

DOÑA ANA COUNTY

DESIGN STORM CRITERIA GUIDELINES

FOR COMMERCIAL AND RESIDENTIAL SITES

Run-off Analysis Methods

This document sets forth the minimum design, technical criteria and specifications for the analysis and design of drainage plans and/or systems. These criteria are intended as guidelines for those situations in which the Doña Ana County Planning and Zoning Commission determines that drainage plans and/or systems are required in order to protect life or property and/or to maintain the natural run-off existing prior to development of particular sites. Those situations include, but are not limited to, zoning applications, special use permits, variances, planned building groups, paving projects, commercial or residential construction and any other situations affected by any methods or types of regulatory schemes for controlling the development and use of land in Doña Ana County which are now in existence or may hereinafter be enacted. The Doña Ana County Planning and Zoning Commission, as it now exists or as it may exist in the future under whatever name or organizational structure, shall have the discretion to require storm drainage analysis and appropriate drainage system design based on the 100-year frequency storm, before any phase of construction is permitted by the Public Works Administration as it now exists or as it may exist in the future under whatever name or organizational structure. Such analysis and design, if required, shall meet the criteria outlined herein.

- I. Development of Less Than Three Acres. Run-off Analysis for developments of less than three (3) acres can be based on general run-off coefficients for Valley and Mesa areas.

The run-off coefficient is an approximation of the amount of run-off that a developer (or home builder) will need to retain on site to maintain existing drainage characteristics. Drainage plans shall be based on the S.C.S. Method. In lieu of this method (S.C.S), the following simplified approach will be acceptable. (Other methods may be considered).

Specific Requirements:

- A. Identify Area Classification
Valley Areas - Land slope less than 1%
Mesa Areas - Land slope greater than or equal to 1%
- B. Run-off Coefficient
Valley Areas - 2.8"
Mesa Areas - 2.0"
- C. Calculate the impervious area of the lot to be developed. The impervious area includes the building, artificial desert landscape with plastic, sidewalks, asphalt paving, etc. (Places where water cannot penetrate into the ground.)
Calculate area in Square Feet (See figures No. 1 and No. 2)
- D. Find required storage volume by multiplying the impervious area (square feet) by the run-off coefficient (inches) and a conversion factor 1 foot/12 inches.

Area x Run-off Coefficient x Conversion Factor = Storage Volume
(See tables No 1 and No 2)

- E. Indicate on the construction plans how the required storage volume will be controlled on site. Induce details on wall and berms that will control or direct run-off, asphalt and lot grades, and method of overflow of the storage area.
 - F. Acceptable types of drainage structures.
See Tables 1 and 2 for typical calculations
 - 1. Open Ponding. Open retention ponds are recommended in areas that have good percolation of water into the soil. Open ponds offer the maximum amount of storage for a given land area. Minimum depth eighteen inches (18") and the pond should be located a minimum of five feet (5') from adjacent property lines and five feet (5') from any structures.
 - 2. French Drain. Acceptable in areas that have poor percolation rates, i.e. CLAYS. French drain shall be used only to provide increased percolation rates for run-off. French drains must have an open pond above rock level with a minimum clearance of twelve inches (12").
- II. Developments Equal to or Greater than Three Acres. Run-off analysis for developments equal to or greater than three (3) acres shall be based on the Soil Conservation Service Method (SCS), which is outlined in a publication entitled "Peak Rates of Discharge for Small Watersheds, Chapter 2 (Revised 2/85 for New Mexico), Engineering Field Manual for Conservation Practices." This manual is specifically for the application of the SCS procedure in New Mexico. Rainfall Data for analysis is outlined in the publication and can be found in the appendix.

(Other methods of calculating storm run-off may be considered.)

The following limitations apply to the SCS method:

- A. Minimum initial time - 5 minutes
- B. Time of concentration equal to the sum of initial time and gutter/pipe flow time. The minimum time of concentration is 10 minutes.
- C. Overland flow portions of time of concentration are to be calculated for a maximum reach length of five hundred feet (500').
- D. Specific Requirements:

The following criteria shall be utilized in the analysis of the drainage system.

