

Grading Permit Standards Handbook

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PRINCIPLES OF EROSION AND SEDIMENT CONTROL

The denuded slopes of construction sites are a major source of surface runoff pollution in the San Mateo County. Particles of nutrient-rich topsoil, displaced by the force of rain and runoff, are carried downslope into stream channels and water bodies. The resulting water quality problems include sediment buildup and blockage of channels, turbidity, increased algal growth and oxygen depletion.

The following are general principles for controlling erosion and sediment on construction sites. They are intended to provide guidance in the prevention of erosion and sedimentation problems and in the development of erosion and sediment control measures (see detailed discussion under Grading Standards).

- fit development to the existing topography, soils, and vegetation as much as possible;
- minimize soil exposure during the rainy season by proper timing of grading and construction;
- retain natural vegetation whenever feasible;
- vegetate and mulch denuded areas to protect them from winter rains;
- divert runoff away from steep denuded slopes or other critical areas with barriers or ditches;
- minimize length and steepness of slopes by benching, terracing or constructing diversion structures;
- prepare drainageways to handle concentrated or increased runoff from disturbed areas by using riprap or other lining materials;
- trap sediment-laden runoff in basins to allow soil particles to settle out before flows are released to receiving waters;
- inspect sites frequently to ensure control measures are working properly, and correct problems as needed.

EROSION AND SEDIMENT CONTROL PLAN GUIDELINES

An Erosion and Sediment Control Plan shall be prepared by a person or firm qualified by training and experience to have expert knowledge of erosion and sediment control methods. The plan shall contain (a) a narrative and (b) a site plan

(a) The narrative section shall contain descriptions of:

- 1) The nature and purpose of the land disturbing activity and the amount of grading involved.
- 2) Existing site conditions including topography, vegetation and soils.
- 3) Adjacent areas such as streams, lakes, residential areas and roads that might be affected by the proposed activity.
- 4) Soil types, including an assessment of erodibility, permeability, effective rooting depth, texture, structure and overall capability for establishing vegetation.
- 5) Critical areas within the developed site that have serious erosion potential or problems.
- 6) Erosion control methods including:
 - a) All drainage systems and facilities, walls, cribbing or other erosion protection devices to be constructed with, or as a part of the proposed work.
 - b) Estimated maximum runoff potential of the area served by any drainage systems or facilities, based on current design standards of the Department of Public Works.
 - c) Proposed vegetative erosion control measures including location, type and quantity of seed, mulch, fertilizer and irrigation; timing and methods of planting, mulching and maintenance of plant material and slopes until a specified percentage of plant coverage is uniformly established.

(Note: Measures must meet or exceed all requirements in the Grading Ordinance and Performance Standards Handbook. If grading is scheduled to be completed before the rainy season begins, the plan should specify contingency actions to winterize the site if construction should fall behind schedule).

- 7) Storm water stabilization mitigation measures, if the development of the site will result in increased peak rates of runoff that may cause flooding or channel degradation downstream.
 - 8) Maintenance schedule of regular inspections and repairs of erosion and sediment control structures, including disposal of waste materials and disposition of control measures after they have served their purpose.
 - 9) Calculations used for the estimation of runoff, and for the design of such items as sediment basins, swales and waterways.
 - 10) An implementation schedule showing the following:
 - a) The proposed grading schedule.
 - b) The proposed schedule for winterizing the site to include the condition of the site on each July 15, and October 15 during which the permit is in effect.
 - c) The proposed schedule for installation of all interim erosion and sediment control measures including, but not limited to, the stage of completion of such devices on each of the dates set forth in subsection b.
 - d) The schedule for construction, if any.
 - e) The schedule for installation of permanent erosion and sediment control devices where required.
 - 11) The estimated cost of implementation of the erosion and sediment control measures.
- (b) The site plan shall include maps or drawings showing:
- 1) The vicinity of the site in relation to the surrounding area.
 - 2) Existing contours.
 - 3) Location and types of vegetation on the site. Within 25 feet of any cut or fill, the applicant shall show the location, circumference, species and appropriate elevation at the base of all trees over 38 inches in circumference as measured at 4 1/2 feet above average ground level. The design of the project shall attempt to save wherever possible all healthy trees, natural vegetation and other natural features of high aesthetic value. Where determined to be appropriate by the County, a licensed tree care specialist shall review the physical condition of any significant and heritage class trees to be saved at the site. When required, a report shall be prepared by the specialist setting

requirements of grading and development adjacent to remaining trees. These requirements shall be incorporated into the grading plan.

