ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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WD-DWGB-1-14 2009

Extending Bedrock Well Casings

INTRODUCTION

The bacterial quality of the water from a bedrock well (also called “artesian” or “drilled”) is normally very reliable. The principle exception occurs when the top of a bedrock well is cut off below the ambient ground level, and thus, subject to flooding. This often results in the leakage of unfiltered surface water directly into the well. Surface water typically contains total, fecal, and *E. coli* bacteria.

The purpose of this document is to provide information relative to raising the top of a bedrock well casing above the ambient ground level. The top of the well is commonly called the “wellhead.” A buried wellhead is a serious problem that should be corrected unless you are absolutely sure that the wellhead will not be flooded, ever!

WELL CONSTRUCTION STANDARD

New Hampshire well construction rule We 602.02(e)(1) requires bedrock well casings to extend above the ambient ground surface a minimum of eight inches or more. This requirement has been in effect since 1985. An exception is allowed only if the projection of the wellhead would create a safety hazard.

Wells constructed before July 2, 1985, are not required to conform to this rule. However, it is highly recommended that older wells be upgraded to current New Hampshire standards where possible. In addition, New Hampshire law RSA 482-B:15 states, “all materials and construction practices used in the construction of a new well or pump installation, or in the maintenance, repair or replacement of any well or pump installation, shall conform with rules adopted by the Water Well Board.”

PITLESS ADAPTOR DESIGN

The normal design of a modern bedrock well ensures that leakage cannot enter the interior of the well by requiring that the top of the well be above any possible flood level. This is achieved by using a so called “pitless adaptor.” This configuration places the top of the well above the level of flooding while allowing the pressurized well water to exit the casing below the ground level in a way that ensures no leakage of contaminants into the well, and provides protections of the pressurized water line from freezing.

Value of A Pitless Adaptor
In addition to preventing bacterial contamination, a pitless adaptor also provides the following additional benefits:

- Easy access for all-weather replacement of a submersible pump. This will prevent costly delay caused by the difficulty in excavating frozen soil during the winter.
- Provides an unmistakable indicator of the well's location relative to inadvertent placement of a leach field on adjacent properties or damage by heavy vehicles passing over the well.

Evaluate the Potential for Flooding of the Well Pit
The only justification for a buried wellhead is a safety issue. To determine if an existing buried wellhead is subject to flooding one can look for staining caused by flood waters on the inside walls of the well pit. If the staining is above the top of the bedrock casing, an extension of the casing is absolutely necessary. It is not reasonable to believe that the top of the buried well can be made water tight so as to be safe in the event of a flood.

If there is no staining (meaning there is never any water buildup in the pit), or the maximum level of staining is noticeably below the top of the well, than extension of the well casing may arguably be deferred for the moment. If you choose not to extend the casing, the pit should be checked periodically during spring snow melt and after very heavy rain events to determine the flood level.

Response to Wellhead Flooding in Hillside Locations
Where a well with a buried wellhead is located on a hillside, it may be possible to lower the flood risk without raising the wellhead by installing a "gravity flow" drain. This drain would be installed at the bottom of the pit and would discharge by gravity to "above ground." Using a sump pump to dewater the wellhead pit is not recommended due to the eventual failure(s) expected of any mechanical device and its electrical service.

Response When the Flooding Is Caused by River or Lake
When a well is located in the flood plain of a lake or river, the typical approach would be to bring in additional fill material to mound up around the immediate outside of the well, and to raise the casing using a pitless adaptor configuration. When grading the backfill around the well, keep the backfill slope shallow on one side so that a well rig may be easily positioned above the well for future maintenance. Mobilization of well drilling equipment could be associated with pulling the pump or deepening the well for more flow.

OPTIONS FOR EXTENDING A WELL CASING
Before and after drawings of a well casing extension are shown on page 3. A well casing extension is a structural improvement for wells which terminate below or too close to grade. Well casing extensions must be water tight. Well casing extensions must also be constructed of the same material as the existing casing and be of sufficient strength and weight to ensure adequate performance.

Steel Casing Extensions
Acceptable methods for joining steel casing extensions to existing steel casing include the use of a:

- Threaded steel coupling.
- Welded pipe joint.

- Weld to threaded steel slip coupling.
- Mechanical steel bolted restraining pipe coupling, commonly referred to as a *Dresser* coupling.

Plastic Casing Extensions
Plastic well casing extensions should be joined to existing plastic casing by either solvent welds or with threaded couplings. Plastic well casing extensions must be constructed of a schedule 40 PVC material or better and NSF approved.

FOR MORE INFORMATION
For more information, please call the Water Well Board at (603)-271-1974. For a complete list of all Drinking Water and Groundwater Bureau fact sheets, visit the DES website at http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm. We would appreciate your comments and suggestions pertaining to this fact sheet. Please check the DES internet site annually for updates to this document.

Note: This fact sheet is accurate as of June 2009. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.