



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Central Regional Office, 627 Main Street, Worcester, MA 01608

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

May 21, 2008

Shrewsbury Board of Selectman
100 Maple Ave.
Shrewsbury, MA 01545

Attention: Dan Morgado

SHREWSBURY
Shrewsbury Water Department
PWS ID # 2271000
WMA Permit #9P4-2-12-271.01
Transmittal # W041478
Final-Approved

Dear Mr. Morgado:

Please find attached document:

- Findings of Fact in Support of the Final Permit Decision.
- Water Management Act Permit for Shrewsbury Water Department for withdrawals in the Blackstone River Basin.

MassDEP issued the Town of Shrewsbury a Water Management Act (WMA) permit dated September 8, 2005, which was subsequently appealed by the Town of Shrewsbury. The WMA permit was upheld by the Administrative Magistrate and the Recommended Final Decision (RFD) was issued November 23, 2007. MassDEP Commissioner, Laurie Burt, adopted the RFD in her decision dated March 21, 2008. The attached permit incorporates Commissioner Burt's decision and includes revised timelines from the original 2005 permit to allow Shrewsbury the same period of time to implement the requirements.

The signature on this cover letter indicates formal issuance of the attached document. If you have any questions concerning the permit conditions, please contact me at (508) 767-2827.

Very truly yours,

Marielle Stone
Section Chief
Drinking Water Program

Enclosures: Shrewsbury Water Withdrawal Permit - BRP WM 03
Finding of Facts in Support of Permit

cc (w/enc.): Duane LeVangie, WMA Program Coordinator, Boston
Robert Tozeski, Shrewsbury Water Department, 100 Maple Ave, Shrewsbury, MA 01545
Paul Howard, Tata & Howard, 125 Turnpike Rd, Westboro, MA
Margaret Kearns, Riverways-DFW
Dr. Mauri S. Peltó
Massachusetts Instream Flow Task Force
Sudbury Valley Trustees
Blackstone Headwaters Coalition

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W:\WS\WMA Program\Permits\Shrewsbury-9P4-2-12-271.01-WMA-2008-05-21

Communication for Non-English Speaking Parties (310 CMR 1.03(5)(a))

English

This document is important and should be translated immediately.

Spanish

Este documento es importante y se debe traducir inmediatamente.

Portuguese

Este original é importante e deve ser traduzido imediatamente.

Italian

Questo documento è importante e dovrebbe essere tradotto immediatamente.

Greek

Αυτό το έγγραφο είναι σημαντικό και πρέπει να μεταφραστεί αμέσως.

French

Ce document est important et devrait être traduit immédiatement.

Chinese (traditional)

這個文件重要和應該立刻被翻譯。
这个文件重要和应该立刻被翻译。



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Findings of Fact in Support of Final Permit Decision
Shrewsbury Water Department, BRP WM 03, Tr. # W041478
Water Management Permit # 9P4-2-12-271.01

The Massachusetts Department of Environmental Protection (the "Department" or "MassDEP") has completed its review of the Shrewsbury Water Department's ("SWD") Water Management Act ("WMA") permit application to increase its authorized withdrawal from existing groundwater sources. On December 24, 2004, the Department issued a Draft Permit and Findings of Fact for public comment. The Department received comments from the following individuals and entities on the Draft Permit:

January 10, 2005	Commonwealth of Massachusetts Riverways Program
January 13, 2005	Dr. Mauri S. Pelto
January 25, 2005	Town of Shrewsbury
February 1, 2005	Massachusetts Instream Flow Task Force
February 8, 2005	Sudbury Valley Trustees
February 17, 2005	Blackstone Headwaters Coalition

The Department hereby approves the Water Management Act permit #9P4-2-12-271.01 in accordance with the Water Management Act (M.G.L. c. 21G). The Department makes the following Findings of Fact in support of the attached permit and in response to the comments received, and includes herewith its reasons for approving the permit and for conditions of approval imposed, as required by M.G.L. c.21G, s.11, 310 CMR 36.26 and 310 CMR 36.00.

MassDEP issued the Town of Shrewsbury a Water Management Act (WMA) permit dated September 8, 2005, which was subsequently appealed by the Town of Shrewsbury. The WMA permit was upheld by the Administrative Magistrate and the Recommended Final Decision (RFD) was issued November 23, 2007. MassDEP Commissioner, Laurie Burt, adopted the RFD in her decision dated March 21, 2008. The following permit incorporates Commissioner Burt's decision and includes revised timelines from the original 2005 permit to allow Shrewsbury the same period of time to implement the requirements.

Shrewsbury Water Department is authorized to withdraw 3.91 million gallons per day (MGD) from the Blackstone River Basin through February 28, 2009. This authorization includes 3.65 MGD previously permitted to SWD in the Blackstone River Basin and an additional 0.26 MGD previously permitted to SWD in the Concord River Basin. SWD previously operated one source in the Concord River Basin, the South Street Well (2271000-01G). The Department approved a permit to abandon this well December 6, 2004.

Shrewsbury Water Department withdrew water in excess of the volume authorized by its WMA permit between 1991 and 2002, with the exception of 1994. The Town operated within the authorized withdrawal volume in 2003 and 2004. As a result of these exceedances, the Town of Shrewsbury entered into an Administrative Consent Order (ACO-CE-03-F001) with the Department dated March 11, 2003.