- 1. Meet requirements of Sections VII, VIII, IX, and X of the Doña Ana County Subdivision Regulations, as revised and outlined in this document.

SECTION VII TERRAIN MANAGEMENT PLAN

- 1. The Commission may approve a terrain management plan if it determines that:
 - A. the plan conforms with the requirements of the Doña Ana County Subdivision Regulations as amended in this document; and

- B. the developer can fulfill the proposals for terrain management contained in the proposed plans.
2. Terrain management plans shall state the developer's name and mailing address, the date the plan is submitted, and is accompanied by a copy of the developer's disclosure statement and a schedule of compliance for meeting Doña Ana County Subdivision Regulations as amended. In addition, the Commission may require the terrain management plans to contain:
- A. maps including the following information:
 - 1. a vicinity map drawn to a scale that provides clear and concise presentation of the relationship of the site to its general surroundings, and the location of all existing drainage channels, water and erosion control structures, watercourses and water bodies within 500 feet of the development boundary.
 - 2. a development drawn to a scale that provides clear and concise presentation of the following:
 - (a) the boundaries of the area to be developed;
 - (b) existing contours at no more than 5-foot intervals, as certified by a registered professional engineer or surveyor;
 - (c) an overlay showing the location of all proposed lots, roads, bridges, water and erosion control structures, and utility easements in relation to the existing contours;
 - (d) an overlay showing the finished contours of the development after the developer's proposals have been implemented using contours at no more than five-foot intervals;
 - (e) the location of all cuts and fills;
 - (f) the location of all buffer strips, drainage channels, watercourses, water bodies, and areas subject to periodic flooding;
 - (g) the location of all areas with slopes over four percent;
 - (h) the location of all areas which the subdivider intends to revegetate; and
 - (i) the location of all areas in which the subdivider intends to preserve vegetation
 - B. A soil survey for the development including an overlay of the various soil types drawn to the scale of the proposed development map showing the location of each different soil type;
 - C. A surface drainage description including:
 - 1. storm drainage computations showing the estimated run-off from the proposed development prior to and following completion of the

- improvements;
 - 2. sufficient run-off information on the areas contributing run-off to the development to show existing drainage patterns and drainage channels that may affect the development or be affected by the development; and
 - 3. all appropriate design details necessary to clearly explain the construction of all necessary water control structures.
- D. The type of utilities to be provided as well as a statement from the appropriate utility company indicating whether or not the utilities are to be installed above ground or underground;
- E. A general grading proposal setting for the means for stabilizing all cut and fill slopes;
- F. An estimated schedule of construction including:
- 1. the start and finish of all clearing and grading operations;
 - 2. duration of exposure of disturbed areas;
 - 3. stabilization date for disturbed areas;
 - 4. installation date of storm drainage systems;
 - 5. installation date for all roads;
 - 6. surfacing date of roads and parking areas;
 - 7. installation date of each utility to be provided; and
 - 8. installation dates for buildings, recreation structures, and other improvements.
- G. The legal description of the development, including the range, township and section within the development is located where such information is available.
- H. The number of parcels within the development and the number of acres in the smallest parcel.

SECTION VIII SOILS AND GRADING

1. Soils

All lands to be developed must be composed of soils suitable for the intended use.

- A. Developments shall have soil suitable for at least the following uses:
- 1. building foundation support;

2. fill;
 3. road location;
 4. underground utilities;
 5. water control structures; and
 6. erosion control structures.
- B. Soil not suitable or having a high degree of hazard for the intended use shall not be developed for the intended use unless the developer can demonstrate in his terrain management plan that the inherent soil limitations may be overcome.
- C. Subject to the provisions of Subsection 2.L of this Section, soil may be transported to the development from other locations where the soil within the development is not suitable for the intended use.

