



Massachusetts Department of Environmental Protection
Source Water Assessment and Protection (SWAP) Report
for
Upper Cape Regional Water Supply Coop.

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

<i>PWS Name</i>	Upper Cape Regional Water Supply Cooperative
<i>PWS Address</i>	Massachusetts Military Reservation
<i>City/Town</i>	Sandwich
<i>PWS ID Number</i>	4261024
<i>Local Contact</i>	Larry Dayian
<i>Phone Number</i>	(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.

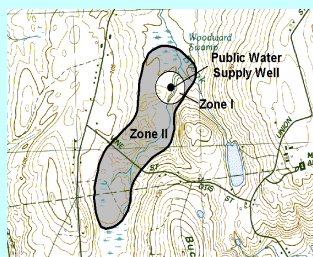
Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

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.

Section 1: Description of the Water System

Zone II #: 575

Susceptibility: High

<i>Well Names</i>	<i>Source IDs</i>
Well No. 1	4261024-01G
Well No. 2	4261024-02G
Well No. 3	4261024-03G

The wells for the Cooperative are located toward the north end of the Massachusetts Military Reservation within the Town of Sandwich. Each well has a Zone I radius of 400 feet. The wells are located in an aquifer with 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 to view the boundaries of the Zone II.

The wells have no treatment at this time. For current information on monitoring results 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 for the Cooperative is predominantly a mixture of forested and open land with relatively small areas of residential, commercial, and industrial land uses (refer to attached map for details). Land uses and activities that are potential sources of contamination are listed in Table 2, with further detail provided in the Table of Regulated Facilities and Table of Underground Storage Tanks in Appendix A.

Key Land Uses and Protection Issues include:

1. Zone I Activities
2. Gas Station
3. Medical Facility
4. Textile Manufacturer
5. Residential Land Uses
6. Transportation Corridors
7. Oil or Hazardous Material Contamination Sites
8. Wellhead Protection Planning

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

1. Zone I Activities – The Zone I for each of the wells is a 400-foot radius around the wellhead. Massachusetts drinking water regulations (310 CMR 22.00 Drinking Water) require that public water suppliers own the Zone I, or control the Zone I through a conservation restriction. All three Zone Is are owned or controlled by the Cooperative. Only water supply activities are occurring within the Zone Is. Currently there are no non-conforming land uses occurring within the three Zone Is.

2. Gas Station – One gas station exists within the Zone II. Gas stations dispense gasoline that is typically stored in underground storage tanks (USTs). If the station is also performing auto repair then they also store and handle automotive fluids and collect waste automotive fluids. Releases to the groundwater can occur if these materials are not handled or contained properly.

Gas Station Recommendation:

- ✓ Encourage this business to use BMPs for the storage, handling, and disposal of all hazardous chemicals, oils and waste oils.
- ✓ If this facility has floor drains, ensure that the floor drains lead to a tight tank or municipal sewer as required by the plumbing code and Underground Injection Control Regulations, 310 CMR 27.00.

3. Medical Facility – A medical facility is located in the Zone II. Medical facilities generate biological waste; use chemicals and generate chemical waste; and may use radioactive material and generate low-level radioactive waste. If hazardous materials are improperly stored, used, or disposed, they become potential sources of contamination. Hazardous materials should never be disposed of to a septic system or floor drain leading directly to the ground.

Medical Facility Recommendations:

- ✓ Work with medical facility to make certain that BMPs are in place for the storage, handling, and disposal of biological, chemical, and radioactive waste.
- ✓ Educate facility on Massachusetts floor drain requirements. See brochure “Industrial Floor Drains” for more information.

4. Textile Manufacturer – One textile manufacturer is located within the Zone II. Industrial activities such as textile manufacturing typically use chemicals and hazardous materials, produce hazardous waste products, and/or store large quantities of hazardous materials in above ground or underground storage tanks. If hazardous materials are improperly stored, used, or disposed, they become potential sources of contamination. Hazardous materials should never be disposed of to a septic system or floor drain leading directly to the ground.

Textile Manufacturer Recommendations:

- ✓ Educate manufacturer on best management practices for protecting water supplies. Distribute the fact sheet “Businesses Protect Drinking Water” available in Appendix C and on www.mass.gov/dep/brp/dws/protect.htm, which provides BMP’s for common business issues.
- ✓ Educate manufacturer on Massachusetts floordrain requirements. See brochure “Industrial Floor Drains” for more information.

