

**WATER CONSERVATION PLAN
TOWN OF JAFFREY WATER SYSTEM
Community Water System #1221010
JAFFREY, NEW HAMPSHIRE**

APRIL 2008

INTRODUCTION

On behalf of the Town of Jaffrey (Town), ENSR Corporation (ENSR) is submitting this Water Conservation Plan to the New Hampshire Department of Environmental Services (NHDES). ENSR and the Town have prepared this Plan according to the NHDES Water Conservation Rules, specifically Env-Ws 390.05, Requirements for Existing Large Community Water Systems. This Conservation Plan documents ongoing conservation efforts by the Town Department of Public Works and also meets the requirement that a Conservation Plan be prepared and submitted in conjunction with the development of a new groundwater source for a large community water system.

The Town is in the process of seeking permits for a new community well, the Squantum Road Well (SRW), located off Squantum Road in southeastern Jaffrey. The SRW is located on the former Virginia Pond Trust property consisting of Jaffrey Tax Map 242, Lot 1 and Rindge Tax Map 11, Lot 28, hereinafter known as the "Site". The Site was purchased by the Town from the Virginia Pond Trust in July 2007. The Site is located southwest of the intersection of Squantum Road and Sherwin Hill Road (Figure 1).

ENSR and Jaffrey are also submitting a Preliminary Report for the SRW to the NHDES. The Preliminary Report constitutes an application for a Large Groundwater Withdrawal Permit under Env-Ws 388 and RSA 485-C:21. Since the anticipated Permitted Production Volume (Env-Dw 302.16) of 250 gpm exceeds 144,000 gpd, the withdrawal will constitute a "Major Withdrawal" per Env-Ws 388.03. The Preliminary Report also constitutes the preliminary report required under Env-Dw 302, "Large Production Wells for Community Water Systems." As required by Env-Ws 388.05, a Large Water Withdrawal Water Conservation Questionnaire has been completed and is attached to the Preliminary Report and included as Appendix A of this Conservation Plan.

WATER SYSTEM DESCRIPTION

The Jaffrey Community Water System (EPA # 1221010) serves portions of the Towns of Jaffrey and Rindge, New Hampshire and has approximately 1530 residential, commercial and industrial customer hookups. Storage facilities with capacity of 1.25 million gallons are located near the former surface water supplies, Bullet Pond, in Rindge and Poole Reservoir in Jaffrey. An existing water main runs along Squantum Road, which forms the northern boundary of the Virginia Pond Trust site.

The Jaffrey water system is currently served by two existing and one new gravel-packed production wells:

- The Turnpike Well
- The Turnpike Redundant Well (new; not yet in service)
- The Contoocook Well

The Turnpike wells are located southwest of the Jaffrey Water Works building on the south side of Turnpike Road (Route 124), about 10,000 feet northwest of the Virginia Pond Trust Site. The original Turnpike Well was drilled in 1966 as a supplemental supply to Bullet Pond. The Turnpike Redundant Well is located a few feet to the west of the original Turnpike Well and was drilled in 2006. The Turnpike Well is capable of pumping about 325 gpm or 468,000 gpd (48-hour pumping test by Dufresne-Henry (1996)). Between March 2002 and October 2003, the average water usage for the Turnpike Well was about 190,000 gpd, and the maximum daily withdrawal was about 350,000 gpd. Currently, the Town estimates that the Turnpike Well produces approximately 325 gpm for about 10 hours per day, when it is used (operator discretion). In 2006, the average total daily water use from both the Turnpike and Contoocook Wells was between 300,000 and 400,000 gpd.

The Turnpike Redundant Well has been installed but has not been fully tested and is not yet approved to be placed on-line, as of April 2008. It is located adjacent to the Turnpike Well, just outside the pump house and is expected to have similar characteristics.