2. Grading

- A. The Commission may require all grading, filling and clearing operations including road development to be designed to:
1. preserve, match, or blend with the natural contours of the land;
 2. retain or replace trees and other native vegetation, to stabilize hillsides, retain moisture, reduce erosion, run-off, and preserve the natural scenic beauty;
 3. minimize scars from cuts and fills;
 4. reduce the amount of cuts and fills and to round off sharp angles at the top and toe and sides of all necessary cut and fill slopes to conform to Chapter 70 of the UBC;
 5. prevent the deposit of sediment into flood plains, drainage channels, watercourses, and water bodies; and
 6. be compatible with the soil survey engineering interpretations.
- B. The following discharges attributable to grading are prohibited whether the discharge is direct or indirect:
1. sediment and other organic or earthen materials discharged into a watercourse, water body, drainage channel, or flood plain; and
 2. material placed in any position which would make it susceptible to erosion and deposition into a watercourse, water body, drainage channel or flood plain.
- C. Whenever the native ground cover is removed or disturbed, or whenever fill material is placed on the site, the exposed surface shall be treated to the extent necessary to eliminate dust arising from the exposed material.
- D. All grading and filling operations shall proceed according to a work schedule included in the grading plan. The schedule shall be drawn up to limit to the shortest possible period the time that soil is exposed and unprotected. (Not to exceed 6 months).

- E. Vegetation removed during clearing operations shall be disposed of in a reasonable manner.
- F. Earth removed during operations shall be disposed of in a reasonable manner at an appropriate site.
- G. The maximum cut or fill slope shall be determined on the basis of the risk of instability or soil erodibility as shown by the soil survey.
- H. Slopes shall not be subject to erosion or subsidence.
- I. If the material of the slope is of such composition and character as to be unstable under the maximum moisture content anticipated, the developer shall employ such measures as are necessary to ensure the stability of the slope. These measures may include, but are not limited to, reduction of the slope angle and mechanical stabilization of the slope.
- J. Where mechanical stabilization or containment of the slope by other than the use of native material is employed, the stabilization devices shall be at least partially screened by vegetation where practical.
- K. Organic material, such as vegetation or rubbish or any other material not subject to proper compaction or otherwise not conducive to its stability shall not be permitted in fills. No rock or similar irreducible material with a maximum diameter greater than eight inches shall be buried or placed in the top two feet of fills.
- L. Borrowing for fill is prohibited unless a revegetation proposal for the borrow area is approved by the local S.C.S. district and the County Director of Engineering.
- M. Each layer of material for fill to be used at construction site shall be compacted to not less than 95 percent of the in-place density of undisturbed adjacent land.
- N. Fills made by the developer which settle by more than ten percent of the height of the original fill within one year of the date of contract completion are to be reopened and properly backfilled at the developer's expense.
- O. Mechanized equipment shall not be operated in watercourses except in a manner that complies with the specifications approved by the Director of Engineering.
- P. During the construction appropriate barriers around all native vegetation proposed for retention shall be required. No vehicles of any kind shall pass over areas to be left in their natural state according to the approved plans.

**SECTION IX
FLOOD PLAIN MANAGEMENT**

- 1. All developments shall be planned and located to:
 - A. lessen the damaging effects of floods for those areas subject to periodic flooding;
 - E. protect individuals from buying lands which are unsuited for intended purposes because of flood hazards; and

- C. promote the development in flood plains of private and public uses such as open space, vegetation, recreation and wildlife habitat.
2. In approving a developer's Special Use Permit, the Planning and Zoning Commission may as a condition of approval require fills, dikes, levies or other diversion measures approved by the Director of Engineering to protect the development from periodic flooding.

