



**Massachusetts Department of Environmental Protection  
Source Water Assessment and Protection (SWAP) Report  
For  
Pearl E. Rhodes Elementary School**

**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.

**SWAP and  
Water Quality**

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

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

Prepared by the  
Massachusetts Department of  
Environmental Protection,  
Bureau of Resource Protection,  
Drinking Water Program

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**Table 1: Public Water System (PWS) Information**

<i>PWS Name</i>	Pearl E. Rhodes Elementary School
<i>PWS Address</i>	Brattleboro Road
<i>City/Town</i>	Leyden, Massachusetts
<i>PWS ID Number</i>	1156001
<i>Local Contact</i>	Dayle Doiron
<i>Phone Number</i>	(413) 498-2911

<i>Well Name</i>	<i>Source ID#</i>	<i>Zone 1 (in feet)</i>	<i>IWPA (in feet)</i>	<i>Source Susceptibility</i>
Well No. 1	1156001-01G	177	472	High

**Introduction**

We are all concerned about the quality of the water we drink. Drinking water supplies may be threatened by many potential sources of contamination, including septic systems, road deicing, 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. 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:**

1. Description of the Water System
2. Discussion of Land Uses in the Protection Areas
3. Protection Recommendations
4. Attachments, including a Map of the Protection Areas

**1. Description of the Water System**

The Pearl Rhodes Elementary School is located in the town of Leyden, a small hilltown in western Massachusetts on the Vermont border. The school has a student and staff population of approximately 100 people. There are no municipal water or wastewater systems in Leyden; therefore the school is served by one on-site water supply well and on-site septic disposal system. The well for the school is located on the east side of Brattleboro Road within the school basement boiler room. The well is a 6-inch diameter, 150 feet deep bedrock well that was hydrofractured in 1991 to enhance water flow to the well.

The area is in the Berkshire/Taconic foothills with relatively steep brook and river

### 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 an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by the water supplier and limited to water supply activities.
- **The 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.

### What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

valleys. The surficial geology is generally thin till with some minor alluvial deposits in the steam valleys. There are numerous bedrock outcrops in the area. The bedrock is mapped as the Lower Conway formation, a schist, equivalent to the Goshen Formation, with interbeds of quartzite and marble. There is no evidence of a protective clay layer or thick till to prevent activities on the ground surface from threatening the water supply. Therefore, the aquifer is identified as having a high vulnerability to contamination due to the absence of hydrogeologic barriers that can prevent contaminant migration. Please refer to the attached map of the Zone I and IWPA.

The Zone I is the area immediately around the well that is most vulnerable. The Zone I for a well is the protected area immediately surrounding the wellhead while the Interim Wellhead Protection Area (IWPA) provides an interim protection area for a water supply well when the actual recharge area (Zone II) has not been delineated. The actual recharge area to the well may be significantly larger or smaller than the IWPA. The DEP allows only activities related to supplying water or other non-threatening activities within the Zone I. Many systems that were developed prior to the DEP requirements are grandfathered, but any expansion or changes to the system require DEP approval and compliance with Zone I restrictions. Well No. 1 has a Zone I radius of 177 feet and an Interim Wellhead Protection Area (IWPA) radius of 472 feet. The Zone I was based on the maximum daily water use as determined from metered water data.

The well serving the school has no treatment at this time. The DEP requires public water suppliers to monitor the quality of the water. For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1. Drinking water monitoring reporting data is also available on the web via EPA's Envirofacts website at [http://www.epa.gov/enviro/html/sdwis/sdwis\\_query.html](http://www.epa.gov/enviro/html/sdwis/sdwis_query.html).

## 2. Discussion of Land Uses in the Protection Areas

There are a number of land uses and activities within the drinking water supply protection areas that are potential sources of contamination.

### Key issues include:

1. **Non-conforming Zone I;**
2. **Elementary School;**
3. **Transportation corridors;**
4. **Fuel oil storage; and**
5. **Residential Land Uses.**

**Table 2: Table of Activities within the Water Supply Protection Areas**

Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Fuel Oil Storage	Yes	Yes	Moderate	Spills, leaks, or improper handling of fuel oil from school and surrounding residences
Lawn Care / Gardening	Yes	Yes	Moderate	Over-application or improper storage and disposal of pesticides
Septic Systems / Cesspools	Yes	Yes	Moderate	Nitrates, microbial contaminants, and improper disposal of hazardous chemicals
School	Yes	Yes	Moderate	Fuel oil, laboratory, art, and other chemicals: spills, leaks, or improper handling or storage
Roads	Yes	Yes	Moderate	Fuels and other hazardous materials: accidental leaks or spills; road salt usage
Manure Storage or Spreading	No	Yes	High	Manure (microbial contaminants, nitrates): improper handling/application

\* -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - [www.state.ma.us/dep/brp/dws/](http://www.state.ma.us/dep/brp/dws/).