The Contoocook Well (a. k. a. Contoocook Lake Well) was drilled in 1977 in a gravel pit south of Squantum Brook and east of Contoocook Lake. The Contoocook Well is located about 3300 feet west and downgradient of the SRW (Figure 1). Both are in the Squantum Brook watershed. The Contoocook Well has a capacity of 0.5 million gallons per day or more. However, the well is pumped at a lower rate due to the cyanide contamination to the north. A number of studies have been performed regarding the cyanide issue (see Section 5.1). Between March 2002 and October 2003, the Contoocook Well produced an average of about 160,000 gpd, with a maximum daily withdrawal of about 325,000 gallons. Currently, the Town estimates that the well pumps at a rate of approximately 300 gpm for about 12 hours per day (about 216,000 gpd). Evaluation of the pumping rate continues with the ultimate goal of utilizing this well to its fullest capacity.

Table 1 provides a summary of information regarding existing wells.

Table 1: Jaffrey Water System Existing Well Information

Well	Capacity	Average Daily Use (3/02 – 10/03)	Maximum Daily Use (3/02 – 10/03)	Notes
Turnpike Well	325 gpm (468,000 gpd)	190,000 – 195,000 gpd	350,000 gpd	Current use: about 325, 10/hr. day
Turnpike Redundant Well				Drilled 2006; not yet in service
Contoocook Well	500,000 gpd (limited by cyanide north of well)	160,000 – 180,000 gpd	325,000 gpd	Current use: about 300 gpm, 12 hr./day (hope to increase)

WATER METERS

Source water meters are currently in place at the Turnpike and Contoocook Wells, and the new SRW will be metered as well. Water user meters are currently in place at all water users, including cemeteries, of the Jaffrey Water Department except the Jaffrey Fire Department. As of March 2008, a consultant has been contacted to make recommendations regarding the metering of this location. It is expected that within 18 months (but not longer than 3 years) of SRW approval by NHDES, all existing water users and uses except firefighting and occasional flushing and testing will be metered. The Town requires all new service connections to be metered.

Per Env-Ws 390.05 (d), "In selecting, installing, and maintaining water meters, the water system shall comply with procedures and protocols described in 'Manual of Water Supply Practices, water Meters – Selection, Installation, Testing, and Maintenance,' document identification number AWWA M6, American Water Works Association, 1999." Source water meters will be read at least once daily days, and user water meters will be read at least once every 30 days. The SCADA system records readings from the source meters automatically and continuously. The Jaffrey Water Department reads the meters manually on a daily basis. The Town of Jaffrey commences with monthly utility billing in May 2008.

WATER AUDIT AND LEAK DETECTION

In addition to the water metering program described above, the Jaffrey Department of Public Works will estimate all unmetered water use, such as firefighting, hydrant flushing, testing, training, etc.

The Jaffrey Water Department will maintain a database, spreadsheet, or similar mechanism that compares metered water use at the sources (wells) and the combined metered water use by the users. At least once per year the Town will compare the total water pumped from the wells with the total water as recorded by the user water meters, using the spreadsheet or similar mechanism. After considering instances of estimated unmetered water use as discussed in the previous paragraph, the audit will include an estimate of additional water that is "unaccounted-for water", as defined in Env-Ws 390.03 (o). "Unaccounted-for water means water for which a specific use cannot be determined due to accounting procedure errors, data processing errors, meter inaccuracies, authorized water use that does not pass through meters, leaks, seepage, overflow, evaporation, theft, unauthorized water use, or malfunctioning distribution controls. The yearly water audits will be conducted "using protocols and procedures described in 'Manual of Water Supply Practices, Water Audits and Leak Detection' document identification number AWWA M36, American Water Works Association, 1999.

If a water audit calculates unaccounted-for water at greater than 15% of the water introduced to the system (metered source water pumped from the wells), the Town will prepare and submit a Response Plan to NHDES within 60 days, per Env-Ws 390.05 (j) and (k). The Response Plan will identify steps, in addition to repairing leaks, that the Town will take within 2 years, to reduce the amount of "unaccounted-for water".

In the past, leaks and water mains in need of replacement have been evident, and a complete leak detection survey has not been performed recently. Jaffrey has focused its

efforts on leak repair and water main replacement in the last few years. This aggressive program has resulted in reductions in the overall amount of water pumped from the wells. It is anticipated that this water main replacement program will continue within available funding constraints.

Within one year of the approval of SRW as a new community well, the Town will conduct a full leak detection program in accordance with AWWA M36. The Town will repair any leaks discovered, within 60 days of discovery, unless a waiver is obtained, per Env-Ws 390.09.

