

Avery County Steep Slope Design Standards
(unincorporated areas of Avery County)

• **Design Standards For Steep Slopes and Hillside Development:**

Steep slopes and hillside areas are defined as follows for the purpose of this section; Steep slopes and hillside areas are any lot, parcel or tract of land which meet all of the following standards.

- 1) That is located in the Avery County Jurisdiction; exclusive of Municipalities and their Extra-territorial Jurisdictions.
- 2) That is defined as a commercial development site; inclusive of Major or Minor residential subdivision development.
- 3) That has an average slope of its natural terrain of 33% or greater (which is greater than or equal to three units horizontal distance to one unit of vertical distance) for the site of which is to be developed.

4) **Average Slope Determination:**

- a. Contour map required, each application for a major or minor residential subdivision and/or a commercial site which meets the standards set forth in the Steep Slope/Hillside definition shall include a contour map which includes a scale and contour intervals (5 foot intervals) on the site plan to determine the average slope of a lot, parcel or tract of land in its natural state.

b. Calculation of natural average slope:

The natural average slope is calculated using the following formula;

$$S/A \% = 0.0023 \times I \times L$$

S = Average natural slope of the parcel shall be determined in percent.

I = Contour interval of the map in feet with said contour intervals to be established at five (5) foot intervals.

L = Total length of the contour line within the parcel in feet.

A = Area of the parcel in acres (0.0023) = constant sq. ft. into acres.

In addition, the property may submit an alternate method of slope calculation for consideration by the Avery County Planning Department. These methods may include but are not limited to the following methods: Weighted average, slope mapping or other field based techniques.

Once "S" or the average natural slope is calculated in a percentage and rounded off to the nearest whole number. These results shall be used to determine development requirements.

5) **Road and Driveway Requirements:**

Ditch line construction with finished grades greater than or equal to 15% slope shall have the bottom matted and rip rap solid.

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- a. Ditch line construction with finished grades greater than or equal to 10% slopes shall be required to have crossover culverts a maximum of every 175 feet apart.
 - b. The minimum size crossover culverts for road construction is 18 inches in diameter.
 - c. The minimum size culvert for a driveway is 15 inches in diameter.
 - d. The maximum grade for a road to be constructed is 18% slope.
 - e. A geotechnical engineer shall be required for road construction in areas where the tract has natural slopes greater than 1.5 to 1 (66%) natural slopes, the recommendations shall be submitted to the Avery County Planning Department for review and approval.
 - f. When guardrails are required they shall be installed in a manner that meets N.C.D.O.T. standards.
- 6) **Structural Retaining Walls and Boulder Wall Construction:**
- a. Structural retaining walls greater than 4 feet in height shall bear the seal of a design professional/structural engineer.
 - b. Boulder walls shall not be constructed greater than 6 feet in height or a proposed boulder walls greater than six (6) in height shall be required to have a structural engineer design and seal the plans and be required to give a letter upon completion that the boulder wall has been to constructed to the scope of the sealed plans.
 - Remedial option for boulder walls, boulder walls may built at a maximum of six (6) feet in height and then terraced with a 6 foot bench and a second six (6) foot high boulder wall may be constructed. This terracing method may be done a maximum of 5 lifts before a structural engineer will be required to design and seal the boulder wall structure.
 - All retaining wall structures: be it "structural, boulder or per-engineered" type construction is required to bare a design professional seal if any portion of the backfill is used to support footers, foundations, piers, pilasters, columns or any other structural member of a home or building to be constructed.
- 7) **Remedial Solutions:**
- a. North Carolina design professional/engineer design and seal retaining wall drawings.
 - b. Terrace/bench slopes: Maximum of 16 feet from toe of fill slope vertical height to top of fill and terrace/bench 6 foot horizontal to toe of second cut slope or base of a second retaining wall structure.
- 8) **Ground Cover for Steep Slopes and Hillside Development:**
- a. Ground cover sufficient to restrain erosion must be provided for any portion of a land disturbing activity in a steep slope area within 7 working days or 14 calendar days following completion of construction activity or a phase of the development, whichever is the shorter time span.