



THE COMMONWEALTH OF MASSACHUSETTS
WATER RESOURCES COMMISSION
100 CAMBRIDGE STREET, BOSTON MA 02114

**Report of the Findings and Justifications of the
Water Resources Commission
Decision**

May 11, 2006

**Town of North Attleboro
Hillman Well
Interbasin Transfer Act**

Decision

On May 11, 2006, the Water Resources Commission (WRC) voted unanimously to approve the interbasin transfer from the North Attleborough Hillman Well in order to bring it into compliance with the Interbasin Transfer Act.

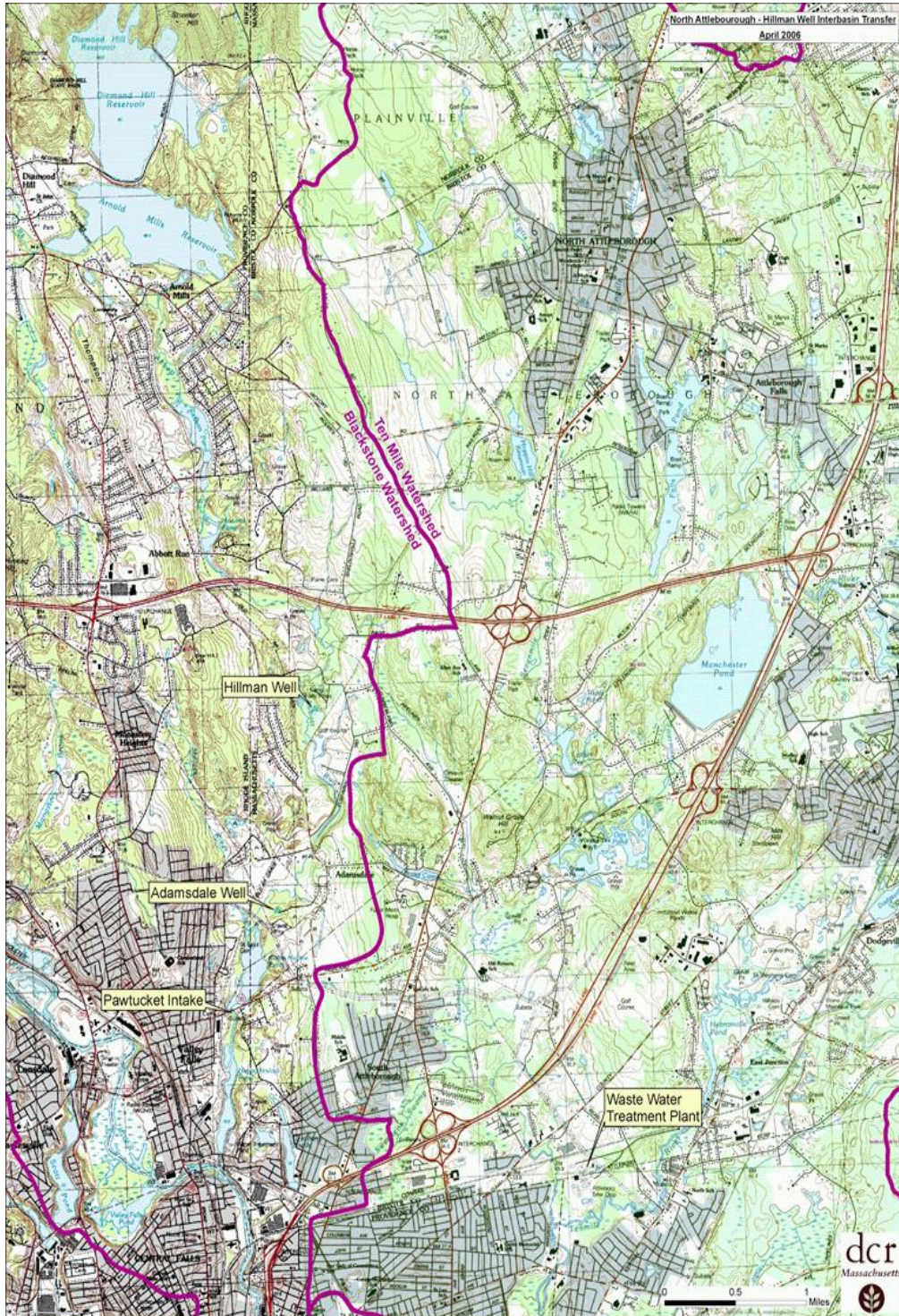
Background

In 2003, during the course of the Water Management Act (WMA) five-year review for the North Attleborough Hillman Well (also known as the Girl Scout Well), DEP contacted WRC Staff to determine if the well should have received Interbasin Transfer Act (ITA) review and approval in 1987, when it was first proposed through the MEPA process. Staff reviewed the issue and after consultation with DEP, North Attleborough officials and legal counsel, it was determined that the well should have gone through the ITA process when it was being developed. The Hillman Well is located in the Blackstone River basin portion of North Attleborough along the Abbott Run near the Rhode Island border (See Figure 1). This subbasin is “unassessed” in the 2001 Stressed Basin Report.

Water from the Hillman Well is used throughout town, which has land area in both the Blackstone and Ten Mile River basins. However, the Town’s wastewater is discharged through a wastewater treatment plant located in the Ten Mile River basin, in the City of Attleboro. This is jurisdictional under the ITA because water from this well crosses both a basin line and a town line for ultimate disposal.

The Hillman Well has a MassDEP approved safe yield of 1.0 MGD, however, the well shares an overlapping Zone II wellhead protection area with North Attleborough’s Adamsdale Well and thus the Hillman Well’s Water Management Act permitted withdrawal is less than the safe yield amount. Between 1998 and 2003, withdrawals from the Hillman Well exceeded the permitted volume. In addition, several water conservation requirements of the WMA Permit had not been implemented. This led MassDEP to enter into an Administrative Consent Order, which was signed by North Attleborough on January 10, 2006.

Figure 1



The WRC considered this issue at its November 13, 2003 meeting. The WRC directed its Staff to work with DEP to incorporate the environmental and water supply management safeguards of the ITA into an Administrative Consent Order (ACO) and Water Management Act (WMA) Permit for this well, rather than requiring North Attleborough to file an ITA application for a well that had been in place and operating since 1987. The Commission reserved the right to pursue ITA compliance and requested a briefing once the ACO and WMA Permit were finalized. Since that time, WRC Staff reviewed available information regarding the Hillman Well, Abbott Run, and Town water use characteristics and closely participated with MassDEP and the Town in the development of the ACO and draft WMA Permit, which incorporate the ITA requirements. It is anticipated that the Water Management Act Permit will be issued shortly.

