

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

Shirley Water District

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 suscepti bility 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	Shirley Water District			
PWS Address	P.O. Box, 1229, 124 Ayer Rd.			
City/Town	Shirley, Massachusetts			
PWS ID Number	2270000			
Local Contact	Brian Goodman			
Phone Number	(978) 425-2245			

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.

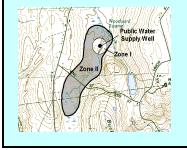
Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

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 waterbearing 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: 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 II.

Section 1: Description of the Water System

Zone II #: 431

Susceptibility: High

Well Name	Source IDs
Catacunemaug Well	2270000-02G

IWPA

Well Name Source ID#		Zone I	IWPA	Source
		(in feet)	(in feet)	Susceptibility
Patterson Well	227000-03G	400	2,400	High

Shirley Water District obtains its water supply from two gravel packed wells. Well #02G is known as the Catacunemaug well, and Well #03G is known as the Patterson well. The Catacunamaug well is located in the southwest portion of the Town of Shirley within a delineated Zone II, and the Patterson well and its Interim Wellhead Protection Area (IWPA) are located in the east-central portion of the Town. 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 and IWPA.

The water is treated with chlorine for disinfection, and potassium hydroxide for pH adjustment prior to being introduced into the distribution system. For current information on monitoring results and treatment and a copy of the most recent Consumer Confidence Report, please contact the Public Water System contact person listed above in Table 1. 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 and IWPA protection areas for Shirley Water District are a mixture of residential and forest 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 B.

Key Land Uses and Protection Issues include:

- 1. Inappropriate activities in Zone I
- 2. Residential land uses
- 3. Transportation corridors
- 4. Hazardous materials storage and use
- 5. Oil or hazardous material contamination sites
- 6. Comprehensive 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. Inappropriate Activities in Zone Is – 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) requires public water suppliers to own the

Zone I, or control the Zone I through a conservation restriction. While the Zone I for Well #02G is not owned or controlled by public water system, the Zone I for well #03G is. 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.

Zone I Recommendations:

- ✓ To the extent possible, remove any non water supply activities from the Zone Is to comply with DEP's Zone I requirements.
- ✓ Keep any new non water supply activities out of the Zone I.

2. Residential Land Uses – Approximately 11% of the Zone II and IWPA consist of residential areas. None of the areas have public sewers, and so all use septic systems. If managed improperly, activities associated with residential areas can contribute to drinking 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:

water supplies. Distribute the fact sheet

"Residents Protect Drinking Water" available in Appendix A and on www.

mass.gov/dep/brp/dws/protect.htm,

which provides BMPs for common

✓ Work with planners to control new residential developments in the water

✓ Promote BMPs for stormwater

management and pollution controls.

3. Transportation Corridors - Route 2 runs through the IWPA for well #03G.

Local roads are common throughout the

Protection Areas for both wells. 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

residential issues.

supply protection areas.

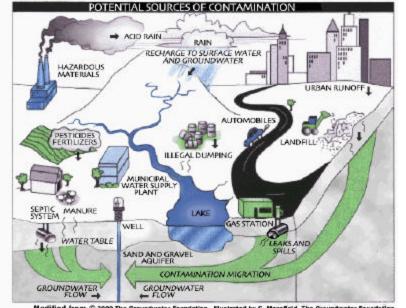
✓ Educate residents on best management practices (BMPs) for protecting

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.



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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 catchbasins.

Railroad tracks run through the water supply protection areas. Rail corridors serving passenger or freight trains are potential sources of contamination due to chemicals released during normal use, track maintenance, and accidents. Accidents can release spills of train engine fluids and commercially transported chemicals.

Transportation Corridor Recommendations:

- ✓ Identify stormwater drains and the drainage system along transportation corridors. Wherever possible, ensure that drains discharge stormwater outside of the protection areas.
- ✓ Work with the Town and State to have catch basins inspected, maintained, and cleaned on a regular schedule. St reet sweeping reduces the amount of potential contaminants in runoff.
- ✓ Work with local emergency response teams to ensure that any spills within the protection areas 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.
- ✓ Work with local officials during their review of the railroad right of way Yearly Operating Plans to ensure that water supplies are protected during vegetation control.

4. Hazardous Materials Storage and Use – Some of the land area within the Zone II and IWPA is commercial or industrial land uses. Many small businesses and industries use hazardous materials, produce hazardous waste products, and/ or store large quantities of hazardous materials in UST/AST. If hazardous materials are improperly stored, used, or disposed, they become potential

sources of contamination. Hazardous materials should <u>never</u> be disposed of to a septic system or floor drain leading directly to the ground.

