

# An Overview of Shallow Well Construction in New Hampshire



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# NH Water Well Program

- Overseen by the Water Well Board and NHDES
- Program began in 1984
- Revised rules effective March 2017
- Well Completion Reports
  - Accept both paper and electronic reports
- Licensing of well drillers and pump installers
- Construction standards based on well type
- Well siting requirements
- Pump installation standards
- Well development
- Well decommissioning
- <https://www.des.nh.gov/organization/commissioner/legal/rules/documents/we100-1000.pdf>

# NH Water Well Board

- Licensing of Water Well Contractors (154 total):
  - Rotary Drillers
  - Cable Tool Drillers
  - Technical (or environmental) Drillers
  - **Point/Wash Well Drillers**
  - **Dug Well Installers**
- Well pump installers (224)

<https://www.des.nh.gov/organization/divisions/water/dwgb/wwwb/index.htm>



# NH Well Report Database – OneStop Website

130,000+ records since 1984



Monday, Feb. 26, 2018

OneStop - Search

OneStop Version One

Any DES Interest Id:

If you have any questions about using this site please contact us. Click the Onestop Contact in the menu bar above for contact information.

Areas of Interest

General Areas of Interest:

If you are unsure which Specific Areas of Interest you want, try selecting a General Area of Interest. This will select all the Specific Areas that apply.

Specific Areas of Interest				
<input type="checkbox"/> Aboveground Storage Tank	<input type="checkbox"/> Air Stationary Source	<input type="checkbox"/> Alteration of Terrain Permit	<input type="checkbox"/> Asbestos Disposal Site (Inactive)	<input type="checkbox"/> Auto Salvage Yard
<input type="checkbox"/> Beaches	<input type="checkbox"/> Bottled Water Site	<input type="checkbox"/> Groundwater Discharge Site	<input type="checkbox"/> Hazardous Waste Generator	<input type="checkbox"/> Initial Response Spill
<input type="checkbox"/> Public Pools/Spas	<input type="checkbox"/> Public Water System	<input type="checkbox"/> Registered Water User	<input type="checkbox"/> Remediation Site	<input type="checkbox"/> Solid Waste Facility
<input type="checkbox"/> Underground Storage Tank	<input checked="" type="checkbox"/> Water Well			

Before hitting the Enter key, if you have checked specific area(s) of interest, you may want to scroll down to check other Interest Specific Criteria you can search on.

Include other interests found at location(s)  Return only results that exist in ALL selected areas of interest

Location

Town/City:

Owner Last Name or Company Name:

Address:

County:

Interest Specific Criteria

ALL Owner fields listed below are automatically wildcard searched. For other fields noted by an "\*", the wildcard character "%" can be used. Click here to learn more about using the Search wildcard character.

Water Well

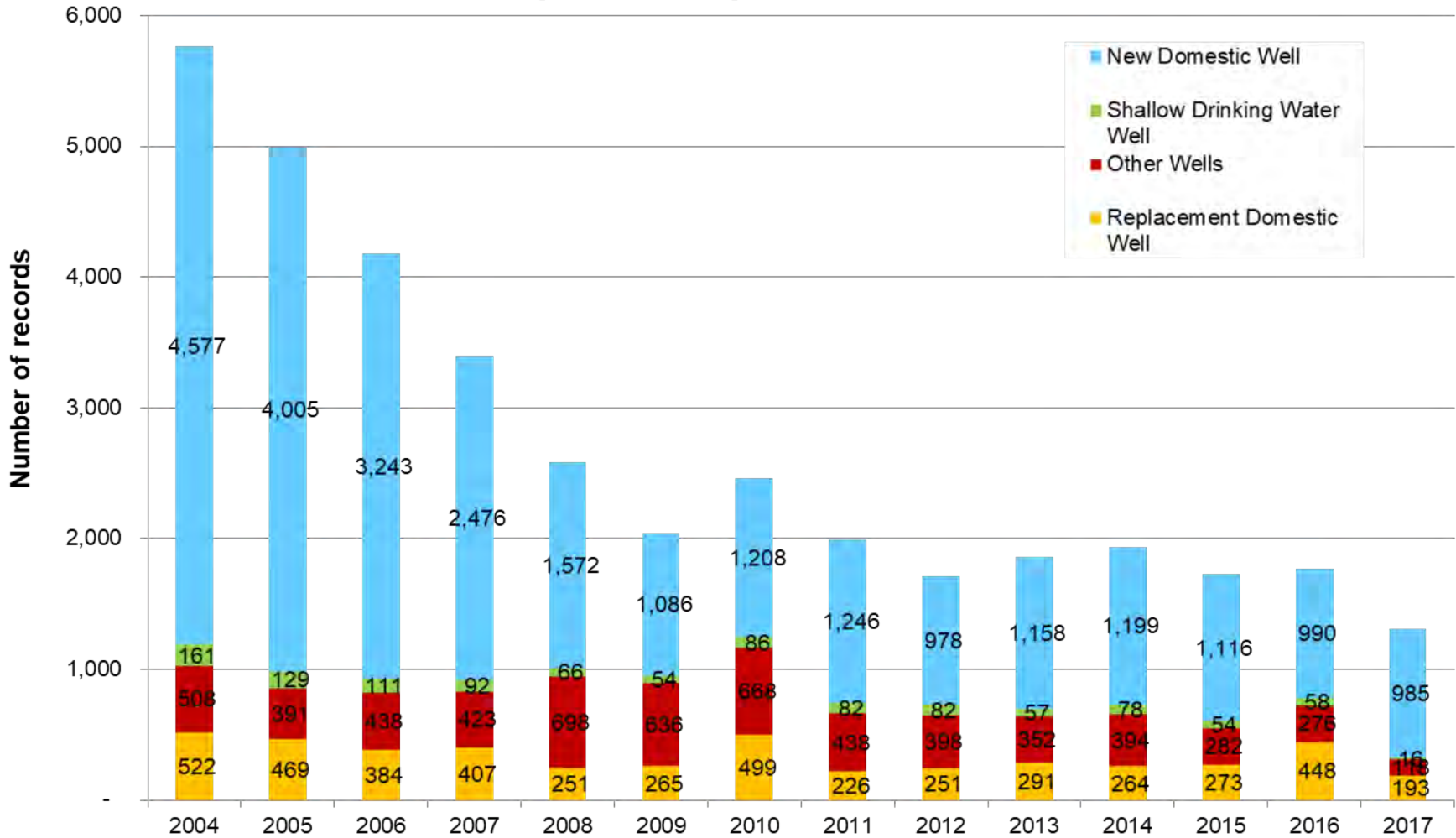
Well Id (WRB#):

