

**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, provide more effective use of rainfall, facilitate installation of more workable drainage systems, reduce the incidence of mosquito infestation, control erosion, improve water quality, and prevent damage to land by water logging.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to all precision land-forming operations for drainage and erosion control as well as other purposes such as moisture conservation, leaching, and improving water quality. All land-forming operations under this standard will be on the basis of a detailed engineering survey and layout. It does not include Land Smoothing (466), or Recreation Land Grading and Shaping (566), and Irrigation Land Leveling (464).

This practice is used 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 measure, 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.

CRITERIA

Design. Installation shall be based on adequate engineering surveys and investigation. 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. Cross slopes must be designed so that "breakthroughs" from rainfall runoff are held to a minimum.

Erosion control. 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 ft (304 mm) 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 elevation and field

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grades that will permit proper functioning of the planned drainage facilities.

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

Water quantity

- Effects on the water budget, especially on volumes and rates of runoff, infiltration, deep percolation, and evaporation.
- Potential for changes in plant growth and transpiration resulting from the changes in the volume of soil water.

Water quality

- Effects on erosion and the movement of sediment and soluble and sediment-attached substances carried on by runoff.
- Effects from the use and management of nutrients and pesticides on surface and ground water quality.
- 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.
- Downstream temperature changes.
- Effects on the visual quality of downstream water resources.

PLANS AND SPECIFICATIONS

Plans and specifications for precision land forming shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

**Natural Resources Conservation Service
Construction Specification**

PRECISION LAND FORMING

1. SCOPE

This specification shall consist of reshaping the land surface to a planned grade.

2. LOCATION

The planned location of the area to be land formed shall be as shown on furnished drawings or as staked in the field.

3. SITE PREPARATION

The land surface shall be free of brush, crop residue, trash and vegetative material that would materially reduce the effectiveness of land forming operations. The land should be smoothed or floated to firm the soil to permit an accurate design survey.

4. MATERIALS AND INSTALLATION

Soil for land forming operations shall be obtained from designated cut areas in the field or other designated areas as specified in the plan.

The land shall be formed to the designed elevations. Fills of more than 6 inches shall be built up by spreading the soil in layers. Land forming operations shall not be performed when soil moisture conditions will result in excessive damage to soil structure. After cuts and fills have been completed, the land should be plowed or disked and the surface smoothed with land revealers, graders, or similar equipment to remove minor irregularities.

All land forming work shall be finished according to the design specifications given in the plan. Permissible variations of the finished grade from the planned grade, or a plane paralleling the planned plane, shall be 0.10 foot, plus or minus, providing such variations will not cause undrained grade sags and drainage or tillage problems.

5. MEASUREMENT

- a. Method 1. When land forming is performed on an acreage basis, the formed area will be measured to the nearest 0.1 acre. Sufficient profiles will be taken to determine that designed grades have been obtained. Since accurate measurements are made during design and layout, only sufficient checks will be made to ensure that the acreage land formed equals or exceeds the acreage planned to be land formed.
- b. Method 2. When land forming is performed on a yardage basis, measurement will be the designed yardage computed to the nearest cubic yard. Sufficient profiles will be taken to determine that designed grades have been obtained. Sufficient checks will be made to ensure that the acreage land formed equals or exceeds the acreage planned to be land formed.