PRESSURE REDUCTION

The Town of Jaffrey water system does not use pressure reducing valves because they might inhibit firefighting capabilities. Jaffrey requests that pressure reduction should not be required for the Jaffrey Water System based on this "health and safety consideration". Env-Ws 390.05 (n) (3) appears to imply that health and safety considerations could negate the requirement for pressure reduction.

Jaffrey is currently updating its water system computer model in order to obtain a more accurate and comprehensive understanding of water pressures within its distribution system. This should allow the Town to determine if it is necessary to reduce pressures at any locations, in order to keep pressure below 100 psi. The updated model should allow an evaluation of the necessity and feasibility of monitoring pressure in certain locations and possibly reducing pressure. Currently, a booster station is used to increase pressure in the Jaffrey Center area by filling the Poole reservoir storage tank.

RATE STRUCTURE

Currently, the Town of Jaffrey bills for water usage at a flat rate with a minimum billing of 1000 gallons, based on billing every four (4) months. In May 2008, the Town is to commence monthly utility billing. Additionally, in 2008, the Town has funded and anticipates completing a sewer and water rate study. Jaffrey's water and sewer rates are among the highest in the state, and with recent improvements in both the water and sewer departments, rates are expected to significantly increase. This rate study will investigate current revenue and expenditures, debt service payments, and operation and maintenance costs to develop alternative water and wastewater rate structures (e.g. conservation rates, lifeline rates, etc.) All options will be considered in the rate study, and a decision regarding rates will be made by the end of 2008.

Currently, Jaffrey charges a minimum of \$10.50 for the first 1000 gallons used in a month. Beyond 1000 gallons, Jaffrey uses a flat rate of \$.80 per 100 gallons used.

EDUCATIONAL OUTREACH INITIATIVE

- Bill stuffers – We could put standard DES Water Conservation Fact Sheets and handouts (Appendix B) in the mail with water customers periodically, say once per year. Additional stuffers could include educational information available through the USEPA and AWWA.
- Separate Water Conservation mailings to water customers in conjunction with annual consumer confidence report.

PUBLIC NOTIFICATION

As required by Env-Ws 390.11, ENSR and the Town will send, via certified mail, a copy of this Conservation Plan to:

- The Town of Jaffrey,
- The Town of Rindge, and
- Southwest Regional Planning Commission, Keene, New Hampshire.

ENSR will provide copies of the certified mail receipts and the returned confirmation of delivery cards to NHDES as soon as they are available.

APPENDIX A

**LARGE GROUNDWATER WITHDRAWAL WATER CONSERVATION
QUESTIONNAIRE**



New Hampshire Department of Environmental Services
 Large Groundwater Withdrawal – Major Designation
 New Source Development Permit Application Instructions

Large Groundwater Withdrawal Water Conservation Questionnaire

Applicant: Town of Jaffrey, Department of Public Works
 Address: 23 Knight Street, Jaffrey, NH 03542
 Phone: 603-532-6521
 Site Name and Location: New well: Squantum Road Well, Virginia Pond Trust site, SW of intersection of Squantum Rd. and Sherwin Hill Road

Please attach a USGS topographic map to this form identifying and locating the project site. See Figure 1

**Section A:
 Description of Need and Water Conservation Baseline Data**

Note: In lieu of completing Sections A and B below, the Applicant may complete Conservation Management Plan in accordance with Env-W's 388.05 using a format developed by the Applicant.

1. Describe the reason for this new Large Groundwater Withdrawal.
To supply needed additional water for the existing Town of Jaffrey water system (EPA ID #1221010). In Letter to the Town dated November 24, 2004 the NHDES stated both that redundant wells are needed for each of the existing wells and that a new source of supply is needed. NHDES also advocates both mechanical and aquifer redundancy for Jaffrey.

