

**CHAPTER 10**  
**GUAM SOIL EROSION AND SEDIMENT CONTROL**  
**REGULATIONS**

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**NOTE:** Rule-making authority cited for formulation of Erosion and Sediment Control regulations by the Guam Environmental Protection Agency, 10 GCA Chapter 45.

Regulatory power for the control of water pollution was originally vested in the Water Pollution Control Commission pursuant to §47101-47112 10 GCA. . Subsequently, all powers of the Water Pollution Control Commission were transferred to the Guam Environmental Protection Agency through §§ 45101-45110 10 GCA Article 1, Chapter 45.

The regulations are reprinted here in form as exact as possible to those filed with the Legislative Secretary. The substance of the regulations has not been changed. However, for the purpose of uniformity and ease of use, a new system of numbering has been adopted by the Editor.

**§10101. General Provisions: Applicability.** This regulation shall apply to all activities as follows:

(a) All projects found to be in need of clearing and/or grading permits as defined in Chapter 70, §7003 of the Uniform Building Code, except for the following:

(1) Grading in an isolated, self-contained area if there is no danger apparent to private or public property.

(2) An excavation below finished grade for basements and footings of a building, retaining wall or other structure authorized by a valid building permit. This shall not exempt any fill made with the material from such excavation nor exempt any excavation having an unsupported

height greater than five (5) feet after the completion of such structure.

(3) Cemetery graves.

(4) Refuse disposal sites controlled by other regulations.

(5) Excavations for wells or tunnels or utilities.

(6) Exploratory excavations under the direction of soil engineers or engineering geologists.

(7) An excavation which:

a. is less than two (2) feet in dept, or

b. which does not create a cut slope greater than five (5) feet in height and steeper than one and one half (1 1/2) horizontal to one (1) vertical.

(8) A fill less than one (1) foot in dept, and places on natural terrain with a slope flatter than five (5) horizontal to one (1) vertical, or less than three (3) feet in depth, not intended to support structures, which does not exceed fifty (50) cubic yards on any one (1) lot and does not obstruct a drainage course.

(9) Field plowing or filling for agricultural purposes.

(10) When the earthmoving activity is for the purpose of erecting a one (1) or two (2) family residence.

(b) Development and/or construction operations shall comply immediately with this regulation to the extent possible.

(c) Ongoing activities/operations of a continuous nature, such as dredging, quarrying, etc., shall be in compliance with these regulations within three (3) months from the effective date.

**§10102. Same: Permit Issuance.** No clearing/grading permit shall be issued for any use which would cause pollution to waters of the Territory as defined in the Guam Water Pollution Control Act.

**§10103. Same: Enforcement.** In the event of any violation of this regulation, enforcement action as

provided in 22 GCA Chapter 46, relative to Water Pollution Control, and for other purposes will be applicable.

**§10104. Same: Penalties.** Persons found guilty of any violations shall be subject to penalties in accordance with 10 GCA Chapter 47, Guam, relative to Water Pollution Control and for other purposes.

**§6105. Definitions.** (a) *Administrator* shall mean the Administrator of the Guam Environmental Protection Agency.

(b) *Agency* shall mean the Guam Environmental Protection Agency.

(c) *Channel* shall mean a natural stream that conveys water; a ditch excavated for the flow of water.

(d) *Check Dam* shall mean a structure used to reduce or prevent excessive erosion by reduction of velocities in water courses.

(e) *Chutes/Flumes* shall mean channels of concrete or comparable material that are used to conduct storm runoff down slopes where concentrated runoff would cause slope erosion.

(f) *Crimping* shall mean a method used to secure fiber mulches. The Operation is performed by a crimping machine which partially punches the mulch into the soil.

(g) *Deflection Structures* shall mean stone, concrete or wooden groins constructed in a river or stream at an angle outward from the shore in a downstream direction to deflect the current away from a critical area of the bank.

(h) *Denuded* shall mean bare; naked; stripped.

(i) *Developer* shall mean a person or corporate entity who controls a land parcel from its acquired state through the process of urbanization. The acquired state may be wild or farm land which is changed to a shopping center, housing unit, commercial unit or amenities.

(j) *Dissipate* shall mean to scatter; disperse; cause to vanish.

(k) *Diversion* shall mean to change the accustomed course of all or part of a stream or of sheet runoff.

(l) *Diversion Dike* shall mean a temporary ridge of soil constructed at the top of a cut or fill slope to divert overland flow from small areas away from unstabilized slopes.

