

GEOLOGIC AND FLOOD HAZARDS

CP.390. Background Summary.

The area on which the City of Astoria is located has experienced many earth slides throughout its history. The sharp escarpment on the north side and near the top of the main ridge indicates that a major movement of land took place many years ago. These areas gradually returned to an appearance of stability, but several major slides have occurred in recent years. The most damaging slides have been the West Commercial Street and the Irving Street slides. Some 50 homes were destroyed or displaced in these slides. Most of these slide areas are in a siltstone and claystone sedimentary rock unit (TOMS), although a basaltic sill (an igneous rock outcropping) underlies Coxcomb Hill, Clatsop Community College, and an area in the western part of the City. Even in these basaltic areas, landslides have been recorded on steeper slopes.

There are two types of slides common to Astoria: 1) the shallow earth slippage, generally not more than two feet in depth, caused by sudden saturation, freezing and thawing, or erosion of cover material. 2) the deep (and much more serious) landslide caused by rotation or movement along a slippage plane caused by water pressure build up within the earth, often as a result of excavation. Installation of drainage systems, and weighting down of the "toe" of the slide by rock fill are the most common means of correcting landslides, although these are often just stopgap measures. Preventing construction in landslide areas is the best deterrent.

Earthquake hazards are not common in coastal Oregon, but a fault line does run in a northeasterly direction past Tongue Point. An earthquake of intensity IV (Mercalli Scale) was recorded on July 23, 1938; with its epicenter near Astoria. The main concern with earthquakes in this area is their potential for triggering landslides. Flood hazards exist only in a small portion of the City, near the Alderbrook area. One hundred year flood elevations are generally about 13 feet. The City has enacted a Flood Prevention Ordinance as part of the Federal Flood insurance Program, which requires new structures to have their first floor joists at least a foot above this level.

CP.395. Conclusions and Problems.

1. Since 1950, it is estimated that sixty to seventy homes have been seriously damaged by earth movement. The resulting cost to the various owners is estimated to be between 500,000 and 1,000,000 dollars. Cost of street and utility repairs is estimated to be over \$2,000,000.
2. The City of Astoria has a variety of means of dealing with geologic hazards: the Engineering Department has detailed information on recent landslides (during the last 50 years); the City has acquired, though the years, much of the active landslide areas on the north slope; the City Engineer, land agent and Building

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official all have access to geologic data. It is used in public works, for land sales, and for the issuance of building permits. The City and other public agencies own most of the lands on the south slope.

3. The City has made good use of landslide areas on the north side by purchasing land, and converting the slide area into parks or open space. Areas of known landslide potential are not permitted to be sold.
4. The City has an opportunity, through the use of undeveloped public property, to control how new subdivisions are designed, thereby reducing landslide hazards. These methods including the platting of streets and utility lines along land contours, the requirement of complete storm drainage systems, and the evaluation of the land prior to development by qualified engineering geologists or other qualified persons. Many of these steps can also be taken with regard to private development through the use of the City's land division ordinance.
5. Geological information indicates that the bedding planes under Astoria generally dip toward the south, and that the landslide potential on the south slope (which is mostly undeveloped at present) could be considerable as development increases. Great care should be taken to insure this area does not experience the same problems encountered on the north slope of the City.
6. The City's major flood hazard area is a small portion of Alderbrook, with small areas around the streams on the south slope. The City has enacted a Flood Hazard Ordinance (Ord. 09-03) and participates in the Federal flood insurance program.
7. The Federal Flood Insurance Program does not presently cover landslides or mudslides, although these hazards are closely related with the high rainfall and resulting storm water runoff in the Astoria area. The City is pursuing the possibility of including landslides and mudslides in the program, with the assistance of the Congressional delegation.

CP.400. Geologic and Flood Hazard Policies.

1. The City will take reasonable precautions to protect life and property from natural hazards or disasters, through the use of the City Flood Hazards Ordinance (Ord. 09-03), the Uniform Building Code, and the policies for the management of geologic hazard areas.
2. Where it appears a landslide, or other earth movement hazard may be present, the approval of the City Engineer will be obtained before a building or development permit is issued. The City Engineer and/or Planning Commission may require a site investigation and report by a City approved licensed engineering geologist or soils engineer in such cases.

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3. The City Engineer will file copies of all geologic and soils reports which are submitted, and be prepared to furnish copies of them to interested persons at the cost of reproduction.
4. Land divisions in areas of steep slopes, unstable soils, weak foundation soils, or landslide potential will be permitted only after a favorable site investigation report has been completed. The Planning Commission will submit site investigation reports to the City Engineer for evaluation. Recommendations of the City Engineer will be used in the review of land division requests. The Planning Commission may require changes in proposed subdivision plats based on the City Engineer's recommendations. Site investigation reports will be filed in the office of the City Engineer, and used in the evaluation of future building permits within the development.
5. The City Engineer and/or Planning Commission may require the submission of detailed topographic maps in steep slope areas, indicating the location of drainages, springs or other natural features. Detailed drainage plans showing the location of proposed storm water disposal will be a part of building permit or land division applications.
6. Clustering of development on stable or less steep portions of sites is encouraged in order to maintain steeper slopes in their natural condition.
7. General development policies for areas of steep slopes will be as follows:
 - a. Construction excavation will be held to the minimum necessary to build footings efficiently.
 - b. Removal of vegetation will be kept to the minimum necessary for the placement of roads, utilities, and structures. Erosion control measures as required by the City Engineer will be employed during and after construction.
 - c. Access roads and driveways will be constructed with a minimum amount of grading.
 - d. No development will be allowed to block stream drainages in any area or divert storm water across adjacent property.
8. Guidelines for site investigation reports will be provided by the City Engineer's office. The individual site reports will generally indicate where construction may take place without enhancing earth movement hazard, the location of feasible building sites, the location of evidence of potential or past earth movement, the recommended method of construction. Where necessary, the City Engineer may require certification by a professional engineer or architect accompany building plans.