Massachusetts Department of Environmental Protection

Source Water Assessment and Protection (SWAP) Report

for

Cheshire Water Department

What is SWAP?

The Source Water Assessment Program (SWAP), 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	Cheshire Water Department
PWS Address	80 Church Street
City/Town	Cheshire
PWS ID Number	1058000
Local Contact	Wilbur Chase, Operator
Phone Number	(413) 743-3816

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.

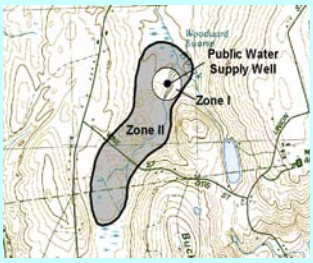
Refer to Table 3 for Recommendations to address potential sources of contamination. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

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 directly 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 #: 352 ***Susceptibility:*** High

Well Names	*Source IDs*
Well #1	1058000-02G
Well #2	1058000-03G

Cheshire is a small, rural community in northwestern Massachusetts. The Hoosic River flows through the center of the community of approximately 1,400 residents. Cheshire Water Department maintains two active groundwater supplies (Well #1 and #2). Cheshire Water Department also maintains two emergency, surface water reservoirs (Kitchen and Thunder Brook reservoirs) that are not addressed in this report. The wells are located east of Route 8, north of the center of town. Well #2 was constructed as a mechanical back up well 25 feet from Well #1 and the two wells are pumped alternately to meet the system water needs. Both wells are 12 by 18-inch diameter, gravel packed wells, 51 feet in depth with 10-foot screens and submersible pumps. Water from the wells is pumped to a motor control and chemical feed building where Calciquest (blended orthophosphate/polyphosphate compound) is added to the water to sequester the hardness (calcium and magnesium) in the water.

The wells are located on the edge of a buried valley aquifer and utilize water from an unconfined, sand and gravel aquifer within the Hoosic River valley. The bedrock valley was deepened by advancing glaciers some 18,000 years before present and later filled with sand and gravel (glacial drift) as the glaciers melted. Although there is some evidence of fine grained material in the aquifer, there is no confining (protective) clay layer at the site to prevent potential contaminants from entering the aquifer from the ground surface. Wells located in these geological conditions are considered to have a high vulnerability to contamination due to the absence of hydrogeologic barriers that can prevent potential contaminant migration from the surface. The Town of Adams' wells are also located within Cheshire, approximately 6,400 feet north (downgradient) of the wells

Bedrock at the well site is mapped as the Kitchen Brook dolomite, a fine-grained massive dolomite with a quartz and calcite-rich region in the upper section. The dolomite contributes to the hardness of the water in the aquifer. The complex bedrock geology of the lowlands and surrounding uplands is mapped as folded and faulted schists, quartzites as well as some marbles and dolomites.

The Zone II for these wells was delineated utilizing conceptual, geological and analytical modeling in accordance with the requirements of the New Source Approval Process following an extended duration pumping test. Please refer to the attached map.

Section 2: Land Uses in the Protection Areas

The Zone I radius for both wells is 400-feet, and is predominantly owned by the Cheshire Water Department although there is a small area coincident with the bike path (Ashuwillatuck Trail) that is owned by the Massachusetts Department of Environmental Management The trail is used for passive (non-motorized) recreation and transects the Zone I and runs along the eastern edge of the Zone II. Although historically the old rail bed was used by snowmobiles, the DEM

rules do not allow motorized vehicles on the trail.
The Zone II for Cheshire's wells is a mixture of residential, forested and agricultural crop 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. Residential Land Uses
2. Transportation corridors
3. Agricultural activities
4. Hazardous materials storage and use

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. Residential Land Uses – Approximately 50% of the Zone II consists of residential areas. None of the areas have public sewers; all use septic systems. There is no clear count of how many residential homes utilize oil versus gas or whether the oil tanks are above or below grade. There is at least one private property which has a 2000 gallon underground storage tank (UST). 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.