(m) *Diversion Ditch* shall mean a ditch constructed to channel stream or sheet runoff into desired direction, and may also be referred to as *Interceptor Channel*.

(n) *Erosion Check* shall mean a technique whereby porous, mat-like material is installed in a slit trench that is oriented perpendicular to the direction of flow in a ditch or swale to prevent the formation of rills and gullies by permitting subsurface water migration without the removal of soil particles.

(o) *Interceptor Dike* shall mean a temporary ridge of compacted soil across graded rights- of-way that are not subject to vehicular traffic to intercept storm runoff and divert it to temporary outlets where it can be disposed of with minimal erosion.

(p) *Intermittent Stream* shall mean a stream or portion of a stream that flows only in direct response to precipitation and receives little or no water from springs and no long-continued supply from other sources.

(q) *Jute Netting* shall mean a heavy woven jute mesh laid directly over seedbeds to minimize soil erosion in critical areas until vegetation can become firmly established. Due to its thick fibrous composition, it also functions as a mulch to conserve soil moisture, insulate against solar insolation, dissipate energy from falling raindrops and reduce erosion caused by overland flow.

(r) *Level Spreader* shall mean an outlet constructed at zero grade across a slope to collect concentrated runoff and convert it into sheet flow with non-erosive velocities onto areas stabilized by existing vegetation.

(s) *Mulch* shall mean a natural or artificial layer of plant residue (fiber mulches) or other materials, such as sand or paper, on the soil surface.

(t) *Mulch Blanket* shall mean blanket type materials used in the establishment of vegetation on swales, ditches and steep slopes where fiber mulch

products do not provide sufficient levels of protection during germination and early growth.

(u) *Netting* shall mean a method of securing fiber mulches through the use of jute, plastic, paper or fiberglass nets on steep exposed slopes where crimping is not possible and tacking will not perform satisfactorily.

(v) *Outcrop* shall mean to come to, or be exposed on the surface.

(w) *Permeable* shall mean having a texture that permits water to move through.

(x) *Permeability* shall mean the property of a porous material which permits the passage or seepage of fluids, such as water for example, or air through its interconnection voids.

(y) *Person* shall mean the territory of Guam or any instrumentality thereof, any municipality, political subdivision, institution, public or private corporation, partnership, individual or other entity.

(z) *pH* shall mean a numerical measure of the acidity or hydrogen ion activity of a soil. (The neutral point is pH = 7.0. All pH values below 7.0 are acid and all above 7.0 are alkaline).

(aa) *Revetments* shall mean a facing of stone or other material, either permanent or temporary, placed along the edge of a stream to stabilize the bank and to protect it from the erosive action of the stream.

(bb) *Right-of-Way* shall mean right of passage over another person's land; a route that is lawful to use; a strip of land acquired for transport or utility construction.

(cc) *Riprap* shall mean broken rock, cobbles or boulders placed on earth surfaces such as the face of a dam or the bank of a stream, for protection against the action of water or waves; also applied to brush or pole mattresses, or brush and stone, or other similar materials used for soil erosion control.

(dd) *Runoff* shall mean that part of the precipitation which runs off the surface of a drainage area and reaches a stream, body of water, a drain or sewer.

(ee) *Sandbag Sediment Barrier* shall mean temporary barriers or diversions that are constructed of sandbags.

(ff) *Sectional Downdrain* shall mean a prefabricated sectional conduit of half-round or third-round, bituminized fiber pipe or other material used to conduct storm runoff from one elevation to another without erosion of slope.

(gg) *Sediments* shall mean mineral or organic solid material that is being transported or has been moved from its site or origin by air or water, and has come to rest on the earth's surface either above or below sea level.

(hh) *Sedimentation* shall mean the depositing of sediments.

(ii) *Sediment Retention Basin* shall mean a temporary dam or basin, or a combination of both, that will trap and store sediment produced on exposed areas and delivered to the structure by storm runoff.

(jj) *Soil Slopes* shall mean all denuded cut, fill or natural soil constituted slopes.

(kk) *Storm-Water Management* shall mean the practice of using detention measures to reduce the impact of minor storms which cause accelerated erosion of stream channels and drainage ways (not to be confused with control of flood flows).

(ll) *Strip Planting* shall mean the planting of a strip of wet soil tolerant, high erosion resistant vegetation in the critical area near the waterline of a major waterway, and the planting of conventional robust rooted grasses and legumes above the critical zone.

(mm) *Tacking* shall mean a method of securing mulches by the application of an asphalt or chemical binder which binds the individual fibers together to form a resistant blanket.