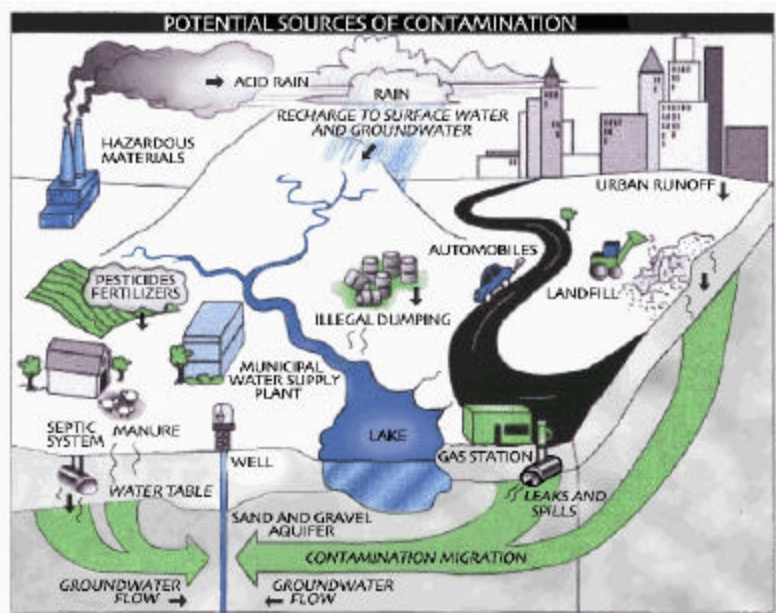
5. Residential Land Uses – Approximately 4% of the Zone II consists of residential areas. None of the areas have public sewers; therefore, all use septic systems. If managed improperly, activities associated with residential areas can contribute to drinking

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.



water contamination. Common potential sources of contamination 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:

- ✓ Educate residents on best management practices (BMPs) for protecting water supplies. Distribute the fact sheet “Residents Protect Drinking Water” available in Appendix C and on www.mass.gov/dep/brp/dws/protect.htm, which provides BMPs for common residential issues.
- ✓ Work with planners to control new residential developments in the water supply protection areas.
- ✓ Promote 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>.

6. Transportation Corridors - Route 130 runs through the eastern portion of the Zone II. Local roads are also located throughout 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 in to catch basins.

Transportation Corridor Recommendations:

- ✓ Wherever possible, ensure that drains discharge stormwater outside of the Zone I.
- ✓ Identify stormwater drains and the drainage system along transportation corridors. 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.
- ✓ Work with local emergency response teams to ensure that any spills within the Zone II can be

(Continued on page 6)

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.

Source Protection Decreases Risk

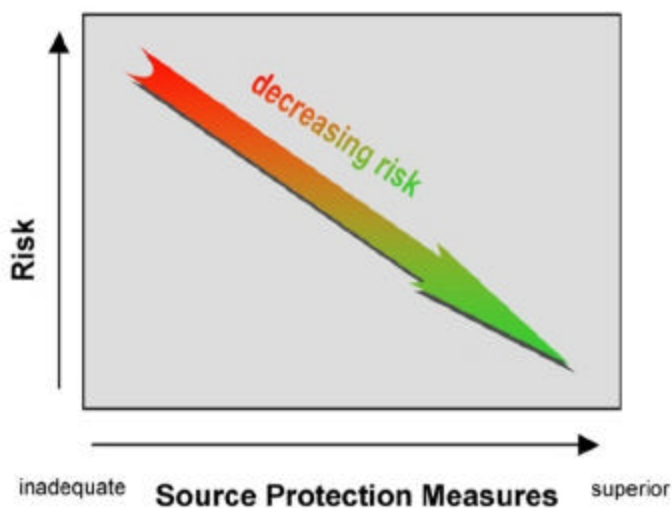


Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

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)

For more information, refer to Appendix A: Regulated Facilities within the Water Supply Protection Area

