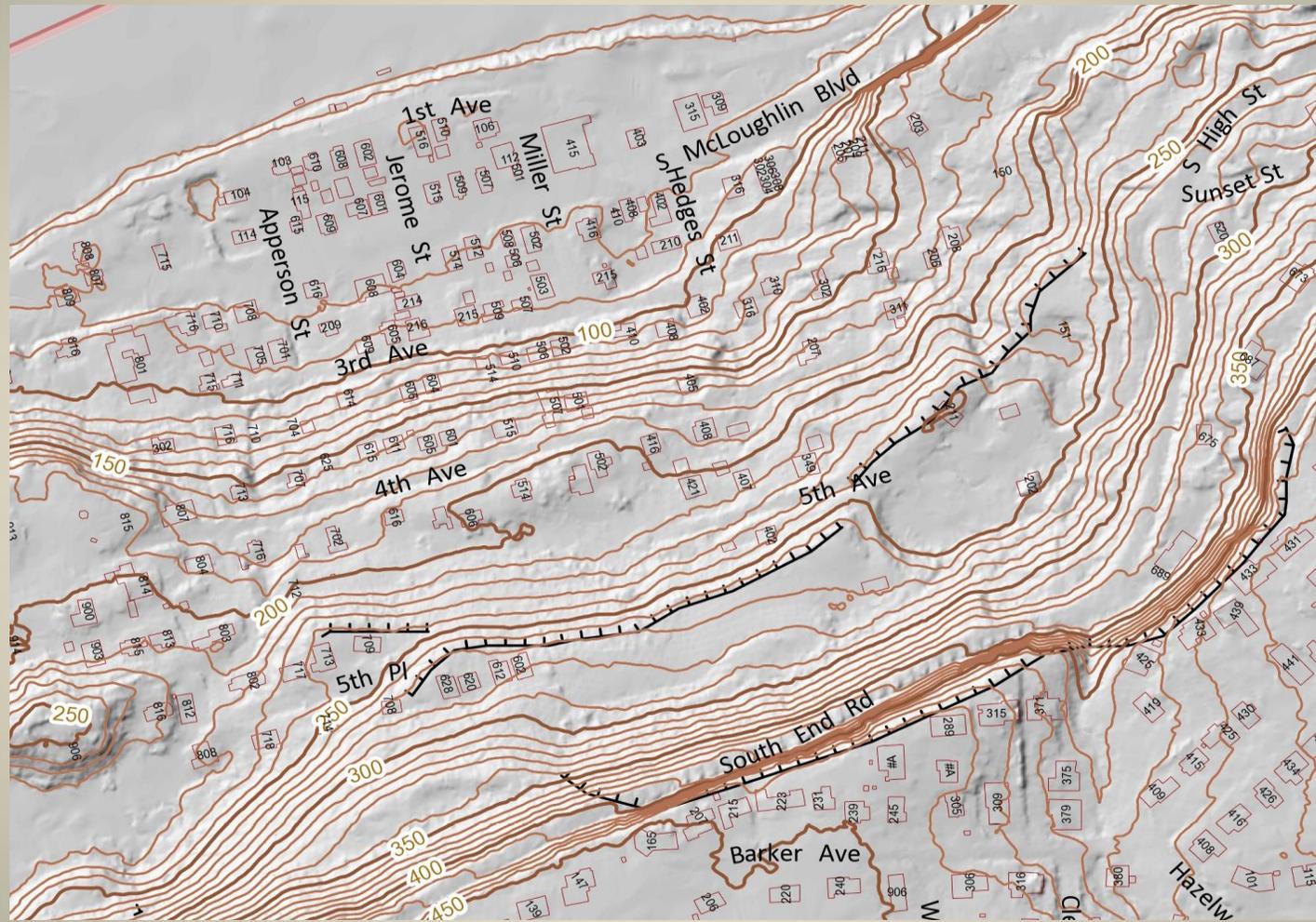
17.44.60 – Development Standards

- Avoid unnecessary disturbance of natural topography, vegetation and soils
- Minimize the number and size of cuts and fills
- Limit density