## Glossary

**Zone I:** The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

**IWPA:** A 400-foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone I I. To determine IWPA radius, refer to the attached map.

**Zone II:** The primary recharge area defined by a hydrogeologic study.

**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 that resists penetration by water.

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

The overall ranking of susceptibility to contamination for the wells is high, based on the presence of at least one high threat land use or activity in the IWPA, as seen in Table 2.

**1. Non-conforming Zone I** – Currently, the wells do not meet DEP's restrictions, which only allow water supply related or other non-threatening activities in Zone I. The school's Zone I contains school buildings, fuel oil storage, boiler room, roads/driveways, parking areas, and athletic fields. The school does not own and/or control all land encompassed by the Zone 1. Systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems.

### Recommendations:

- ✓ Remove all non-water supply activities from the Zone I to comply with DEP's Zone I requirements.
- ✓ Do not use or store pesticides, fertilizers, or road salt within the Zone I.

**2. School** – Activities associated with schools commonly involve hazardous materials such as fuel oil, laboratory, art, and other chemicals. These hazardous materials have the potential to impact drinking water supplies if they are improperly handled, stored, or improperly disposed into septic systems.

### School recommendations:

- ✓ Implement BMPs that can be used to reduce the risk of contamination.
- ✓ Provide source protection education for maintenance staff, food preparation staff, teachers and students.

**3. Transportation Corridors** – Brattleboro Road is located within the Zone I and IWPA. Greenfield Road is also located within the IWPA. Roads are potential sources of contamination due to salting of roadways and leaks or spills of fuels and other hazardous materials during accidents.

### Recommendation:

- ✓ Contact the local fire department to ensure that the IWPA's are included in Emergency Response Planning.
- ✓ Request that the town apply low volumes of salt to those portions of Brattleboro Road and Greenfield Road that are within the IWPA.

**4. Fuel Oil Storage – Aboveground Storage Tank (AST)** – The UST fuel oil tank was replaced with an AST with containment. If managed improperly, Aboveground Storage Tanks and fuel oil lines can be a potential source of contamination due to leaks or spills of the chemicals they store.

### Recommendations:

- ✓ Any modifications to the AST must be accomplished in a manner consistent with Massachusetts plumbing, building, and fire code requirements. Consult with the local fire department for any additional local code requirements regarding ASTs.
- ✓ Monitor deliveries of oil as many spills are related to delivery.

**5. Residential Land Uses** – At least one residential property falls within the IWPA. All residences in the area have on-site septic systems. If managed improperly, activities associated with residential areas can contribute to drinking water contamination. Common potential sources of contamination

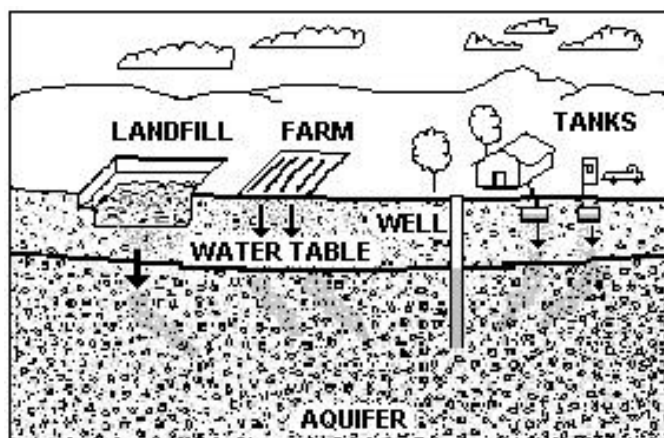


Figure 1: Example of how a well could become contaminated by different land uses and activities.

### For More Information:

Contact Catherine Skiba in DEP's Springfield Office at (413) 755-2119 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on the Drinking Water Program web site at:

[www.state.ma.us/dep/brp/dws/](http://www.state.ma.us/dep/brp/dws/)

### Additional Documents:

To help with source protection efforts, more information is available by request or online at [www.state.ma.us/dep/brp/dws/](http://www.state.ma.us/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

Copies of this assessment have been made available to the public water supplier and town boards.

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 (USTs and ASTs) 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:

- ✓ Educate residents on best management practices (BMPs) for protecting water supplies. Distribute the fact sheet “Residents Protect Drinking Water” available in Appendix A and online at [www.ma.gov/dep/brp/dws/protect.htm](http://www.ma.gov/dep/brp/dws/protect.htm), the DEP website. The fact sheet provides BMPs for common residential issues.
- ✓ Promote BMPs for stormwater management and pollution controls.

