NATURAL RESOURCES CONSERVATION SERVICE

DOCUMENTATION REQUIREMENTS FOR

TERRACE

CODE 600

Design Criteria

Design in accordance with the criteria listed in Conservation Practice Standard 600, Terrace, Chapter 8 in National Engineering Handbook Part 650 (NEH 650), *Engineering Field Handbook*, and the Kansas Supplement to Chapter 8 in NEH 650. The terrace should be installed at the location as shown on the conservation plan map and location map.

Surveys

Record standard engineering notes on Form KS-ENG-1, Terrace - 600, or on Form NRCS-ENG-28 and Form NRCS-ENG-29, Loose Leaf Field Sheet, or Forms KS-ENG-37 and KS-ENG-37a, Field Notes or equivalent.

Take and record ground elevation shots at 100-foot intervals, at all significant breaks in grade that occur between the regular stations, and at the location of blocks and outlets. The proposed terrace alignment may be surveyed and marked with flags at the downstream edge of the channel; at the no-cut, no-fill line; or at the center of the channel. When connecting to an existing terrace, take ground elevation shots along the existing terrace to establish the proper grade rod to continue the terrace.

Determine the land slope in percent above each terrace. Undulating topography may require multiple land slope determinations per terrace—particularly for underground outlet terraces—to accurately compute storage volume.

For underground outlet terraces, set a stake and/or flag to locate the riser. A rod reading for both the terrace line and the riser should be recorded at this station.

It is recommended to set at least 1 temporary bench mark as needed.

Locate and identify special conditions that may affect the design and installation of the terrace. Safety procedures in National Engineering Manual (NEM) Sections 503.10 through 503.12 and NEM Section KS503.10 should be strictly followed.

Layout

Sufficient stations, alignment, flags, and grade stakes will normally be set when the design survey is made to establish the location of the terrace. In some cases, it will be necessary to set special reference stakes along the line after design and prior to terrace installation. These should be described in the survey notes. Record information obtained from the surveys for design and layout on Form KS-ENG-1 for a gradient terrace, level terrace, and underground outlet terrace and/or attach the survey notes as appropriate.

Complete the “Layout by” block and enter the date.

Design and Plans

Develop the design in accordance with the “Design Criteria” section above.

Record design information on page 1 of Form KS-ENG-1 including the following:

- Name of the owner and/or operator and location information.
- Type of terrace (Underground Outlet, Level, or Gradient), X value and Y value, average land slope, vertical interval or spacing (and circle the respective description), horizontal interval or spacing (and circle the respective description), and storage depth and block height (both for level terraces).
- Terrace design cross sections.
- The location map showing the plan view of the proposed terrace. Attach a map (as needed) for more details.

- Any special instructions needed for installation of the terrace
- Sign the “Designed by,” “Checked by,” and “Approved by” blocks and enter the respective dates.

For gradient terrace design, the design velocity should not exceed the maximum permissible velocity allowed for the soil classification (texture or Unified Soil Classification System [USCS]) of soils in the terrace channel.

For level terrace design (erosion control and water conservation), design the terrace height and the cross section to contain the design runoff plus the anticipated sediment accumulation.

The Terrace (Gradient) Spreadsheet can be used to produce individual designs as well as to design tables for gradient terraces. The Terrace (Storage) Spreadsheet can be used to complete designs for terraces with underground outlets. The Terrace (Level) Spreadsheet can be used to produce design tables for level terraces. Detailed instructions for these spreadsheets are available as separate worksheet tabs within each spreadsheet.

The Hydrologic Summary Sheet in the Terrace (Gradient) Spreadsheet can be used to determine the peak discharge for a gradient terrace. Tables in Chapter 2 of NEH 650 and Form KS-ENG-137a, Hydrologic Summary Sheet–Waterway (412) or Practice ( ), can be completed manually for the same information.

Checkout

For gradient terraces and level terraces, complete page 2 of Form KS-ENG-1 by recording the information below.

- Channel and Ridge Profiles with readings at 100-foot intervals or more frequently (if necessary)–Take at least 1 channel reading on the centerline of channels 15 feet wide or less. Take at least 2 readings in the channel (near the outer edges of the bottom) for widths from 15 to 30 feet. Take at least a centerline reading and readings near each of the outer edges of channels over 30 feet wide. For gradient terraces, record the difference of the channel reading from the ridge reading in the height column. For level terraces, the height is the difference between the average channel reading and the ridge reading. Also, record the minimum allowable ridge rod (average channel rod minus design terrace height) and the block grade rod (average channel rod minus the design storage depth).
- At least 1 cross section for each terrace design shown on the “Design Cross Sections” portion of Form KS-ENG-1. Show the terrace number and station for each cross section taken.
- Linear feet of each terrace installed and total length. Also show measuring device, calibration factor, and counter readings.
- Sign the “Checkout by” block and enter the date.

For underground outlet terraces, use the checkout sheet within the Terrace (Storage) Spreadsheet.

- Complete the checkout data calculations to determine whether enough effective height (and storage volume) is provided. If the “Effective Height Diff” total (sum) is positive, then the constructed terrace has sufficient storage volume. If the “Effective Height Diff” total is negative, then divide this sum by the number of stations storing water to derive the minimum amount necessary to raise the lowest point in the ridge. Other low points in the ridge must also be raised to this new height. This ensures that the terrace will achieve required effective height (and storage volume). Any required blocks must be raised to a minimum of this new height less any required freeboard.
- Sign the “Checkout by” block and enter the date.