- 4) Soil types and their boundaries within the proposed development.
- 5) Areas within the development with potentially serious erosion problems.
- 6) Existing drainage patterns including dividing lines and direction of flow.
- 7) Final contours after proposed development.
- 8) Limits of the areas to be cleared and graded.
- 9) Location of vegetative erosion control measures including planted areas and irrigation.
- 10) Location and details of all drainage systems and facilities, walls, cribbing or other erosion protection devices to be constructed in connection with, or as a part of the proposed work.

GRADING STANDARDS

(a) General Grading Standards.

- 1) One copy of approved grading plans and specifications shall be kept on the site at all times during the progress of grading work.
- 2) All grading and noise therefrom including, but not limited to, warming of equipment motors in residential zones, or within one thousand feet (1,000') of any residential occupancy, hotel, motel or hospital, shall be allowed only between the hours of 7:00 a.m. and 5:30 p.m. weekdays, unless other hours are approved by the County upon receipt of evidence that an emergency exists which would constitute a hazard to persons or property.
- 3) All exposed or finished banks or slopes of any fill or excavation shall be protected from erosion by approved planting, hydroseeding, cribbing, walls, terracing or other suitable method or a combination thereof. Other unprotected graded surfaces shall be planted, paved or built upon, or shall be provided with berms and approved drainage facilities adequate to prevent erosion and to conduct the accumulation or runoff of surface waters to an approved place of discharge. Rock cut slopes not amenable to seeding may be horizontally terraced to a width and depth of approximately 1 foot (between mandatory 8 foot wide terracing) during grading to allow accumulation of soil and subsequent growth of vegetation. It is the intent of this section to prohibit the abandonment of graded areas or slopes which are not provided with erosion and rock fall protection and adequate drainage facilities, even though all other requirements herein have been provided and approved.
- 4) All building site pads shall be graded to provide drainage to a street, natural watercourse, approved flood control channel or conduit, or easement for drainage purposes as approved by the County.
- 5) Cut and fills shall be designed to balance as nearly as possible to avoid problems created by off-site hauling. If off-site hauling is necessary, details of the hauling operation including but not limited to size of trucks, haul route, disposal site, dust and debris control measures, and time and frequency of haul trips shall be submitted to County for approval. The County shall be empowered to place such restrictions as it deems necessary to minimize problems relating to health, safety, and general welfare which might arise from this hauling.
- 6) Cut and fill slopes shall be contour rounded as approved by the County.
- 7) Variable slopes shall be used when required by the County to eliminate the artificial look of slopes, to mitigate environmental damage, or to take advantage of inherent characteristics of slope materials. Variable slope treatment shall be as approved by the County.

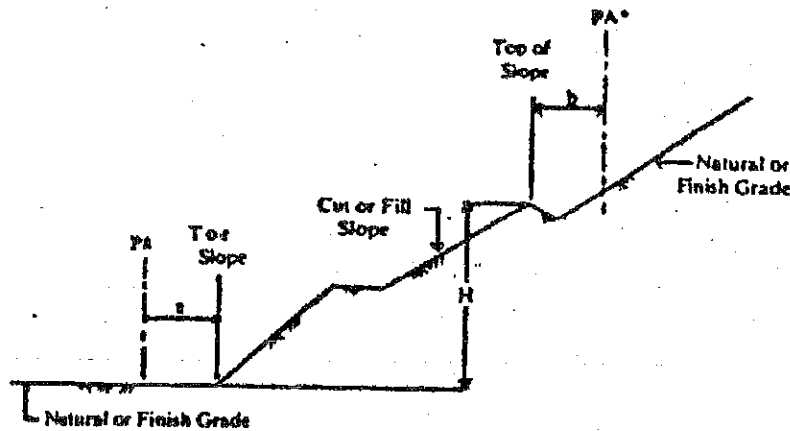
- 8) Whenever any portion of the work requires entry onto adjacent property for any reason, the permit applicant shall obtain a right of entry from the adjacent property owner or his authorized representative in a form acceptable to the County, and shall file a copy of the fully executed right of entry with the County prior to issuance of the grading permit and/or approval of the grading plan.
- 9) Sediment basins may be required to detain runoff and trap sediment during construction until slope erosion planting has been established. The sediment basin and collected silt shall then be removed and the resulting material hauled from the site or used as topsoil. Any off site disposal shall be described and shown on the plan.
- 10) Stockpiling of materials shall be subject to County approval and shall be removed or relocated when required by the County.
- 11) Maintenance of protective devices, etc. The owner of any property on which an excavation or fill has been made shall maintain in good condition and repair all retaining walls, cribbing, drainage structures and other protective devices.
- 12) Grading operations shall stockpile any removed topsoil for reapplication on slopes less than 20 percent to aid the establishment of vegetation.