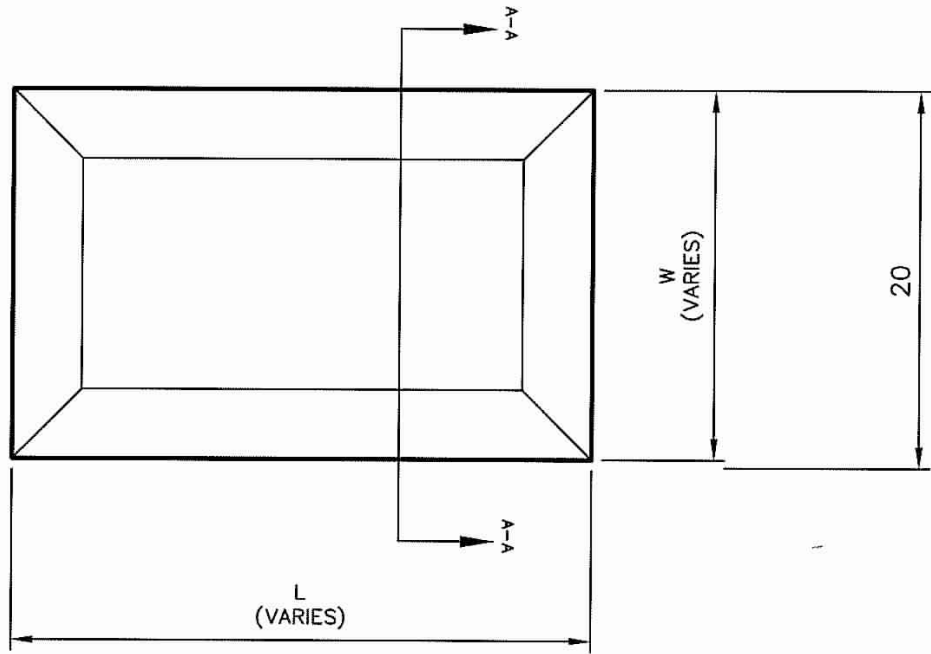
SECTION X STORM DRAINAGE

1. The Planning and Zoning Commission may require that developments shall be planned, constructed and maintained to:
 - A. protect and preserve existing natural drainage channels except where erosion and water control measures are approved by the County Director of Engineering;
 - B. protect structures and other works from flood hazards;
 - C. provide a system by which water within the development will be removed without causing damage or harm to the natural environment, or to property or persons within the development or in other areas;
 - D. assure that waters drained from the development do not contain pollutants and sedimentary materials of any greater quantity than would occur in the absence of the development; and
 - E. assure that waters are drained from the development in such a manner that the water will not cause erosion outside of the development to any greater extent that would occur in the absence of the development.
2. All storm drainage systems shall be constructed in accordance with:
 - A. specifications approved by the Director of Engineering and;
 - B. engineering interpretations of the soil survey.
3. The Director of Engineering may require the design and construction of a drainage system that will ensure that the inlet flow line elevations and the capacity are such that the drainage system has the capacity or may be extended as necessary, to serve adequately the entire drainage basin within which the development is located when such basin is fully developed.
4. Buffer strips may not be developed except for planting trees, vegetation, or other like improvements. The following legend shall appear on the face of the plat in each buffer strip:

“This strip is reserved for the development of trees, other vegetation or other like improvements by the developer or the owner.”