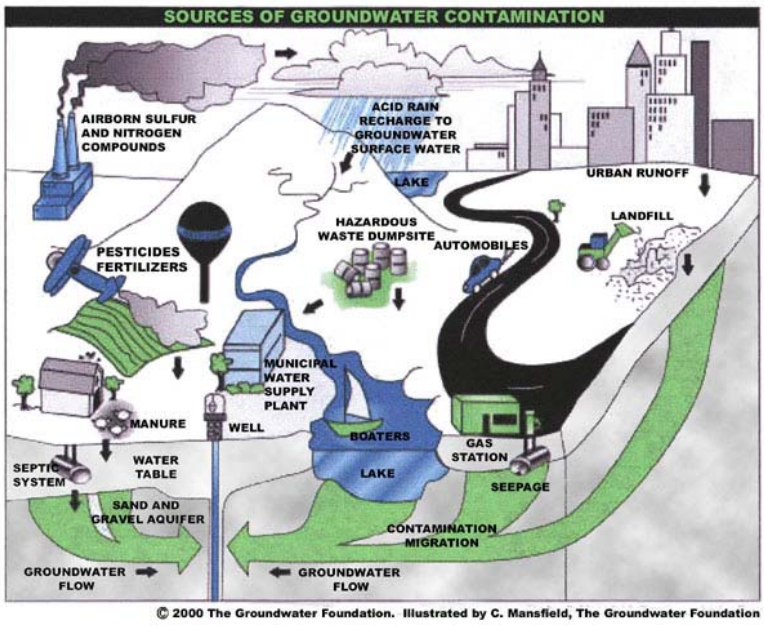
Benefits of Source Protection

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.

- **Heating Oil Storage** - If managed improperly, Underground and Aboveground Storage Tanks (UST and AST) are 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 on www.mass.gov/dep/brp/dws/protect.htm, which provides BMPs for common residential issues.

- ✓ Inventory residential fuel sources and encourage residents to remove any underground tanks and contain all other tanks.
- ✓ Work with planners to control new residential developments in the water supply protection areas.
- ✓ Promote BMPs for stormwater management and pollution controls.

2. Transportation Corridors - Route 8 runs along the western border of the Zone II, just west of the wells. Local roads are common 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:

- ✓ Identify stormwater drains and the drainage system along transportation corridors. Wherever possible, ensure that drains discharge stormwater outside of 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. Request a copy of the State Highway Department's schedule for catch basin cleaning.
- ✓ Work with local emergency response teams to ensure that any spills within the Zone II 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.

3. Agricultural Activites – There are several farms with crop lands within the Zone II. 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 pits and field application are potential sources of contamination to ground and surface water sources.

Agricultural Activities Recommendation:

- ✓ Work with farmers in your protection areas to make them aware of your water supply and to encourage the use of a US Natural Resources Conservation Service farm plan to protect water supplies.
- ✓ Supply the land owners with maps of the Zone II area.

4. Hazardous materials storage and use — Many small businesses, municipalities and industries use hazardous materials, produce hazardous waste products, and/or store quantities of hazardous materials in UST/AST. These

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

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.

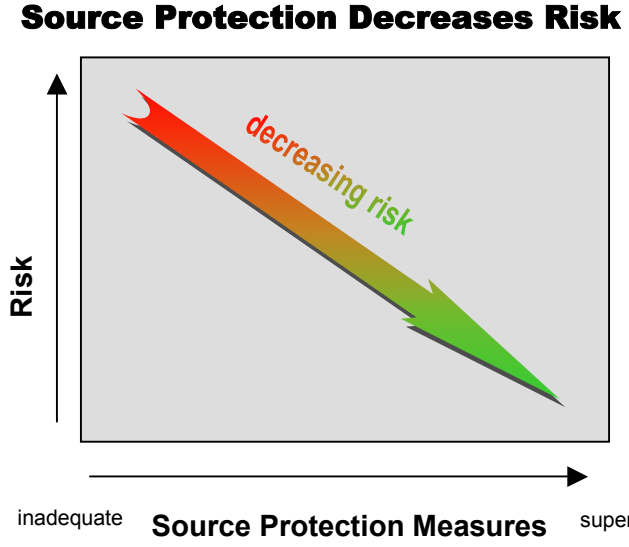


Figure 2: Risk of contamination decreases as source protection increases. This is true for public water systems of any susceptibility ranking, whether High, Moderate, or Low.