2. Describe your existing sources of water.
Turnpike Well – gravel packed well S of Rte. 124
Turnpike Redundant Well – gravel packed well adjacent to Turnpike Well (not yet in service)
Contoocook Lake Well – gravel packed well S of Squantum Brook, west of Contoocook Lake and about 3000 feet west of Temple Pond Well

3. Anticipated Demand

What is the maximum 24-hour average withdrawal rate in million gallons per day (mgd) you are seeking for the new proposed source? 0.36 mgd

	Existing	Proposed
4a. What is/will be the average daily demand (mgd) of your system?	<u>313,000 gpd (2006)</u>	<u>(1)</u>
4b. What is/will be the peak demand (mgd) of your system?	<u>633,000 gpd (4/06)</u>	<u>(1)</u>
4c. What is/will be the pumping capacity (mgd) of your system?	<u>(2)</u>	<u>(3)</u>
4d. Can you meet your average daily demand with your biggest source producer offline?	<u>Yes X</u>	<u>No</u>

- (1) Tighe & Bond is currently conducting a water audit and demand projection study. Also, see Item 5 (next page)
- (2) (300 gpm Contoocook Well + 325 gpm Turnpike Well = 625 gpm = 900,000 gpd)
- (3) (900,000 gpd existing + 360,000 Squantum Road Well = 1,260,000 gpd)



New Hampshire Department of Environmental Services
Large Groundwater Withdrawal – Major Designation
New Source Development Permit Application Instructions

5. What is your typical pumping schedule? Please explain the fluctuation in the pumping schedule due to changes in demand (i.e., factors that control water demand).
Currently, the Turnpike Well and Contoocook Lake Wells can alternate with each well pumping 10-12 hours per day. Contoocook is now the lead well and is capable of supplying average daily demand, thanks to allowed increases in Contoocook pumping and to conservation.
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6. Describe the alternative sources of water available or potentially available for your use.
Temple Pond Well (new production well for which Large Groundwater Withdrawal Permit is sought).
Town has explored for new water sources for many years. Town investigated an existing bedrock well near Jaffrey Center and remains an option for future supply. Connection with Peterborough would be expensive and only viable if Peterborough's South Well is contamination-free, operable and water is available to provide Jaffrey. The Barking Dog Water Co. has offered to sell water (recently permitted) to Jaffrey from its well near Mud Pond, on the Jaffrey-Sharon Town line. The cost appears high, the supply would not be under the Town's control, and there may be water quality issues. Returning to Bullet Pond, a surface supply, would require constructing filtration treatment, which is not cost effective for a source that does not meet all the Town's needs.
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7. Describe your ability to store water to reduce peak withdrawals.
2 storage tanks totaling 1.25 million gallons, about 4 days supply, based on 2006 average daily use of about 313,000 gallons.
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8. What controls the consumption of water at your facility? Relate the volume of water needed at your facility to a quantified end point use (i.e., number and type of units produced, number of and type of institutions served, etc.)
The customers control water consumption. Other water consumption events include fire fighting and flushing. The two biggest commercial water users in 2007 were Millipore and a commercial Laundromat. Millipore has its own bedrock wells and is also connected to Town water for domestic and fire protection use. Their usage was exceptional in 2007 due to problems with their wells and needed to rely upon the Town to supply water for both process and consumptive use. Typically, Millipore uses Town water only for drinking and employee washrooms. Millipore demand up to 100,000 gpd 5d/week, based on wastewater flow. School District and nursing home also large water users.
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New Hampshire Department of Environmental Services
Large Groundwater Withdrawal – Major Designation
New Source Development Permit Application Instructions

Section B: Water Conservation Measures

General – All Applicants Must Complete Items 1-4 in this Section

(Public water supply applicants must also complete Items 4 – 12 in this section)

(All non-public systems must also complete Items 13 – 15 in this section)

1. What measures are you implementing to conserve water?

Water Rates: Rates based on metered use create a financial incentive for customers to conserve water.

Water Meters: Every service is metered, as are the sources. Currently, customer meters are read every 4 months. Commencing in May 2008, water meters will be read monthly with billing on a monthly schedule. On the bill will be a histogram that will provide the consumers with a graphical depiction of water usage for which spikes for a leaks, etc will be readily apparent. Monthly billing will also allow closer monitoring of customer water consumption and alert owners of leaks much quicker than currently available.

Water Main Replacement: Jaffrey has continues with its water main replacement program. Most recently, the Town replaced water mains on River Street and in Jaffrey Center. This program has reduced the amount of water lost to leakage and breaks.