Reduce impacts to reduce risk

- Limit area of disturbance
- Limit volume of cut and fill
- Maintain drainage

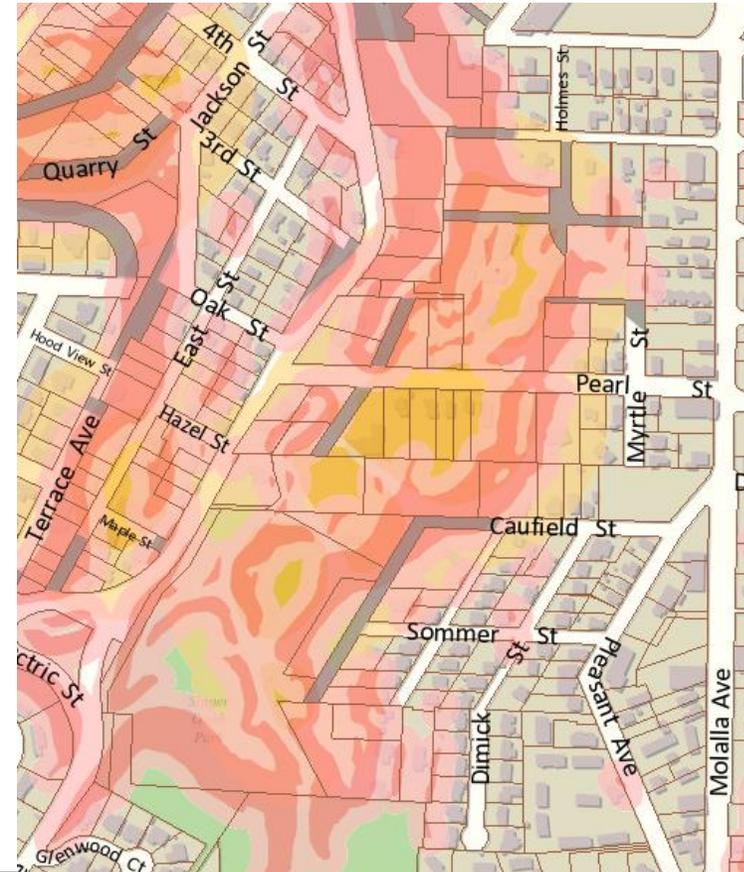
Questions Following Presentations



Up next is Josh Wheeler, Assistant City Engineer

History

- July 1, 2009 – Ord. No. 08-1014
- July 7, 2010 – Ord. No. 10-1003
- Foundation Engineering is the current City on-call consultant for Development Review
- GRI is the current City consultant for oversight on Armory and Trillium Drive



Geologic Hazards Community Forum

History

- City Commission presentation by DLCD/DOGAMI on October 8, 2019
- Planning Commission presentation by staff in conjunction with Beaver Creek concept plan on Sept 23, 2019
- Development Stakeholders Group – March 14, 2019 and February 13, 2020
- Natural Resource Committee – June 10, 2020
- City Commission Work Session – July 7, 2020



Geologic Hazards Community Forum

New Landslide Guide

- Published October 2019
- By DLCDD and DOGAMI
- Oregon City – used as an example in preparing the guide



PREPARING FOR LANDSLIDE HAZARDS

**A LAND USE GUIDE
FOR OREGON COMMUNITIES**

October 2019



Geologic Hazards Community Forum

Areas for Code Enhancement

- Clarification when a review is required
 - Now includes land disturbance
- Clarification on exemptions
- Reference to new State guide



Areas for Code Enhancement

- Additional application requirements
 - Stormwater Management
 - Construction Phasing
 - Construction Methods



Proposed Revisions to
City Code 17.44 - Geologic Hazards

Areas for Code Enhancement

- Additional applicability requirements
 - Existing – 1.0 acre property required hydrology report
 - Proposed – requires any property size within a mapped landslide unless exempted to prepare a hydrology report