On April 6, 2006 the WRC voted to waive the application process for the Interbasin Transfer Act. The two public hearings required under the ITA were held on April 18, 2006 in North Attleborough. The proponent was the only party in attendance. No one provided testimony. No written comments were received. Based on the information provided through the ACO and WMA processes and the public hearings **on May 11, 2006, the WRC approved the Interbasin Transfer from the North Attleborough Hillman Well.**

Environmental Conditions

A major concern expressed by Commissioners at the November 2003 meeting was the effect that use of this well might have on streamflow. In the intervening time, streamflow records for Abbott Run were reviewed. The following information was developed:

- Upstream from North Attleborough, in Cumberland, RI, there are some very large surface water reservoirs. These are the primary sources of water for the City of Pawtucket. Water is released from the Cumberland reservoirs and routed about nine miles down the Abbott Run (through North Attleborough) to Pawtucket's intake near the Cumberland/Pawtucket border.
- The Pawtucket Water Supply Board manages releases from the Cumberland reservoirs using gate valves. They have not directly measured outflow from the reservoir in the past, but have estimated their releases and recorded gate valve openings. Data were provided for 2000 to 2003. During the spring months, the reservoirs typically overflow uncontrolled through mid-June. The Pawtucket Water Superintendent estimates the reservoirs are overflowing at about 16-20 MGD during the spring. During the remainder of the year, releases are made dependent on water demand and weather conditions. The reservoir gate valves may be left at the same setting for a month at a time without adjustment during the summer months.
- There are continuous releases from the upstream reservoirs to Abbott Run. It has been estimated that the Pawtucket Water Supply Board releases about 120% of its water demand from the reservoirs, to account for losses to ground water and evaporation along the nine miles of Abbott Run between the reservoir and the water treatment plant intake. The reported average day demand for Pawtucket in 2000 to 2003 was about 12.7 MGD. The maximum day demand for the same period was estimated at 22 MGD. Pawtucket also has some ground water wells that are used to supplement the water supply, typically during the

summer months. Those wells only account for 5 to 10 percent of the total demand.