(b) Specific Grading Standards.

- 1) Cuts and Fills. Unless otherwise recommended in the soils engineering and/or engineering geology report and approved by the County, cuts and fills shall be in accordance with the following provisions:
 - a) Cut and fill slopes shall be no steeper than two horizontal to one vertical.
 - b) Where existing ground slopes are steeper than five horizontal to one vertical, the surface to receive fill shall be benched into stable bedrock or other competent material as determined by the geotechnical consultant. The bench under the toe of the fill shall be at least 10 feet wide for fills, 10 feet or higher. In general, the bench (basal key) under the toe of the fill is approximately one half the vertical height of the fill.
 - c) Earth materials which have no more than minor amounts of organic substances and have no rock or similar irreducible material with a maximum dimension greater than 8 inches shall be used for fill material. Rock or concrete in excess of 8 inches may be placed in a fill only at locations and to the specifications of the geotechnical consultant. Care shall be taken to avoid nesting and foundation interference.
 - d) All fills shall be compacted to a minimum of 90 percent of maximum density as determined by State of California Test Method 1557 or equivalent method of determining maximum soil density approved by the

County. Field density shall be determined by a method acceptable to the County.

- e) The tops and toes of cut and fill slopes shall be set back from property lines and structures as far as necessary to provide for safety of adjacent property, safety of pedestrians and vehicle traffic, required slope rounding, adequate foundation support, required swales, berms and drainage facilities and applicable zoning requirements. In no case shall setback be less than as follows:

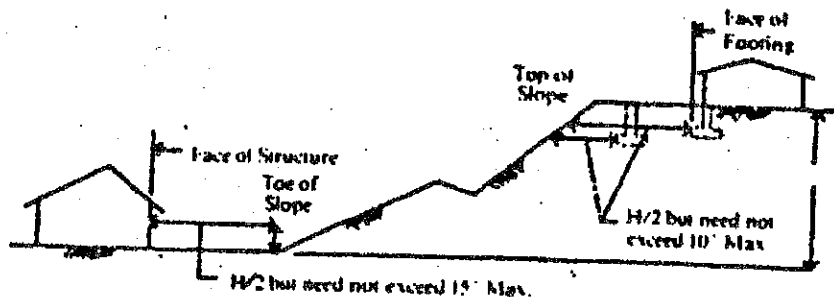


*Permit Area Boundary

REQUIRED SETBACKS FROM PERMIT AREA BOUNDARY (FEET)

H	SETBACKS	
	a	b
Under 5	0	1
5 - 30	H/2	H/5
Over 30	15	6

*Additional width may be required for interceptor drain.



- f) The faces of cut and fill slopes shall be prepared and maintained to control erosion and to return the slope to a natural appearance as near as possible. The protection for the slopes shall be installed as soon as practicable and prior to calling for final approval. The planting shall be so timed that plant material will not be washed out by rains nor burned due to lack of water. Where necessary, check dams, cribbing, riprap and other devices or methods shall be employed to control erosion and/or provide safety. All plantings shall be maintained by the owner for a period no less than two winter seasons ending April 15.
- h) Erosion control measures shall be employed during the rainy season (see Section 8605.6) as recommended by the geotechnical consultant and approved by the County.

2) Drainage.

- a) Terraces at least 8 feet in width shall be established at not more than 30-foot vertical intervals to control surface drainage and debris on cut or fill slopes. Suitable access shall be provided to permit proper cleaning and maintenance of such benches.

Swales or ditches on terraces shall have a minimum gradient of one percent and must be paved with reinforced concrete not less than 3 inches in thickness. All surface gutters shall be completely emplaced in competent material underlying any top soil. They shall have a minimum depth at the deepest point of 1 foot and a minimum paved width of 32 inches. A single run of swale or ditch shall not collect runoff from a tributary area exceeding 15,000 square feet (projected) without discharging into a down drain.