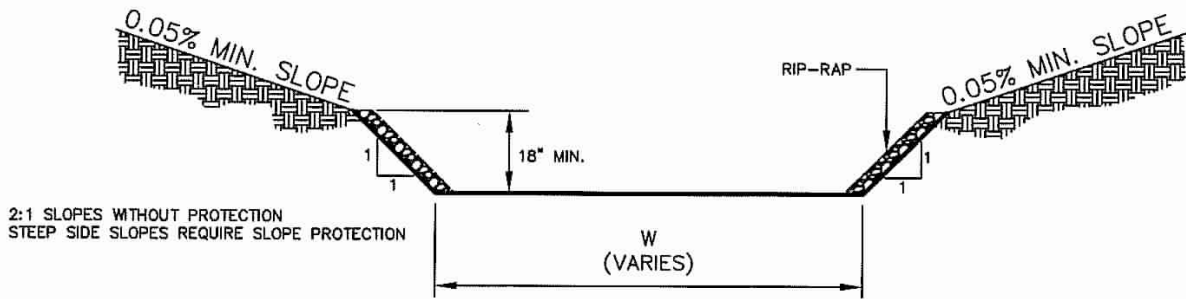
5. Storm Drainage Analysis and Plan - A storm analysis and plan shall be prepared and signed by a professional engineer registered in New Mexico to include the following:
- A. an up-to-date topographic survey or contour map of the area to be subdivided and contributing watershed showing existing structures and pavement, and denoting existing elevations above mean sea level of all land features and improvements that would affect drainage.
 - B. a drainage report with a map identifying and locating all sheet flow, rivers, creeks, arroyos, draws, washes or any other channel having definite banks and beds with visible evidence of the occasional flow of water. It shall include computations of the watershed area draining into each watercourse, identifications and analysis or permeability of soils in each watershed, and calculations (based on the S.C.S. Engineering Field Manual procedures for estimating run-off from a 100-year frequency storm) of:
 - 1. The volume and peak discharge of storm surface waters emanating from higher lands and draining through the area to be developed (external drainage); and
 - 2. The volumes and peak discharges of internal drainage originating from the land to be developed before and after completion of the proposed development.
 - C. A detailed storm drainage plan showing how the additional amount of run-off created by the development from a 100-year frequency storm will be maintained on the property being developed by means of detention basins, retention basins, swales on lots or any other method approved by the Director of Engineering so as to ensure that new development will not increase the peak discharge load on the existing drainage system or cause damage to properties at lower elevations. A map submitted with the plan shall indicate all points of entry and discharges of storm run-off before and after development; as well as proposed easements and structures provided for containment or controlled discharge of storm drainage. Points of discharge of natural watercourses shall not be altered by the development.
 - C. Grading Plans for Developments - A grading plan for a development will be required where appropriate. A conference in the pre-preliminary stage between the Director of Engineering, Flood Commission, and the developer will determine whether a grading plan is necessary. If there is a difference of opinion between the staff and the developer over the grading plan, the developer may present his arguments to the Planning and Zoning Board, who will have final determination. A grading plan will show any proposed alterations, including finished elevations of areas to be graded, paved areas, building sites, retention or detention ponding areas, retaining walls and other structures. It shall be accompanied by a signed agreement by the owner of the lands being developed, that no grading, land filling, excavation or other alteration will be done except pursuant to the approved or amended grading plan. If swales on individual lots are included in the plan as one means of retaining additional run-off, the owner or developer must agree to include prohibitions against altering these swales in restrictive covenants given to lot buyers.

NOTE: POND DIMENSIONS AND SHAPE WILL VARY WITH DIFFERENT LOT SIZES AND BUILDING LOCATIONS.



POND TYPICAL PLAN VIEW
NTS

NOTE: SLOPES ON BANKS MAY VARY WITH LOT SIZE AND BUILDING LOCATIONS AND BUILDING LOCATIONS.