- Data provided by the Pawtucket Water Supply Board indicate flow in Abbott Run, as it passes the Hillman Well site in North Attleborough, was at least 0.5 cfs on average, every month during the 2000-2003 period. Monitoring at the well site should be used to demonstrate daily flows and spring flows.
- Pawtucket's releases from the Cumberland reservoirs are most likely maintaining strong flows in Abbott Run, and may be contributing to artificially high flows during the summer months. North Attleborough probably does not cause significant impacts to streamflow by pumping their wells, when compared to the magnitude of releases made upstream for Pawtucket's water supply. A study proposed by North Attleborough is appropriate (stream gage installation, rating, and monitoring until July 2008) to assure that reasonable instream flow in Abbott Run is maintained. It is expected, based on this information, that the conditions at the well site represent suitable instream flows that meet Interbasin Transfer Act requirements.

Interbasin Transfer Act Criteria

The following section summarizes how the requirements of the North Attleborough ACO and Water Management Act Permit address the criteria of the Interbasin Transfer Act.

CRITERION #1: An environmental review pursuant to MGL, c. 30, §§ 61 and 62H, inclusive has been complied with for the ... IBT.

While this is not addressed in the ACO or the WMA Permit, this project went through the MEPA process in November 1987. No alterations to the project have occurred since that MEPA review.

CRITERION #2: All reasonable efforts have been made to identify and develop all viable sources in the receiving area.

This is an existing well. To assure that future Interbasin Transfers are minimized, MassDEP's modification of the WMA Permit #92-4-12-211.01 will state: "North Attleborough must identify and develop all viable sources in the Ten Mile River Basin section of Town before developing another source in the Blackstone River Basin section of Town."

CRITERION #3: All practical measures to conserve water have been taken in the receiving area ...

Deficiencies in North Attleborough's water conservation measures will be addressed as follows:

- *North Attleborough's public education program will be enhanced using a new program to be developed and approved by DEP and the WRC;*
- *The town will develop a commercial, industrial, and institutional water use plan;*
- *The ACO and WMA Permit require leak detection and repair to be implemented on a schedule that is consistent with ITA performance standards;¹*

¹ The Leak Detection Survey for 2004/2005 was furnished to MassDEP and WRC Staffs in January 2006.

- *The Town has implemented a 5-year program to convert all meters to an Automatic Meter Reading System. This program will be completed by the date imposed in the WMA Permit;*
- *North Attleborough is required to develop an enhanced water conservation plan;*
- *Following audit of all public buildings, all Town-owned public buildings shall be retrofitted with water saving devices (such as faucet aerators, low flow shower heads, toilet displacement bottles/dams, low flow toilets, and automatic shut off faucets). A schedule will be submitted for approval for this work;*
- *The Town shall complete a water system water audit. The deadline for this audit will be included in the Water Management Act Permit;*
- *The Town shall submit a plan to ameliorate the impacts of drought, seasonal shortages or other non-emergency water supply shortfalls. The deadline for this plan will be included in the Water Management Act Permit;*
- *In any year that the WMA Performance Standard for unaccounted-for water is not met, the Town shall submit a supplemental study focusing on steps to be taken to address problematic areas cited in the water audit².*

It should be noted that North Attleboro's draft calculation of unaccounted-for water for 2005 was 9.5%.

CRITERION #4: A comprehensive forestry management program which balances water yields, wildlife habitat, and natural beauty on watershed lands presently serving the receiving area and under control of the proponent has been implemented. *This does not apply to this situation. North Attleborough's sources are ground water sources. This Criterion refers to surface water sources.*

CRITERION #5: Reasonable instream flow in the river from which the water is transferred is maintained. *Reservoirs located in Cumberland, Rhode Island are located at the headwaters of Abbott Run. These reservoirs include Diamond Hill, Arnold Mills, Rawson Pond, and Howard Pond. The reservoirs are operated by the Pawtucket Water Supply Board (PWSB), which releases water into Abbott Run and withdraws the water downstream of North Attleborough at the PWSB water treatment plant adjacent to Happy Hollow Pond.*

The US Geological Survey (USGS) reported average day demands for the Pawtucket Water Supply Board of 12.0 million gallons per day (MGD) for the period of 1995 to 1999 in its Water Resources Investigations Report 03-4190 (Barlow, 2003). The safe yield for the Pawtucket reservoir system was reported as 16 MGD in the same publication. The town of Cumberland does not use the reservoir system for its public water supply, but rather uses wells in a different subbasin.

