Massachusetts Department of Environmental Protection
Source Water Assessment and Protection (SWAP) Report
for

The Pinehills Water Company

What is SWAP?

The Source Water Assessment and Protection (SWAP) program, established under the federal Safe Drinking Water Act, requires every state to:

- inventory land uses within the recharge areas of all public water supply sources;
- assess the susceptibility of drinking water sources to contamination from these land uses; and
- publicize the results to provide support for improved protection.

Susceptibility and Water Quality

Susceptibility is a measure of a water supply's potential to become contaminated due to land uses and activities within its recharge area.

A source's susceptibility to contamination does *not* imply poor water quality.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, disinfecting, filtering, or treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Actual water quality is best reflected by the results of regular water tests. To learn more about your water quality, refer to your water supplier's annual Consumer Confidence Reports.

Table 1: Public Water System Information

PWS Name	The Pinehills Water Company
PWS Address	431 Beaver Dam Road
City/Town	Plymouth, MA 02360
PWS ID Number	4239055
Local Contact	Marisa Picone-Devine
Phone Number	508-888-7262

Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential contaminant sources, including storm runoff, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination, the assessment helps focus protection efforts on appropriate Best Management Practices (BMPs) and drinking water source protection measures.

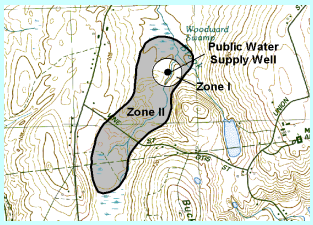
Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes the following sections.

1. Description of the Water System
2. Land Uses within Protection Areas
3. Source Water Protection Conclusions and Recommendations
4. Appendices

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and a Zone II protection area.



Glossary

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material (i.e. clay) that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. This area should be owned or controlled by the water supplier and limited to water supply activities.

Zone II: The primary recharge area for the aquifer. This area is defined by hydrogeologic studies that must be approved by DEP. Refer to the attached map to determine the land within your Zone II.

IWPA: is the larger area that is likely to contribute water to the well. In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

Section 1: Description of the Water System

Zone II #: 412	*Susceptibility:* **Moderate**
Well Name	***Source IDs***
Well #1	4239055-01G
Well #2	4239055-02G
Well #3	4239055-03G

The Pinehills Water Company has three active wells. The water company was formed in 2001 to provide water to the residents and businesses within The Pinehills community in Plymouth. The wells have a Zone I of 400 feet and a Zone II that has been hydrogeologically determined. These terms are defined in the Glossary. The wells have a high vulnerability to contamination due to the absence of hydrogeologic barriers (i.e. clay) that can prevent contaminant migration. Please refer to the attached map for Zone I and Zone II boundaries.

For current information on treatment and the results of water quality monitoring, please contact the public water system contact person listed above in Table 1 for a copy of the most recent Consumer Confidence Report. Drinking water monitoring reporting data are also available on the web at http://www.epa.gov/safewater/ccr1.html.

Section 2: Land Uses in the Protection Areas

The Zone II is entirely located in Plymouth. Land uses and activities that are potential sources of contamination for the wells are listed in Table 2.

Key Land Uses and Protection Issues include:

1. Land Uses Within Zone I
2. Residential Land Uses
3. Golf Course
4. Fire Station
5. High School/Groundwater Discharge
6. Transportation Corridors

The overall ranking of susceptibility to contamination for the system is Moderate, based on the presence of at least one Moderate threat land use within the water supply protection areas, as seen in Table 2.

1. **Land Uses Within Zone I –** The Zone I for the wells is a 400 foot radius around each wellhead. Massachusetts drinking water regulations (310 CMR 22.00) require public water suppliers to own the Zone I or control the Zone I through a conservation restriction. Only water supply activities are allowed in the Zone I. However, many public water supplies were developed prior to the Department's regulations and contain non-water supply activities such as homes and public roads. The Pinehills Water Company owns or controls the Zone I and conducts regular inspections. There are no non-water supply activities occurring within the Zone I.