Hazardous Materials Storage and Use Recommendations:

- ✓ Educate local businesses on best management practices for protecting water supplies. Distribute the fact sheet "Businesses Protect Drinking Water" available in Appendix A and on www.mass.gov/dep/brp/dws/protect.htm, which provides BMP's for common business issues.
- ✓ Work with local businesses to register those facilities that are unregistered generators of hazardous waste or waste oil. Partnerships between businesses, water suppliers, and communities enhance successful public drinking water protection practices.
- Educate local businesses on Massachusetts floordrain requirements. See brochure "Industrial Floor Drains" for more information.

What are "BMPs?"

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

For More Information

Contact Josephine Yemoh-Ndi in DEP's Worcester Office at (508) 849-4030 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.

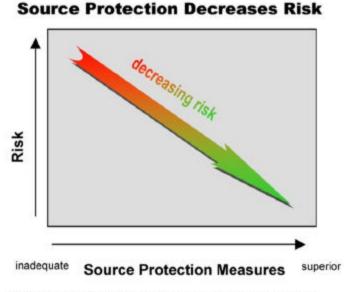


Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

(Continued on page 7)

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, <u>if managed</u> <u>improperly</u>, 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, IWPA)

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

Activities	Quantity	Well #	Threat*	Potential Source of Contamination				
Agricultural								
Forestry Operation	2	All	L	Herbicides or pesticides, equipment maintenance materials: leaks, spills, or improper handling; road building				
Livestock Operations	2	03G	М	Manure (microbial contaminants): improper handling				
Commercial								
Auto Repair Shops	1	03G	Н	Automotive fluids, vehicle paints, and solvents: spills, leaks, or improper handling				
Railroad Tracks And Yards	1	All	Н	Herbicides: over-application or improper handling; fuel storage, transported chemicals, and maintenance chemicals: leaks or spills				
Sand And Gravel Mining/Washing	2	All	М	Heavy equipment, fuel storage, clandestine dumping: spills or leaks				
Industrial								
Foundries Or Metal Fabricators	1	03G	Н	Solvents and other chemicals: spills, leaks, or improper handling or storage				
Machine/Metalworking Shops	1	03G	Н	Solvents and metal tailings: spills, leaks, or improper handling				
Residential								
Fuel Oil Storage (at residences)	Many	All	М	Fuel oil: spills, leaks, or improper handling				
Lawn Care / Gardening	6	All	М	Pesticides: over-application or improper storage and disposal				
Septic Systems / Cesspools	50	All	М	Hazardous chemicals: microbial contaminants, and improper disposal				

Table 2: Land Use in the Protection Areas (Zones I and II, IWPA) - continued

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

Activities	Quantity	Well #	Threat*	Potential Source of Contamination				
Miscellaneous								
Aquatic Wildlife	1	All	L	Microbial contaminants				
Fishing/Boating	1	All	L	Fuel and other chemical spills, microbial contaminants				
Landfills and Dumps	1	02G	Н	Seepage of leachate				
Military Facilities (Past And Present) Type	1	03G	Н	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	02G		Tier Classified Oil or Hazardous Materials Sites are not ranked due to their site-specific character. Individual sites are identified				
Small quantity hazardous waste generators	2	03G	М	Hazardous materials and waste: spills, leaks, or improper handling or storage				
Stormwater Drains/ Retention Basins	3	03G	L	Debris, pet waste, and chemicals in stormwater from roads, parking lots, and lawns				
Superfund Sites	1	03G		Oil or hazardous materials and waste: spills, leaks, or improper handling or storage				
Transmission Line Rights-of-Way - Type:	1	All	L	Corridor maintenance pesticides: over-application or improper handling; construction				
Underground Storage Tanks	2	All	Н	Stored materials: spills, leaks, or improper handling				
Very Small Quantity Hazardous Waste Generator	1	03G	L	Hazardous materials and waste: spills, leaks, or improper handling or storage				
Waste Transfer/ Recycling Station	1	02G	М	Water contacting waste materials: improper management, seepage, and runoff				

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 B: 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 C: 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.

(Continued from page 4)

5. Presence of Oil or Hazardous Material Contamination Sites – The protection area for well 03G contains a DEP Tier Classified Oil and/or Hazardous Material Release Site indicated on the map as Release Tracking Number 2-011873. Refer to the attached map and Appendix 3 for more information.