Years Well Completed From:  To:

Well Driller:



# NH Well Completion Report Totals 2004 - 2017




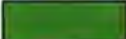


Note: Values are **approximate** and only include records in the water well database.

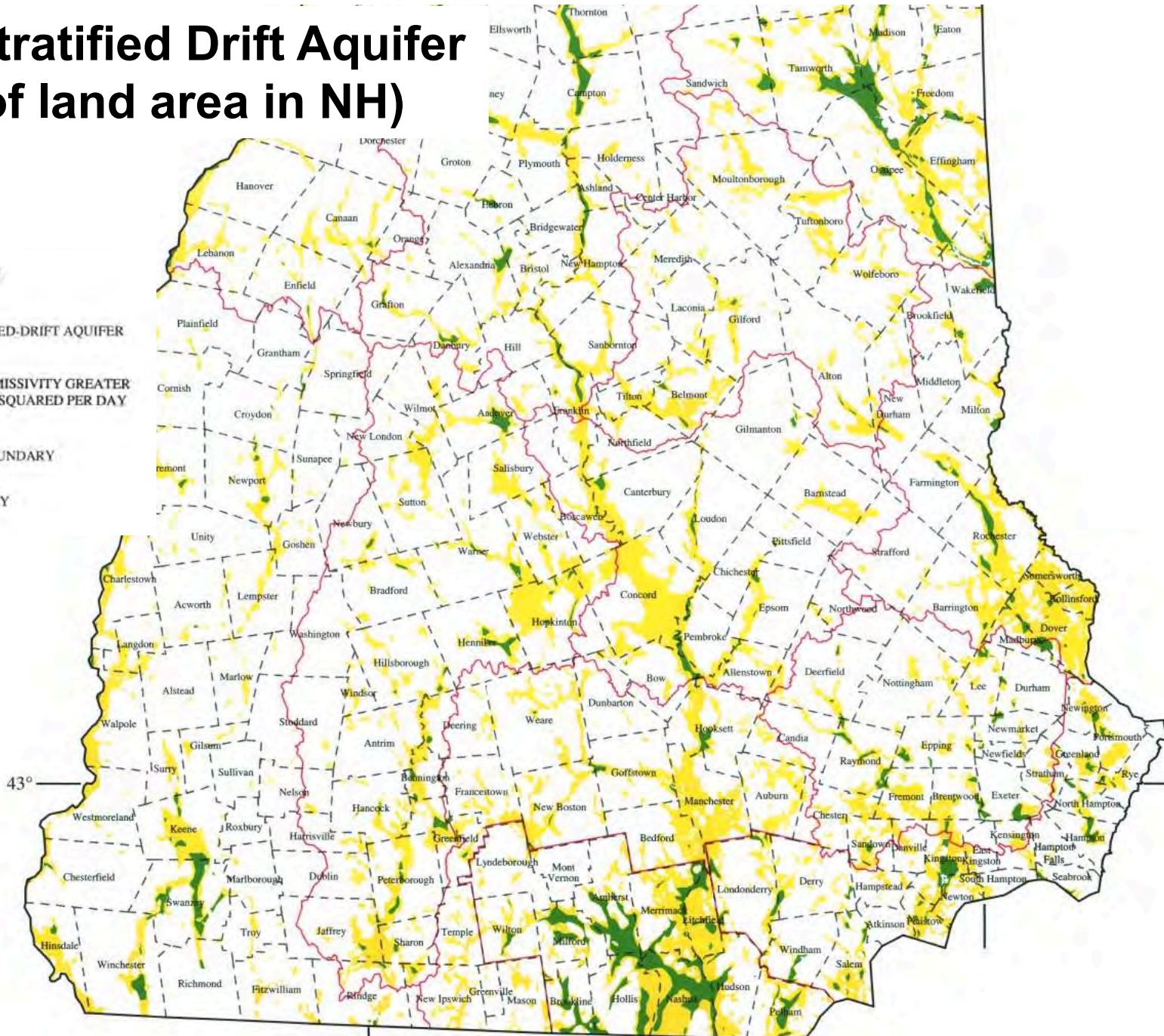
Due to data entry challenges, many paper records for 2015 - 2017 have yet to be entered into the database.

