

TITLE III, LAND USE AND DEVELOPMENT

DIVISION 3, BUILDING REGULATIONS

CHAPTER 6 - GEOLOGIC HAZARDS

GEOLOGIC HAZARDS

336-1. **Purpose.** The purpose of these regulations is to ensure that risks to life and property in moderate and high geologic hazard areas shall be minimized and further, to assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability or destruction of development sites or surrounding areas or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

336-2. **Applicability.** The Geologic Hazards Regulations shall apply throughout Humboldt County for those projects and activities which fall within the County's land use and development jurisdiction.

336-3. **Modifications Imposed by Geologic Hazards Regulations.** The provisions of the Geologic Hazards Regulations shall be in addition to requirements imposed by all other Zoning and Development Regulations. Whenever the provisions of these regulations conflict with or are inconsistent in application with any other regulations, including any conflict with the County Grading Ordinance (Section 331-14), the most restrictive regulations shall apply.

336-4. **Natural Hazards/Land Use Rating Matrix.** New development shall be reviewed, approved and sited in accordance with the "Geologic Hazards Land Use Matrix", Figure 1 of this section, and the regulations pertaining to the "Area of Demonstration of Stability," Section 336-5.(4)(a)vii, below.

336-5. **Reports Required.** Engineering geologic and/or soil engineering reports shall be required according to the following:

- (1) R1 Report Requirements.
  - (a) A preliminary engineering geologic report and a preliminary soils engineering report shall be prepared for the classes of development and hazard areas indicated by "R1" in the Geologic Hazards Land Use Matrix found as Figure 1 of these regulations.
  - (b) The preliminary engineering geologic report shall be prepared by a registered geologist or a registered engineering geologist and shall provide a geological reconnaissance and evaluation of the project site and surrounding terrain. The preliminary report shall identify areas or issues which either do or do not require further engineering geologic and/or soils engineering evaluation.

(c) The preliminary soil engineering report shall describe the nature of the subsurface soils and any soil conditions which would affect the design and/or layout of the proposed development. The report shall include the locations and logs of any test borings and percolation test results if onsite sewage disposal is proposed. The report shall recommend areas or issues of concern which require additional engineering or geologic evaluation.

(d) The additional information that is recommended by the preliminary reports shall be provided or the proposed development shall be modified to avoid the identified areas of potential instability. The proposed development shall be sited and designed in accordance with the recommendations of the reports in order to minimize risk to life and property on the project site and for any other affected properties.

(2) R2 Report Requirements.

(a) A preliminary engineering geologic report and a preliminary geotechnical engineering report shall be prepared for the classes of development and hazard areas indicated by "R2" in the Geologic Hazards Land Use Matrix found as Figure 1 of these regulations. These reports shall be prepared by either a registered geologist or a registered geotechnical engineer experienced and knowledgeable in the practice of soil engineering. These reports shall provide a geologic reconnaissance and evaluation of the project site and surrounding terrain. (Res. 85-126, 12/17/85)

(b) A geotechnical (soils) engineering analysis may meet the preliminary geologic report requirement for developments where the primary concerns are soils mechanics and appropriate structural design. In such cases it is incumbent upon the engineer to consult a registered geologist should it become apparent that an adequate structural solution requires additional geologic input. If, after preliminary investigation of the project site and the surrounding terrain, no geological consultation is felt by the engineer to be required, the engineer shall certify that such an evaluation is not required. It is incumbent upon the geologist to recommend that a geotechnical engineer be consulted when it becomes apparent that soils mechanics analyses are needed.

(c) The applicant shall either provide additional information as recommended by the preliminary geologic or soils report or modify the application

to avoid identified areas of potential instability. The proposed development shall be sited and designed in accordance with the recommendations of the report(s) in order to minimize risk to life and property on the project site and for any other affected properties.

- (3) Alquist-Priolo Special Study Zone Report.
- (a) **Special Study Zone Report.** When a report is required pursuant to the Geologic Hazards Land Use Matrix found as Figure 1 of these regulations, or State Law, it is to be combined with the reports required under this part where feasible. The report is to be prepared by a registered geologist and consistent with State Mines and Geology Note 49, or successor regulations.
- (b) **Review of Geologic Fault Evaluation Report by County Geologist.** An application for development which requires a report or waiver prepared pursuant to the Alquist-Priolo Fault Hazard Regulations shall not be accepted as complete unless and until there are fully executed agreements between:
- i. A geologist registered in the State of California and the County to either review the report required herein above or to prepare a request for waiver; and
  - ii. The County and the applicant to reimburse the County for the costs incurred pursuant to the agreement specified in subparagraph (i) above.
- (c) **County Geologist Review.** Within thirty (30) days of an application for development located within an Alquist-Priolo special study area, the County shall cause a geologist registered in the State of California (hereinafter called County reviewing geologist) to review the geologic report. The review shall assess the adequacy of the documentation contained in the report, and the appropriateness of the depth of study conducted in consideration of the use proposed for the project site. The County reviewing geologist shall prepare a written review which either concurs or does not concur with the scope, methodology, interpretations, conclusions, and recommendations of the geologic report. Said review shall be subject to comment and revision as may be deemed necessary by the County.