PRV's: Due to constraints imposed by firefighting needs, there are no pressure reducing valves in the Jaffrey water system.

2. What type of water conservation measures are utilized in your industry, and are these measures feasible at your facility?

All of the above, plus leak detection surveys in some settings. SCADA systems can allow real-time monitoring of water use and system operation. Estimating unaccounted-for-water by comparing source meters and customer meters.

3. Is there a potential at your facility to reduce the quantities of water withdrawn through reuse, recycling and reduction of wastewater?

Wastewater in Jaffrey is also metered, for those on the Town wastewater system (nearly all those who are on the water system). This creates an incentive to reduce wastewater, and therefore water. Reuse and recycling apply to industrial users, but Millipore and DD Bean usually do not use Town water for industrial purposes, except for water supply emergencies. (Millipore and DD Bean use Town water for domestic purposes.)

Public Water Supply Systems –

All Public Water Supply Applicants Must Complete this Section

(Items 4 – 12)

4. What is your percentage of unaccounted-for water?

20-30%

Unaccounted-for water means unmetered use including system flushing and maintenance, fire-fighting, leakage, etc.

- 5a. Specify the dates of your last three system-wide leak detection surveys.

July 29, 1997; others unknown



New Hampshire Department of Environmental Services
Large Groundwater Withdrawal – Major Designation
New Source Development Permit Application Instructions

5b. Briefly describe your system leak detection policy or approach.

If a leak is suspected due to changes in system pressure or other factors, the Water Department goes to the affected area and looks for the problem. The approach is reactive. However the Town's water main replacement program has also helped.

6. Do you require that users of your water system utilize low-flow plumbing fixtures and/or flow restricting devices? If so, please explain.
Current plumbing/building code requires the installation of water saving fixtures. This includes new construction and renovations requiring such permits. Jaffrey's water and sewer rates are such an incentive exists to install such fixtures.

7. Do(es) the community/communities which your system serves have a water use restriction bylaw or other control mechanism to restrict water use? If so, please explain.

(see Water Ordinance found in Appendix A2)

8. For your industrial customers, do you encourage industrial reuse and recycling? If so, please explain below.

No (Millipore & DD Bean have own wells for industrial purposes); existing high water rates constitute an incentive for industrial reuse and recycling for other commercial customers. Millipore is proactive in incorporating reuse/recycling at their industrial complex

9. Is your water rate structure decreasing, flat or increasing? Please describe your water rate structure.

Flat – (considering Life Line rates for low income customers)

10. Do you, or some other third party entity conduct or plan to conduct residential, commercial, and industrial water audits? If so, please describe below.

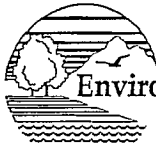
Tighe & Bond is currently doing water audit of the town's water system. A consultant is also to be contracted with this fiscal year to complete water and sewer rate study

11. Describe your efforts (or the efforts of the community in which you provide water to) to educate the public about water conservation.

Not doing at present – Plan:

- Bill stuffers (NHDES Fact Sheets on water conservation)
- Provide Fact Sheets to local public schools
- Submit press release on water conservation to local papers

12. Describe any other water use efficiency programs or policies you practice or promote.



NEW HAMPSHIRE
DEPARTMENT OF
**Environmental
Services**

**New Hampshire Department of Environmental Services
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1. water main replacement program is key.
 2. meter replacement and conversion to radio – read meters
 3. Water Resource Protection Committee will address wellhead and aquifer protection; also BMPs and conservation.
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Non-Public Systems –

**All Non-Public Water Supply Applicants Must Complete this Section
(Items 13 – 15)**

13. Please describe any of the conservation measures which are not essential to the product or service design such as floor washing methods in a beverage plant, swimming pool filling practices, irrigation practices, or leak and overflow management at a manufacturing facility.
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14. Please describe measures for reducing water use essential to product or service design, such as re-use, and loss reduction. Please also describe water management practices that are utilized to manage peak demands such as increasing storage.
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15. Please describe your experience with the cost effectiveness of conservation measures and a schedule for any new measures planned.
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APPENDIX B

WATER CONSERVATION EDUCATIONAL MATERIALS