Database source: <http://www4.des.state.nh.us/DESONestop/BasicSearch.aspx>.

# Glacial Stratified Drift Aquifer (14% of land area in NH)

## EXPLANATION

-  MAJOR STRATIFIED-DRIFT AQUIFER
-  ZONE OF TRANSMISSIVITY GREATER THAN 2,000 FEET SQUARED PER DAY
-  STUDY AREA BOUNDARY
-  TOWN BOUNDARY





# Stratified drift aquifer map available on: NHDES OneStop Data Mapper

<https://www.des.nh.gov/onestop/index.htm>

The screenshot displays the NHDES OneStop Data Mapper interface. At the top, the New Hampshire Department of Environmental Services logo is visible, along with a search bar and navigation icons. The main map area shows a stratified drift aquifer map with various transmissivity zones. A blue box with the text "I want to..." is overlaid on the map. The left sidebar contains a "Layers" panel with the following items:











- NHDES Environmental Data
- Filter Layers... (Filter)
- Bedrock Geology
- Conservation Lands
- Floodplains
- Parcels
- Political Boundaries
- US National Grid
- Transportation
- Water Resources (checked)
- Watershed Boundaries
- Surface Water
- Shoreline Buffer Zones (checked)
- Wetlands
- Aquifer Transmissivity (checked)
- Landcover/Land Use
- Regional Landcover and Land Use
- 2001 NH Landcover

The map shows several lakes, including Silver Lake, Whinn Lake, and Disappearing Lake. The aquifer transmissivity zones are labeled with values such as "Less than 2000 feet sq./day", "2000 - 4000 feet sq./day", and "Greater than 4000 feet sq./day". A scale bar at the bottom indicates 1 km and 1 mi. The bottom right corner contains the text "Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri C..."



# OneStop Data Mapper Layers and Metadata

Click each layer name for layer information (metadata), if available.

- [Aboveground Storage Tank Sites](#) 
- [Air Facility Systems](#) 
- [Asbestos Disposal Sites](#) 
- [Automobile Salvage Yards](#) 
- [Dams](#) 
- [Environmental Monitoring Sites](#)
- [Groundwater Classification Areas GAA\\*](#) 
- [Groundwater Classification Areas GA1](#) 
- [Groundwater Classification Areas GA2](#) 
- [Hazardous Waste Generators](#) 
- [Local Potential Contamination Sources](#) 
- [NPDES Outfalls](#) 
- [Outstanding Resource Water Watersheds](#) 
- [Public Water Supply Wells\\*](#) 
- [Registered Water Users\\*](#) 
- [Remediation Sites](#) 
- [Solid Waste Facilities](#) 
- [Source Water Protection Areas\\*](#) 
- [Surface Water Impairments with 1-Mile Buffer 2010](#) 
- [Underground Storage Tank Sites](#) 
- [Water Supply Intake Protection Areas\\*](#) 
- [Water Well Inventory\\*](#) 
- [Wellhead Protection Areas\\*](#) 

\*Water supply data: In the interest of Homeland Security, these data are available only to registered users of NHDES OneStop Data Retrieval/Data Provider systems and NHDES employees. [Apply for access using the OneStop Data Retrieval/Data Provider Registration Form](#), available online.

## Contact

For assistance, please email [gis@des.nh.gov](mailto:gis@des.nh.gov).