Activities	Quantity	Threat*	Potential Source of Contamination
Commercial			
Gas Stations	1	High	Automotive fluids and fuels: spills, leaks, or improper handling or storage
Medical Facilities	1	High	Biological, chemical, and radioactive wastes: spills, leaks, or improper handling or storage
Industrial			
Textile Manufacturers	1	High	Manufacturing chemicals: spills, leaks, or improper handling or storage
Residential			
Fuel Oil Storage (at residences)	Numerous	Moderate	Fuel oil: spills, leaks, or improper handling
Lawn Care / Gardening	Numerous	Moderate	Pesticides: over-application or improper storage and disposal
Septic Systems / Cesspools	Numerous	Moderate	Hazardous chemicals, microbial contaminants and improper disposal
Miscellaneous			
Military Facilities	1	High	Pesticides and herbicides, fuel, chemicals and other materials: spills, leaks, or improper handling or storage; may include ordnance or waste landfill/dump sites
Oil or Hazardous Material Sites	1	-	Tier Classified Oil or Hazardous Materials Sites are not ranked due to their site-specific character. Individual sites are identified in Appendix B.
Transportation Corridors	1	Moderate	Fuels and other hazardous materials: accidental leaks or spills; pesticides: over-application or improper handling
School's Baseball Field	1	Moderate	Pesticides: over-application or improper storage and disposal
Very Small Quantity Hazardous Waste Generator	1	Low	Hazardous materials and waste: spills, leaks, or improper handling or storage

Notes for Table 2 are located on page 6 .

Table 2 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.
 2. For more information on regulated facilities, refer to Appendix A: Regulated Facilities within the Water Supply Protection Area information about these potential sources of contamination.
 3. For information about Oil or Hazardous Materials Sites in your protection areas, refer to Appendix B: Tier Classified Oil and/or Hazardous Material Sites.
- * **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.

effectively contained. Review storm drainage maps with emergency response teams.

- ✓ Work with the Town and State to best manage stormwater in the Zone II. Best management practices include street sweeping, vegetative swales, and regular catch basin inspection, cleaning and maintenance.

7. Oil or Hazardous Material Contamination Sites – The Zone II contains one DEP Tier Classified Hazardous Material Release Site indicated on the map as Release Tracking Number 4-0015035. Refer to the attached map and Appendix B for more information.

Oil or Hazardous Material Contamination Sites Recommendation:

- ✓ Monitor progress on any ongoing remedial action conducted for the known contamination site.

8. Wellhead Protection Planning – Currently, the Town of Sandwich has water supply protection controls that meet DEP's Wellhead Protection regulations 310 CMR 22.21(2). A Wellhead Protection Plan has also been established.

Protection Planning Recommendations:

- ✓ Coordinate efforts with local officials to compare local wellhead protection controls with current MA Wellhead Protection Regulations 310 CMR 22.21(2). If they do not meet the current regulations, adopt controls that meet 310 CMR 22.21(2). For more information on DEP land use controls see <http://mass.gov/dep/brp/dws/protect.htm>.
- ✓ Work with town boards to review and provide recommendations on proposed development within your water supply protection areas. To obtain information on build-out analyses for the town, see the Executive Office of Environmental Affairs' community preservation web site, <http://commpres.env.state.ma.us/>.

Other land uses and activities within the Zone II include a military facility and a school. Refer to Table 2 for more information about these land uses.

Identifying potential sources of contamination is an important initial step in protecting your drinking water sources. Further local 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.

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.

Section 3: Source Water Protection Conclusions and Recommendations

Current Land Uses and Source Protection:

As with many water supply protection areas, the 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 Area. The fact that the sources are located on military property provides added security relative to Zone I access.

Source Protection Recommendations:

To better protect the sources for the future:

- ✓ Educate residents on ways they can help you to protect drinking water sources.
- ✓ Work with emergency response teams to ensure that they are aware of the stormwater drainage in your Zone II and to cooperate on responding to spills or accidents.
- ✓ Partner with local businesses to ensure the proper storage, handling, and disposal of hazardous materials.
- ✓ Monitor progress on any ongoing remedial action conducted for the known contamination site.

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 C.

DEP staff, informational documents, and resources are available to help you build on this SWAP report as you continue to improve drinking water protection in your community.