(nn) *Terrace* shall mean an embankment or combination of an embankment and channel constructed across a slope to control erosion by diverting or storing surface runoff instead of permitting it to flow uninterrupted down the slope.

(oo) *Tetrahedron* shall mean solid figure with four (4) triangular surfaces.

(pp) *Watershed* shall mean the area contained within a divide above a specified point on a stream.

(qq) *Watershed Divide* shall mean the line that follows the ridges or summits forming the exterior boundary of a drainage basin and separates one drainage basin from another.

(rr) *Waterway* shall mean a natural course or constructed channel for the flow of water.

**§10106. General Requirements: Erosion and Sediment Control Plans.** (a) Erosion and sediment control plans shall be prepared as set forth in §10109 of these regulations and submitted to the Agency in time to allow fourteen (14) working days review.

(b) At the end of the fourteen-day review period, the Agency shall approve or disapprove the Erosion Control Plan. Any condition attached to such approval shall be complied with in full, unless subsequently waived by the Agency. Lack of Agency comments within the stipulated time shall constitute approval. Any notice of a disapproval must contain any and all reasons for such disapproval.

**§10107. Same: Earth Moving Activities.** (a) All earth moving activities in the Territory shall be conducted in a manner that prevents accelerated land erosion, transportation of sediment to and along waterways, and siltation of rivers, estuaries and marine waters. All developers engaged in earth moving activities shall proceed in accordance with the erosion and sediment control plan specifications set forth under §10108 through §10113 of these regulations.

(b) The area of land to be graded at any one time during development or construction shall be kept to a minimum. No graded area shall remain unstabilized for a period exceeding two (2) months. In the event that grading is discontinued or lengthy delays occur, the graded area shall receive emergency temporary cover acceptable to the Agency to protect it from erosion. Upon resumption of construction, the two-month exposure period shall be reimposed.

(c) Temporary ditches, dikes, vegetation and/or mulching shall be used to protect critical areas during construction.

(d) All permanent facilities for the conveyance of water around, through or from project areas shall be properly designed and completed in an orderly and professional manner.

(e) All disturbed areas, slopes, channels, ditches and banks must be stabilized as soon as possible after the final grade has been completed.

(f) Stormwater runoff from disturbed areas of a project shall be collected and diverted to facilities for removal of sediment prior to discharge to any surface or marine waters of the Territory.

(g) All erosion and sedimentation control facilities necessary to protect areas from erosion during the stabilization period shall be maintained by the permittee until stabilization is complete.

(h) Sediment loss shall not violate §5103(b)(6) and (7) of the Water Quality Standards, relative to Specific Numerical Water Quality Criteria on Suspended Matters and Turbidity.

**§10108. Procedures: Preliminary Site Evaluation.**

The developer shall conduct a Preliminary Site Evaluation which shall be performed in a professional manner by a person experienced in the siting and design of both structural and vegetative erosion controls, knowledgeable in the earth and vegetative sciences and capable of recognizing the critical physical features affecting erosion and sediment control. A description of the physical features of the site to be developed shall be performed in sufficient detail to provide the background information necessary to implement the erosion control plan as called for in and may include any and/or all of the following:

- (a) Existing vegetation and land use.
- (b) A soil and rock analysis that includes:
  - (1) Steepness of slopes and erodibility of soil.
  - (2) Type and degree of outcroppings.
  - (3) Permeability and percolation rates.
  - (4) Depth of topsoil.
  - (5) American Association of State Highway Officials or unified soil classification.

- (6) Hydrogen ion concentration (pH).
  - (7) Shrink - swell potential.
  - (8) Moisture - density relationship.
  - (9) Gradation and organic matters.
- (c) Hydraulic characteristics that include:
- (1) Rivers and streams - dimensions and flow.
  - (2) Springs and wells including flow and well logs.
  - (3) Subsurface conditions including aquifer type and capacity, depth to the watertable and location of perched water.
  - (4) Marine water and reef flat condition where applicable.
  - (5) Natural drainage depression, basins and sinks.
  - (6) Flood plains, both on the site and downstream, that will undergo changes due to grading and construction.

**§10109. Same: Erosion and Sediment Control Plan Preparation.** (a) Preliminary site evaluation shall be submitted together with the erosion and sediment control plan prepared by a qualified professional consulting engineer.

(b) The physical features of the site to be developed shall be defined on a topographic map having a scale of 1" equal to 40' or 50' with contour intervals of 5'. The map shall extend beyond the site to be developed far enough so that any impact of erosion from the site and its deposition on adjacent properties may be assessed.

