
ENVIRONMENTAL Fact Sheet



29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

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Best Management Practices for Protection of Surface Water Quality During Well Drilling Operations

Background

Most well construction methods include rotary drilling, cable tool drilling, percussion hammer, jetting, excavation and augering. These methods commonly include the use of heavy equipment, water, bentonite clay and related byproducts. As a result, well drilling operations may generate solids, referred to as suspended solids when transported by water movement or discharged directly to a wetland or surface water. When not properly contained, the generated solids may adversely impact wetlands and surface waters.

Suspended Solids

Suspended solids in surface waters often consist of natural sand, silt and clay. They are typically produced by activities such as road construction and maintenance, timber harvesting, agricultural practices, mining, land development and well drilling. The well drilling process uses and generates solids that may become suspended in water.

Suspended solids may impact surface waters and water-dependent organisms by:

- Increasing the transport of nutrients (nitrogen and phosphorus) that adhere to sediment particles in water bodies. Increased nutrient loading to lakes and ponds encourages algae growth and may eventually change the character of water bodies from clear, high-oxygen habitats to murky, low-oxygen habitats that no longer support fish species such as trout that need high oxygen levels. Occasionally, algae growth may result in dramatic increases in algae populations, referred to as algal blooms, further degrading the value of water bodies for uses such as swimming and boating.
- Adding sediments to a water body and supporting the dominance of nuisance or non-native species.
- Causing murky conditions, reducing the ability for fish and other aquatic organisms to find food, breathe and successfully reproduce.

BMPs to Prevent Impacts of Suspended Solids to Wetlands and Surface Waters

Containment of well drilling operation: All well drilling operations should have the site contained during and after well installation. This includes digging a containment pit on-site, installing hay bales and silt fencing, managing overflow so that it will not carry sediment into wetlands or surface water (e.g., by pumping overflow to a poly-lined dumpster when necessary), and containing artesian flow.

Well location: All wells should be constructed outside wetlands and surface waters as defined by NHDES. All permanent and temporary wetland or surface water impacts necessary for well construction require a NHDES Wetlands Dredge and Fill Permit.

Heavy equipment: All heavy equipment should stay outside surface waters and wetlands as defined by NHDES. If permanent or temporary surface water or wetland impacts are necessary for well construction a Wetlands Dredge and Fill Permit is required. Areas subject to earth disturbance should be contained with hay bales and silt fence if the potential to adversely impact wetlands or surface water exists.

Containment pit: During the well drilling process a containment pit, or mud pit, is often necessary. If so, the mud pit should have sufficient capacity to prevent overflow or should discharge to uplands. When overflow does occur, the discharge should spread out to prevent channeling of water, which could lead to erosion and possible adverse impacts to nearby wetlands and surface waters. When this is not possible and impacts to wetlands and surface waters is likely to occur, trucking the discharge from the mud pit off-site is necessary.

Well drilling materials: Water and bentonite clay may be used during the well construction process. Disposed water should infiltrate in the ground without impacting wetlands and surface waters or channeling off-site. Bentonite clay must be contained on site, preferably in a pit to prevent overland flow either during construction or afterwards.

Well drilling byproducts: During the well drilling process, approximately 20 cubic feet of drilling byproducts is generated for every 100 feet of well depth. Often this is a fine material referred to as stone dust. To meet NHDES water quality standards it is necessary to contain these byproducts on site and prevent them from moving into wetlands and surface waters.

Water Quality Standards

Water quality standards are used to protect the state's surface waters. Standards consist of three parts: designated uses, such as fishing and swimming; numerical or narrative criteria to protect the designated uses; and an antidegradation policy, which maintains existing high quality water that exceeds the criteria. Criteria are established by statute and by administrative rules.

For Additional Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or the Water Well Board at (603) 271-1974 or waterwellprogram@des.nh.gov, or visit our website at des.nh.gov.

Note: This fact sheet is accurate as of July 2019. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.