

## 7. MODEL LAND-USE REGULATIONS IN AVALANCHE-HAZARD ZONES

### 7.1 Purpose and Introduction

The purpose of this section is to provide model land-use regulations in areas subject to avalanches. The only specific reference to avalanches in the Anchorage Municipal Code (AMC) is found in AMC 21.80.120 of the subdivision regulations. This states:

Subdivision design in the R-10 (Residential Alpine Slope) District shall take into consideration known areas susceptible to land slide, mud and earth flow, talus development, soil creep, solifluction or rock glaciation, avalanche chutes, runouts or wind blast. Each lot or track zoned R-10 shall include a building site which is not within such a known susceptible area. The specific factors set forth in Section 21.40.115 of this title shall be taken into consideration in any development in the R-10 District.

The R-10 zone is a relatively new zoning district which is described in AMC 21.40.115. Parts of this section read:

The following statement of intent and use regulations shall apply in the R-10 district:

A. The R-10 district is intended for use in those areas in the Municipality where natural physical features and environmental factors such as slopes, vegetation, alpine and forest, soils, slope stability and geologic hazards (emphasis added), require unique and creative design for development. Creative site design and site engineering are essential to insure that the development of these lands will:

3. Avoid development of land within geologic hazard areas to minimize the possibility of loss of life and/or property damage.

Avalanches are, by definition, one of a number of geologic or geophysical hazards (Rogers and others, 1974), therefore are

included in the R-10 Residential Alpine/Slope district.

To date, the R-10 zoning district has not been applied to any land area within the Municipality. Nearly all of the avalanche hazard areas are zoned Unrestricted. Additional regulations will be necessary to provide protection from inappropriate development of hazard zones.

The following model regulations are adapted from chapter 21.60, the floodplain regulations of the Anchorage Municipal Code. This adaptation is reasonable because both floods and avalanches are naturally occurring geologic processes. Both can be defined in terms of a magnitude/frequency relationship, and both have been mapped for the Municipality through application of state-of-the-art technology.

## 7.2 Model Regulations for Land-Use in Avalanche-Hazard Zones

### 7.2.1 Interpretation and Disclaimer of Liability

- A. In the interpretation and application of this chapter, all provisions shall be:
1. considered as minimum requirements;
  2. liberally construed in favor of the governing body; and
  3. deemed neither to limit nor repeal any other powers granted under state statutes.

B. Warning and Liability Disclaimer.

The degree of avalanche protection required by this chapter is reasonable and is based on scientific and engineering considerations. Larger avalanches can and will occur on rare occasions.

This chapter does not imply that avalanches will not occur outside the limits of the designated avalanche-hazard zones.

7.2.2. Creation of Avalanche-Hazard District and Adoption of Official Avalanche Hazard Report and Maps

- A. There is hereby created an avalanche-hazard district defined in its territorial extent by sections 7.2.3. and 7.2.4. and by the Anchorage Snow Avalanche Zoning Analysis, prepared by Arthur I. Mears, P.E., Inc. (1982). The above avalanche zoning analysis is made a part of this chapter by reference.
- B. The boundaries of the avalanche-hazard zones shall be determined from the cited maps and report. Where interpretation is needed as to the exact location of the boundaries, the Municipal Planning Department shall make the necessary interpretation.

7.2.3. Definitions

As used in this chapter, the following terms are specifically defined:

- A. "Design-Avalanche" (100-year avalanche) means the avalanche having a 1% probability in any given year.
- B. "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures and mining.
- C. "Avalanche" means a mass of snow or ice and other material which may become incorporated therein as such mass moves rapidly down-slope.

- D. "Avalanche-hazard zone" means any area affected by avalanches with return periods of up to 100 years.
- E. "Avalanche defense" means any combination of structural additions, changes, or adjustments to structures or terrain that reduce or eliminate avalanche damage to real estate or improved real property and contents.
- F. "Red (high-hazard) zone" means an area reached by avalanches with return periods of 10 years or less (10% annual probability), and/or by avalanches with kinetic-energy densities of 40 kPa (800 lbs/ft<sup>2</sup>) or more.
- G. "Blue (moderate hazard) zone" means an area reached by avalanches with return periods of 10-to-100 years (1-to10% annual probabilities) and with kinetic-energy densities of less than 40 kPa.

#### 7.2.4. Establishment of Avalanche-Hazard District

- A. The regulations within this section shall apply to all areas of the hazard district.
- B. Any new construction, fill, obstructions and other development or action that would increase or extend the area or frequency of avalanches and significantly increase the hazard are prohibited.
- C. No building permits or other land-use permits shall be issued for construction or placing a structure within the avalanche-hazard district unless the plans show that, in addition to compliance with all other ordinances, regulations, and permit requirements, the structure shall meet the following requirements:
  - 1. The structure must be reasonably safe from avalanches. Safety

of the structure shall be demonstrated by showing detailed plans for an avalanche defense structure or structures.