(c) Construction increments shall be defined considering the physical features of watersheds and identified on the erosion control plan. Completion dates for each phase of construction shall be indicated for each increment, and all clearing, grading and stabilization operations shall be completed on a specified increment before moving on to the next specified increment.

(d) Location, construction and maintenance of sediment retention structures and equipment:

(1) The site plan shall specify the type, dimensions and location of all sediment retention or stormwater management structures and equipment.

(2) The plan shall indicate the construction sequence of erosion control structures coordinated with the increment development schedule.

(3) A maintenance program for the control facilities during the construction phase shall be prepared that includes plans for the removal and disposal of materials from the control facilities on the project area.

(e) Traffic Control During Construction:

(1) All vegetative filter strips along waterways and undisturbed open spaces must be located on the site plan and designated as off-limits for all vehicular traffic.

(2) All right-of-ways shall be shown on the site plan and the specification must state that all vehicular traffic will stay within the designated right-of-way. The right-of-way crossing streams or stabilized drainage areas shall be approved stabilized crossings.

(f) Natural Stream Erosion Controls:

(1) All critical areas along streams must be marked on the site plan and the recommended methods of stabilization indicated.

(2) Stream stabilization shall be scheduled during periods of dry weather flow whenever possible.

(3) All sediment or water management structures for natural waterways in the development area shall be installed prior to the initiation of clearing and grading. Completion dates for these structures must be indicated.

(g) The stabilization of all waterways shall be defined giving both temporary and permanent practices which state where and when sodding, temporary seeding and permanent seeding are to be used. The specification shall include ground preparation, sod quality, seed type and quality, fertilization and mulching.

(h) Grading Delays:

(1) The construction specifications shall clearly define the maximum length of time that a graded area

can be left uncovered after completion of grading and after any grading shutdown as specified in §10107(b) of these regulations.

(2) The specification shall state what short term stabilization practices will be performed in the event of a lengthy delay.

**§10110. Methods and Specifications: Stabilization of Waterways.** (a) All grading shall be scheduled during periods of low expected precipitation and staged to minimize the time span that soil is exposed.

(b) In order to increase the channel capacity and lessen sedimentation, excavation shall have preference over filling unless it can be shown in specific situations that filling is more practicable.

(c) Vegetated waterways shall be preferred over concrete or asphalt lined waterways where the most permeable surface is desired. Vegetative measures are both practical and economical in many cases where one or more of the following conditions exist:

- (1) Poor quality vegetative cover.
- (2) Relatively flat terrain.
- (3) Low stream banks.
- (4) Tangential flow.
- (5) Low flow velocity.
- (6) Fertile soil.

(d) Vegetation for use in stream bank stabilization shall be selected on its tolerance to erosive forces, soil moisture, sedimentation and soil conditions.

(e) Prior to planting, all banks shall be graded to the required slope.

(f) Strip planting techniques shall be used except where it can be demonstrated that another method is more practicable.

(g) An erosion control netting or blanket may be required along with normal mulching practices to protect the graded and planted areas until a strong vegetative cover is established.

(h) Grade control structures shall be used to control the gradient of waterway channels, reduce

stream velocity, protect against undercutting and minimize scouring:

(1) Check dams may be constructed of logs, treated timber, stone, concrete or synthetic materials to flatten the slope of the stream and dissipate hydraulic energy. They should be used with caution on streams that are susceptible to flooding since flow rates are reduced and flood levels are increased.

(2) Revetments may be used as a facing in stream banks and shorelines to prevent erosion. flexible revetments are preferred over rigid structures. They may be constructed of riprap, fabricform mats, bagions, inter-lacking concrete blocks or steel or concrete tetrahedrons. Rigid to slightly flexible revetments may be constructed of concrete or asphalt paving, grouted stone riprap or sacked concrete. A stable foundation is required and where fill is used, the upper one (1) foot shall be compacted to at least eighty-five percent (85%) of optimum beneath the revetments. To prevent undercutting, all revetments should extend several feet below the existing ground surface. Where extra undercutting protection is needed, large loose boulders may be placed at the toe of the revetment. All flexible and most rigid revetments must be placed on slope of fifty percent (50%) Gabions, wood and sheet piling are constructed with a vertical face.

(3) Deflection structures of stone, concrete or wood groins should only be used in large streams where the deflected current will not jeopardize the opposite bank. To protect the groin against scouring, a foundation must be constructed below the anticipated scour depth.

(i) Whenever possible the natural drainage system should be utilized and measures must be taken to preserve natural vegetation during construction. When the natural vegetation is not able to resist the additional erosive force of the increased runoff from an area, during and after development, it will be necessary to reinforce the natural vegetation with additional planting or structures.

