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Diversions

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Developed by the Soil and Water Division Conservation Systems committee and approved by the Soil and Water Division January 2008; periodic review extended for two years December 2012; revised April 2014; reaffirmed November 2018.

Keywords: Channel, Diversion, Waterway

1 Purpose and Scope

1.1 A diversion consists of a channel constructed across the slope with a supporting ridge on the downhill side. This standard is intended to guide engineers and technicians in the planning, design, layout, construction, and maintenance of diversions.

1.2 Diversions are used for one or more of the following purposes to:

— Divert water away from active gullies or critically eroding areas.

— Supplement water management on conservation cropping or strip cropping systems.

— Break up concentrations of water on long, gentle slopes and on undulating or warped land surfaces that are generally considered too flat or irregular for terracing.

— Divert water away from farmsteads, agricultural waste systems, and other improvements.

— Collect or direct water for water-spreading or water harvesting systems.

— Protect terrace systems by diverting water from the top terrace where topography, land use, or landownership prevents terracing the land above.

— Intercept surface and shallow subsurface flow.

— Protect flat lands from upland runoff and overland flow from adjacent areas.

— Control runoff and erosion on urban or developing areas, construction sites, and surface mine sites.

— Act as a grass filter for reducing sediment in runoff waters when vegetated.

— A diversion may be used to divert excess water from an agricultural site, an urban or developing site, or a construction or mining site. A diversion may also be used to divert uncontaminated water away from a source of contamination in order to maintain water quality as part of a pollution abatement system.

1.3 This standard applies where concentrated surface flow, non-concentrated surface flow, or shallow subsurface flow is a problem, can be intercepted by a shallow channel and a suitable outlet exists. Soil and site conditions must be suitable to build earth channels and earth ridges and sediment accumulations must be manageable.

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2 Normative References

2.1 The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies unless noted. For undated references, the latest approved edition of the referenced document (including any amendments) applies.

2.1.1 ANSI/ASAE S318, Safety for Agricultural Field Equipment

2.1.2 ASAE EP463, Design, Construction and Maintenance of Subsurface Drains in Arid and Semiarid Areas

2.1.3 ASAE EP480, Design of Subsurface Drains in Humid Areas

2.1.4 ASAE S526, Soil and Water Terminology

2.1.5 USDA-ARS Agricultural Handbook Part 667, Stability Design of Grass-Lined Channels

2.1.6 USDA-NRCS National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 9, Diversions

3 Planning

3.1 A diversion may be permanent or temporary. It is used to intercept and divert frequent flows where flows larger than design storm runoff will not cause loss of life or significant damage to the diversion, the diversion outlet, or the area and facilities being served. Installation or removal of a diversion must conform to water rights and drainage laws governing changes of the existing drainage pattern. There are three basic types of diversions: ridge diversions, channel diversions, and combination diversions.

3.1.1 The ridge diversion is located at the upper edge of a steeper slope to divert water from flowing down the slope. This type of diversion is constructed by placing fill to form a ridge, which creates a channel. The depth is measured from the bottom of the channel to the top of the ridge.

3.1.2 The channel diversion is usually located at the base of a slope. It is constructed by excavating a channel. The spoil is spread or disposed of and is not used to form the ridge. The depth is measured from the bottom of the channel to the low bank.

3.1.3 The combination type diversion is constructed by pushing material from the channel to form a ridge. The depth is measured from the channel bottom to the top of the ridge.

3.2 Locate diversions used to intercept shallow subsurface flows so that the planned channel depth will intercept the target seepage.

3.2.1 Locate diversions to meet outlet conditions, fit the topography and soil type, be consistent with land use and accommodate cultural operations.

3.2.2 Visual aesthetics can be critical to diversion alignment and location in urban or developing areas. The alignment should not damage important landscape elements such as unique trees, geologic formations, or scenic features.

3.2.3 Agricultural field diversions should be aligned approximately parallel to the field contours to permit farming along the contour. Diversion alignment must be compatible with the farm equipment that will be used in the field unless otherwise provided in the operations and maintenance plan. It should be built close to the boundary between the land uses.

3.3 The bed slope of the diversion should be selected to meet velocity, capacity, and lining requirements for the site.

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