# Types of Shallow Drinking Water Wells

- Wells drilled in unconsolidated materials
  - Augured
  - Drive and Wash
  - Driven Point
  - Jetted
- Wells Constructed by Excavation (Dug wells)
  - Concrete tiles
  - 6" PVC cased
- General regulations:
  - Extend casing above ground surface
  - Secure cover (not plywood)
  - 2 ft cover of impervious backfill
  - Ground surface graded away from casing

# Large Gravel Wells

Driving 20 Inch  
Casing

133 ft deep, 700 gpm

Municipal well in Bow,  
NH in 2011



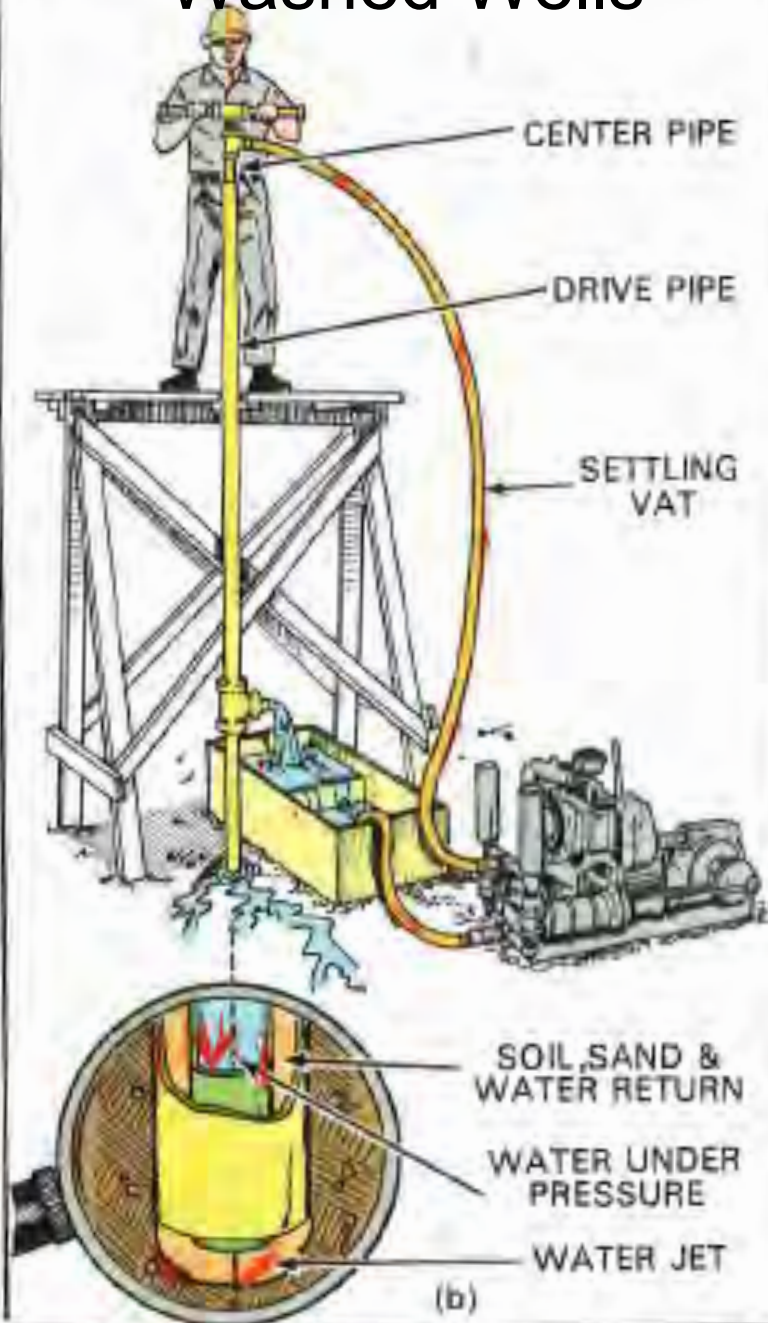


# Point Wells



(b)

# Washed Wells



(b)

