

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

PRECISION LAND FORMING

(Ac.)

CODE 462

DEFINITION

Reshaping the surface of land to planned grades.

PURPOSE

To improve surface drainage and control erosion.

CONDITIONS WHERE PRACTICE APPLIES

On all land that is suitable for the purpose required and where precision land forming is practical. Soils shall be of sufficient depth and of suitable textures so that after precision land forming is completed, an adequate root zone remains to permit the planned use of the land and application of proper conservation measures, soil amendments, and fertilizer.

All precision land forming shall be planned as an integral part of an overall system to facilitate the conservation use of soil and water resources. Due consideration shall be given to the maintenance of wildlife habitat. This standard does not apply in areas needing Land Smoothing (466), Recreation Land Grading and Shaping (566), or Irrigation Land Leveling (464).

CRITERIA

All precision land forming shall be planned as an integral part of an overall system to facilitate the conservative use of soil and water resources.

Design and installation shall be based on adequate engineering surveys and investigations. If the land is to be formed for

more than one purpose, it must be formed to meet the requirements of the most restrictive purpose and crop.

All forming work must be designed within the slope limits required for the proposed use and provide for the removal of excess surface water. If other conservation practices such as grassed waterways, drainage field ditches, and filter strips are needed to accomplish the stated purpose, they shall be included in the plans for improvement.

Slope requirements. Slope may be uniform in the direction of flow or may increase or decrease.

Reverse grades in the direction of planned water flow shall not be permitted. Short level sections are permissible to meet field conditions. Depending on cultural practices, cross slopes shall be such that water can be contained within the furrows to prevent breakthroughs from rainfall runoff.

Slope to control erosion caused by runoff from rainfall. Design field grades shall be such that erosion caused by runoff from rainfall can be controlled within the limits permissible for conservation farming. When benching between land-formed plots exceeds 1 foot, a permanent grassed area or border ridge must be left between the plots to reduce the possibility of gully erosion.

Surface drainage. All precision land-forming systems shall include plans for removing or otherwise providing for control of excess water.

Designs must provide field elevations and grades that will permit proper functioning of the planned drainage facilities.

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<p>Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.</p>
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Borrow computations. Excavation and fill material required for or obtained from such structures as ditches, ditch pads, and roadways shall be considered part of the precision land-forming design, and the appropriate yardage shall be included when balancing cuts and fills and determining borrow requirements.

CONSIDERATIONS

Machine control and grade management systems make it feasible to reshape irrigated fields using a variable slope design. This approach can significantly reduce the depth of cuts and fills, the amount of top soil relocated, and potential cost of land-forming.

Effects on the water budget, especially on volumes and rates of runoff, infiltration, deep percolation, and evaporation.

Short-term and construction effects of installation on downstream water resources.

Potential for earth moving to uncover or redistribute toxic materials, such as saline soils, and make them available to water or plants.

Effects on wetland hydrology and/or wetland wildlife habitat.

Evaluate potential impacts to existing utilities. Locate and avoid underground utilities.

Effects on soil loss due to increased wind erosion potential and subsequent deposition.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and good engineering practice. The plans and specifications shall include all details necessary for implementation of precision land forming.

The following list of Construction Specifications is intended as a guide to selecting the appropriate specifications for a specific project. The list includes most but may not contain all of the specifications needed for a specific project:

- IA-1 Site Preparation
- IA-5 Pollution Control
- IA-21 Excavation
- IA-23 Earthfill
- IA-26 Salvaging and Spreading Topsoil
- IA-27 Diversions

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be prepared for and reviewed with the landowner or operator. The plan shall specify that the treated areas and associated practices are inspected annually and after significant storms events to identify repair and maintenance needs.

Actions shall be carried out to insure that this practice functions as intended. Such actions include periodic checks of drainage structures (field ditches, grassed waterways, etc.) to insure that siltation is not occurring and performing minor maintenance to maintain the required field slopes.

REFERENCES

National Engineering Handbook, Part 623, Chapter 3, Planning Farm Irrigation Systems.

National Engineering Handbook, Part 650, Water Management (Drainage), Chapter 14.

Iowa Drainage Guide, Special Report 13, Iowa State University.

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