Areas for Code Enhancement

- Additional Standards

- Waiver process codified
- Clarity on Weather Window
- Requirement of certification by a professional engineer
 - Structural fill
 - Retaining Walls

- Clarity on density calculation

- Slopes AND mapped landslides
- AND all buffer zones

- Clarity on Storm Drainage

- Proper References
- Infiltration not allowed 25% or greater slopes
- Report required for slopes 10% or greater in a geologic hazard area
- Requirement of certification by a professional engineer



Areas for Code Enhancement

- Clarity of Construction Standards

- Erosion Control
- Review by other agencies
- Inspections after rain event
- Requirement of certification by a professional engineer

- Clarity on Liability

- Agreements to be recorded and continue with all present and future owners of the property



Existing Resources

- City Code 17.44
- OC Maps – Lidar, Slopes, Landslide Deposits, Landslide Features
- DLCDD/DOGAMI Landslide Guide
- DOGAMI Homeowner's Guide
- City Website
- Geologic Hazard Development Checklist
- October 13, 2011 presentation
- This presentation will be added to the City website



Existing Projects

- Staff complete quarterly monitoring of Trillium Drive and the “Upper Yard/Armory” area for ground movement
- Design is ongoing for Trillium Drive to restore utilities and roadway
- Forest Edge Apartments received a permit to restore utilities, stormwater, and roadways



Legislative Hearings- GLUA 20-00033

Legislative Process and Public Comment

- September 28, 2020 Planning Commission- *1st Hearing.*
**multiple hearings will occur this fall*
- Full code package can be found at bit.ly/GLUA20-33
- Send comment to crobertson@orcify.org and questions to jwheeler@orcify.org
- City meeting agendas can be found at www.orcity.org/meetings one week in advance of meetings

PROPOSED: Amendments to the Oregon City Municipal Code (Multiple Chapters)

THIS IS TO NOTIFY YOU THAT THE CITY OF OREGON CITY HAS PROPOSED CHANGES TO THE OREGON CITY MUNICIPAL CODE THAT MAY AFFECT THE PERMISSIBLE USES AND VALUE OF YOUR PROPERTY AND OTHER PROPERTY. THIS PROPOSAL DOES NOT INCLUDE ANY CHANGES TO THE ADOPTED ZONING MAP OR ANY CITY-INITIATED CONSTRUCTION OR DEVELOPMENT

On September 28, 2020, the City of Oregon City Planning Commission will hold a public hearing regarding the adoption of Ordinance Number 20-1009 (Planning File GLUA 20-00033) to consider proposed code revisions to the Geologic Hazards Overlay District, and other ancillary Public Works related development code, including refinements to Public Utility Easements (PUE) and undergrounding utility requirements. The City Commission will hold public hearings on the matter once the Planning Commission has made a recommendation. All meetings will be held at Oregon City, City Hall, 625 Center Street, Oregon City at 7pm unless otherwise noticed. Any interested party may testify at the hearings or submit written comments to crobertson@orcify.org at or prior to the public hearings while the record is open. All hearing materials are available at www.orcity.org seven days prior to the public hearings. The ordinance and code changes are available at the Oregon City Planning Division (695 Warner Parrott Rd) or at bit.ly/GLUA20-33. It is anticipated that these documents will be revised during the review process until final adoption by the Oregon City City Commission. **Sign up to attend the online Geologic Hazards Community Forum at 6pm on September 9, 2020 at bit.ly/OCGeoHazardUpdate** Additional information may be found by calling (503) 496-1548 or emailing jwheeler@orcify.org

NOTICE TO MORTGAGEE, LIENHOLDER, VENDOR OR SELLER: ORS CHAPTER 215 REQUIRES THAT IF YOU RECEIVE THIS NOTICE, IT MUST PROMPTLY BE FORWARDED TO THE PURCHASER.



Geologic Hazards Community Forum

Question and Answers

- Panel Members :
 - Scott Burns, Portland State University
 - George Freitag, GRI
 - Tim Pfeiffer, Foundation Engr.
 - Tricia Sears, DLCDC
 - Josh Wheeler, City of Oregon City



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