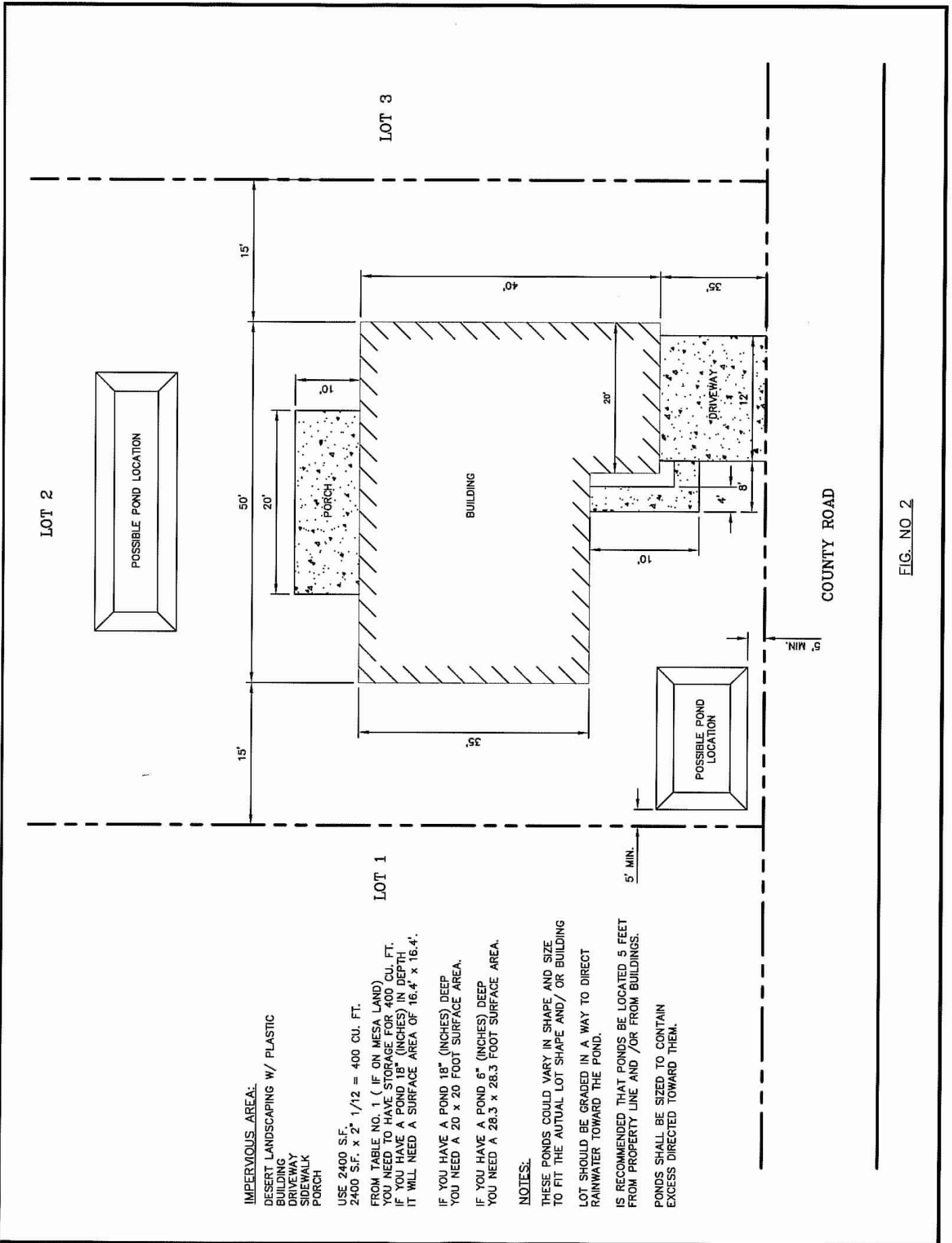


2:1 SLOPES WITHOUT PROTECTION
STEEP SIDE SLOPES REQUIRE SLOPE PROTECTION

SECTION "A - A"
NTS

FIG. NO 1

TYPICAL POND SECTIONS



IMPERVIOUS AREA:

DESERT LANDSCAPING W/ PLASTIC
 BUILDING
 DRIVEWAY
 SIDEWALK
 PORCH

USE 2400 S.F.
 2400 S.F. x 2" 1/12 = 400 CU. FT.

FROM TABLE NO. 1 (IF ON MESA LAND)
 YOU NEED TO HAVE STORAGE FOR 400 CU. FT.
 IF YOU HAVE A POND 18" (INCHES) IN DEPTH
 IT WILL NEED A SURFACE AREA OF 16.4' x 16.4'.

IF YOU HAVE A POND 18" (INCHES) DEEP
 YOU NEED A 20 x 20 FOOT SURFACE AREA.

IF YOU HAVE A POND 6" (INCHES) DEEP
 YOU NEED A 28.3 x 28.3 FOOT SURFACE AREA.

NOTES:

THESE PONDS COULD VARY IN SHAPE AND SIZE
 TO FIT THE ACTUAL LOT SHAPE AND/OR BUILDING

LOT SHOULD BE GRADED IN A WAY TO DIRECT
 RAINWATER TOWARD THE POND.

IS RECOMMENDED THAT PONDS BE LOCATED 5 FEET
 FROM PROPERTY LINE AND /OR FROM BUILDINGS.

PONDS SHALL BE SIZED TO CONTAIN
 EXCESS DIRECTED TOWARD THEM.