According to the ACO, SWD agreed to perform a number of actions including the following:

- Obtain compliance with the Inter Basin Transfer Act;
- Propose a water conservation plan;
- Submit regular progress reports;
- Submit a WMA permit application; and
- Complete a safe yield analysis of the sub-basin from which Shrewsbury withdraws water in the Blackstone River Basin.

SWD submitted the permit application under review pursuant to the ACO.

Inter Basin Transfer Act

The SWD's application was potentially subject to the Inter-Basin Transfer Act (IBTA) because the Town's water supply is located in the Blackstone River Basin and its wastewater is transported to the Westborough publicly owned treatment works in the Concord River Basin. Under the IBTA, an action that increases the capacity to transfer water across municipal and basin boundaries is subject to the Act. Prior to 1983, Shrewsbury had grandfathered capacity to transfer 7.8 MGD from the Blackstone Basin to the Concord Basin based on Shrewsbury's historical pumping capacity. Because Shrewsbury's Home Farm Well #6.2 was constructed after 1983, however, its use was not grandfathered from the IBTA.

The Water Resource Commission (WRC) decided on September 9, 2004 that to be in compliance with the requirements of the IBTA, the volume from the Home Farm Wells #6.1 and #6.2 should be restricted to no more than 5.4 MGD. A copy of the WRC Decision is attached to this permit. The following actions were to be taken and appropriately documented:

- SWD must adjust the SCADA system controlling the Home Farm Well site to restrict pumping to no more than 5.4 MGD and provide appropriate documentation to WRC and the Department.
- Submit Annual Statistical Reports to the Department and to WRC staff.

Also, in 2004, as per the WRC Order, the Department approved abandonment of Sewell St. Well #5 and the Oak St. Well, which are located in the Blackstone Basin and were in operation prior to 1983. Because the Inter Basin Transfer process evaluates the capacity to transfer water across basin boundaries, the capacity lost from these two wells could be applied elsewhere in the Blackstone Basin without triggering the need to go through the IBTA process.

This permit also serves to reallocate the 0.26 mgd volume previously permitted in the Concord River Basin to SWD's withdrawal sources in the Blackstone River Basin. The SWD Concord River Basin permit #9P-2-14-271.01, is hereby rescinded.

Safe Yield Analysis

In support of the permit application, a letter dated June 27, 2003 was sent to the Department by the Town's consultant. The letter stated that the "impacts of the proposed transfer from Oak St. Well and Sewell Well #5 to the Home Farm Well are anticipated to be negligible. . . . Home Farm Well site has produced quantities of water greater than 5.76 MGD without causing any adverse environmental impacts." The sub-basin safe yield analysis submitted by SWD consisted of a basic water balance calculation using aquifer recharge area, groundwater recharge based on precipitation and percent infiltration. Precipitation during a dry year is roughly 35 inches per year and assuming a runoff-evapotranspiration rate of 50%, 17.5 inches per year may be available for recharge. After subtracting out current WMA registered and permitted withdrawals, the total volume of available water was estimated by SWD to be approximately 16 MGD. However, the "available" water does not necessarily represent environmental or habitat needs.

MassDEP's Division of Watershed Management published the Blackstone River Watershed Water Quality Assessment Report in 2001. According to the report, "the lower reach of Poor Farm Brook, from the outlet of City Farm Pond to the mouth at Lake Quinsigamond, was dry." Poor Farm Brook is classified as a Cold Water Fishery and as a result receives a higher level of review from the Department. In response to the draft permit, MassDEP received several comments from parties expressing concern about the impact of the withdrawals on the Brook.

Department staff, along with representatives from the Riverways Program, visited Poor Farm Brook on September 2, 2004 and observed the brook was dry along the lower reach. Department staff also conducted a reconnaissance of the Poor Farm Brook watershed on August 18, 2005. The field inspection included stops in headwater areas; the unnamed tributary to Poor Farm Brook crossing beneath Burncoat St.; and Great Brook at the Boylston-Worcester municipal boundary (Shrewsbury St.). These tributaries have been widened to create several ponds from which golf course irrigation water is withdrawn before the brook reaches the Home Farm wells. Poor Farm Brook is a second order stream that begins at the outlet of the final impoundment at Worcester Country Club (WCC). This is just below the confluence of the unnamed tributary and Great Brook. Worcester Country Club is authorized through a Water Management Act registration to withdraw 25 MGY over a 210-day period each year from the unnamed tributary to Poor Farm Brook. WCC has averaged 15.8 MGY for the past seven years. Stream flow above the Worcester Country Club in both the unnamed tributary at Burncoat Street and Great Brook at Shrewsbury Street appeared to be greater individually than the combined stream flow below the Worcester Country Club. No flow was passing over the spillway of the final irrigation pond during the inspection.

Below WCC in the area of the Quabbin Estates complex the observation of the brook continued to show very little flow. In many areas the flow is less than ½ inch deep and 2 feet wide. The brook also pools in several areas giving the impression that more flow exists. At the time of the site inspection, Poor Farm Brook downstream of this location was receiving water from a Clark Street storm drain resulting from the draining of a municipal swimming pool.

Another unnamed tributary with a drainage area of 0.5 square miles enters Poor Farm Brook just below Clark Street. This tributary was observed where it crosses under Tacoma Street and at the time of the inspection, this brook was dry.