- b) All drainage facilities shall be designed to carry waters to the nearest practical drainage way approved by the County and/or other appropriate jurisdiction as a safe place to deposit such waters. Drainage shall not adversely affect adjacent properties. If drainage facilities discharge onto natural ground, riprap and/or energy dissipaters shall be constructed. All building sites shall be graded and sloped away from the building foundation with a minimum slope of 2 percent for a minimum distance of 10 feet on all sides of every building except where yard requirements are less than 20 feet, in which case the soil shall be graded away from the foundation to a minimum of two-tenths of a foot in elevation at a distance not less than one-half the required yard width. Lot drainage shall be directed toward approved drainage facilities at a minimum gradient of 2 percent unless otherwise approved by the Department of Public Works.
- c) Properly designed trash racks may be required on the upstream end of storm drain pipes where that pipe accepts drainage from a waterway which is not to be undergrounded. These racks are to be constructed so

as to preclude significant debris from being pulled into the pipe from heavy storm flows. The County may require the installation and proper up keep of trash racks at other locations as it deems necessary for proper maintenance and safety.

GEOTECHNICAL REPORT GUIDELINES

- (a) The geotechnical report required shall be prepared by a professional geotechnical consultant under the direction of a Soils Engineer and an Engineering Geologist in accordance with the current County guidelines for the preparation of geotechnical investigations as detailed in County of San Mateo "Minimum Standards for Geotechnical Reports."
- (b) Recommendations included in this report and approved by the County shall be incorporated in the grading plans and/or specifications.
- (c) Sufficient soil samples to represent a true cross-section of the cut and fill areas and of the material to be used as fill shall be taken and tested under the supervision of the geotechnical consultant. All soils shall be classified in accordance with the Unified Soil Classification system. Reports, including all test reports by the geotechnical consultant, shall be submitted covering the following:
 - 1) Field and laboratory tests of the land to be covered with fill to determine the characteristics of the soil, including its expansive qualities and bearing capacity, consolidation potential, and a statement as to whether it can support the proposed fill and structures. In those areas where saline or alkaline soils or other problem conditions may be encountered, sufficient information to define the problem and evaluate its solution shall be submitted to the County. Recommendations for solutions to concrete related problems should be included where relevant.
 - 2) Field and laboratory soil analysis of the material proposed for the fill, including its source and expansive quality and a statement as to its suitability. The analysis shall also specify the optimum moisture content at which the proposed fill material compacts to 100% dry density in accordance with California Test Method 1557 or approved equal. This requirement may be postponed until sufficient excavation has been done to obtain good representative samples.
 - 3) Field and laboratory soil analysis of existing soil conditions in proposed cut locations, including expansive qualities and bearing values. Additionally, sufficient data concerning slope stability analysis shall be submitted.
 - 4) Any potential groundwater condition which may affect soil strength, consolidation, or slope stability shall be defined and evaluated.
 - 5) Proposals to replace, rework or blend, or to stabilize or modify with additives either the natural site soils or the proposed fill materials, shall be supported by appropriate laboratory analyses and other such data as may be necessary for evaluation of the proposal.

- 6) The location of and effects of active faults which may affect the proposed development and the results of seismic activity on the soils as the site is proposed to be graded and on the proposed buildings are to be evaluated. Recommendations shall be made relating to building setback distances from nearby active faults and foundation design necessitated by seismic activity.
- (d) A complete and detailed specification shall be prepared by the geotechnical consultant for clearing, grubbing, and all aspects of grading, including utility trench backfill, water control measures, compaction methods, moisture content, frequency of field density tests, and minimum density to be obtained in the field as related to laboratory density tests.
- (e) A statement regarding specified grading and slopes shall be prepared by the geotechnical consultant, giving a professional opinion, including the following:
 - 1) Shrinkage or settlement of a fill constructed in compliance with the proposed specification for controlled earthwork.
 - 2) The safe load-bearing capacity for such controlled sites.
 - 3) The maximum slope ratios necessary for slope stability for proposed fill and cut slopes, with the assumption of proper planting on the slope to assure freedom from erosion.
- (f) The County reserves the right to require additional soils and/or geological investigations to be made if deemed necessary in order to further insure the safety and maintainability of the site.

DUST CONTROL PLAN GUIDELINES

- (a) All graded surfaces and materials, whether filled, excavated, transported or stockpiled, shall be wetted, protected or contained in such a manner as to prevent any significant nuisance from dust, or spillage upon adjoining property or streets. Equipment and materials on the site should be used in such a manner as to avoid excessive dust. A "dust control plan" may be required at anytime during the course of the project.
- (b) A dust palliative shall be applied to the site when required by the County. The type and rate of application shall be as recommended by the Soils Engineer and approved by the Director of Public Works, Environmental Health Officer, and any appropriate State agency.

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