The PWSB provided withdrawal data to WRC staff to facilitate its review of the North Attleborough Hillman Well interbasin transfer. Monthly withdrawal data were supplied for the years 2000 through 2003. These withdrawals were from Abbott Run. It is

² North Attleborough was recently awarded a Water Loss Prevention Grant through MassDEP to conduct a water audit, develop a water conservation plan, and purchase and install 100 remote read meter adapters for service meters.

assumed that flows in Abbott Run past the Hillman Well were at least equivalent to the rates that were withdrawn downstream by PWSB. Based on this, it is estimated that on a monthly basis the river flows, at a minimum, ranged from 7.7 to 14.6 MGD. Converted to cubic feet per second (cfs), the flows would be equivalent to 12 to 22 cfs. The drainage area to the Hillman Well is 23.6 square miles. Thus, the flows passing the well site are estimated to range from at least 0.50 to 0.95 cfs per square mile (cfs/m) of drainage area. These estimated flow values do not include water that would have flowed past the PWSB intake.

The USGS installed and operated a temporary stream gage (#01113760) on Abbott Run from December 10, 2003 through September 30, 2004. The gage was located near the bottom of the Abbott Run subbasin, downstream of the Robin Hollow Pond but upstream of Happy Hollow Pond and the Pawtucket Water Treatment Plant intake. Flows measured during this period ranged from 12 to 333 cfs, with an average of 52 cfs and a median of 36 cfs. The drainage area to this gage was 26.90 square miles. On a cfs/m basis, the flows ranged from 0.45 cfs/m to 12.38 cfs/m. These flows occurred even with the Hillman Well in operation.

To illustrate the flow conditions near the Hillman Well, the data from the temporary USGS gage was scaled to the size of the Hillman Well drainage area (23.6 square miles / 26.9 square miles). The monthly withdrawals made from the Hillman Well during the gage period were added back into the flow, to simulate the flows that would have occurred in absence of the Hillman Well withdrawals. Flows at the Hillman Well site were simulated to range from 11 cfs to 293 cfs with an average of 46 cfs and a median of 32 cfs. The Hillman Well safe yield of 1.0 MGD (1.55 cfs) was then subtracted from the flow for each day to evaluate the impacts of the maximum withdrawal rates on the estimated streamflow. It was therefore estimated that the Hillman Well safe yield (1 MGD) withdrawal would have represented between 0.53% and 14% of the river flows at the well site, with an average of 4.36% for the gaged period of December 2003 to September 2004. Flows at the well site, even with the reduction for maximum well withdrawal, would have ranged between 0.41 cfs/m and up to 12.33 cfs/m. Figure 2 depicts the hydrograph from this period with the Abbott Run simulated flow and the reduced flow superimposed. The flows are nearly indistinguishable. Figure 3 shows the same data with only the lower flows between May 1 and September 30, to illustrate the summer flow reductions. During the summer months, the flows generally remained near or above 1 cfs/m throughout the monitoring period. These flows are considered adequate for instream flow needs in Abbott Run, and the impacts of the well withdrawals acceptably minor.

The Town submitted a draft plan to monitor streamflow of Abbott Run adjacent to the Hillman Well, in accordance with the ACO. Because releases from upstream surface water reservoirs in Rhode Island operated by the Pawtucket Water Supply Board likely contribute significantly to streamflow in Abbott Run, a monitoring program is appropriate to verify adequate instream flow conditions near the Hillman Well and provide data to allow a more accurate and detailed assessment of the potential impacts to instream flow caused by the Hillman Well. Once the monitoring plan has been approved by MassDEP and the WRC, all of the monitoring requirements contained in the plan will be incorporated into the Water Management Act Permit and will be made enforceable thereunder.