Further downstream, slow moving flow was observed in the Mountain Street East culverts across from Clemente Field. A storm drain receiving discharge from the pond at Allegro MicroSystems enters the brook at this location beneath Mountain St. East. Continuing downstream, Poor Farm Brook enters City Farm Pond just south of Route 70. An 8-to-10-foot high earthen dam created City Farm Pond. The flashboards have rotted away lowering the pond level by 3 ½ feet to 4 feet. The dam and spillway appear to be in need of significant repair. At the time of the site visit, no water flowed over the dam. The dam at City Farm Pond controls stream flow to Poor Farm Brook and only under high water conditions will

flow continue beyond City Farm Pond. Department staff walked the Poor Farm Brook streambed to the point it meets Lake Quinsigamond approximately 2,500 feet away. The streambed was dry until approximately 500 feet from the lake.

The Department acknowledged in the draft permit and findings of fact issued on December 24, 2004 that the withdrawal of up to 3 MGD from Home Farm Well #6.2 since approximately 1990 likely contributed to the loss of flow in the final reach of the brook as it enters Lake Quinsigamond. However, given the presence of the dam at City Farm Pond and the distance from the dam to the Shrewsbury Home Farm Wells, along with the likely effects of the registered withdrawals from the Worcester Country Club, the impact of the withdrawal from the Home Farm Wells may not be the primary reason for the dry streambed. Therefore, a water level monitoring plan will be implemented by the SWD as a condition of the permit to determine the impact of the withdrawal on groundwater levels in the vicinity of the Home Farm Well site.

The Department believes that by complying with the conditions of this permit, and using water more efficiently through conservation, the Town will reduce peak demands and total withdrawals from the Home Farm Wells and therefore reduce impact on the basin. The Department strongly encourages the Town of Shrewsbury to pursue future water supply sources outside of the Poor Farm Brook sub-basin to meet future demand and to potentially transfer existing withdrawal capacity to a less environmentally sensitive location. Based on current information, the Department will discourage application for further increases in withdrawal from the Home Farm Well site.

Permit Conditions

To better achieve the balance of competing water uses mandated by the Water Management Act, the Department has conditioned this permit to reflect the “Water Management Policy For Permit and Permit Amendment Applications and 5-Year Review, Effective Date: April 2, 2004 WMA Policy #: BRP/DWM/DW/P04-1, found on the Department’s web site at <http://www.mass.gov/dep/brp/wtrm/wtrmregs.htm>. This policy identifies specific standards and conditions that are to be applied to new and existing Water Management permits. The Town of Shrewsbury’s sources are located in a subbasin of the Blackstone River, which is identified as a high stress basin by the Water Resources Commission. The policy established the following performance standards for all permittees that withdraw water from medium and highly stressed river basins:

1. Residential per capita water use of 65 gallons per day or less;

2. Unaccounted for water of 10% or less; and
3. A seasonal withdrawal cap based on minimizing the difference between summer (May through September) and winter (previous November through March) withdrawals derived from each community's summer to winter withdrawal ratio.
4. Streamflow thresholds that trigger mandatory limits on nonessential outdoor water use, including but not limited to lawn and landscape irrigation.

The standards set forth above shall hereinafter be referred to collectively as the "Basin Performance Standards." The reporting requirements added in the Permit are intended to standardize the information submitted to the Department to assess compliance with the Permit and the Basin Performance Standards. The permit contains a requirement that these performance standards be met within two years following issuance of the permit. Failure to meet the standards thereafter will require the implementation of the actions outlined in Special Conditions 9 and 10, as appropriate. In evaluating whether any additional enforcement measures would be taken, MassDEP would consider the steps undertaken and the progress made to date by SWD in achieving the standards set out in this permit.

Because streamflow is particularly stressed during the summer, the seasonal withdrawal cap specifically targets conservation when water demands are high and streamflow is naturally low. The seasonal withdrawal cap is intended to reduce the difference between summer (May through September) and winter (previous year November through March) water use. Based on a seasonal three-year average, communities with an average summer to winter withdrawal ratio of 1.4 or greater are required to reduce the summer-winter difference in withdrawal volumes by 50%, effective with the filing of the 2nd Annual Statistical Report from the permit issuance date. Communities with an average summer to winter withdrawal ratio that is less than 1.4 are required to reduce the summer-winter difference by 25%. The 1.4 ratio is considered to be a reasonable cutoff for the reduction grouping, and the Department has further determined that a summer to winter ratio of 1.2 or less is an acceptable summer conservation performance. The Department's proposed approach was to apply the reduction percentage on the summer-winter difference for the highest summer use within the last three years to determine the summer cap. However, because the Shrewsbury Water Department has already attained a 1.2 summer to winter ratio for 2002 and 2003, and at 1.26 in 2004, SWD will instead be required to continue to maintain a 1.2 ratio as a condition of the Permit. If this performance standard is exceeded at the end of the second full calendar year following permit issuance, or for any year thereafter, the Department will require development of actions as specified in Special Condition 9.