Oil or Hazardous Material Contamination Sites Recommendation:

✓ Monitor progress on any ongoing remedial action conducted for the known oil or contamination sites.

6. Protection Planning – Currently, the Town does not have water supply protection controls that meet DEP's Wellhead Protection regulations 310 CMR 22.21(2). Protection planning protects drinking water by managing the land area that supplies water to a well. A Wellhead Protection Plan coordinates community efforts, identifies protection strategies, establishes a timeframe for implementation, and provides a forum for public participation. There are resources available to help communities develop a plan for protecting drinking water supply wells.

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 copy of DEP's guidance, "Developing a Local Wellhead Protection Plan".
- ✓ Coordinate efforts with local officials to compare any local wellhead protection controls with current MA Wellhead Protection Regulations 310 CMR 22.21(2). If there are no local controls or 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.
- ✓ If local controls do not regulate floordrains, be sure to include floordrain controls that meet 310 CMR 22.21(2).
- ✓ 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/.

Top 5 Reasons to Develop a Local Wellhead Protection Plan

• Reduces Risk to Human Health

• Cost Effective! Reduces or Eliminates Costs Associated With:

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

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

• Ensures clean drinking water supplies for future generations

• 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.



Other land uses and activities within the Zone II and IWPA include an auto repair shop, forestry operations, livestock operations, railroad tracks, sand and gravel mining/washing, and machine/metalworking shops. Refer to Table 2 and Appendix 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.

Section 3: Source Water Protection Conclusions and Recommendations

Current Land Uses and Source Protection:

As with many water supply protection areas, the system Zone II and MPA contain potential sources of contamination. However, source protection measures reduce the risk of actual contamination, as illustrated in Figure 2. The water

Protection Measures	Status	Recommendations
Zone I		
Does the Public Water Supplier (PWS) own or control the entire Zone I?	NO	Follow Best Management Practices (BMP's) 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 non-water supply activities in Zone Is.
Municipal Controls (Zoning Bylaws, He	alth Regula	tions, and General Bylaws)
Does the municipality have Wellhead Protection Controls that meet 310 CMR 22.21(2)?	NO	The Town does not have an "Aquifer Protection District" bylaw that 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	Work with neighboring municipalities to include Zone IIs in their wellhead protection controls.
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	Augment plan by developing a joint emergency response plan with fire department, Board of Health, DPW, and local and state emergency officials. Coordinate emergency response drills with local teams.
Does the municipality have a wellhead protection committee?	YES	Establish committee; include representatives from citizens' groups, neighboring communities, and the business community.
Does the Board of Health conduct inspections of commercial and industrial activities?	YES	For more guidance see "Hazardous Materials Management: A Community's Guide" at www.state.ma.us/ dep/brp/dws/files/hazmat.doc
Does the PWS provide wellhead protection education?	YES	Aim additional efforts at commercial, industrial and municipal uses within the Zone II.

Table 3: Current Protection and Recommendations

supplier is commended for taking an active role in promoting source protection measures in the Water Supply Protection Areas.

Source Protection Recommendations:

To better protect the sources for the future:

- ✓ Inspect the Zone I regularly, and when feasible, remove any non-water supply activities.
- ✓ 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 IWPA, 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 oil or contamination sites.
- ✓ Develop and implement a Wellhead Protection Plan.

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, 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 Department's Wellhead Protection Grant Program and Source Protection Grant Program provide funds to assist public water suppliers in addressing water supply source protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the Grant Program. Please note: each spring DEP posts a new Request for Response for the grant program (RFR).

Other 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 and IWPA. Use this information to set priorities, target inspections, focus education efforts, and to develop a long-term drinking water source protection plan.

Section 4: Appendices

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

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 B: REGULATED FACILITIES WITHIN THE WATER SUPPLY PROTECTION AREA FOR SHIRLEY WATER DISTRICT

DEP Permitted Facilities

DEP Facility Number	Facility Name	Street Address	Town	Permitted Activity	Activity Class
37155	BEMIS ASSOC	80 AYER RD	SHIRLEY	Generator of Hazardous Waste	Very Small Quantity Generator of Hazardous Waste
51520	BEMIS ASSOC	ONE BEMIS WAY	SHIRLEY	PLANT	Air Quality Permit
51393	DALAN INC	68 WALKER RD	SHIRLEY	PLANT	Air Quality Permit
51393	51393 DALAN INC 68 WALKER		SHIRLEY	Generator of Hazardous Waste	Small Quantity Generator –Waste Oil/PCBs

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.