# McDonald Well & Pump Kingston, NH Point/Wash Well Drill Rig



**Spudder**

**140 lb. Hammer**







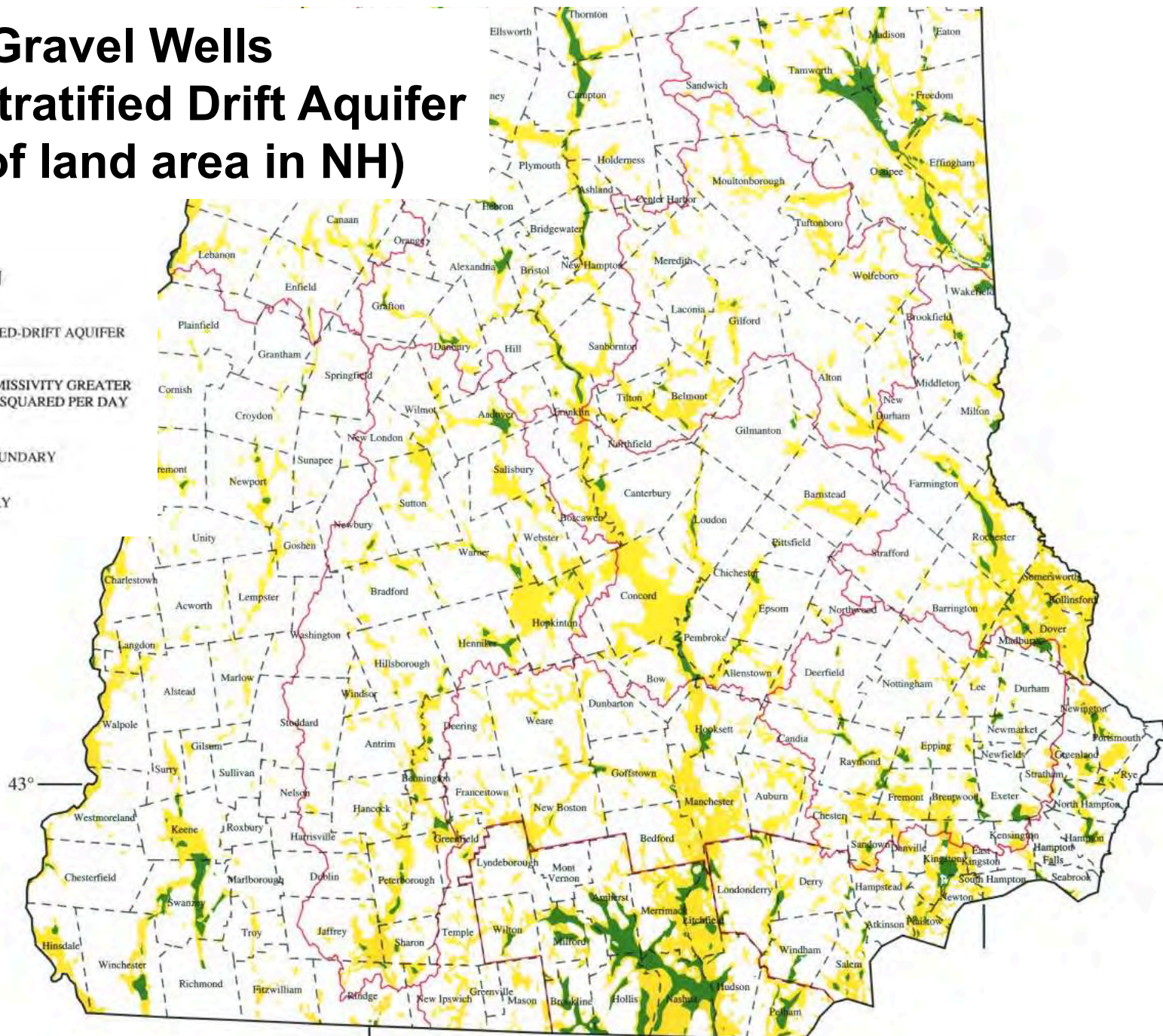
# Gravel Wells

## Glacial Stratified Drift Aquifer

(14% of land area in NH)

### EXPLANATION

-  MAJOR STRATIFIED-DRIFT AQUIFER
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# Drive and Wash