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

(Continued on page 9)

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

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	Continue daily inspections of drinking water protection areas.
Are water supply-related activities the only activities within the Zone I?	YES	Continue monitoring for non-water supply activities in Zone Is.
Municipal Controls (Zoning Bylaws, Health Regulations, and General Bylaws)		
Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)?	YES	The Town “Aquifer Protection District” bylaw meets DEP’s requirements for wellhead protection. Refer to www.state.ma.us/dep/brp/dws/ for model bylaws and health regulations, and current regulations.
Do neighboring communities protect the Zone II areas extending into their communities?	NO	The Zone II does not extend into neighboring communities; therefore, this is not applicable.
Planning		
Does the PWS have a Wellhead Protection Plan?	YES	Update plan as necessary, “Developing a Local Wellhead Protection Plan” is 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	Coordinate emergency response drills with local teams.
Does the municipality have a wellhead protection committee?	YES	
Does the Board of Health conduct inspections of commercial and industrial activities?	YES	The Board of Health only conducts inspections of property outside of the Massachusetts Military Reservation.
Does the PWS provide wellhead protection education?	YES	Aim additional efforts at commercial, industrial and residential uses within the Zone II.

Section 4: Appendices

- A. Regulated Facilities within the Water Supply Protection Area
- B. Table of Tier Classified Oil and/or Hazardous Material Sites within the Water Supply Protection Area
- C. Additional Documents on Source Protection

DEP Permitted Facilities:

DEP Facility Number	Facility Name	Street Address	Town	Permitted Activity	Activity Class
264811	CAPE COD TEXTILE	338 RTE 130	SANDWICH	Generator of Hazardous Waste	Very Small Quantity Generator of Hazardous Waste
314850	SANDWICH EXXON	336 RTE 130	SANDWICH	Fuel Dispenser	Fuel Dispenser

Department of Fire Services Permitted Underground Storage Tanks:

Facility Name	Address	Town	Tank Material	Tank Type	Tank Leak Detection	Capacity (gal)	Contents
SANDWICH EXXON ID #40084	336 ROUTE 130	SANDWICH	Reinforced	2 Walls	Interstitial Monitoring	10000	Gasoline
			Reinforced	2 Walls	Interstitial Monitoring	10000	Gasoline
			Reinforced	2 Walls	Interstitial Monitoring	10000	Gasoline
			Reinforced	2 Walls	Interstitial Monitoring	10000	Gasoline

For more information on underground storage tanks, visit the Massachusetts Department of Fire Services web site: <http://www.state.ma.us/dfs/ust/ustHome.htm>

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.

* Above Ground Tank

APPENDIX B – Table of Tier Classified Oil and/or Hazardous Material Sites within the Water Supply Protection Areas

DEP's datalayer depicting oil and/or hazardous material (OHM) sites is a statewide point data set that contains the approximate location of known sources of contamination that have been both reported and classified under Chapter 21E of the Massachusetts General Laws. Location types presented in the layer include the approximate center of the site, the center of the building on the property where the release occurred, the source of contamination, or the location of an on-site monitoring well. Although this assessment identifies OHM sites near the source of your drinking water, the risks to the source posed by each site may be different. The kind of contaminant and the local geology may have an effect on whether the site poses an actual or potential threat to the source.

The DEP's Chapter 21E program relies on licensed site professionals (LSPs) to oversee cleanups at most sites, while the DEP's Bureau of Waste Site Cleanup (BWSC) program retains oversight at the most serious sites. This privatized program obliges potentially responsible parties and LSPs to comply with DEP regulations (the Massachusetts Contingency Plan – MCP), which require that sites within drinking water source protection areas be cleaned up to drinking water standards.

For more information about the state's OHM site cleanup process to which these sites are subject and how this complements the drinking water protection program, please visit the BWSC web page at <http://www.state.ma.us/dep/bwsc>. You may obtain site - specific information two ways: by using the BWSC Searchable Sites database at <http://www.state.ma.us/dep/bwsc/sitelist.htm>, or you may visit the DEP regional office and review the site file. These files contain more detailed information, including cleanup status, site history, contamination levels, maps, correspondence and investigation reports, however you must call the regional office in order to schedule an appointment to view the file.

The table below contains the list of Tier Classified oil and/or Hazardous Material Release Sites that are located within your drinking water source protection area.

Table 1: Bureau of Waste Site Cleanup Tier Classified Oil and/or Hazardous Material Release Sites (Chapter 21E Sites) - Listed by Release Tracking Number (RTN)

RTN	Release Site Address	Town	Contaminant Type
4-0015035	Greenway RD	SANDWICH	Hazardous Material

For more location information, please see the attached map. The map lists the release sites by RTN.

* Site recently classified, not reflected in current GIS map.