Implementing the following recommendations will reduce the system’s susceptibility to contamination. Reportedly there is manure spreading in the protection areas. Pesticides and fertilizers have the potential to contaminate a drinking water source if improperly stored, applied, or disposed. If not contained or applied properly, animal waste from barnyards, manure piles and field application are potential sources of contamination to ground and surface water supplies. Work with hobby farmers by supplying them with information regarding protecting their own wells and the public water supply by encouraging the use of BMPs. For additional resources, refer homeowners, conservation commissioners and planners to the DEP websites: <http://www.state.ma.us/dep/brp/dws/dwspubs.htm> and <http://www.state.ma.us/dep/consumer/animal.htm#dwqual> resources.

## 3. Protection Recommendations

Implementing protection measures and best management practices (BMPs) will reduce the well’s susceptibility to contamination. Pearl Rhodes Elementary School is commended for removing the fuel oil underground storage tank (UST) and replacing it with an aboveground tank (AST) with containment. Pearl Rhodes Elementary School is also commended for not using pesticides and fertilizers on its athletic fields. Pearl Rhodes Elementary School should review and adopt the key recommendations above and the following:

### Priority Recommendations:

- ✓ Do not use or store pesticides, fertilizers, or road salt within the Zone I.
- ✓ Redirect road and parking lot drainage in the Zone I away from well.

### Zone I:

- ✓ Keep non-water supply activities out of the Zone I.
- ✓ Post the Zone I area with “Public Drinking Water Supply Recharge Area” signs at appropriate locations away from the actual well.
- ✓ Remove all non-water supply activities from the Zone I to comply with DEP’s Zone I requirements.

- ✓ Consider well relocation if Zone I threats cannot be mitigated or if water quality is impacted by activities.
- ✓ If the school intends to continue utilizing the structures in the Zone I, use BMPs and restrict activities that could pose a threat to the water supply.
- ✓ Monitor sodium concentrations in well water and use the sodium concentration trend as an indication as to whether or not increased efforts need to be made to reduce salt usage in the Zone I and IWPA and to work with the town on additional improvements to parking lot and road drainage.
- ✓ If it's not feasible to purchase privately owned land within the Zone I at this time, consider a conservation restriction that would prohibit potentially threatening activities or a right of first refusal to purchase the property.
- ✓ Consider upgrading the heating system to propane for the purpose of removing fuel oil storage from the Zone I.

### **Training and Education:**

- ✓ Train staff on proper hazardous material use, disposal, emergency response, and best management practices; include custodial staff, groundskeepers, certified operator, and food preparation staff. Post labels as appropriate on raw materials and hazardous waste.
- ✓ Post drinking water protection area signs at key visibility locations away from the actual well.
- ✓ Incorporate groundwater education into the school curriculum.
- ✓ Work with your community to ensure that stormwater runoff is directed away from the area and is treated according to DEP guidance.

### **Facilities Management:**

- ✓ Implement standard operating procedures regarding proper storage, use and disposal of hazardous materials. To learn more, refer to <http://www.state.ma.us/dep/bwp/dhm/files/sqgsum.pdf> for the Requirements for Very Small Quantity Generators.
- ✓ Implement Best Management Practices (BMPs) for the use of fertilizer, herbicides and pesticides on school property.
- ✓ Septic system components should be located, inspected, and maintained on a regular basis.
- ✓ For utility transformers that may contain PCBs, contact the utility to determine if PCBs have been replaced. If PCBs are present, urge their immediate replacement. Keep the area near the transformer free of tree limbs that could endanger the transformer in a storm.

### **Planning:**

- ✓ Work with local officials in town to include the facility IWPA in Aquifer Protection District Bylaws and to assist you in improving protection.
- ✓ Have a plan to address short-term water shortages and long-term water demands. Keep the phone number of a bottled water company readily available.
- ✓ Supplement the SWAP assessment with additional local information and incorporate it into water supply educational efforts. Use a land use inventory to assist in setting priorities, focusing inspections, and creating educational activities.

### **Funding:**

The Department's Wellhead Protection Grant Program provides funds to assist public water suppliers in addressing Wellhead protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the "Wellhead Protection Grant Program". For additional information, please refer to the attached program fact sheet. If funding is available, each program year the Department posts a new Request for Response for the Grant program (RFR). Other funding opportunities are described in "Grant and Loan Programs: Opportunities for Watershed Protection, Planning and Implementation" at <http://www.state.ma.us/dep/brp/mf/files/glprgm.pdf>.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to encourage discussion of local drinking water protection measures.

## **4. Attachments**

- Map of the Public Water Supply (PWS) Protection Areas
- Recommended Source Protection Measures Fact Sheet
- Your Septic System Brochure
- Pesticide Use Fact Sheet
- Healthy Schools Fact Sheet