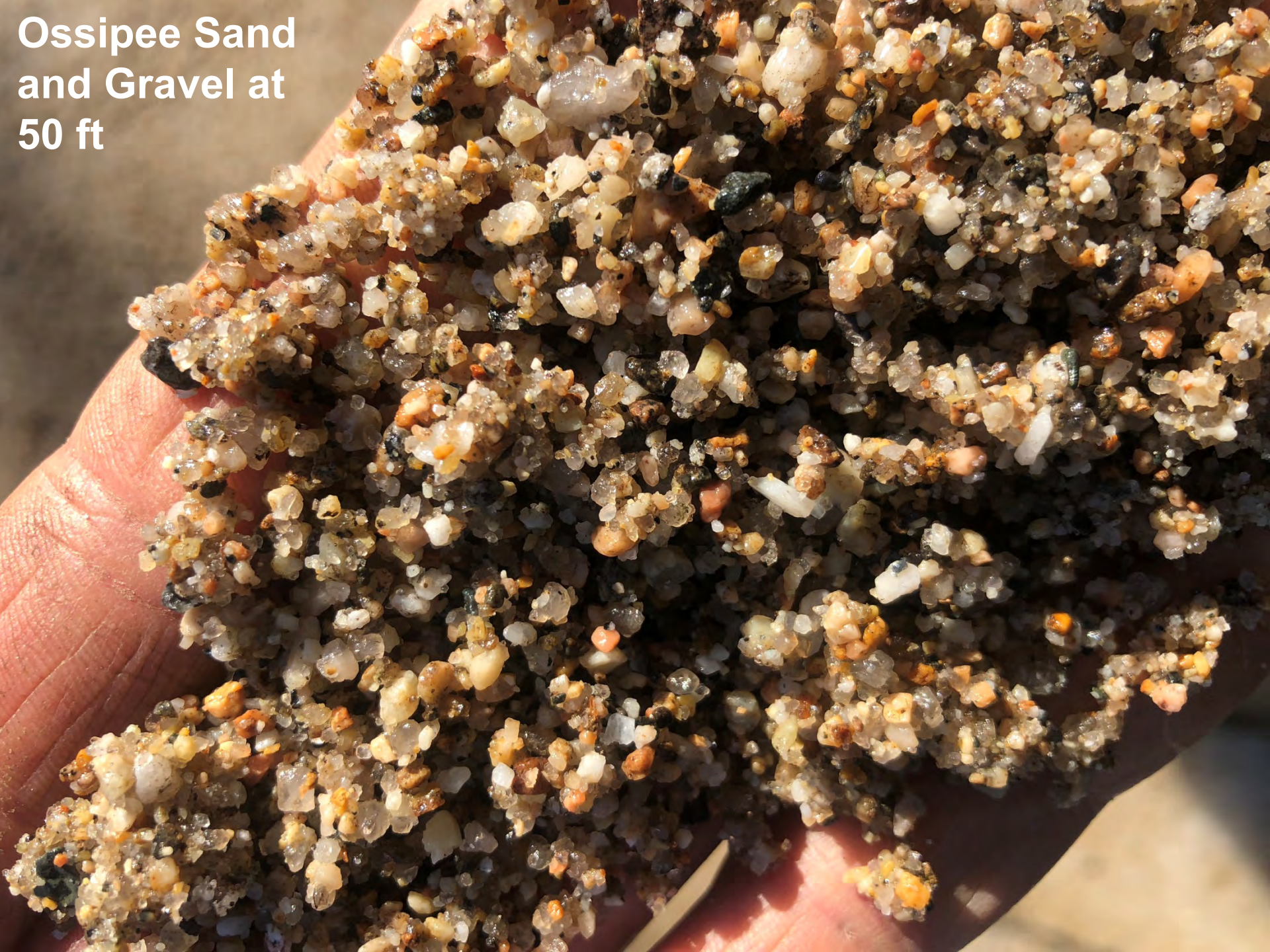
Wash pipe lowered to bottom of well casing

Screen catches material being washed out of the well





Ossipee Sand  
and Gravel at  
50 ft





# Set the well screen

Rubber seals the screen to the casing

5' SS screen chosen based on material in wash

4" well casing to 50'