The Department has also determined that to minimize the impacts of increasing authorized withdrawal volumes in High and Medium stressed basins, it will require that an offset feasibility study be performed

and submitted to the Department for approval. The offset study shall evaluate the feasibility of reducing water losses to the basin, and identify the most feasible means of maintaining local water balance, and shall be submitted to the Department within one year of exceeding the average daily demand of 3.76 MGD. The amount of water to be offset will be based on the extent to which the additional water withdrawn is lost to that basin. Shrewsbury is required to offset 100% of any additional water withdrawn, because Shrewsbury discharges its wastewater outside of the basin of withdrawal. Additional water withdrawn is the difference between the authorized withdrawal volume (3.91 MGD) and current use. Current use is the volume used for the prior calendar year or the average for the prior 3 years, whichever is higher provided said volumes were in compliance with their authorized withdrawal volumes. In 2001, Shrewsbury withdrew 4.17 MGD, which exceeded the volume authorized in this permit; therefore the permit volume of 3.91 MGD was used in averaging. The feasibility study shall evaluate water offset for 54 million gallons per year, the volume calculated based upon the difference between the 3.76 MGD average for 2001 through 2003 and the authorized volume of 3.91 MGD.

The Department has determined there are a wide variety of activities that can return water to the basin or prevent water loss in the basin, such as reduced infiltration and inflow, recharge of stormwater, and retrofit of existing development using low impact development principles. The Department anticipates issuing guidance in 2005 to assist water suppliers in preparing offset feasibility studies.

Special Conditions

Special Condition 4, Wellhead Protection. The Town of Shrewsbury has complied with final land use controls and floor drain regulations that meet 310 CMR 22.21(2) for the Zone of Contribution covered by this permit.

Special Condition 5, Groundwater Level Monitoring, will be conducted during at least the next two years to evaluate the potential impacts from pumping the Home Farm Wells on water levels near Poor Farm Brook in accordance with a plan developed with and approved by MassDEP.

Special Condition 6, Streamflow Triggers and Outside Water Use Restrictions, addresses limits on nonessential outside water use from May through September, and requires the SWD to implement required actions. Mandatory water use restrictions are to occur when streamflow falls below **0.5 cubic**

feet per second per square mile (cfsm), the New England Aquatic Base Flow summer default value, which equates to **12.8 cubic feet per second** (cfs), measured at the USGS Quinsigamond River at North Grafton Stream Gage #01110000, for three consecutive days. The Department is in the process of evaluating recent studies conducted by the United States Geological Survey (USGS) to develop an alternative streamflow threshold for triggering streamflow restrictions and may modify this condition in the future to reflect the latest science on this topic. The Department notes that mandatory restrictions on outdoor water use have been in place in Shrewsbury since 2001. The Department also requires that the SWD submit with its Annual Statistical Report, a report documenting all actions taken by the Town to implement and enforce outside water use restrictions for the prior calendar year. Please note that this report is in addition to the requirements of 310 CMR 22.15(8), "Notification of Imposition of Mandatory Water Use Restrictions and Local Drinking Water Health Advisory," that requires notification to MassDEP within 14 days of the effective date of any restrictions.

Special Conditions 7 through 12, are required to address the Department's Water Management Policy discussed previously; to incorporate the Water Conservation Standards for the Commonwealth of Massachusetts reviewed and approved by the WRC in October 1992; to ensure that the information necessary to evaluate compliance with the conditions included herein are accurately evaluated; and to provide for specific actions for failure to meet the Basin Performance Standards. These conditions are intended to ensure the efficient use of water and to mitigate the potential impact of the withdrawals through decreased demand.



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**WATER WITHDRAWAL PERMIT
 MGL c 21G**

This permit is approved pursuant to the Massachusetts Water Management Act for the sole purpose of authorizing the withdrawal of a volume of water as stated below and subject to the following special and general conditions. This permit conveys no right in or to any property beyond the right to withdraw the volume of water for which it is issued.

PERMIT NUMBER: 9P4-2-12-277.01 **RIVER BASIN:** Blackstone

PERMITTEE: Shrewsbury Water Department
 100 Maple Ave.
 Shrewsbury, MA 01545

EFFECTIVE DATE: May 21, 2008

EXPIRATION DATE: February 28, 2009

NUMBER OF WITHDRAWAL POINTS: 6
 Groundwater: 6
 Surface Water: 0

USE: Public Water Supply

DAYS OF OPERATION: 365

WITHDRAWAL POINTS IDENTIFICATION:

Name	Point ID Code
Home Farm Well 6.1	2271000-07G
Home Farm Well 6.2	2271000-08G
Home Farm Well 6.3	2271000-09G
Lamberts Sand Pit Well 3.1	2271000-04G
Lamberts Sand Pit Well 3.2	2271000-05G
Sewell #4	2271000-02G

SPECIAL CONDITIONS

1. Maximum Authorized Annual Average Withdrawal Volume

This permit authorizes the withdrawal of water, on average over a calendar year, at the rate described below. The volume reflected by this rate is in addition to the 2.64 million gallons per day (mgd) previously registered to the SWD through the Water Management Act Program.

The permitted volume is expressed in millions of gallons, both as an average daily withdrawal rate per year and as a total annual withdrawal volume for each five-year period of the permit term.

Withdrawals are authorized as follows:

<u>Five-Year Periods</u>	<u>Total Raw Water Withdrawal Volumes</u>			
	<u>Permit</u>		<u>Total of Permit and Registration</u>	
	<u>Daily Average (MGD)</u>	<u>Total Annual (MGY)</u>	<u>Daily Average (MGD)</u>	<u>Total Annual (MGY)</u>
Period Four Years 16-20 5/21/2008 to 2/28/2009	1.27	463.6	3.91	1,427.15

Where applicable, the SWD shall provide compensating water offsets for any increased withdrawals above 3.76 MGD, or 1,372.4 MGY, as noted in Special Condition 8. In addition, the SWD must comply with the seasonal water use ratio established in Special Condition 7. This permit reflects the transfer of 0.26 MGD previously authorized to Shrewsbury in the Concord River basin.

