

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
*SOUTH DAKOTA SUPPLEMENTS ITALICIZED***

PUMPING PLANT FOR WATER CONTROL

(No.)
CODE 533

DEFINITION

A pumping facility installed to transfer water for a conservation need, including removing excess surface or ground water; filling ponds, ditches or wetlands; or pumping from wells, ponds, streams, and other sources.

PURPOSE

To provide a dependable water source or disposal facility for water management on wetlands or to provide a water supply for such purposes as irrigation, recreation, livestock, or wildlife.

CONDITIONS WHERE PRACTICE APPLIES

Wherever water must be pumped to accomplish a conservation objective. It is especially applicable for maintaining critical water levels in existing swamps, marshes, or open water and for providing water sources for newly constructed wetlands and ponds.

PLANNING CONSIDERATIONS

Water Quantity

Effect of the pumping plant on upstream and downstream quantity.

Water Quality

Sediment production caused by erosion during construction.

Possible effects on surface and ground water of spilled fuels and lubricants used to operate and maintain the facility.

CRITERIA

Laws and Regulations. This practice must conform to all federal, state, and local laws and

regulations. Laws and regulations of particular concern include those involving water rights, land use, land disturbance by construction, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.

The efficiency of units, type of power, quality of building, automation, and accessories installed shall be in keeping with the value and importance of the system, shall accomplish the conservation and environmental objectives.

Pump requirements. The capabilities, range of operating lifts, and general class and efficiency of equipment shall be determined from appropriate technical studies. The size and number of pumps and their performance requirements shall be determined on the basis of the conservation requirements of the system. The total head shall be determined for critical operating conditions, taking into account all hydraulic losses. Automatic controls shall be included in the plans as required.

The capacity (gallons per minute) of pumps installed in wells must be based on the capacity of the well. Generally, pump capacity should not exceed 90 percent of well capacity.

Power units. The power units shall be selected on the basis of costs, operating conditions, conservation needs, and objectives, including need for automation. The power unit shall be matched to the pump and be capable of operating the pump effectively within the range of operating conditions. The horsepower requirements, pump efficiency, and total head on the pump shall be computed.

Selection of pump type, power unit, plumbing, and controls must be based on individual site conditions. Major consideration must be given to the installation that will operate for the least total

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annual cost (including labor) while meeting conservation needs and objectives.

Internal combustion engines must not be loaded to more than 80 percent of the manufacturer's power rating. This rating must be further reduced for temperature, altitude, and motor accessories.

Electric motors must not be loaded to more than 100 percent of the manufacturer's rated load, with reduction for any expected high temperatures.

Suction and discharge pipes. The size of suction and discharge pipes shall be based on studies of efficiencies and effects on costs and operations. The arrangement and length of discharge pipe shall be based on the need for recovery of head through syphonic action, and for delivery of water in keeping with conservation and environmental objectives. Gates, valves, pipe connections, discharge bays, and other protective works shall be installed, as needed, for satisfactory plant operation.

Building and accessories. The design of the plant and associated housing, if required, shall consider the need for protecting equipment from the elements, malicious damage, and fire and the need for equipment maintenance and repairs. The appearance of the plant shall be in keeping with its surrounding environment and its importance or value.

The foundations shall be designed to safely support the loads imposed. Sheet piling or other measures shall be used, as required, to prevent piping beneath the foundation.

Pumps may be mounted *in a building*, in the open, on piling, or in *a well* or pit.

Suction bays (or sumps) shall be designed to conform to the hydraulic characteristics established by the pump manufacturer.

The discharge bay or connection with distribution system shall be ample to meet hydraulic and structural requirements. Provisions for repair or removal of pumps and engines shall be provided. Trash racks shall be provided, as needed, to exclude debris and trash from the pump.

All structural features and equipment shall provide adequate safety features to protect workers and public against injury.

Vegetative Cover, Fencing and Riprap. *All disturbed areas must be seeded following completion of construction. Fencing must be provided where necessary to protect vegetation and control grazing.*

Riprap must be included where needed to control erosion.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing pumping plants for water control shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose

OPERATION AND MAINTENANCE

An Operation and Maintenance Plan must be prepared for use by the owner/operator. The plan must provide specific instructions for operating and maintaining the facility to insure it functions as designed.

REFERENCES

USDA-NRCS National Engineering Handbook, Section 16 - Drainage.

USDA-NRCS National Engineering Handbook, Section 15, Irrigation.