Zone I Recommendations

- ✓ Use BMPs for the storage, use, and disposal of hazardous materials such as water supply chemicals and maintenance chemicals.
- ✓ Keep any non-water supply activities out of the Zone I.
- ✓ Do not use fertilizers, pesticides or road salt within the Zone I.

2. Residential Land Uses – At present, approximately 7% of the Zone II consists of residential land uses. The total community population at build-out will be about 2800 people. Common potential sources of contamination associated with residential land use include:

- **Septic Systems** – Improper disposal of household hazardous chemicals to septic systems is a potential source of contamination to the groundwater because septic systems lead to the ground. If septic systems fail or are not properly maintained they can be a potential source of microbial contamination.
- **Household Hazardous Materials** - Hazardous materials may include automotive wastes, paints, solvents, pesticides, fertilizers, and other substances. Improper use, storage, and disposal of chemical products used in homes are potential sources of contamination.
- **Heating Oil Storage** - If managed improperly, Underground and Aboveground Storage Tanks (UST and AST) can be potential sources of contamination due to leaks or spills of the fuel oil they store.
- **Stormwater** – Catch basins transport stormwater from roadways and adjacent properties to the ground. As flowing stormwater travels, it picks up debris and contaminants from streets and lawns. Common potential contaminants include lawn chemicals, pet waste, and contaminants from automotive leaks, maintenance, washing, or accidents.

Residential Land Use Recommendations

- ✓ Continue to educate residents on source protection measures for protecting water supplies. Distribute the fact sheet "Residents Protect Drinking Water" available in Appendix A and at www.mass.gov/dep/brp/dws/protect.htm.
- ✓ Continue to work with officials in Plymouth to improve water supply protection.
- ✓ Promote Best Management Practices (BMPs) for stormwater management and pollution controls. Visit DEP's web site for additional information and assistance at http://www.state.ma.us/dep/brp/wm/nonpoint.htm.
- ✓ Encourage the Town of Plymouth to conduct household hazardous waste collection days.

3. Golf Course - There is a golf course within the Zone II.

Golf Course Recommendation

- ✓ Minimize the use of pesticides and fertilizers. Use BMPs for handling and using chemicals and washing vehicles.

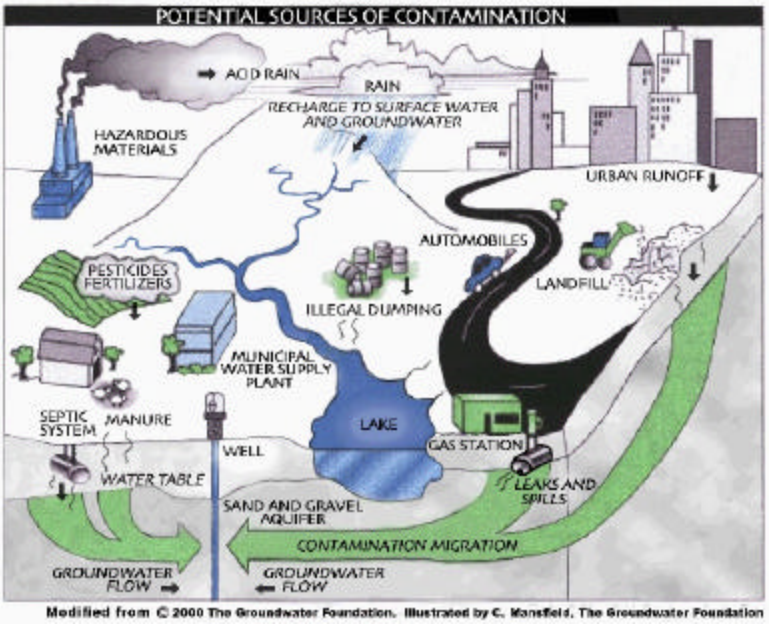
4. Fire Station - There is a Town of Plymouth Fire Station within the Zone II.