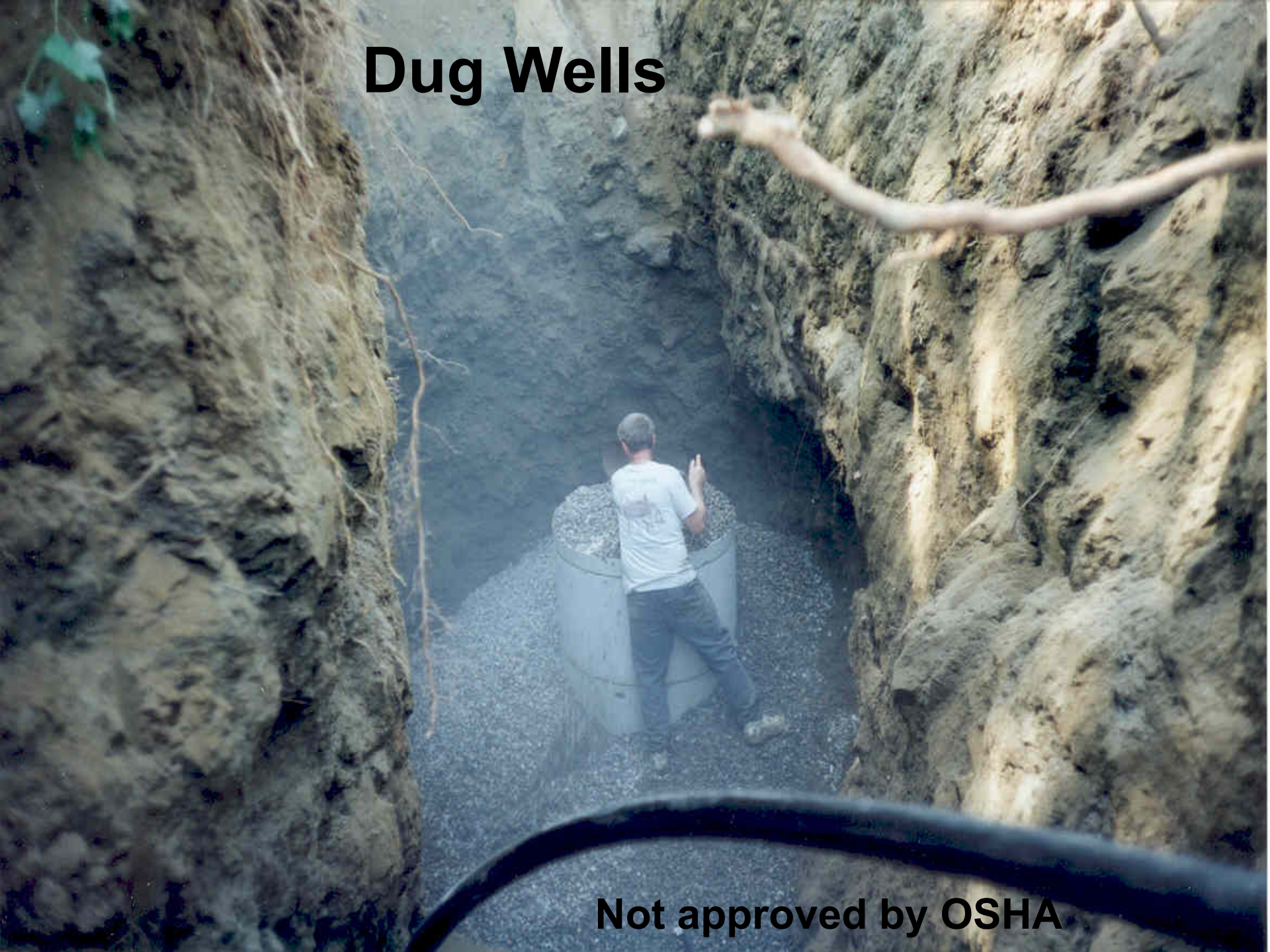




# Types of Shallow Drinking Water Wells

- Wells drilled in unconsolidated materials
  - Augured
  - Drive and Wash
  - Driven Point
  - Jetted
- Wells Constructed by Excavation (Dug wells)
  - Concrete tiles
  - 6" PVC cased

# Dug Wells



Not approved by OSHA



**Dug wells-**

**3'x4' interlocking concrete well tiles**





**Six Inch Gravel Pack Well  
(aka 6 pack well)  
Construction**



08/13/2013



**PVC casing perforated  
with circular saw**



08/13/2013





08/13/2013





08/13/2013





CAT

08/13/2013



# Well Covers



- 8 to 12 Inches Above Ground
- Sealed Cover
- Screened Vent
- Electrical Conduit Secured to Cover
- Submersible Pump Ground Wire Bonded to Casing
- Wire connections must be water tight. Wire nuts prohibited
- Exception: Grounding conductor



# Common Non-Compliant Cover







08/20/2014







**Duct Tape!**





# Dug Well with Access Plug









# Well Cased with Culvert Pipe (Unlicensed Contractor)













# Before





# Raised Wellhead





# 2012 New Hampshire Revised Statutes

## Title L - WATER MANAGEMENT AND PROTECTION

### Chapter 485 - NEW HAMPSHIRE SAFE DRINKING WATER ACT

#### Section 485:37 - Fencing or Covering.

**Universal Citation:** [NH Rev Stat § 485:37 \(2012\)](#)

**485:37 Fencing or Covering.** – No person who owns or occupies land shall knowingly allow any well which is within 500 feet of a dwelling or within 200 feet of any highway to remain open on such land, unless there is around such well a substantial fence or protection at least 3 feet high so constructed that no child can crawl through or under it. Any such well shall be deemed to be open unless it is protected by a covering strong enough to hold 1,000 pounds and secured so that it cannot be easily removed by children. The term "well" as used in this subdivision shall mean any artificially made hole in the surface of the earth (a) which is more than 4 feet deep and (b) which is more than 8 inches in diameter and less than 16 square feet in area at the top and (c) the sides of which are steeper than a 60 degree slope.

**Source.** 1989, 339:1, eff. Jan. 1, 1990.



# Abandoned Wells













# Resources available through NHDES




- OneStop Search:
  - Well completion report database- “Water well”
  - Public Water systems
  - Water Use database
  - Remediation Site and more
- OneStop Data Mapper
- DES Water Well Homepage
- DES DWGB Fact Sheets



# Factsheets available through The Drinking Water Groundwater Bureau

## Drinking Water/Ground Water Fact Sheets

All documents have been saved in Adobe Acrobat Reader  format.