2. Maximum Daily Withdrawal from Authorized Withdrawal Points

Withdrawals from individual withdrawal points are not to exceed the approved maximum daily volumes listed below without specific advance written approval from the Department.

Table 2: Maximum Daily Withdrawal Rates

Name	Point ID Code	Maximum Daily Rate (MGD)
Home Farm Well 6.1	2271000-07G	4.32*
Home Farm Well 6.2	2271000-08G	3.02*
Home Farm Well 6.3	2271000-09G	*
Lamberts Sand Pit Well 3.1	2271000-04G	0.75
Lamberts Sand Pit Well 3.2	2271000-05G	0.58
Sewell #4	2271000-02G	1.14

* The total pumping rate from Home Farm Wells 6.1, 6.2 and 6.3 is not to exceed on a maximum daily basis 5.4 MG in accordance with the Water Resource Commission Decision concerning Inter-Basin Transfer. Home Farm Well 6.3 was installed as a back-up well for Home Farm 6.1, therefore the combined withdrawal rate for Home Farm Wells 6.1 and 6.3 shall not exceed the approved pumping rate for Home Farm Well 6.1 of 4.32 MGD.

3. Zone of Contribution (Zone II or Zone III) Delineations

Department records show that the Home Farm Wells 6.1 and 6.2 (2271000-07G and -08G), Sewell Street Well 4 (2271000-02G), and Lambert Pit Wells 3.1 and 3.2 (2271000-04G and -05G) have MassDEP approved Zone II delineations. Therefore, no further Zone II work is required as a condition of this permit. Although Home Farm Well 6.3 has been added to the permit, the Zone II for the Home Farm Wells, Sewell St. and Lambert Pit Wells is a combined, conceptual Zone II and no revision is required.

4. Wellhead Protection

The Town of Shrewsbury is in compliance with MA Drinking Water Regulations wellhead protection requirements, 310 CMR 22.21, including a Board of Health bylaw prohibiting floor drains within the Zone II of the water supply wells. Shrewsbury has demonstrated its "Best Effort", 310 CMR 22.21(1)(d), in encouraging other communities within the Zone II of its wells to adopt land use controls which meet 310 CMR 22.21(2). Portions of the City of Worcester and the Towns of West Boylston and Boylston are within the Zone II of the Home Farm Wells (2271000-07G, -08G, and -09G), Sewell St. Well (2271000-02G), and Lambert Pit Wells (2271000-04G and -05G). The compliance date for the wellhead protection requirement was October 2006.

5. Groundwater Level Monitoring

Groundwater level monitoring will be conducted to evaluate the potential impacts from pumping from the Home Farm Wells on water levels near Poor Farm Brook. For CY2009 and CY2010 the following tasks will be completed:

- Within 90 days of the issuance of this permit, submit the monitoring well location plan to the Department for review and approval.
- Collect monthly water level data from all available monitoring wells on the Home Farm Well site from April to November.
- Collect at least hourly water level data from selected monitoring wells using pressure transducers and data loggers for one month during peak summer demand.
- Install and monitor a minimum of three piezometers along the length of the streambed of Poor Farm Brook.
- Tabulate pumping data from each of the Home Farm Wells in order to compare withdrawal rates with water level elevations.
- Submit the tabulated data and a monitoring well location map with the Annual Statistical Report. Water level data must reflect surveyed elevation data.

- The need for additional monitoring will be evaluated after the submittal of two years of data.

6. Stream Flow Triggers and Nonessential Outside Water Use Restrictions

Beginning on May 1, 2009, the Shrewsbury Water Department shall implement the Required Actions identified in the following table whenever stream flow falls below the levels identified for three (3) consecutive days as measured at the USGS Stream Gage noted.

Period	Streamflow Trigger (3 consecutive days below threshold)	Flow Volume (USGS Gage Station Quinsigamond River at N. Grafton # 01110000)*	Required Action
May 1 st thru September 30 th	< 0.5 cfsm **	< 12.8 cfs	Implementation of Mandatory Water Restrictions

cfsm: cubic feet per second per square mile

* The stream flow threshold set forth above is the daily mean stream flow recorded at the applicable USGS gage. Should the reliability of flow measurements at the Quinsigamond River Gage Station #01110000 be so impaired as to question its accuracy, the SWD may request for the Department's review and approval that the trigger mechanism be transferred to another gage. The Department reserves the right to require the use of an alternate gage and/or an alternate streamflow threshold.

** The Department reserves the right to modify this streamflow trigger contingent upon site specific data collection or developing science.