Benefits of Source Protection

Source Protection helps protect public health and is also good for fiscal fitness:

- Protects drinking water quality at the source
- Reduces monitoring costs through the DEP Waiver Program
- Treatment can be reduced or avoided entirely, saving treatment costs
- Prevents costly contamination clean-up
- Preventing contamination saves costs on water purchases, and expensive new source development

Contact your regional DEP office for more information on Source Protection and the Waiver Program.



Fire Station Recommendation

✓ Use BMPs for handling and using chemicals and washing vehicles.

5. High School/Groundwater Discharge - There is a high school within the Zone II. The school is also a public water system.

School Recommendation

✓ Send school administrators the enclosed *Healthy Schools Fact Sheet*.

6. Transportation Corridors -

Route 3 and local roads run through the Zone II. Roadway construction, maintenance, and typical highway use can all be potential sources of contamination. Accidents can lead to spills of gasoline and other potentially dangerous transported chemicals. Roadways are frequent sites for illegal dumping of hazardous or other potentially harmful wastes. De-icing salt, automotive chemicals and other debris on roads are picked up by stormwater and wash into catch basins.

Transportation Corridor Recommendations

✓ Identify stormwater drains and the drainage systems along transportation corridors. Wherever possible, ensure that drains discharge to outside the Zone II.

✓ Work with the Town and State to have catch basins inspected, maintained, and cleaned on a regular schedule. Street sweeping reduces the amount of potential contaminants in runoff.

✓ Work with local emergency response teams to ensure that any spills can be effectively contained.

✓ If storm drainage maps are available, review the maps with emergency response teams. If maps aren't yet available, work with town officials to investigate mapping options such as the upcoming Phase II Stormwater Rule requiring some communities to complete stormwater mapping.

✓ Check with the local Conservation Commission to determine whether pesticides are used on road rights-of-way. Highway departments and utilities are responsible for submitting a copy of their approved Vegetation Management Plan and Yearly Operating Plan to the Town if pesticides are used in their rights-of-way. There are state regulatory setbacks and other requirements to help protect drinking water sources from pesticide over-application or spills.

What are "BMPs?"

Best Management Practices (BMPs) are measures that are used to protect and improve surface water and groundwater quality. BMPs can be structural, such as oil & grease trap catch basins, nonstructural, such as hazardous waste collection days or managerial, such as employee training on proper disposal procedures.

For More Information

Contact Isabel Collins in DEP's Lakeville office at (508) 946-2726 for more information and assistance on improving current protection measures.

Copies of this report have been provided to the public water supplier, board of health, and the town.

Section 3: Source Water Protection Conclusions and Recommendations

Protection Planning – The Town of Plymouth currently meets DEP's Wellhead Protection regulations, 310 CMR 22.21(2).

Protection Planning Recommendations

✓ Develop a Wellhead Protection Plan. Establish a protection team and refer them to http://mass.gov/dep/brp/dws/protect.htm for a

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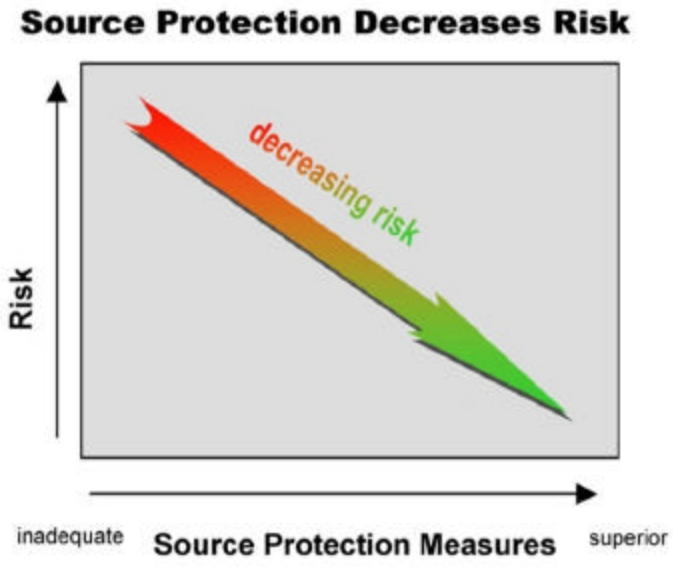

Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

Potential Source of Contamination vs. Actual Contamination

The activities listed in Table 2 are those that typically use, produce, or store contaminants of concern, which, if managed improperly, are potential sources of contamination (PSC).