Plans will be certified by an engineer registered in the State of Alaska and will meet the general and special design requirements as set forth in the Anchorage Snow Avalanche Zoning Analysis.

2. Approval of a subdivision application shall require proof that:

- a. The proposed construction is consistent with the need to minimize avalanche hazard through placement of structures, avoidance of hazardous areas, and construction defenses;
- b. all above-ground public facilities shall be located to minimize avalanche hazard to the facilities and other structures.

#### 7.2.5. Schedule of Regulations Applicable to Subdistricts

A. Red (high hazard) area. Since the red zone is an extremely hazardous area due to the frequency, destructive potential, and depositional characteristics of avalanches, the following provisions apply:

1. permitted uses and structures: parks and parkways, green-belts, land reserves, golf courses, and related facilities;
2. uses, structures and activities permitted only by special avalanche-hazard permit: roads, streets, railroad and tramway tracks, bridges, utility installations and above-ground pipelines, and storage yards for equipment.
3. prohibited uses: encroachments not otherwise excepted in

this section, including new construction, substantial improvements, and other development unless certified by a registered professional engineer or architect that such encroachments shall significantly increase avalanche hazard to adjacent areas.

B. Blue (moderate-hazard) zone. The regulations listed in this subsection are applicable to the blue hazard zone:

1. permitted uses and structures: parks, parkways, greenbelts, land reserves, golf courses, playgrounds, playfields and related facilities;
2. uses, structures and activities permitted only by special avalanche-hazard permits: any use permitted by special avalanche-hazard permit as set forth in subsection A above, single-family and multiple-family dwellings if certified by a registered professional engineer or architect to safely withstand the forces generated by the design avalanche and considered allowable by the applicable use district classification.
3. prohibited uses: schools, hospitals, restaurants, and other commercial activities concentrating human activity, civil defense facilities.

#### 7.2.6. Construction Requirements

A. All new construction and substantial improvements that are intended for human occupancy within the blue zone shall meet the following conditions:

1. Structures shall safely withstand the static, dynamic and aerodynamic forces associated with the design avalanche at the location of the structure.
2. Structures shall be certified as being safe from the design avalanche by an engineer or architect registered in the State of Alaska.

#### 7.2.7. Special Avalanche-Hazard Permit

- A. No person shall engage in development within the avalanche-hazard district unless a special avalanche-hazard permit is first issued. Applications for the avalanche-hazard permit may be made to the official administering this chapter.
- B. Conditions attached to special avalanche-hazard permit. Special conditions may be attached to the issuance of a special avalanche-hazard permit including any measures deemed necessary by the official to further the purposes of this chapter.

#### 7.2.8. Nonconforming Uses

Continuance of nonconforming uses. A structure or the use of a structure or premises located within the avalanche-hazard district which was lawful before the original passage of applicable regulations, but which is not in conformity of the provisions of such regulation may be continued subject to the following conditions:

- A. No such use shall be expanded, changed, enlarged or altered in any way that increases its nonconformity with respect to the provisions of this chapter.

- B. No repair, alteration or addition shall be made to any nonconforming structure if the value of such repair, alteration or addition shall exceed 25% of the value of the structure at the time of its becoming a nonconforming use unless the structure is permanently changed to a conforming use.
- C. Any permitted alteration, addition or repair to any nonconforming structure which would result in substantially increasing the avalanche-damage potential shall be designed in accordance with 7.2.7.

7.2.9. Variations and Appeals - Standards and Conditions

- A. In passing upon variations or appeals, the Planning and Zoning Commission shall consider all technical evaluations, all relevant factors, standards specified in other sections of this chapter, and:
  - 1. the danger that materials may be swept by avalanches onto other lands, thereby increasing the hazard to others;
  - 2. the danger of life and property due to avalanche impact and/or deposition;
  - 3. the importance of the services provided by the proposed facility to the community;
  - 4. the availability of alternative locations for the proposed use that are not subject to avalanche hazard;
  - 5. the compatibility of the proposed use with existing and anticipated development;
  - 6. the safety of access to the property in times of avalanche



for ordinary and emergency vehicles; and

7. the costs of providing public services during and after avalanche conditions, including maintenance and repair of public utilities and facilities.

B. Before passing upon variances and appeals, the Planning and Zoning Commission may seek advice from the Geotechnical Advisory Commission, Building Board of Examiners and Appeals, and the Zoning Board of Examiners of Appeals.

C. The Planning and Zoning Commission may attach such conditions to the granting of variances or appeals as it deems necessary to further the purposes of this ordinance.