### Water Supply Sources

- [WD-DWGB-1-1 Overview of Water Supply Sources](#)
- [WD-DWGB-1-2 Bedrock \(Artesian, Drilled\) Well Design](#)
- [WD-DWGB-1-3 Bedrock Well Development by Hydrofracturing](#)
- [WD-DWGB-1-4 Dug Well Design](#)
- [WD-DWGB-1-5 Residential Spring Well Design](#)
- [WD-DWGB-1-6 Point Well Design](#)
- [WD-DWGB-1-7 Maintenance of Inactive Wells and Decommissioning of Abandoned Wells](#)
- [WD-DWGB-1-8 Recommended Minimum Water Supply Capacity for Private Wells](#)
- [WD-DWGB-1-9 Secondary Well Seals and Liners](#)
- [WD-DWGB-1-11 Use of Lakes or Streams for Domestic Water Supply](#)
- [WD-DWGB-1-13 Determining the Reliable Capacity of a Private Water Supply Well and Pumping System](#)
- [WD-DWGB-1-14 Extending Bedrock Well Casings](#)
- [WD-DWGB-1-16 Water Supply Options During Droughts](#)
- [WD-DWGB-1-17 Intermittent Water Withdrawals from Surface Waters](#)

### Drinking Water Quality: General

- [WD-DWGB-2-1 Suggested Water Quality Testing for Private Wells](#)
- [WD-DWGB-2-5 Considerations When Purchasing Water Treatment Equipment](#)
- [WD-DWGB-2-10 Magnetic / Electronic Water Treatment Devices](#)
- [WD-DWGB-2-11 Reverse Osmosis Treatment of Drinking Water](#)
- [WD-DWGB-2-12 Ion Exchange Treatment of Drinking Water](#)
- [WD-DWGB-2-15 Distillation Treatment Of Drinking Water](#)
- [WD-DWGB-2-23 Suggested Installation Practices For Drinking Water Treatment Aerators](#)

### Drinking Water Quality: Contaminants

- [WD-DWGB-3-2 Arsenic in Drinking Water](#)
- [WD-DWGB-3-3 Beryllium in Drinking Water](#)
- [WD-DWGB-3-4 Corrosivity of Water Supplies](#)
- [WD-DWGB-3-5 Fluoride in Drinking Water](#)
- [WD-DWGB-3-6 Hardness in Drinking Water](#)
- [WD-DWGB-3-8 Iron and/or Manganese in Drinking Water](#)
- [WD-DWGB-3-9 Nitrate/Nitrite in Drinking Water](#)
- [WD-DWGB-3-10 Organics in Drinking Water](#)
- [WD-DWGB-3-11 Mineral Radioactivity in Drinking Water](#)
- [WD-DWGB-3-12 Radon in Air and Water: An Overview for Homeowners](#)
- [WD-DWGB-3-14 Sand and Sediment in Drinking Water](#)
- [WD-DWGB-3-15 Taste and Odor in Drinking Water](#)
- [WD-DWGB-3-16 Hydrogen Sulfide in Drinking Water](#)
- [WD-DWGB-3-17 Sodium and Chloride in Drinking Water](#)
- [WD-DWGB-3-18 Air Bubbles in Drinking Water](#)
- [WD-DWGB-3-19 MtBE in Drinking Water](#)



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# ENVIRONMENTAL Fact Sheet

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WD-DWGB-1-4

2009

## Dug Well Design

For the most part, this document assumes the reader will be installing a new well. See comments near the end for suggestions concerning inspection of existing dug wells. For springs, see WD-DWGB-1-6, "Point Well Design" and for well abandonment see WD-DWGB-1-7, "Well Abandonment and Decommissioning." These fact sheets are available at <http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm>

### Government Regulations

**State Regulations:** Any person or business constructing wells, or installing well pumps, in the state of New Hampshire must be licensed, pursuant to RSA 482-B. The N.H. Water Well Board, administered by the Department of Environmental Services (DES), licenses well and pump contractors including persons constructing shallow wells by excavation, commonly known as "dug wells" or "springs." Anyone planning to hire a well contractor or pump installer can check the person's license status on the state registry at [www2.des.state.nh.us/OneStop/Water\\_Well\\_Contractors\\_Query.aspx](http://www2.des.state.nh.us/OneStop/Water_Well_Contractors_Query.aspx). An exemption from licensing does exist for a person who wishes to construct his or her own well on the person's property if the well will be used for the person's own permanent residence, or the well will be used for non-commercial farming purposes.



Questions?