It is important to understand that a release may never occur from the potential source of contamination provided facilities are using best management practices (BMPs). If BMPs are in place, the actual risk may be lower than the threat ranking identified in Table 2. Many potential sources of contamination are regulated at the federal, state and/or local levels, to further reduce the risk.

Table 2: Land Use in the Protection Areas (Zones I and II)

Activities	Quantity	Threat*	Potential Source of Contamination
Residential			
Septic Systems	few	M	microbial contaminants; improper disposal of hazardous chemicals
Fuel Oil Storage	few	M	spills, leaks or improper handling and storage of fuel oil
Lawn Care	few	M	over-application or improper storage and disposal of pesticides
Commercial			
Golf Course	1	M	spills or over-application of pesticides and fertilizers; leaks, spills from vehicles and maintenance products
Miscellaneous			
Fire Station	1	M	vehicle wash water; spills or leaks of chemicals
High School	1	M	leaks or spills of chemicals from laboratories, art & photographic studios, machine shop; runoff from parking lot
Transportation Corridors	local roads & Route 3	M	leaks or spills of fuel, other hazardous materials or pesticides

Notes:

1. *When specific potential contaminants are not known, typical potential contaminants or activities for that type of land use are listed. Facilities within the watershed may not contain all of these potential contaminant sources, may contain other potential contaminant sources, or may use Best Management Practices to prevent contaminants from reaching drinking water supplies.*

**** THREAT RANKING** - The rankings (high, moderate or low) represent the relative threat of each land use compared to other PSCs. The ranking of a particular PSC is based on a number of factors, including: the type and quantity of chemicals typically used or generated by the PSC; the characteristics of the contaminants (such as toxicity, environmental fate and transport); and the behavior and mobility of the pollutants in soils and groundwater.*

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copy of DEP's guidance *Developing a Local Wellhead Protection Plan*.

Identifying potential sources of contamination is an important initial step in protecting your drinking water sources. Further bcal investigation will provide more in-depth information and may identify new land uses and activities that are potential sources of contamination. Once potential sources of contamination are identified, specific recommendations like those below should be used to better protect your water supply.

Current Land Uses and Source Protection

As with many water supply protection areas, this system's Zone II contains potential sources of contamination. However, source protection measures reduce the risk of actual contamination, as illustrated in Figure 2. The water supplier is commended for taking an active role in promoting source protection measures in the Water Supply Protection Areas through:

? working with town officials in Plymouth to protect the public wells;
? conducting regular inspections of the water supply protection areas; and
? educating residents about their role in protecting their sources of drinking water.

Source Protection Recommendations

To better protect the sources for the future:

- ✓ Continue to inspect the Zone I regularly.
- ✓ Develop a wellhead protection plan.
- ✓ Educate residents on ways they can help protect drinking water.
- ✓ Work with emergency responders to ensure that they are aware of the stormwater drainage in the Zone I & II and to cooperate on responding to spills or accidents.

Top 5 Reasons to Develop a Local Wellhead Protection Plan

❶ Reduces Risk to Human Health

❷ Cost Effective! Reduces or Eliminates Costs Associated With:

- Increased groundwater monitoring and treatment
- Water supply clean up and remediation
- Replacing a water supply
- Purchasing water

❸ Supports municipal bylaws, making them less likely to be challenged

❹ Ensures clean drinking water supplies for future generations

❺ Enhances real estate values – clean drinking water is a local amenity. A community known for its great drinking water in a place people want to live and businesses want to locate.

Conclusions

These recommendations are only part of your ongoing local drinking water source protection. Additional source protection recommendations are listed in Table 3, the Key Issues above and Appendix A.