Implementation of mandatory restrictions requires the filing of a public notice in a local newspaper within 5 business days of the date that the required action is triggered. A copy of each notice as published shall be forwarded to the Department within 14 business days of publication. Each notice shall at a minimum include:

1. The stream flow value that triggered the required notification;
2. The need to limit water use, especially nonessential outside water use, to protect stream flow for aquatic life and to ensure a sustainable drinking water supply;
3. Ways individual homeowners can limit water use, especially nonessential outside water use;
4. A detailed description of the restrictions and the penalties for violating the restrictions.
5. At a minimum, the mandatory restrictions shall limit nonessential outside water use to hand held hoses only and include hourly restrictions on nonessential outside water use. At a minimum, hourly restrictions shall avoid water use during the hours 9 a.m. to 5 p.m., when evapotranspiration rates are typically the highest. Notwithstanding the forgoing, irrigation of public parks and recreational fields by means of automatic sprinklers equipped with moisture sensors or similar control technology may also be permitted outside the hours of 9 a.m. to 5 p.m. For purposes of this Permit, the term nonessential outside water use is defined to

include those uses that do not have health or safety impacts, are not required by regulation and are not needed to meet the core functions of a business or other organization. The Shrewsbury Water Department shall have the authority to enforce mandatory restrictions, including the authority to assess penalties or impose fines for violations.

The Shrewsbury Water Department shall implement mandatory restrictions, and enforce the restrictions until streamflow exceeds, for seven (7) consecutive days, the applicable streamflow threshold set forth in the table above.

In order to evaluate the effectiveness of the restrictions on nonessential outside water use, the Department requires that the Shrewsbury Water Department submit with the Annual Statistical Report, a report documenting all actions taken by the Shrewsbury Water Department to implement and enforce the restrictions on nonessential outside water use, including, without limitation, the dates the restrictions on nonessential outside water use were in place, the streamflow threshold that triggered the restrictions, the restrictions imposed, and the Shrewsbury Water Department's efforts to enforce the restrictions, including the names and addresses of those against whom action was taken and any fines or penalties imposed.

7. Performance Standards

Beginning with the Annual Statistical Report for CY2010, Shrewsbury Water Department shall meet the following performance standards.

- Performance Standard for Unaccounted for Water

Unaccounted for water shall not exceed 10% of overall water use.

Shrewsbury Water Department's Annual Statistical Report shall provide a detailed assessment of its unaccounted for water. Unaccounted for water is defined by the Massachusetts Water Resources Commission as the difference between water pumped or purchased, and water that is metered or confidently estimated. Unaccounted for water shall include water that cannot be accounted for due to meter problems, unauthorized hydrant openings, unavoidable leakage, recoverable leakage, illegal connections, stand pipe overflows, and fire protection where it cannot be confidently estimated.

The need for water main flushing and the use of water in construction or meter calibration shall be metered or estimated as appropriate to assist in determining actual demand. Volumes flushed to waste shall be reported in the Shrewsbury Water Department's Water Supply Annual Statistical Report.

If the Shrewsbury Water Department fails to meet the performance standard for Unaccounted for Water at the end of the second full calendar year following permit issuance, or for any Annual Statistical report thereafter, the Department may require Shrewsbury to implement restrictions that are more stringent than the restrictions set forth in Special Condition 10 below, for the following calendar year.

- Performance Standard for Residential Per Capita Water Use

Residential Per Capita Water Use shall not exceed 65 gallons per day.

The Shrewsbury Water Department shall report its residential gallons per capita per day (rgpcd) and the calculation used to derive that figure as part of its Annual Statistical Report. The rgpcd is the total volume of daily residential water use in gallons divided by the population served. The source of the data used to establish the service population and the year in which this data was developed shall be provided. If the Shrewsbury Water Department fails to meet the performance standard for keeping residential per capita water use at or below 65 gallons per day by the end of the second full calendar year following permit issuance, or for any Annual Statistical Report thereafter, the Department will require SWD to implement an Enhanced Water Conservation Plan as set forth in Special Condition 9 below, for the following calendar year. The plan shall be submitted 30 days after the Annual Statistical Report. At a minimum, the enhanced conservation plan, subject to the Department's approval, shall include the implementation of a program to make water saving devices such as faucet aerators, low flow shower heads and toilet displacement bottles/dams available to its customers at cost, and to provide rebates or other incentives for the purchase of low flow appliances (washing machines, dish washers and toilets) and the installation of moisture sensors or similar control technology on irrigation systems.

- Performance Standard for Seasonal Water Use

Water use between May 1st and September 30th shall not exceed a summer to winter use ratio of 1.2. SWD achieved the target seasonal water use ratio of 1.2 in 2002 and 2003. SWD achieved a ratio of 1.26 in 2004. SWD shall continue to maintain a summer to winter ratio of 1.2. If the performance standard is exceeded by the end of the second full calendar year following permit issuance, or for any Annual Statistical Report thereafter, the Department will require the implementation of Special Condition 9.

8. Offsets, Offset Feasibility Study and Implementation Plan

SWD shall submit an offset feasibility study and implementation plan and schedule for the Department's approval **within one year of exceeding the current average day demand of 3.76 MGD**. Offsets are designed to compensate for water losses attributed to increased withdrawals, or water exported out of basin. The feasibility study shall evaluate a water offset for 54 million gallons per year (150,000 gallons per day), the volume calculated to be water consumed by an increase from your average use of 3.76 MGD to the 3.91 MGD authorized within this permit.

The volume of water to be offset identified above for the feasibility study was calculated based on an expectation that water use and wastewater disposal within the SWD system will continue in a manner consistent with current system practice. For the purposes of this calculation the Department assumed that 100% of the water withdrawn by SWD in the Blackstone River basin is lost to that basin because of wastewater transfer out of basin or the evapotranspiration losses associated with irrigation use. The offset feasibility study and implementation plan and schedule shall be approved by the Department. The Department will review the implementation plan and will determine the appropriate ratio to be calculated for each offset method. For example, infiltration/inflow improvements may require a greater ratio than stormwater return.