Because streamflow in Abbott Run is augmented and controlled by the Pawtucket Water Supply Board, and the Hillman Well relies in part on Abbott Run as a recharge source, the WRC recommends that North Attleborough initiate communication to attempt to develop a mechanism whereby Pawtucket will notify North Attleborough before the Board discontinues use of the reservoirs upstream of the Hillman Well or otherwise alters its practices in a way that would impact North Attleborough's use of the Hillman Well.

Impacts on other streamflow dependant resources

Although not addressed in the ACO or WMA Permit, the following has been determined: The December 11, 1989 Blackstone River Basin Plan indicated that the Blackstone River contains some resident warm-water fisheries including bass, red-fin pickerel, and sunfish. The plan does not depict Abbott Run as a cold-water fishery resource but indicates that some tributaries are stocked with trout. The plan also indicated that no anadromous or catadromous fisheries existed in the Blackstone River in Massachusetts. The Hillman Well does not appear to influence Abbott Run flows significantly to have an impact on fisheries.

A deciduous wooded swamp is found along Abbott Run adjacent to the Hillman Well. The impact of the Hillman Well does not appear to significantly impact wetland habitats; specifically, the releases from the Cumberland reservoirs appear to maintain artificially high flows in Abbott Run throughout the summer months. Although the Hillman Well may have the potential to dewater the area wetlands under normal conditions, this appears to be mitigated by the upstream releases.

Use of the Hillman Well does not appear to impact the water quality, recreational uses or aesthetic values of Abbott Run, as the well withdrawals appear to represent a very low proportion of the total flow in the river. No areas of critical environmental concern (ACEC) appear on MassGIS near or downstream of the Hillman Well in Massachusetts. Article 97 land is not present in the vicinity of the Hillman Well.

The Hillman Well has been present and pumping since about 1987. Other streamflow dependant uses have likely adapted to the presence of the well. Other water supply withdrawals exist within Abbott Run, including those made by PWSB and the Adamsdale Well operated by the Town of North Attleborough. The Hillman Well is expected to have a minor impact on the PWSB operations by inducing river flow from Abbott Run; however, representatives of PWSB were made aware of this interbasin transfer and the opportunities to comment and did not choose to do so. PWSB has more influence on North Attleborough's Hillman Well operations than North Attleborough has on the PWSB operations. The PWSB operations have a much stronger influence on Abbott Run than North Attleborough's withdrawals from the Hillman Well. The Town is expected to manage its withdrawals from the Hillman Well so as to minimize impacts and optimize operations with the Adamsdale Well.

CRITERION #6: The results of a pump test have been used to indicate the potential impacts of this project on other environmental resources and adjacent wells.

A pumping test was conducted for this well in 1987. The test is documented in the 1987 pumping test report (Whitman and Howard). The report acknowledges that up to 90 percent of the well's recharge is derived from Abbott Run.

CRITERION #7: Communities have adopted or are actively engaged in developing a local water resources management plan.

North Attleborough has met this Criterion. In addition, the town is in the process of developing a Comprehensive Wastewater Management Plan.

CRITERION #8: The Commission shall consider the impacts of all past, authorized or proposed transfers in the donor basin.

North Attleborough operates a registered well known as the Adamsdale Well near the Hillman Well. The Adamsdale Well was registered with the Massachusetts Water Management Act for an average daily volume of 0.43 MGD. The Pawtucket (RI) Water Supply Board operates upstream surface water reservoirs in Rhode Island and provides releases throughout the year which likely contribute significantly to streamflow in Abbott Run, despite the ground water withdrawals. The reservoir releases most likely are the strongest influences on Abbott Run streamflow, and the Town of North Attleborough has no jurisdiction over these releases and subsequent flows.

Because streamflow in Abbott Run is augmented and controlled by the Pawtucket Water Supply Board, the WRC recommends that North Attleborough initiate communication to attempt to develop a mechanism whereby Pawtucket will notify North Attleborough before the Board discontinues use of the reservoirs upstream of the Hillman Well or otherwise alters its practices in a way that would impact North Attleborough's use of the Hillman Well.

Staff Recommendation

The ITA requirements for use of this well have been incorporated into the ACO and WMA Permit. In order to bring the Hillman Well into compliance with the Interbasin Transfer Act, the WRC approved the North Attleborough Hillman Well with the following conditions.

