

NATURAL RESOURCES CONSERVATION SERVICE
DOCUMENTATION REQUIREMENTS FOR
IRRIGATION SYSTEM, TAILWATER RECOVERY

CODE 447

Design Criteria

The design should be developed in accordance with the criteria listed in [Conservation Practice Standard 447, Irrigation System, Tailwater Recovery](#), and the procedures outlined in the [Kansas Supplement to Chapter 7 in National Engineering Handbook Part 652 \(NEH 652\), Irrigation Guide](#). It should be located as shown on the irrigation development plan.

Design

Use [Form KS-ENG-9, Irrigation System, Tailwater Recovery - 447](#), to design the required volume and dimensions of the structure as follows:

- Fill in the name of the owner and/or operator, location information, etc.
- Determine if the system will be operated “Intermittent” or “Continuous” and check the appropriate block.
- Input the Crop, Field Slope, Soil, Intake Family, and Row Spacing of the irrigation system in the appropriate blanks.
- Determine and record the Number of Sets (N) to be irrigated with pumpback water per pumpback cycle (maximum of 2 sets).
- List the hours required to irrigate one set—Irrigation Set Time (Ti)—as determined using the design guide sheets shown in the [Kansas Supplement to Chapter 6 in NEH 652](#) or the operating schedule as listed in [Table KS6-6 in NEH 652](#).
- Record the Primary Source Pumping Rate of irrigation water for the system.
- Determine whether Pumpback Tailwater “Will Enter the Pit” or “Will Not Enter the Pit” and check the appropriate block.

- Use [Table KS7-2 in NEH 652](#) to determine the percentage of pumped water—both the primary source pumping rate (Q) and pumpback water—that will flow back to the tailwater pit. Enter the percentages.
- If the system will operate intermittently, use [Table KS7-1 in NEH 652](#) to estimate the Ca factor and enter the number. For continuous operation, [Form KS-ENG-9](#) determines the Cb factor.
- For either method of operation, [Form KS-ENG-9](#) computes the Estimated Excavation Volume (Ve).
- Sketch in the plan view of the system. Show the location of the tailwater pit, inlet structure, return pipeline, and irrigation well or water source and the direction of irrigation and field drainage.
- Draw the design for the pit and prepare detail plans for the inlet structure using computer drafting or standard drawings.
- On [Form KS-ENG-9](#), enter the Design Dimensions information—Width of the bottom, Depth (total), and End and Sides Slopes. The Length of the bottom will be calculated. The pit dimensions can also be estimated using the equations in [Table KS7-4 in NEH 652](#).

Layout

Use the Design Layout section on page 2 of [Form KS-ENG-9](#) as follows:

- Stake out the pit and record the dimensions and grade rods as appropriate on the design layout plan view.
- List the Bench Mark (BM) elevation in the design layout survey table and the BM Description.

- Record the elevations developed for the Top of Berm, Auxiliary Spillway, Inlet Flow-Line, Field, and Design Bottom in the design layout survey table.
- Compute the excavated yardage by filling out the section on Excavation Volume Computations. This section need not be filled out if a printer output or photocopy from an approved computer program is attached to [Form KS-ENG-9](#). Make a notation in the Remarks block if this method is used.

On page 1, sign the “Designed by,” “Checked by,” and “Approved by” blocks and enter the respective dates. Complete the “Layout by” block and enter the date.

Checkout

Use the Construction Checkout section on page 3 of [Form KS-ENG-9](#) as follows:

- Measure dimensions and take grade rods. Record this information on the construction checkout plan view.
- Record the elevations of items listed in the construction checkout survey table.
- Sign the “Checkout by” block and enter the date.