9. Enhanced Water Conservation Plan

If SWD fails to comply with the Performance Standards for Residential Per Capita Water Use or Seasonal Water Use by the end of the second full calendar year following permit issuance, or for any Annual Statistical Report thereafter, the SWD shall develop and implement an enhanced water conservation plan for the following calendar year. For any year in which the SWD is required to develop and implement an enhanced water conservation plan, the SWD shall submit within 30 days after the Annual Statistical Report, a report documenting all actions taken by the SWD to develop and implement the enhanced water conservation plan.

The enhanced water conservation plan for the Town of Shrewsbury may include, without limitation, the items listed below:

- Adoption and enforcement of a bylaw or other regulation to require moisture sensors or similar control technology on automatic sprinklers;
- Adoption and enforcement of a bylaw or other regulation to limit the amount of land clearing for the creation of lawns;
- More stringent restrictions on outside water use;
- Adoption and enforcement of a bylaw or other regulation to promote infiltration of stormwater to recharge groundwater at a rate 1.5 times the volume of recharge for new development projects and a rate 1.0 times the volume of recharge for redevelopment projects for the appropriate hydrologic group, as identified in Standard 3 of the DEP Stormwater Management Standards;
- Irrigation of recreational fields and parks in accordance with the Water Resource Commission's May 2002 Guide to Lawn and Landscape Water Conservation;
- Encouragement of the use of cisterns or rain barrels for outside watering thru the use of a rebate or at cost program;
- Enhanced public education outreach;
- Purchase and/or development of out-of-basin sources; and,
- Implementation of a water bank to provide for keeping at least an equivalent gallon of water within the basin for every gallon of water demand added to the system.

At a minimum, the enhanced water conservation plan shall meet the requirements set forth below.

- If SWD fails to comply with the performance standard for keeping residential per capita water use at or below 65 gallons per day, the enhanced water conservation plan shall include the implementation of a program to make water saving devices such as faucet aerators, low flow shower heads and toilet displacement bottles/dams available to its customers at cost and to provide rebates or other incentives for the purchase of low flow appliances (washing machines, dish washers and toilets), and the installation of moisture sensors or similar control technology on irrigation systems.
- Any enhanced water conservation plan required by this Permit shall include (1) submission of a report that evaluates the effectiveness of a seasonal rate as a tool for encouraging water conservation, (2) implementation of any changes to the current rate structure that will enable the SWD to encourage water conservation, and (3) notification to the Department of the changes along with the reasons for these changes.

10. Control of Unaccounted for Water: Water Audit

If the SWD fails to comply with the performance standard for unaccounted for water, the SWD shall conduct a water audit.

Relative to the water audit, if the difference between the quantity of the raw water entering the Shrewsbury Water Department treatment plant and the quantity of the finished water entering the distribution system from that treatment plant exceeds 5%, the SWD shall submit to the Department for its review and approval, within nine (9) months of submitting the Annual Statistical Report, a scope of work and schedule for conducting a water audit of the treatment plant. The scope of work shall call for the SWD to evaluate operations at the treatment plant and recommend actions that can save water during the treatment process, and propose a schedule for implementing those actions. Thereafter, the SWD shall complete the water audit in accordance with the scope of work and schedule approved by the Department and submit to the Department for its review and approval, a report documenting the results of the water audit including a plan and schedule for reducing the volume of water lost during the treatment process. The SWD shall implement the actions recommended in the water audit report as approved by the Department in accordance with the schedule approved by the Department.

In addition, and at a minimum, the Shrewsbury Water Department shall implement the actions listed below to meet the performance standard of having unaccounted for water at or below 10%.

Metering

- The Shrewsbury Water Department reports its system as 100% metered. Continue the ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by the customers to within 2%. Such plan shall continue to include provision for, and scheduling of, placing sufficient funds in its annual water budget to recalibrate, repair, or replace meters as necessary.
- The Shrewsbury Water Department shall continue to calibrate all master meters on an annual basis.

Leak Detection

At a minimum, the Shrewsbury Water Department shall continue to conduct a full leak detection survey every two years. In addition, the Shrewsbury Water Department shall perform a leak detection survey of its entire distribution system whenever the volume of unaccounted for water is greater than 10% of overall water use, or whenever the percentage of unaccounted for water increases by 5% or more (for example an increase from 3% to 8%) over the percentage reported on its Annual Statistical Report for the prior calendar year. With the ASR for any calendar year in which a leak detection survey takes place, the Shrewsbury Water Department shall submit to the Department for its review, a report detailing the leak detection survey, any leaks uncovered as a result of the survey or otherwise, and the estimated water savings as a result of the repair.

Leak Repair

The Shrewsbury Water Department shall have repair reports available for inspection by the Department.

Leaks shall be repaired as soon as possible including leaks in any water pipes up to the service meter. In no event, shall any leak remain unrepaired for more than seven (7) days after detection.

11. General Reporting Requirements

Shrewsbury Water Department shall report on the Annual Statistical Report both the raw water volumes and finished water volumes for the entire water system.

When reporting categories of water use, consumptive residential water use, at a minimum, shall include residential areas, mobile home parks, condominiums, apartments and other residential areas. Residential use is not based on ownership. Water use for rented apartments shall be reported as residential use and not reported as commercial water use. At a minimum the following categories of water use shall be reported: residential, commercial, industrial and agricultural.

