

NATURAL RESOURCES CONSERVATION SERVICE
PACIFIC BASIN AREA
CONSERVATION PRACTICE STANDARD

ROOF RUNOFF STRUCTURE

(Number)
CODE 558

DEFINITION

A facility for collecting, controlling, and disposing of runoff water from roofs.

PURPOSE

To prevent roof runoff water from flowing across concentrated waste areas, livestock shelter or holding areas, roads, and alleys, and to reduce pollution and erosion, improve water quality, prevent flooding, improve drainage, and protect the environment. Water may be collected at the edge of the roof (gutters), or at the ground surface beneath the eaves.

CONDITIONS WHERE PRACTICE APPLIES

A roof runoff structure may be a part of any Pacific Basin conservation plan addressing a single or multiple resource concern including but not limited to the following:

1. In situations where roof runoff water may come in contact with manure, other wastes, or
2. In situations where roof runoff water can cause soil erosion, or
3. In situations where livestock shelter or holding areas may require flood protection; or
4. In situations where improved water management is needed.

DESIGN CRITERIA

Capacity. Design of roof runoff management facilities shall be based on the runoff from a 10-year frequency, 5 minute rainfall except that a 25-year frequency, 5-minute rainfall shall be used to design such facilities for exclusion of roof runoff from Pacific Basin standards, Filter Strip (393A), Waste Storage Facility (313), or similar practices. Rainfall data from the local FOTG Section I -

"Climatic Data" or reliable local records may be used for design.

Hydrology. Design discharge is determined by dividing the product of the area of catchment times the rainfall by the storm duration, i.e. (area X rainfall) / duration. Proper unit conversions must be applied.

Hydraulics. Chapter 3 of the Engineering Field Handbook (EFH), will be used for determining pipe/gutter capacity.

Materials. Roof gutters and downspouts may be made of aluminum, galvanized steel, wood, or plastic. Aluminum gutters and downspouts shall have a nominal thickness of at least 0.7 and 0.5 mm, (0.027 and 0.020 in), respectively. Galvanized steel gutters and downspouts shall be at least 28 gage. Wood shall be clear and free of knots. A water repellent preservative shall be applied to the flow of areas of wood other than redwood, cedar, or cypress. Plastics shall contain ultraviolet stabilizers. Dissimilar metals shall not be in contact with each other.

Supports. Gutter supports shall have sufficient strength to withstand anticipated water. They shall have a maximum spacing of 120 cm (48 in) for galvanized steel and 81 cm (32 in) for aluminum or plastic. Wood gutters shall be mounted on fascia boards using furring blocks that are a maximum of 61 cm (24 in) apart. Downspouts shall be securely fastened at the top and bottom with intermediate supports that are a maximum of 3 m (10 ft) apart.

Outlets. The water from roof runoff structures may empty into surface drains or other outlets meeting design criteria for the Pacific Basin standard, Underground Outlets (620), or onto the ground surface. When downspouts empty onto the ground surface, there shall be an elbow to direct water away

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from the building and splash blocks or other protection shall be provided to prevent erosion.

Protection. Roof runoff structures and outlets shall be protected from damage by livestock and equipment.

CONSIDERATIONS

WATER QUANTITY

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

Effects on downstream flows or aquifers that would affect other water uses.

Potential use for water management to conserve water.

WATER QUALITY

Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.

The effects on wetland and water related wildlife habitats associated with the practice.

DESIGN

The condition of the roof and supports should be evaluated to determine if they are capable of supporting a gutter system for the required life of the practice. Costly renovation of roofs needs to be compared with excluding livestock from the area immediately below the eaves, where the water can be collected and carried away via an underground outlet. Maintenance of ground level water management features is often easier than elevated features.

Resistance to winds as generated by tropical storms should be considered when evaluating the style of roof runoff collection and conveyance.

PLANS AND SPECIFICATIONS

Plans and specifications for installing roof runoff structures shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Plans (construction drawings) developed for roof runoff structures shall be drawn to requirements outlined in Chapter 5, "Preparation of Engineering Plans" of the Engineering Field Handbook (EFH).

OPERATION AND MAINTENANCE

A written operation and maintenance plan shall be developed detailing the overview of common operational problems with recommended actions. When a project includes more than one practice it is acceptable to consolidate operation and maintenance requirements into a single document for the project.