1. North Attleborough must commit in writing to abide by the following conditions of the Water Resources Commission for operation of the Hillman Well.
2. North Attleborough must abide by the ACO and WMA Permit for the Hillman Well.
3. If in the future, the Pawtucket Water Supply Board alters use of its upstream reservoirs resulting in lower flows in the Abbott Run River, the WRC and the Town will work together with MassDEP, to prevent environmental impacts from being caused by use of the Hillman Well.
4. North Attleborough's residential water use is currently above 65 gallons per capita per day. Therefore, the Town must implement a comprehensive residential conservation program (as required by Special Condition 6.2 of the draft Water Management Act Permit) that seeks to reduce residential water use through a retrofit, rebate or other similarly effective program for encouraging

installation of household water saving devices, such as faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use. The Town must provide a plan for this program to the WRC for approval. WRC Staff will work with the Town and DEP through the WMA process to determine the deadline for submittal of this plan.

5. North Attleborough's draft calculation of unaccounted-for water for 2005 was 9.5%. The Town must continue to implement programs to reduce or maintain the level of unaccounted-for water.
6. North Attleborough must provide the MassDEP Annual Statistical Reports to the WRC for the first five (5) years after the Interbasin Transfer approval for the Hillman Well to determine if the programs in place are successful in reducing residential water use and maintaining low levels of unaccounted-for water.
7. North Attleborough must provide the report on results of streamflow monitoring in Abbott Run to WRC Staff to verify that withdrawals from the Hillman Well do not cause significant impacts to instream flow conditions. As required by the ACO, the final summary monitoring report will be provided to WRC Staff no later than July 31, 2009. Annual reports will be provided in the interim. In the event that results of the monitoring program do not support the conclusions of this WRC Decision, WRC Staff will work with the Town and MassDEP to develop a management plan for the Hillman Well to protect streamflow.

Figure 2. Abbott Run Streamflow simulated for Hillman Well Site showing potential flow reductions from 1 MGD additional well withdrawal. Flows appear nearly identical.

