

USDA
NATURAL RESOURCES
CONSERVATION SERVICE

DELAWARE CONSERVATION
PRACTICE STANDARD

**DRAINAGE WATER
MANAGEMENT**

CODE 554
(Reported by Ac.)

DEFINITION

Control of water surface elevations and discharge from surface and subsurface drainage systems.

PURPOSES

The purposes of this practice are to:

- Improve water quality.
- Improve the soil environment for vegetative growth.
- Reduce the rate of oxidation of organic soils.
- Prevent wind erosion.
- Enable seasonal shallow flooding.

**CONDITIONS WHERE PRACTICE
APPLIES**

This practice applies where:

- The topography is relatively smooth, uniform, and flat to gently sloping.
- A water table may be maintained without excessive seepage and without having an adverse impact on adjoining properties.

CONSIDERATIONS

An adequate water supply should be available when it is necessary to raise the water.

The effect of drainage systems on wetlands should be evaluated.

Maintaining a high water table, especially in arid areas, may not be appropriate due to salinity/alkalinity.

CRITERIA

Criteria Applicable to All Purposes

The system shall be designed to remove the water required for adequate drainage. The rate of outflow and the level of the water table shall be controlled by structures or pumps. Water velocities in the soil near the drain shall be kept slow enough to prevent soil particles from entering the drainage system.

Structures and pumps shall be located where they are accessible and subject to convenient control. Designs of critical components shall be in accordance with pertinent NRCS Practice Standards.

Additional Criteria to Improve Water Quality

The system shall prevent automatic discharge of storm water during minor rainfall events. The controlled discharge of excess water shall account for water not otherwise removed by evapotranspiration and seepage. The uniformity of storm water draw down shall be improved throughout the areas influenced by the designed system. The distance the water must travel in surface ditches before it reaches the main discharge point shall be maximized when practical.

Additional Criteria to Improve Soil Environment for Vegetative Growth

The combined capacity of the surface and subsurface facilities shall satisfy the appropriate drainage coefficient for the crops to be grown. The water table shall be held between

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

predetermined elevations at all points in the design area when the system is being used for sub-irrigation.

Additional Criteria to Reduce the Rate of Oxidation of Organic Soils

Drainage beyond that necessary to provide an adequate root zone for a crop shall be kept to a minimum. When practicable, the water table shall be raised to the surface, or to a designated maximum elevation, for a sufficient time to return the saturated zone to anaerobic conditions. The implementation of this practice must result in a reduced average annual thickness of the aerated layer of the soil.

Additional Criteria to Prevent Wind Erosion

The system shall provide sufficient moisture to the soil surface, either by ponding or capillary action, to prevent wind erosion when there is insufficient organic residue or plant material on the surface.

Additional Criteria to Enable Seasonal Soil Saturation or Shallow Flooding

The system shall provide saturation to the surface or shallow flooding for a sufficient time to accomplish the desired pest control, provide wildlife habitat, or reduce the rate of oxidation of organic soils.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard as necessary and shall describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

An Operation & Maintenance Plan shall be developed that will identify the intended purposes of this practice and that will identify critical dates and target elevations of the water level necessary to accomplish the intended purposes.

The plan shall also include the operation and maintenance of critical components of the infrastructure used to manage the drainage water.

SUPPORTING DATA FOR DOCUMENTATION

Field Data and Survey Notes

Record on survey notepaper, SCS-ENG-28, or other appropriate format. The following is a list of the minimum data needed:

1. Plan view sketch.
2. Topographic survey and map of the field(s) to be provided with drainage water management.
3. Location and elevation of proposed outlet control system for the field(s).
4. Soil boring locations and the associated soil logs. Include the depth to the restricting soil layer and the seasonal high water depth.
5. Profile and cross-section of the main outlet and, special precautions if needed.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the Engineering Field Handbook, Part 650. The following is a list of the minimum required design data:

1. Locate the managed fields on the farm plan map in the case file.
2. Determine soil type and any special restrictions.
3. Determine design discharge from the contributing drainage area for the crops anticipated in accordance with Chapter 14, Engineering Field Handbook - Part 650 or by other approved method.
4. Design each system in accordance with this standard and Chapter 14, Engineering Field Handbook - Part 650, or other source.
5. Show job class on the plan. Indicate the location, description and elevation of the temporary benchmarks used in the design survey. Provide a location map, which indicates the job site.

6. Plan view and profile of the surface drains or subsurface drains for each design reach are to be shown on the construction plans.
7. Details of the water control structures and other structural components needed.
8. Planting plan. This must meet the criteria, specifications and documentation requirements of the conservation standard for Critical Area Planting (Code 342). Show on the plans.
9. Estimated quantities and cost estimate.
10. Written Operation and Maintenance plan.

Construction Check Data/As-Built Plans

Record on survey notepaper, SCS-ENG-28, or other appropriate format. Survey data will be plotted on the as-built plans in red. The following is a list of minimum data needed for as-built documentation:

1. Documentation of site visits on CPA-6. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed and decisions made and by whom.
2. Check notes recorded during or after completion of construction showing location of constructed components and including length, size, grade and depth.
3. Measure total area under management.
4. Statement on seeding and outlet stability.
5. Final quantities and documentation for quantity changes. Material certifications as appropriate.
6. Signature and date on check-notes and plans of someone with the appropriate engineering job approval authority. Include a signed statement that constructed practice meets or exceeds the construction plans and NRCS practice standards.