

ADMINISTRATIVE MANUAL
COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
GEOTECHNICAL AND MATERIALS ENGINEERING DIVISION

GS047.0

SURFICIAL SLOPE STABILITY FOR NATURAL SLOPES

This directive provides guidelines applicable for the review of structures proposed adjacent to natural slopes, swales, etc., that have a potential for shallow or surficial failures (excludes gross stability).

Guidelines contained herein exclude additional criteria and requirements that may be imposed by the Building Official or Land Development Division Subdivision Mapping Section relative to runoff, drainage, grading, etc. The requirement for an engineering geology report may be waived by the District Geologist based upon the geologic conditions and/or the scope of the project under review.

1. A coordinated investigation by a Certified Engineering Geologist and a Civil Engineer competent in soils engineering is commonly necessary for a thorough assessment of the stability of natural slopes. Surficial materials include soils, colluvium, talus, slopewash, highly weathered (soil like) bedrock, etc.
2. The geotechnical consultant(s) must demonstrate that proposed structures will be free from landsliding, settlement and slippage as defined in the 2011 County of Los Angeles Building Code (CLABC) Sections 110 and 111.
3. Site specific data must be provided and considered in the assessment of potential mobilization of surficial materials (e.g. debris flows, mudflows).
4. Assessment and/or contents of consultant geotechnical reports should include:
 - Evaluation of significant slopes. Generally, significant slopes are steeper than 2:1 (horizontal:vertical) ratio (>26 degrees), and/or when the height of the slope and geologic conditions warrant.
 - Evaluation of material thickness, density, variability, and potential irregularity of contact with underlying firm material or bedrock.
 - Impact of underlying bedrock or other materials of low permeability that may indicate conditions conducive to potential instability.
 - Variability and concentration of surface runoff (no drainage devices). If drainage devices are necessary and considered in the evaluation, devices must be shown on the plans.

- Change in slope gradients.
 - Hydrogeologic and geologic conditions relative to stability.
 - Location and description of past surficial failures in the area.
 - Presence of animal burrows, cracks in the soils, and fractures that may increase the infiltrate rate into the surficial materials.
 - Geotechnical map that includes native drainage courses (e.g. swales, hollows) and proposed drainage devices, and topographic anomalies.
 - Coordinated assessment by the consulting engineering geologist and soils engineer.
 - Evaluation of existing off-site instabilities and slope performance under similar site and geologic conditions.
 - Illustration of geologic and hydrogeologic conditions and data inclusive of cross-sections.
5. A slope stability analysis that evaluates stability of natural surficial materials. The consulting engineering geologist shall supplement the stability analysis with a qualitative assessment that takes into account geologic conditions, slope history, published documents, etc. Mitigative measures should be based upon input from the consulting engineering geologist and soils engineer. Surficial slope stability requirements shall conform to the following:
- Analysis shall use the infinite slope method with seepage parallel to the slope surface, or other critical surface if identified during the geotechnical investigation.
 - Depth of full saturation shall be 4 feet, unless geologic conditions indicate an alternate thickness is appropriate for the analysis.
 - Minimum factor of safety shall be 1.50.
 - Shear strength parameters used in the analysis shall be representative of surficial materials.
6. The volume of debris calculated for mitigation design/measures should be based upon the slope stability analysis and qualitative input from the geotechnical consultants.

7. If surficial slope stability analyses and/or qualitative data indicate a debris flow potential exists on the subject natural slope, slope setback reductions cannot be granted (see 2011 CLABC Section 1808.7).
8. Walls detaining or diverting debris shall be designed as impact walls. These walls shall be designed for a minimum force of 125 pounds per cubic foot (equivalent fluid pressure). Force acting on the wall shall be applied to the entire height of wall potentially in contact with debris.
9. Mitigative or preventative measures which divert debris onto adjacent properties and/or require maintenance are unacceptable. Debris hazards should be completely mitigated on-site. Mitigative measures, resulting in modification of natural drainage or removal (grading) of natural slope surficial material, are subject to review and approval by the Building Official or Subdivision Mapping Section. Incorporation of paved swales or other devices may be required by the Building Official or Subdivision Mapping Section. Please note that debris fences are not an accepted form of mitigation unless a debris fence maintenance covenant is permitted by the Building Official.
10. Diverting debris onto a public right-of-way may be an acceptable mitigative measure provided the Building Official or Land Development Division Subdivision Mapping Section has assessed and accepted the potential impact of the concentration and deposition of debris onto a public street. The following note must be included on the plans and review sheets to the Building Official or Subdivision Mapping Section:

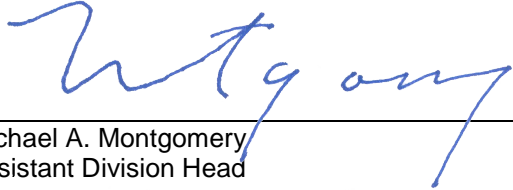
Attention Drainage Plan Checker:

Proposed debris flow hazard mitigation plan will potentially divert material onto a public right-of-way. The estimated volume of debris is _____ cubic yards.

The Geotechnical Development Review Units shall work with the Building Official to ensure that the volume, area, and depth of debris diverted onto public right-of-ways and the resulting impact to “access free of geotechnical hazards” and life safety services (e.g. fire department, ambulance service) is fully understood by the Building Official and documented.

NOTE: Before preparing comments regarding surficial slope stability, Geotechnical Development Reviewers should have read and be familiar with, at a minimum, the following documents: California Geological Survey Note 33, United States Geological Survey Professional Paper 851 (by Russell H. Campbell, 1975), and the Bulletin of the Association of Engineering Geologist, Vol. XVIII, No. 1, 1981, pp. 17-28.

Approved By:

A handwritten signature in blue ink, appearing to read "Montgomery", written over a horizontal line.

Michael A. Montgomery
Assistant Division Head