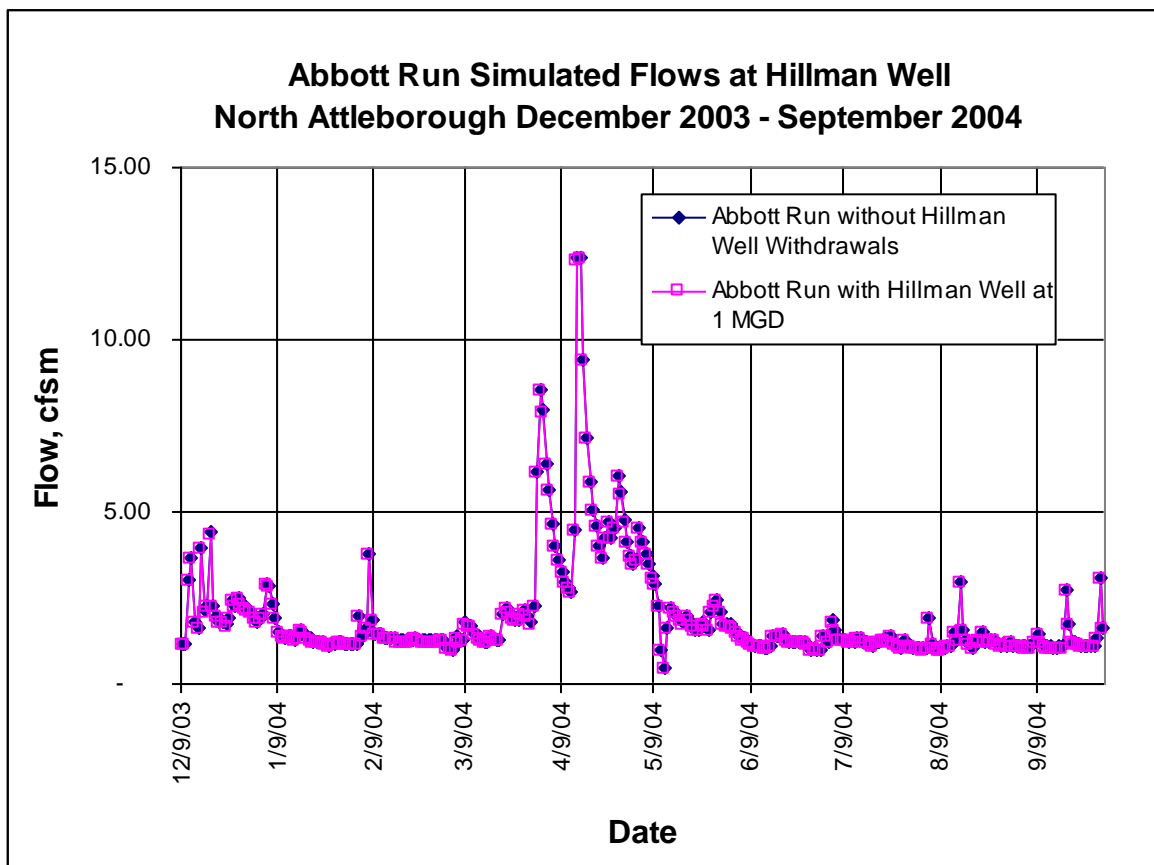
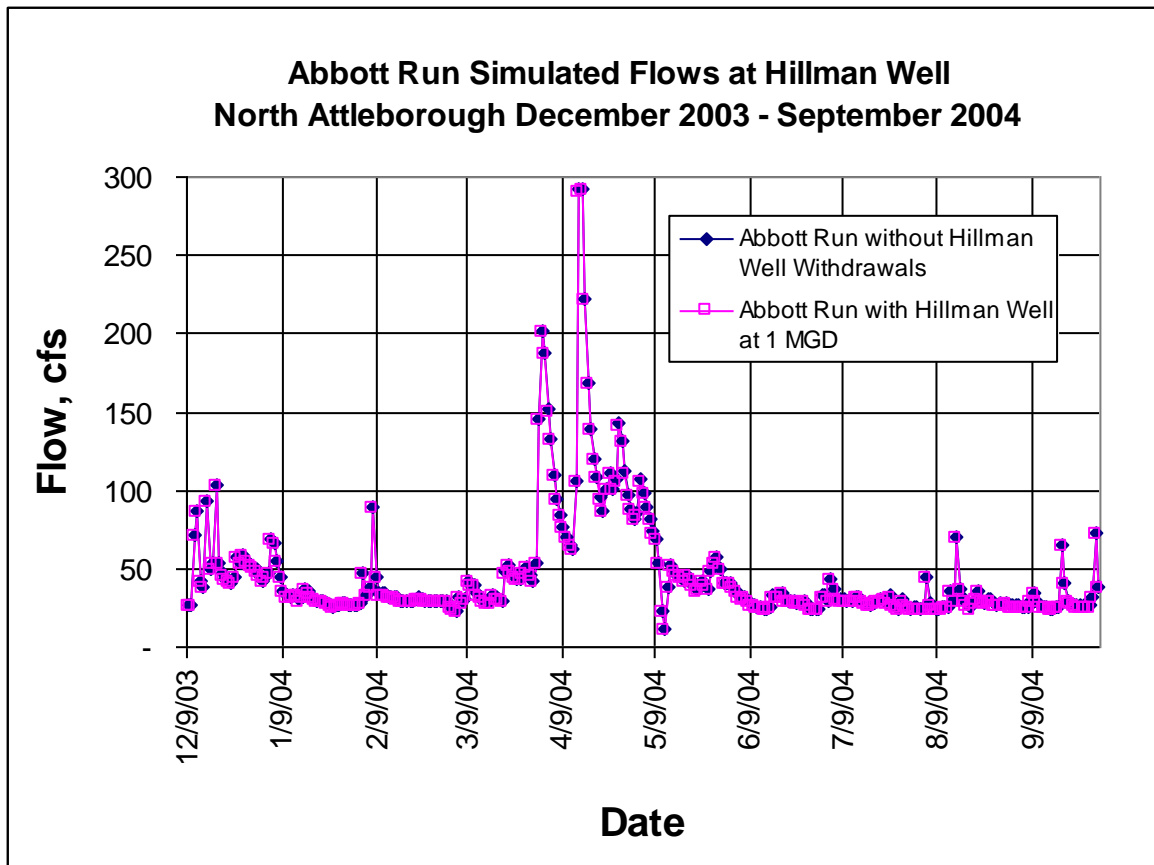


Figure 3. Simulated Abbott Run Flows at Hillman Well Site with flow reductions of up to 1 MGD, May through September 2004. Flows generally remain around 1 cfsm.

