7-007 DESIGN STANDARDS

7-007.01 The Director will review plans and specifications for substantial conformance to the “Recommended Standards for Water Works”, 2007 Edition and the requirements of Title 179 NAC 7. In the event of discrepancy, Title 179 NAC 7 will govern. The Department will consider approving designs that follow generally accepted engineering guidelines and standards published by national engineering societies, federal environmental agencies, public health boards, engineering textbooks used by accredited university engineering programs, documented successful installations or successful pilot/full scale testing.

7-007.02 Chemical Feed Systems: All chemical feeders must have primary and secondary interconnect control devices to prevent overfeeding. Where applicable, chemical feeders must be electrically interconnected with the well or service pump and must also be provided with secondary control devices as a means of reducing the possibility of overfeed. An exception to this may be made for systems that have warning devices and are staffed 24 hours a day, 7 days a week.

7-007.03 Wells/Groundwater Source(s)

1. Every well, infiltration line or spring serving or intended to provide water for a public water system, to the greatest extent possible, shall be located, constructed, or modified in such a manner that neither underground nor surface contamination by any biological, chemical or radioactive substance or by the physical property of any substance from any cesspool, privy, septic tank, sub-surface tile system, sewer, drain, pit below ground surface, abandoned or decommissioned well, animal or avian wastes, or any other possible source of pollution can adversely affect such water supply. The minimum recommended horizontal distances in feet separating the well, infiltration gallery or spring from potential sources of contamination are as described in the following table. The Department will consider location, of wells and springs at closer proximity than the minimum distances below. Approval for such location may be given when circumstances require such location, but only if, in the opinion of the Director, the engineer demonstrates that such location will not constitute a pollution hazard to the supply. The examples are not meant to be all inclusive. When locating a ground water source, the owner of a public water system shall consider all potential sources of contamination and anything which may affect the ability of the source to produce an adequate supply of safe water on a continuous basis. When surface runoff or underground movement from potential sources of contamination may adversely affect the quality of water from such supplies, the distance separating these potential sources of contamination and the well, infiltration gallery, or spring should be greater than that listed in the following schedule.

CATEGORY	DISTANCE Feet
Water Well	1,000
Sewage Lagoon	1,000
Land application of municipal/industrial waste material	1,000
Feedlot or Feedlot Runoff	1,000
Underground disposal system (septic system, cesspool, etc.)	500
Corral	500
Pit Toilet/Vault Toilet	500
Wastewater Holding Tanks	500
Sanitary Landfill/Dump	500
Chemical or Petroleum Product Storage	500
Sewage Treatment Plant	500
Sewage Wet Well	500
Sanitary Sewer Connection	100
Sanitary Sewer Manhole	100
Sanitary Sewer Line	50

NOTE: If the distance requirements in 179 NAC 13 Attachment 2 are not met, the well is subject to testing to determine if it is ground water under the direct influence of surface water. If a well meets that definition, it is treated as a surface water source subject to all the requirements of the rules regarding surface water.

2. A test hole is required for all proposed well sites or the engineer must provide similar information that would have been provided by the test hole.
3. The annular space must be grouted (cement based grout) to a minimum depth of 10 feet below the ground surface. If a pitless unit is to be installed, the upper limit of the cement based grout must be one foot below the field connection of the adapter. Crushed or chip bentonite must be installed from the top of the designed gravel pack to the base of the cement based grout. In order to accomplish this, the annular space must be 4 to 12 inches larger than the nominal casing size. Pouring into a dry annular space is preferred. Placement of the bentonite into the annular space must be done in a manner which ensures that bridging does not occur. Prior to using this material, it must be sieved over a 1/4 inch mesh screen to remove fines which may have accumulated in the bag during shipment. Any alternate annular space grouting/sealing proposed must be justified by the engineer with supporting documents.
4. The following information must be submitted with the plans and specifications, addenda thereto, or prior to construction:

a. Test hole driller’s logs and reports or similar information.
b. All sieve analysis and calculations used in gravel pack and screen design.

This information must be submitted prior to the placement of the screen and gravel pack.

5. The well casing must be at least two nominal sizes larger than the bowl size of the pump.
6. Well casing lengths must be joined by a watertight method appropriate to the material used so that the resulting joint will have the same structural integrity as the casing itself.
7. Cement-based grout must be placed by tremie pouring. The tremie pipe must be kept full continuously from the start to finish of the grouting procedure, with the discharge end of the tremie pipe being continuously submerged just below the surface of the grout until the zone to be grouted is completely filled.
8. The filter pack grain size must be determined by taking the 70% retained grain size of the finest formation to be filtered and multiplying it by 4, 5, or 6. This is the 70% retained grain size of the filter material to be used. The uniformity coefficient (the size of sieve that retains 40% of the sample divided by the size that retains 90%) must not be greater than 2.5. The gradation of the filter material must form a smooth and gradual size distribution curve when plotted. The screen aperture openings must be of such size as to retain between 85% and 100% of the filter material. The total open area of the screen must be such that the entrance velocity of water at the design condition does not exceed 0.1 feet per second (fps) with 50% of the screen open area blocked off.
9. The length of filter pack must extend a distance of 2-1/2 times the maximum diameter of the well above the screen and below the screen, unless terminating in bedrock or clay.
10. The filter pack must be placed with a tremie pipe by washing or pumping the filter material in with water as a slurry.
11. The sand content must be determined from averaging the results of at least 5 samples collected over the course of the constant rate pump testing. The average of the sand content from these test results must not exceed two parts per million (ppm).