Within thirty (30) days after acceptance of the geologic report, the County shall forward it to the State Geologist to be placed on open file.

(4) Discretionary Report Requirements. The Chief Building Official shall determine if a preliminary geologic report or a preliminary soil engineering report is required for the classes of development and hazard areas indicated by a 'D' in the Geologic Hazards Land Use Matrix. The criteria for determining whether or not a report is required when it is designated in the Geologic Hazard Land Use Matrix as discretionary include the following; however, where evaluation of items listed below is inconclusive, a statement is required by a registered engineer that a geologic or soil report is not required for the safety of the project:

- (a) Criteria for either type of report shall include:
  - i. a site inspection by the building inspector;
  - ii. geologic maps and reports -covering the area;
  - iii. the potential for the development to affect adjacent property or improvements;
  - iv. the degree to which public exposure to risk may be a factor;
  - v. the size and scale of the proposed development;
  - vi. for development within the Coastal Zone, the policies of certified local coastal plans; or
  - vii. where any portion of a project is located within an area of demonstration of stability as described in the following subsection, a geologic report is required:

**"Area of Demonstration of Stability"** - As a general rule, the area of demonstration of stability (Illustration A) includes the base, face, and tops of all bluffs and cliffs. The extent of the bluff top considered should include the area between the face of the bluff and a line described on the bluff top by the intersection of a plane included at a 20° angle from horizontal passing through the toe of the bluff or cliff, or 50 feet inland from the edge of the cliff or bluff whichever is greater. However, the County may designate a lesser area of demonstration in specific areas of known geologic stability (as determined by adequate geologic evaluation and historic evidence) or where adequate protective works already exist. The County may designate a greater area of demonstration or exclude development entirely in areas of known high instability.

**"Bluff or Cliff Areas"** - A bluff or cliff is a scarp or steep face of rock, decomposed rock, sediment or soil resulting from erosion, faulting, folding or excavation of the land mass. The cliff or bluff may be simple planar or curved surface or it may be steplike in section. For the

purposes of this guideline, "cliff" or "bluff" is limited to those features having vertical relief of 10 feet or more, and "seacliff" is a cliff whose toe is or may be subject to marine erosion.

- (b) A soil engineering report is required when one or more of the following conditions exist or are proposed:
  - i. the depth (or height) of cut or fill is three (3) feet or greater;
  - ii. the fill is to support structural footings;
  - iii. an engineered cut or fill is required;
  - iv. the soils are or may be subject to significant shrink-swell; or
  - v. material exists that may be subject to settlement or subsidence.
  
- (c) An engineering geologic report is required when one or more of the following conditions exist or are proposed:
  - i. finish cut or fill slope faces with vertical heights in excess of 10 feet;
  - ii. existing slope steeper than five (5) horizontal to one (1) vertical;
  - iii. an existing cut slope having a vertical height in excess of ten (10) feet;
  - iv. existing sea cliffs, stream bank cliffs, etc. in excess of ten (10) feet;
  - v. existing or suspected earthquake or seismic hazards;
  - vi. existing or suspected groundwater hazards;
  - vii. areas that are underlain by landslides or soil creep or by rock material susceptible to landslide or creep activity;
  - viii. areas where materials exist that may be subject to settlement or subsidence; or
  - ix. areas subject to drifting or loose sand.

- (5) **Report Waiver.** The report requirements of subsections (1), (2) or (3) above may be waived or the contents modified by the Chief Building Official when:

- (a) An adequate geologic and/or soil assessment at a suitable scale already exists for the site proposed for development; or
  - (b) Reports are found not to be required following an evaluation of the criteria listed in subsection (4) by the Building Official; and
  - (c) The proposed development is not within a Critical Water Supply Area as designated in the General Plan.
  - (d) Report requirements may not be waived within the Coastal Zone, except that for Coastal Zone portions of Shelter Cove only, the requirements may be waived if the proposed development is within a waiver area as specified in Appendix E of the Southcoast Area Plan, and the Chief Building Official concurs.
- (6) **Substitute Report.** The above required soil report may serve as a substitute for the report required by Section 326-24, where, in the opinion of the Building Official, it contains substantially the same information and addresses the concerns that may have been identified by the Department's field inspection.

**F. Contents of Reports.**

- (1) **Engineering Geologic Report.** The above required engineering geologic reports, "R1" and "R2", shall provide a preliminary geological reconnaissance and evaluation of the project site and surrounding terrain. The degree of analysis should be appropriate to the degree of potential risk presented by the site and the proposed project. Reports shall be prepared in accordance with the California Division of Mines and Geology (CDMG) Note #44, "Recommended Guidelines for Preparing Engineering Geologic Reports." CDMG Notes #37, 43 and 49 shall be utilized as applicable when seismic or fault rupture hazards are identified as concerns.

In citing the CDMG Notes, it is not the intent of the County to seek lengthy dissertations on the area geology, but rather to provide uniform outlines to serve as checklists with points to be discussed as applicable.

