

Date: 2-13-01

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Number of Pages Including Cover Sheet: 6

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Comments: Here is the letter and recommendations
from Dino.

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863-533-1884

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February 12, 2001

Subject: Energy Crop Tree Farm
Drainage Specifications

To: Ed Sheehan, District Conservationist
Bartow Field Office

After visiting the site and reviewing the topographic map it is my opinion that the site needs improved surface drainage. Due to the lack of slope macrobeds should be constructed to remove surface runoff from the site (see attached information from GUIDELINES FOR RECLAIMING PHOSPHATIC CLAY SEETLING AREAS FOR INTENSIVE AGRICULTURE). The macrobeds should not be constructed longer than 1320 feet. All macrobeds should have positive grade and adequate outlets for surface runoff. A road should be established at the end of each Lateral Ditch with a pipe conveying the runoff from the Lateral ditch under the road. An 8 in x 30 ft, SCH40, PVC, pipe will provide the necessary outlet for the Lateral Ditches. The pipes should outlet directly into the perimeter ditch or into Main ditches, if necessary, which outlet into the perimeter ditch. Culverts will need to be installed to convey the surface runoff from any Main ditches into the perimeter ditch. A 12 inch culvert will drain 10 ac., a 18 inch culvert will drain 25 ac. and a 24 inch culvert will drain 48 ac. All culverts should be a minimum of 30 ft. long. The landowner should contact the SWFWMD to determine if any permits are necessary. A current survey will be required to design a site specific drainage system. It will probably take two months to provide this design. It appears that the existing row direction is adequate.

A handwritten signature in black ink, appearing to read "Dino Ricciardi", is written over a horizontal line.

Dino Ricciardi, P.E.
Agricultural Engineer

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May 1991

SS-MLR-01

GUIDELINES FOR RECLAIMING PHOSPHATIC CLAY SETTLING AREAS FOR INTENSIVE AGRICULTURE

BY

Edward A. Hanlon, Harvey W. Kananen and Edwin C. French

Polk County Mined Lands Agricultural Research/
Demonstration Project

1702 Highway 17 South
Bartow, FL 33830

A cooperative project of:

University of Florida IFAS
Florida Institute of Phosphate Research
Polk County Board of Commissioners
Polk Soil and Water Conservation Dist.
Phosphate Industry

SURFACE DRAINAGE: LATERAL DITCHING

Slopes less than 1%: On level or nearly level sites, a system of lateral drainage ditches is needed. These lateral drainage ditches should drain directly into the rim drainage ditch. Experience with nearly level phosphatic clays indicates that these lateral ditches should be a part of a land forming process, which consists of an alternating series of macrobeds and lateral ditches (Fig. 3).

The purpose of macrobeds is to provide positive drainage of the cropped area. The actual design of the macrobed can take many shapes. At the AGRICO site of the MLRDP, only a sweet corn experiment planted on a constructed macrobed produced marketable corn in 1987. Three experiments planted in the same season "on the flat" did not produce marketable ears due to poor drainage.