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 B: Regulated Facilities within the Water Supply Protection Area

Activities	Quantity	Threat*	Potential Source of Contamination
Agricultural			
Crop lands (hay, corn)	57.7 acres	Moderate	Fertilizer and pesticide usage
Commercial			
Gas Stations	1	High	Automotive fluids and fuels: spills, leaks, or improper storage or handling
Service Stations/ Auto Repair Shops	7	High	Automotive fluids and solvents: spills, leaks, or improper storage or handling
Sand and Gravel Operation	2	Moderate	Heavy equipment, fuel storage, clandestine dumping: spills or leaks
Chemical Storage	1	High	Chemical wastes: spills, leaks, or improper handling or storage
Residential			
Septic Systems/ Cesspools	Numerous	Moderate	Household hazardous waste: improper disposal and microbial contaminants
Miscellaneous			
Fire Training Facilities/ Fire Station	1	Moderate	Fuels and other chemicals: improper use or storage
Elementary School	1	Moderate	Fuel oil, cleaning and other chemicals; over-application or improper management of fertilizers and pesticides on athletic fields; parking areas; spills, leaks, or improper handling
Underground Storage Tanks	Numerous	High	Stored materials: spills, leaks, or improper handling

Activities	Quantity	Threat*	Potential Source of Contamination
Aboveground Storage Tanks	Numerous	Moderate	Petroleum products and hazardous materials: spills, leaks, or improper handling
Waste Transfer/ Recycling Station	1	Moderate	Water contacting waste materials: improper management, seepage, and runoff
Road and Maintenance Depots (covered salt storage)	1	Moderate	Asphalt materials and other chemicals, gasoline and diesel storage: spills, leaks, or improper handling of deicing materials
Floor Drains in Commercial/Industrial Facilities	Numerous	High	An inspection of the Zone II found several non-complaint floor drains in facilities where hazardous materials were stored.

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

include a 10,000 gallon UST at the Cheshire School, and a 1000 gallon UST at the First Baptist Church. 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.

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. Encourage the Board of Health to enforce the local floor drain regulation.

Other land uses and activities within the Zone II that pose potential threats include the bike path. Although passive recreation poses minimal threat, the use of motorized vehicles poses a more significant threat. Request that DEM enforce their rules for no motorized vehicle access. Monitor activities and report any violations to the DEM. 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. The final report of the findings of an Underground Injection Control Inspection is included as Attachment E of this report to help identify some 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 contain 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:

- Passing wellhead protection bylaws to protect the land areas near the Cheshire Water Department wells.
- Implementing a Public Education program on wellhead protection.
- Working with the board of Health to pass floor drain regulations.

Source Protection Recommendations:

To better protect the sources for the future:

- ✓ Support the passage of wellhead protection bylaws and floor drain regulations to protect the Zone II for Adams' wells located in Cheshire.
- ✓ Inspect the Zone I and Zone II regularly.

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 (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**	Maintain current signs. Additional economical signs are available from the Northeast Rural Water Association (802) 660-4988 if needed.
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?	**NO**	Continue monitoring along bike path and non-water supply activities in Zone Is. Request DEM enforce their rules for access.
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 wellhead protection requirements. Refer to www.state.ma.us/dep/brp/dws/ for current regulations.
Do neighboring communities protect the Zone II areas extending into their communities?	**YES**	Continue to work with neighboring municipalities to include Zone IIs in their wellhead protection controls.
Planning		
Does the PWS have a Wellhead Protection Plan?	**YES**	Continue current measures toward maintaining Wellhead Protection; modify plan as necessary.
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?	**NO**	Establish committee; include representatives from citizens' groups, neighboring communities, and the business community. Propose bylaws for Adam's Zone II.
Does the Board of Health conduct inspections of commercial and industrial activities?	**Partial**	For guidance see "Hazardous Materials Management: A Community's Guide" at www.state.ma.us/dep/brp/dws/files/hazmat.doc. Encourage Board of Health to adopt guidelines as a requirement.
Does the PWS provide wellhead protection education?	**YES**	Continue public education program.

- ✓ Continue to educate residents on ways they can help you to protect drinking water sources.
- ✓ Notify Massachusetts Highway Department regarding the location of the Zone II and coordinate 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.
- ✓ Work with farmers in your protection areas to make them aware of your water supply and to encourage the use of a NRCS farm plan to protect water supplies.
- ✓ Develop and implement a Wellhead Protection Plan.

Resources for Drinking Water Source Protection:
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.

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 the 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 to the Zone II .

2. The groundwater in this area probably discharges to 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.

Conclusions:
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.

For More Information

Contact Catherine V. Skiba in DEP's Springfield Office at (413) 755-2119 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 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
E. UIC Report for the town of Cheshire