

**NEW MEXICO ENVIRONMENT DEPARTMENT  
GROUND WATER DISCHARGE PERMIT  
MONITORING WELL CONSTRUCTION AND ABANDONMENT GUIDELINES**

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**Purpose:** These guidelines identify minimum construction and abandonment details for installation of water table monitoring wells under ground water Discharge Permits issued by the NMED's Ground Water Quality Bureau (GWQB). Proposed locations of monitoring wells required under Discharge Permits and requests to use alternate installation and/or construction methods for water table monitoring wells or other types of monitoring wells (e.g., deep monitoring wells for delineation of vertical extent of contaminants) must be submitted to the GWQB for approval prior to drilling and construction.

**General Drilling Specifications:**

1. All well drilling activities must be performed by an individual with a current and valid well driller license issued by the State of New Mexico in accordance with 19.27.4 NMAC. Use of drillers with environmental well drilling experience and expertise is highly recommended.
2. Drilling methods that allow for accurate determinations of water table locations must be employed. All drill bits, drill rods, and down-hole tools must be thoroughly cleaned immediately prior to the start of drilling. The bore hole diameter must be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of sand and sealant.
3. After completion, the well should be allowed to stabilize for a minimum of 12 hours before development is initiated.
4. The well must be developed so that formation water flows freely through the screen and is not turbid, and all sediment and drilling disturbances are removed from the well.

**Well Specifications (see attached monitoring well schematic):**

5. Schedule 40 (or heavier) PVC pipe, stainless steel pipe, carbon steel pipe, or pipe of an alternate appropriate material that has been approved for use by NMED must be used as casing. The casing must have an inside diameter not less than 2 inches. The casing material selected for use must be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. The casing material and thickness selected for use must have sufficient collapse strength to withstand the pressure exerted by grouts used as annular seals and thermal properties sufficient to withstand the heat generated by the hydration of cement-based grouts. Casing sections may be joined using welded or threaded joints; the method selected must provide sufficient joint strength for the specific well installation. The casing must extend from the top of the screen to at least one foot above ground surface. The top of the casing must be fitted with a removable cap, and the exposed casing must be protected by a locking steel well shroud. The shroud must be large enough in diameter to allow easy access for removal of the cap. Alternatively, monitoring wells may be completed below grade. In this case, the casing must extend from the top of the screen to 6 to 12 inches below the ground surface; the monitoring wells must be sealed with locking, expandable well plugs; a flush-mount, watertight well vault that is rated to withstand traffic loads must be emplaced around the wellhead; and the cover must be secured with at least one bolt. The vault cover must indicate that the wellhead of a monitoring well is contained within the vault.
6. A 20-foot section (maximum) of continuous-slot, machine slotted, or other manufactured PVC or stainless steel well screen or well screen of an alternate appropriate material that has been approved for use by NMED must be installed across the water table. Screens created by cutting slots into solid casing with saws or other tools must not be used. The screen material selected for use must be compatible with the anticipated chemistry of the ground water and appropriate for the contaminants of interest at the facility. Screen sections may be joined using welded or threaded joints; the method selected must provide sufficient joint strength for the specific well installation and must not introduce constituents that may reasonably be considered contaminants of interest at the facility. A cap must be

attached to the bottom of the well screen; sumps (i.e., casing attached to the bottom of a well screen) should not be installed. The bottom of the screen must be installed no more than 15 feet below the water table; the top of the well screen must be positioned not less than 5 feet above the water table. The well screen slots must be appropriately sized for the formation materials. A slot size of 0.010 inches is generally adequate for most installations.

7. Casing and well screen must be centered in the borehole. Placement of centralizers near the top and bottom of the well screen is recommended.
8. A filter pack must be installed around the screen by filling the annular space from 1 foot below the bottom of the screen to 2 feet above the top of the screen with clean silica sand. The filter pack must be properly sized to prevent fine particles in the formation from entering the well; clean medium to coarse silica sand is generally adequate as filter pack material for 0.010-inch slotted well screen. For wells deeper than 30 feet, the sand must be emplaced by a tremmie pipe. The well should be surged or bailed to settle the filter pack and additional sand added, if necessary, before the bentonite seal is emplaced.
9. A bentonite seal must be constructed immediately above the filter pack by emplacing bentonite chips or pellets (3/8-inch in size or smaller) in a manner that prevents bridging of the chips/pellets in the annular space. The bentonite seal must be 3 feet in thickness and hydrated with clean water. Adequate time should be allowed for expansion of the bentonite seal before installation of the annular space seal.
10. The annular space above the bentonite seal must be sealed with a bentonite-cement grout (5 lbs. of powdered bentonite, 94 lbs. of Portland cement, and 6½ to 8½ gallons of clean water), neat cement grout (94 lbs. of Portland cement and 5 to 6 gallons of clean water), or bentonite grout (20 percent solids, created by mixing 50 lbs. of bentonite grout with 24 gallons of clean water). Emplacement of the annular space seal using a tremmie pipe (flow by gravity or pumping through the pipe) is preferred. Annular space seals must extend from the top of the bentonite seal to the ground surface (for wells completed above grade) or to a level 3 to 6 inches below the top of casing (for wells completed below grade).
11. For monitoring wells finished above grade, a concrete pad (2-foot minimum radius, 4-inch minimum thickness) must be poured around the shroud and wellhead. The concrete and surrounding soil must be sloped to direct rainfall and runoff away from the wellhead. The installation of steel posts around the well shroud and wellhead is recommended for monitoring wells finished above grade to protect the wellhead from damage by vehicles or equipment. For monitoring wells finished below grade, a concrete pad (2-foot minimum radius, 4-inch minimum thickness) must be poured around the well vault and wellhead. The concrete and surrounding soil must be sloped to direct rainfall and runoff away from the well vault.

#### **Abandonment:**

12. Approval for abandonment of monitoring wells used for ground water monitoring in accordance with Discharge Permit requirements must be obtained from NMED prior to abandonment.
13. Monitoring wells no longer in use must be plugged in a manner to prevent migration of surface runoff or ground water along the length of the well casing. Where possible, this must be accomplished by removing the well casing and pumping bentonite-cement grout, neat cement grout, or bentonite grout (prepared as specified above for annular space seals) from the bottom of the borehole to the ground surface using a tremmie pipe. If the casing cannot be removed, bentonite-cement grout, neat cement grout, or bentonite grout must be emplaced in the well using a tremmie pipe from the bottom of the well to the ground surface.
14. After abandonment, written notification shall be submitted to the NMED with the date and method of abandonment.

**Deviation from Guidelines:** Requests to construct water table monitoring wells or other types of monitoring wells for ground water monitoring under ground water Discharge Permits in a manner that deviates from the details of these guidelines must be submitted in writing to the GWQB. Each request

must state the rationale for the proposed deviation from these guidelines and provide detailed evidence supporting the request. The GWQB will approve or deny requests to deviate from these guidelines in writing.

