

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

IRRIGATION PIT OR REGULATING RESERVOIR REGULATING RESERVOIR

(no.)

CODE 552B

DEFINITION

A small storage reservoir constructed to regulate or store a supply of water for irrigation.

PURPOSE

To store water for relatively short periods to:

1. Provide for regulating fluctuating flows in streams or canals,
2. Provide suitable (usually larger) irrigation streams,
3. Provide for improved management of irrigation water,
4. Permit more efficient use of available labor,
5. Avoid nighttime operation, and
6. Provide storage for reuse irrigation systems.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies only to sites meeting all of the following criteria and conditions:

1. The existing available irrigation stream is of such size that regulation is necessary to accomplish the intended purposes. For small irrigation wells, collection facilities are needed for efficient operation of the pumping plants.

2. Water must be stored to be used between times of rotation deliveries.
3. An adequate and dependable volume of good quality water is or can be made available.
4. Topographic, geologic, and soils conditions are suitable for the practical construction of a regulating reservoir having an adequate storage capacity. Pervious soils in the reservoir area can be sealed so that seepage losses are not excessive.
5. If surface runoff enters the reservoir, the contributing drainage area is or can be protected against erosion so that normal sedimentation does not materially shorten the planned life of the reservoir.

Scope

This standard applies to reservoirs created by impounding structures and pits excavated below the ground surface for the short-period storage of either diverted surface water, water from pumped or flowing wells, or water from an irrigation delivery system.

Regulating reservoirs created by earth embankments shall be within the scope of the Hawaii Standard for **Pond** (Code 378) or the Hawaii Standard for **Water Harvesting Catchment** (Code 636).

This standard also applies to water tanks installed as regulating reservoirs used to

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collect water for application with a sprinkler or drip irrigation system.

This standard establishes the minimum acceptable quality level for the planning and functional design of irrigation regulating reservoirs. It does not include detailed design criteria or construction specifications for individual reservoirs or components of the regulating facility.

CRITERIA

Capacity. Irrigation regulating reservoirs shall have a usable capacity sufficient to permit the existing irrigation stream to be regulated so that irrigation water can be applied with a reasonable high efficiency. In computing capacity requirements, due consideration shall be given where applicable to diverted inflow, surface runoff, precipitation, evaporation, and seepage. Excessive seepage losses shall be prevented by the use of an adapted method of sealing or lining. Additional capacity shall be provided as necessary for sediment storage.

Capacity requirements for regulating reservoirs used as part of a system for collecting water from two or more small wells shall be based on the discharge capacities of the contributing wells and on the operation frequency of the sprinkler system.

Reservoir Design. Irrigation regulating reservoirs created by earthen dams, enclosed embankments, excavated pits, and the related appurtenant structures shall be designed according to the Hawaii Standard for **Pond** (Code 378) or the Hawaii Standard for **Water Harvesting Catchment** (Code 636).

Water tanks used as regulating reservoirs shall be designed according to the design criteria in the Hawaii Standard for **Watering Facility** (Code 614).

Inlet Protection. Where the inflow enters the reservoir, the side slope of the reservoir shall be protected against erosion by the use of a pipe inlet or some other suitable

structure. The capacity of the inlet structure shall be no less than that required to accommodate the maximum anticipated rate of inflow.

Overflow Protection. An overflow protection structure having a capacity equal to or greater than the inlet stream shall be provided for an enclosed embankment. This structure may be designed and installed in combination with the outlet works.

Outlet Works. Outlet works shall be provided for the controlled release of irrigation water. The outlet works may consist of a gated conduit through or over the embankment for gravity flow to the irrigated area or to a pumping plant. They may also consist of a pumping plant designed to lift water directly from the reservoir basin. The capacity of the outlet works shall be no less than that required to provide the outflow rate needed to meet peak period irrigation system demands.

PLANNING CONSIDERATIONS FOR WATER QUANTITY AND QUALITY

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
2. Effects on downstream flows or aquifers that would affect other water uses or users.
3. Potential for irrigation water management.

Water Quality

1. Effects on erosion and the movement of sediment, pathogens, and the soluble and sediment-attached substance carried by runoff.
2. Effects on the movement of dissolved substances to ground water.

3. Short-term and construction-related effects on the quality of downstream water courses.
4. Potential of uncovering or redistributing toxic material.
5. Effects on wetlands or water-related wildlife habitats.
6. Effects on the visual quality of water resources.

CONSTRUCTION PLANS

Plans and specifications for irrigation regulating reservoirs shall be in keeping with this standard and shall describe the requirements for proper installation of the practice to achieve its intended purpose.

Plans for earthen irrigation regulating reservoirs should include the items listed under construction plans in the Hawaii Standard for **Pond** (Code 378) or **Water Harvesting Catchment** (Code 636).

Plans for water tanks used as irrigation regulating reservoirs should include the items listed under construction plans in the Hawaii Standard for **Watering Facility** (Code 614).

The Hawaii **Pond** Specification (Code 378), **Water Harvesting Catchment** Specification (Code 636), or **Watering Facility** Specification (Code 614) may be used for installation specifications.