NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
(Texas Addendum)

TERRACE, BASIN
(Ft.)
CODE 600A

This addendum serves as an integral part to the companion Standard of the National Handbook of Conservation Practices. The contents of this addendum magnify national guidance and implement experience factors important to the installation of this practice under the range of conditions found within Texas. Criteria and guidance contained herein shall be followed in addition to those found in National Handbook of Conservation Practices, Terrace Standard (600).

DESIGN CRITERIA

Spacing. *When basin terraces are installed to break up concentrations of rainfall runoff on cropland with long slopes of zero to one percent, the spacing shall not exceed approximately 1320 feet.*

When basin terraces are installed on cropland with slopes greater than one percent, either the terrace spacing formula (VI = xs + y) or the revised universal soil loss equation (RUSLE) shall be used to determine spacing.

RUSLE (Guidance and Definitions)

Maximum allowable terrace spacing determined by RUSLE shall not exceed the maximum allowed by the National Standard. The "C" factor used will be based on the planned crop rotation and cropping system for the field to be terraced, site specific. Average slope will be used when selecting the "P" factor from the Erosion Handbook. The average horizontal interval above each terrace shall be used when determining a composite "P" factor, which is adjusted for terracing and contouring. Terrace spacing for terrace system design will be based on the Soil Loss Tolerance "T", for the dominant soil-mapping unit in the system.

Allowable erosion rates for terrace system evaluation shall be limited to 125% of "T", for the dominant soil mapping unit in the system.

Slope length as it relates to RUSLE is the distance from the point of origin of overland flow to the point where the slope decreases enough that deposition begins, or the runoff water enters a well-defined channel. A well-defined channel cannot be plowed out with normal farming operations. Rills can be removed by normal farming operations.

Capacity. *The minimum capacity shall be that required to store runoff from the 10-year 24-hour storm without over-topping.*

When a basin terrace is constructed from both sides, the centerline design height may be determined by the equation:

$$H = SQRT(SA/50) + FB$$

H = Design height of ridge above natural ground in feet.
S = Average slope in percent of natural ground immediately above basin terrace.
FB = Freeboard in feet. Minimum of 0.5 foot above the depth of impoundment.
A = Cross sectional area of impoundment in square feet or basin storage in cubic feet per linear foot as determined` by:

$$A = \frac{3630(a)(R)}{L}$$

a = Drainage area in acres.
R = Rainfall runoff in inches
L = Length of terrace in feet.

If additional capacity for sediment storage is required, "A" may be determined by the following equation:

$$A = \frac{3630(a)(R) + 20(a)(T)(Y)}{L}$$

a = Drainage area in acres.
R = Rainfall runoff in inches.
T = Soil loss, tons/acre/year.
Y = Design life, years
L = Length of terrace in feet.

When a basin terrace is constructed from other than both sides, other approved methods such as DIVCALC (diversion calculator) should be used to determine design height.

Design height of basin terraces should not exceed 3.5 feet above natural ground. Minimum freeboard shall be 0.5 foot.

Basin terrace length shall not exceed 3,500 feet unless the channel is blocked at intervals not exceeding 3,500 feet.

***End Closures**. The spill elevation of end closures shall be equal to the design elevation minus freeboard.*

The base width of end closures shall be equal to or greater than the design base width of the terrace ridge.

***Cross Section**. The terrace ridge shall have a minimum top width of 4 feet at the design elevation.*

Side slopes should be smooth and uniform, permitting mowing or disking to control undesirable vegetative growth. Where basin terraces are constructed on cultivated land, they should be built to a cross section that can be worked safely with farming equipment.

***Alignment**. Variations from a level grade should not exceed +/- 0.2 foot. The variation should be undulating so the average grade will approach zero.*

***Land Forming**. The terrace interval shall be modified by land forming to provide required terrace storage, accomplish moisture distribution and prevent excessive ponding which may damage crops or delay farming operations.*

***Vegetation**. When basin terraces are constructed on sandy soils, permanent grass or high residue crops should be established on the ridge to prevent damage by wind or water erosion.*

***Outlets**. An emergency spill area shall be provided for basin terraces that impound the 10-year 24-hour rainfall runoff. Emergency spill areas shall convey runoff to the drainage pattern of the field, unless easements are obtained.*

A basin terrace shall not be designed to spill onto a lower terrace, unless the lower terrace is designed to control the runoff from the total drainage area of both terraces.

CONSIDERATIONS

***Water Quantity**. Level terraces and terraces with underground outlets are storage terraces that retain or retard runoff, increase infiltration time, and conserve soil moisture. For storage terraces, soil*

permeability, underlying geology, and depth to water table are all factors that determine the amount of deep percolation and ground-water recharge.

***Water Quality**. Sediment: Terraces reduce the occurrence of ephemeral and classic gullies on areas down slope of the terrace. Runoff velocity is reduced, so sedimentation occurs in the channel. Terraces can reduce overall sediment yield by 30 to 95 percent. Level storage terraces can reduce sediment yield up to 100 percent, for storm events equal to or less than the design storm. Underground outlet terraces will trap 85 to 99 percent of the sediment.*

***Nutrients**: Underground outlet terraces will trap up to 95 percent of adsorbed chemicals, and generally remove from 30 to 90 percent of the soluble substances from surface runoff. Beneath the storage basins, in more permeable soils, more soluble materials will be leached below the root zone. Storage terraces increase the time available for the downward leaching of soluble substances toward the ground water.*

***Pesticides**: the movement of sediment-attached pesticides will be reduced in the same proportion as the reduction of sediment. The amount of soluble pesticides lost from the field or below the root zone depends on the time of application, persistence, solubility and how soon there is precipitation after the pesticide is applied.*

Salinity: Storage terraces increase the potential for recharge that may concentrate and accelerate salinity problems in saline seeps or ground water.

PLANS AND SPECIFICATIONS

Construction specifications describing the requirements for applying this practice shall be developed from the generalized Construction Specifications (Texas) for Terrace (Basin). The Construction Details section shall be used to describe site specific job requirements.

OPERATION AND MAINTENANCE

When accumulation of sediment significantly reduces the storage capacity or farming operations reduce the height of the ridge or end closures, appropriate maintenance measures should be employed to restore the height and capacity of the basin terrace.

Vegetation established to protect the ridge should be maintained by controlling weed or brush growth with appropriate chemical or mechanical means.

APPROVAL AND CERTIFICATION

TERRACE (BASIN)

(ft.)

CODE 600A

PRACTICE STANDARD APPROVED:

/s/ JOHN W. MUELLER	**06/24/02**
State Conservation Engineer	**Date**

NRCS, Texas
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