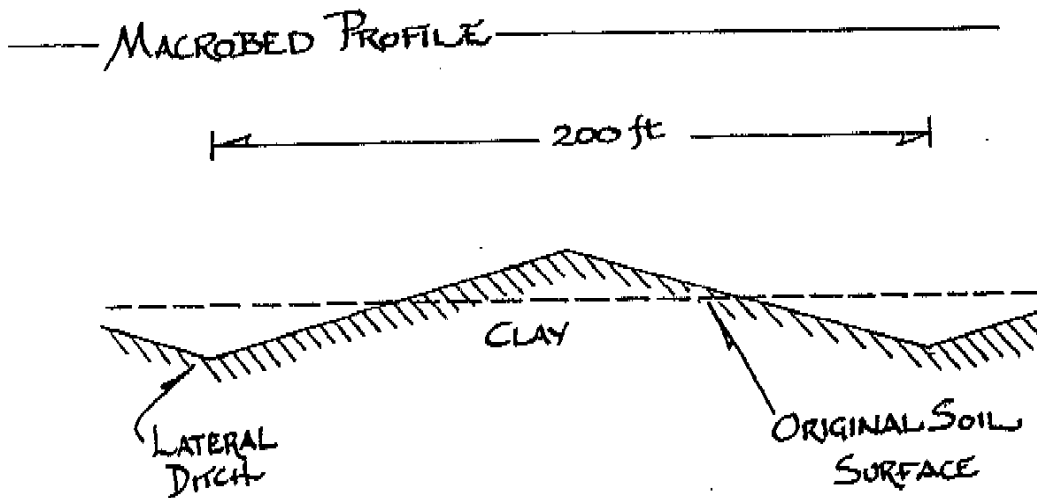


Figure 3. Cross section of a macrobed design used at the Mined Lands Research/Demonstration Project.

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accumulation in and near the inlets of the cross over pipes. Rim ditches and spillway structures should not contain unwanted vegetation which can act as obstructions to drainage water flow.

TILLAGE CONSIDERATIONS

Good soil conservation practices, such as plowing parallel to the contour, retard erosion of clays toward the lateral drains. One approach to slope maintenance is to practice one-way plowing with the clay being directed to the uphill side. This practice also renews the surface by moving clay material uphill. The use of macrobeds is recommended for any level sections within the old pond area.

Experience with a macrobed constructed in 1987 at the AGRICO research site indicates that some slope maintenance is necessary each season. To date, light harrowing has been used to maintain the slope. Experiments on this macrobed have precluded plowing, however, some loss of slope is evident suggesting the need for corrective measures in the near future. On slopes with steeper gradients, the need for slope maintenance will, of course, be greater.

Land leveling may be beneficial, provided the leveling is used to smooth the low/high spots within the field. Tillage or land leveling should be planned so a downward slope is maintained to the lateral ditches.

MACROBED CONSTRUCTION AND DESIGN

Level clay ponds should have field topography developed to reduce the risk of flooding high cash-value crops. One technique that has proven successful at the MLRDP is the use of macrobeds. While the actual design can be quite flexible, the following guidelines describe the macrobed created at the MLRDP (Fig. 3). These macrobeds are 200 feet wide with a 20 foot waterway between adjacent beds. The beds are built to a center height of 2 feet, resulting in a settled height of 18 inches. Cultural farming methods may reduce this height to 1 foot, which is still sufficient for effective water removal. These dimensions are a compromise between the need for positive drainage, construction costs, maintenance costs, agricultural farming equipment use, and erosion considerations.

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The 20 ft. waterways between adjacent beds should be grassed and function as lateral ditches. Adjustments to the distance between lateral ditches should be based upon horticultural or agronomic needs, such as width of planting equipment or size of individual vegetable beds.

While research is still continuing at the MLRDP, the moldboard plow has proven to be the best implement to move clay material laterally into a crowned macrobed. Use of a small caterpillar dozer proved too slow for efficient macrobed formation. Two problem areas must be addressed to move larger amounts of phosphatic clay in land forming; only the drier surface (about 10 to 20 inches) can support vehicular traffic limiting the weight of the earth moving equipment; and movement of the surface material to its desired location exposes the wetter, plastic material below, increasing the risk of equipment becoming mired in the clay.

The methodology for effective use of either a moldboard or large disk plow is to locate the center line and start the back furrow at this line (the plow will be turning the clay toward this center line). The entire 100 feet on each side of the centerline should be plowed, continuing to the bottom of the lateral drainage ditch. This procedure will increase the capacity of the lateral drainage ditch. Plowing to the bottom of the ditch will also give shape to the ditch and permit easy crossing by farm equipment.

The above procedure should be repeated, starting each new tillage pass by picking up the back furrow next to the center line and throwing it toward the center. The process should stop one furrow short of the center line on each subsequent tillage pass. This entire process should be repeated until the design crown height of 2 feet is achieved. Depending upon the water content of the newly exposed clay, work might have to be curtailed until the clay dries sufficiently for tillage.

Disking between passes of the plow can speed both the settling and drying processes resulting in a usable surface more quickly. After achieving the 2-foot construction height, a shallow disking and land leveling with a landplane will create a uniformly shaped macrobed.

Lateral ditches between the newly formed macrobeds should be grassed after the macrobed construction. Before seeding, proper drainage of the ditches should be insured.