(j) Where limiting factors such as excessive soil erodibility, slopes, toxicity or a high watertable (either natural or perched) inhibits the use of vegetated waterways, checkdams may be used in series to flatten

the gradient of the waterway and dissipate the hydraulic energy.

(k) Vegetated waterways with erosion resistant soils shall be designed with flow velocities that will not cause detrimental effects on seeded areas. If the designed flow is between four (4) and seven (7) feet per second with erosion resistant soils, sodding shall be performed. If the soil is erodible at these velocities or, if the velocity is in excess of seven (7) feet per second, structural measures will be required in conjunction with seeding or sodding.

(l) Temporary stabilization of all seeded and sodded areas shall be undertaken until the vegetation is firmly established. Long fiber mulches covered by nettings such as plastic, paper or fiberglass or jute nettings which also function as a mulch, are recommended for this purpose.

(m) In waterways with permeable granular soils where subsurface drainage presents a problem, erosion checks must be established across the waterway and beneath the netting at various intervals along the channels.

**§10111. Same: Stabilization of Man-Made Cut and Fill Soil Slopes.** (a) Man-made cut and fill slopes shall be properly constructed to the required steepness. Wherever water collected by the slope creates an erosion problem, control measures must be instituted.

(b) To divert runoff away from denuded slopes, diversion dikes shall be placed along the tops of cuts and fills or at intervals along natural slopes.

(c) Benches and terraces shall be constructed in cut and fill slopes to break the length of the slope, collect runoff water and carry it to safe disposal points; and shall meet the following specifications:

(1) Diversion terraces and channels shall be constructed upgrade of a project area to divert runoff water around the project area.

(2) Diversion terraces and channels shall be grassed or lined with erosion resistant material to prevent accelerated erosion.

(d) Level spreaders may be constructed at zero grade across a slope to convert concentrated flow into

sheet flow for outlet at non-erosive velocities onto areas stabilized by vegetation.

**§10112. Same: Interim or Emergency Stabilization Measures.** (a) For short term soil stabilization, i.e., to protect denuded soil from wind and water erosion during delays in grading operations or during heavy rain periods, chemical soil binders or fiberglass, wood chips or any acceptable substitute shall be used.

(b) Whenever it is necessary to anchor mulches to prevent their washing or blowing away, crimping or tacking methods must be used.

(c) On steep exposed slopes where crimping is not possible and tacking will not perform satisfactorily, jute, plastic, paper and fiberglass nettings, or mulch blankets shall be used in the anchoring process.

(d) Mulch blankets shall be used in establishing vegetation in swales and ditches when other fiber mulch products fail to provide sufficient levels of protection.

**§10113. Same: Sediment Retention Structures.** (a) In areas where the detrimental effects of storm water runoff is minor, filter berms or sandbags may be used to filter sediment from runoff:

(1) On sloping lots, straw bales or other approved substitutes may be used to divert sediment-laden runoff to sediment retention structures.

(2) Crushed stone or sandbags shall be placed around storm drain inlets to filter out sediment.

(3) To retard flow as well as filter out sediment around storm drain inlets, vegetative filter strips must be used.

(b) In areas where a large amount of runoff creates a major detrimental effect, sediment basins or ponds shall be used:

(1) The size of the sediment basin shall be determined by the area of its watershed, topography of the watershed, infiltration rate of the soils in the watershed and regional hydrological factors.

(2) Sediment basins may be constructed as short-term structures to function during construction, long-term structures to be utilized for recreation or other

purposes after development construction has been completed.

(3) Sediment basins must be properly designed by a registered engineer, and constructed considering effects of failure on downstream land, water, people and facilities.

(4) A sediment basin must be cleaned when its efficiency is reduced by twenty-five percent (25%) or less.

(5) Discharge from a sedimentation basin shall be to a natural waterway via outlet structures that pass a minimum flow of 2.0 cubic feet per second for each acre of project area tributary to the

**§10114. Restoration: Stabilization.** Upon completion of the project, all areas which were disturbed by the project shall be stabilized so that accelerated erosion and/or sedimentation will be prevented.

**§10115. Same: Interim Control Measure.** Any erosion and sedimentation control facility required or necessary to protect areas from erosion during the stabilization period shall be maintained until stabilization is completed.

**§10116. Same: Final Measures.** Upon completion of stabilization, all unnecessary or unusable control facilities shall be removed, the areas shall be graded and the soils shall be stabilized.