DEP staff, documents, and other resources are available to help you build on this SWAP report to continue to improve drinking water protection. Grants and loans are available through the Drinking Water State Revolving Loan Fund, the Clean Water State Revolving Fund, and other sources. For more information on grants and loans, visit the Bureau of Resource Protection's Municipal Services web site at: http://mass.gov/dep/brp/mf/mfpubs.htm.

The assessment and protection recommendations in this SWAP report are provided as a tool to encourage community discussion, support ongoing source protection efforts, and help set local drinking water protection priorities. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures. The water supplier should supplement this SWAP report with local information on potential sources of contamination and land uses. Local information should be maintained and updated periodically to reflect land use changes in the Zone II. Use this information to set priorities, target in-

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Table 3: Current Protection and Recommendations

Protection Measures	Status	Recommendations
Zone I		
Does the Public Water Supplier (PWS) own or control the entire Zone I?	**YES**	Follow Best Management Practices (BMPs) that focus on good housekeeping, spill prevention, and operational practices to reduce the use and release of hazardous materials.
Is the Zone I posted with "Public Drinking Water Supply" Signs?	**YES**	Additional economical signs are available from the Northeast Rural Water Association (802) 660-4988.
Is Zone I regularly inspected?	**YES (and fenced)**	Continue inspections of drinking water protection areas.
Are water supply-related activities the only activities within the Zone I?	**YES**	Continue monitoring activities in Zone I.
Municipal Controls (Zoning Bylaws, Health Regulations, and General Bylaws)		
Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)?	**YES— Plymouth**	
Do neighboring communities protect the Zone II areas extending into their communities?	**N/A**	The Zone II is delineated entirely within Plymouth
Planning		
Does the PWS have a Wellhead Protection Plan?	**NO**	Develop a wellhead protection plan. Follow *Developing a Local Wellhead Protection Plan* available at: www.state.ma.us/dep/brp/dws/.
Does the PWS have a formal *Emergency Response Plan* to deal with spills or other emergencies?	**YES**	Work with the Town's Local Emergency Planning Committee to conduct drills with local emergency response officials to test procedures.
Does the municipality have a wellhead protection committee?	**NO**	A committee can be helpful with implementing wellhead protection measures.
Does the Board of Health conduct inspections of commercial and industrial activities?	**YES**	
Does the PWS provide wellhead protection education?	**YES**	Continue to educate residents on how they can protect drinking water.

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spections, focus education efforts, and to develop a long-term drinking water source protection plan.

Section 4: Appendices

A. DEP Permitted Facilities

B. Source Protection Fact Sheets - *What You Need to Know About Microbial Contamination, Water Suppliers Protect Drinking Water, Residents Protect Drinking Water, Healthy Schools Fact Sheet*

What is a Zone III?

A Zone III (the secondary recharge area) is the land beyond the Zone II from which surface and ground water drain to the Zone II and is often coincident with a watershed boundary.

The Zone III is defined as a secondary recharge area for one or both of the following reasons:

1. The low permeability of underground water bearing materials in this area significantly reduces the rate of groundwater and potential contaminant flow into the Zone II.
2. The groundwater in this area discharges to a surface water feature such as a river, rather than discharging directly into the aquifer.

The land uses within the Zone III are assessed only for sources that are shown to be groundwater under the direct influence of surface water.

Additional Documents

To help with source protection efforts, more information is available by request or online at mass.gov/dep/brp/dws including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

APPENDIX A - DEP Permitted Facilities
REGULATED FACILITIES WITHIN THE WATER SUPPLY PROTECTION AREAS AT THE PINEHILLS.

DEP Facility Number	Facility Name	Street Address	Town	Permitted Activity	Activity Class
1198	Plymouth Vocational High School	Long Pond Road	Plymouth	Groundwater Facility	Groundwater Discharge

Note: This appendix includes only those facilities within the water supply protection area(s) that meet state reporting requirements and report to the appropriate agencies. Additional facilities may be located within the water supply protection area(s) that should be considered in local drinking water source protection planning.