12. General Water Conservation Requirements

Pricing

The water pricing structure shall not be a decreasing block rate structure.

The Town of Shrewsbury shall continue to ensure that water supply system operations are fully funded by water supply system revenues. The pricing system shall at least reflect the full cost of supplying water, including but not limited to:

- Administrative costs;
- Staff salaries, benefits, insurance and pension costs;
- Distribution system operation, maintenance and repair, including leak detection and repair costs and metering costs;
- Pumping costs and utilities;
- Treatment costs;
- Capital replacement costs, capital depreciation and debt service;
- Costs associated with water conservation programs and public education programs;
- Watershed or wellhead purchase and/or protection costs and land acquisition;
- Costs associated with offsets (required under Condition 8 above); and,
- Emergency planning.

Education

The Town of Shrewsbury shall continue its current public education program and consider additional educational activities. The Town of Shrewsbury shall also continue to provide customers of the public water system with literature emphasizing:

- The cost of providing water;

- Investments in efficiency and conservation will provide consumers with long-term savings;
- How water use fluctuates throughout the year;
- Actual daily per person water use for the household;
- The environmental benefits of reducing water demand.

Bill stuffers with water conservation tips or water saving messages shall, at a minimum, be included annually with customer's water bills, or as a separate mailing. Copies of this information shall be made available to the Department upon request.

Outdoor Water Use

The Department acknowledges the Town of Shrewsbury's Water Use Restriction Bylaw. Shrewsbury is expected to fully implement its Water Use Restriction Bylaw as a condition of this permit. The Town of Shrewsbury shall notify the Department in writing should it modify or eliminate the Water Use Restriction Bylaw. Drinking Water Regulations, 310 CMR 22.15(8) require notification to the Department within 14 days of implementing mandatory water use restrictions.

Plumbing

The Town of Shrewsbury shall implement a program to work with Shrewsbury's Plumbing Department to enforce the March 1, 1989, plumbing code for new construction and building rehabilitation where installation of water saving devices and low flow toilets are required.

The Town of Shrewsbury shall submit to the Department a plan to retrofit all public buildings with water saving devices (such as faucet aerators, low flow showerheads, toilet displacement bottles/dams, low flow toilets, and automatic shut off faucets). The plan shall be submitted on or before December 31, 2008. For any public building without a device on each of the appropriate plumbing fixtures, the plan shall describe the retrofit proposed, its anticipated cost, and a schedule by which the Town proposes to complete each retrofit. The plan shall set out the justification for any retrofit to be installed after December 31, 2011. The Department will review the plan and confirm or modify the schedule as part of its approval. Shrewsbury shall implement the approved plan and schedule, and report its progress on the retrofits as part of its Annual Statistical Report, provided it may install any proposed retrofits prior to Department approval of the plan.

Water Main Flushing

The need for water main flushing and the use of water in construction shall be metered or estimated as appropriate to assist in determining demand. Volumes flushed to waste shall be reported annually in the appropriate section of the Water Supply Annual Statistical Report.

GENERAL CONDITIONS (applicable to all permittees)

1. **Duty to Comply** The permittee shall comply at all times with the terms and conditions of this permit, the Act and all applicable State and Federal statutes and regulations.
2. **Operation and Maintenance** The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw up to the authorized volume so as not to impair the purposes and interests of the Act.
3. **Entry and Inspections** The permittee or the permittee's agent shall allow personnel or authorized agents or employees of the Department to enter and examine any property for the purpose of determining compliance with this permit, the Act or the regulations published pursuant thereto, upon presentation of proper identification and an oral statement of purpose.
4. **Water Emergency** Withdrawal volumes authorized by this permit are subject to restriction in any water emergency declared by the Department pursuant to MGL c 21G ss 15-17, MGL c 150 ss 111, or any other enabling authority.
5. **Transfer of Permits** This permit shall not be transferred in whole or in part unless and until the Department approves such transfer in writing, pursuant to a transfer application on forms provided by the Department requesting such approval and received by the Department at least thirty (30) days before the effective date of the proposed transfer. No transfer application shall be deemed filed unless it is accompanied by the applicable transfer fee established by 310 CMR 36.37.
6. **Duty to Report** The permittee shall submit annually, on a form provided by the Department, a certified statement of the withdrawal, such report to be received by the Department by January 31st of each year. Such report must be mailed or hand delivered to:

Department of Environmental Protection
Drinking Water Program
Water Management Program
One Winter Street, 6 th Floor
Boston, MA 02108

7. **Duty to Maintain Records** The permittee shall be responsible for maintaining monthly withdrawal records.
8. **Metering** All withdrawal points included within the permit shall be metered within one year of the date of issuance of the permit. OR (for existing metered withdrawal points) The withdrawal point(s) included within this permit are metered and shall be calibrated annually. Meters shall be maintained and replaced as necessary to ensure the accuracy of the withdrawal records.

NO WITHDRAWAL IN EXCESS OF 100,000 GALLONS PER DAY OVER THE REGISTERED VOLUME (if any) SHALL BE MADE FOLLOWING THE EXPIRATION OF THIS PERMIT, UNLESS BEFORE THAT DATE THE DEPARTMENT HAS RECEIVED A RENEWAL PERMIT APPLICATION PURSUANT TO 310 CMR 36.00.