- (2) **Preliminary Soil Engineering Report.** The above required preliminary soil engineering report shall describe the nature of the subsurface soils and any soil conditions which would affect the design and/or layout of the proposed development. The report shall include the locations and logs of any test borings and percolation test results if on-site sewage disposal is proposed. The report shall recommend areas or issues of concern which require additional engineering

or geologic evaluation. These reports shall be prepared in accordance with the applicable sections of the Uniform Building Code, including appendices.

- (3) **Supplementary Information for Reports for Development located in the Coastal Zone.** Specifically, within the coastal zone, the reports should give particular treatment and analyze the following, as applicable:

- (a) Historic, current and foreseeable cliff erosion, including investigation of recorded land surveys in addition to the use of historic maps and photographs where available and possible changes in shore configuration and sand transport;
- (b) Ground and surface water conditions and variations, including hydrologic changes caused by the development (i.e., introduction of sewage effluent and irrigation water to the groundwater system; alterations in surface drainage);
- (c) Potential erodibility of site and mitigating measures to be used to ensure minimized erosion problems during and after construction (i.e., landscaping and drainage design);
- (d) Effects of marine erosion of seacliffs;
- (e) Detailed mitigation measures or alternative solutions for avoiding potential impacts;
- (f) Professional conclusions as to whether the project can be designed so that it will neither be subject to nor contribute to significant geologic instability throughout the life span of the project; and
- (g) Currently acceptable engineering stability analysis method should be used, the method(s) of field analysis should be described, and the degree of uncertainty of analytical results due to assumptions and unknowns should be described.

**G. Development Standards.**

(1) When a report is required by Section 336-4, the applicant shall either provide additional information as recommended by the preliminary geologic and/or soils report, or modify the proposed development to avoid identified areas of potential instability. The proposed development shall be sited, designed and constructed in accordance with the recommendations of the report(s) in order to minimize risk to life and property on the project site and for any other affected properties.

- (2) Projects shall be constructed in accordance with the California Building Code Section pertaining to Earthquake Regulations, as applicable.
  - (3) Within the coastal zone, the following shall also apply:
    - (a) Developments shall be sited and designed to assure stability and structural integrity for their expected economic life spans while minimizing alteration of natural landforms (for the purpose of these regulations the "expected economic life span" is seventy-five (75) years; it is recognized that this is a "term of art" for the geologic profession);
    - (b) Bluff and cliff developments (including related storm runoff, irrigation, wastewater disposal and other activities and facilities accompanying such development) shall not create nor contribute significantly to problems of erosion or geologic instability on the site or on surrounding geologically hazardous areas;
    - (c) Alteration of cliffs and bluff tops, faces, or bases by excavation or other means shall be minimized. Cliff retaining walls shall be allowed only to stabilize slopes.
- H. **Standard Condition.** When a report is required by Section 336-4, and in addition to any other terms or conditions imposed as development conditions, the owners of record, prior to permit issuance, shall complete and execute a "Deed Restriction and Hold Harmless Agreement." The restriction and agreement shall be recorded and run with the land.



Figure 1

**GEOLOGIC HAZARDS LAND USE MATRIX**

	BUILDING TYPE/ LAND USE	Earthquake Shaking	Slope Stability				Liquefaction		Fault Rupture SSR*	Critical Water Supply Areas***
			1	2	3	4	Moderate	High		
hazardous	Nuclear power plants, major dams, hazardous chemical storage		R 1							
essential	Hospitals, fire and police stations, civil defense headquarters, life line utility systems, ambulance stations									
high risk	Schools, theaters, auditoriums, hotels, large motels, major office buildings, high density residential, redundant utility systems, major highway bridges									
low risk	Major subdivision, heavy industrial	D	R 2	R 2	R 1	R 1	D	R 2	R 2*	
	Multi-family structures greater than 4-plexes	D	D	D	R 2	R 1	D	R 2	R 2*	
	Minor subdivisions	D	D	D	R 2	R 1	D	R 2	R 2*	
	Light industrial warehousing, commercial	D	D	D	D	R 2	D	D	R 2*	
	Residential structures on existing lots with footing loads greater than typical two-story wood-frame dwellings	D	D	D	R 2	R 2	D	D	R 2*	
	Residential wood-frame structures two stories or less on existing lots	D	D	D	R 2	R 2	D	D	R 2**	

R means preliminary report is required (see Section 336-5 (1) and (2) for R 1 and R 2 requirements).

D means preliminary report is discretionary.

\* SSR means Alquist-Priolo Special Studies Zone. A report prepared by a registered geologist is required in the fault rupture Special Studies Zone unless waived pursuant to the Alquist-Priolo Act.

\*\* a single-family wood-frame structure not exceeding two stories is exempt when such dwelling is not part of a development of four more dwellings.

\*\*\* as designated on the Biological Resources Map.

Major Subdivision: defined as subdivisions requiring the filing of a final map pursuant to Subdivision Map Act (see. Gov. Code Section 66426).

Minor Subdivision: subdivisions requiring the filing of a parcel map pursuant to the Subdivision Map Act.