The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

AMENDED
WATER CONSERVATION PLAN APPROVAL

February 20, 2014

Troy Cornock
Emerald Lake Village District
PO Box 2217
Hillsboro, NH 03244

Subject: Hillsborough, Emerald Lake Village District (PWSID: 1141020)
Water Conservation Plan

Dear Mr. Cornock:

On February 2, 2014, the Department of Environmental Services ("DES") Drinking Water and Groundwater Bureau received an amended Water Conservation Plan and a waiver request for Emerald Lake Village District (ELVD), located in Hillsborough New Hampshire. DES has determined that the plan complies with Env-Wq 2101, *Water Conservation* rules. The purpose of this letter is to approve the Amended Water Conservation Plan and waiver request signed on January 29, 2014.

ELVD requested a 5-year waiver to rules related to service metering, water accounting, billing, and rate structure. The waiver was requested with the commitment that ELVD would focus its current resources on leak detection – ongoing leakage has been documented as an ongoing significant issue across the system. ELVD has secured SRF funding to install zone meters with data loggers to assist with leak detection and continues to implement a water main replacement program.

DES approves the Amended Water Conservation Plan and the 5-year waiver request based on the following conditions:

1. Ongoing three year compliance reports shall continue to be submitted every three years from the date of the original Water Conservation Plan Approval, November 12, 2010. The next compliance report is due on **November 12, 2016.** Attached to the three year ongoing compliance report shall be:

    a. A leak log including the date the leak was discovered, the date of repair, the type of leak (ex. main, service, hydrant), and estimated size (gpm), and the nearest address.

b. The data and night flow analysis for occasions where leaks were suspected, including the date of the night flow analysis and the corresponding leak discovered and repaired as identified in the leak log.

2. By **January 1, 2015**, complete the following:

   a. Test and if necessary calibrate all source meters. Submit testing/calibration certificates to DES.

   b. Request residents refrain from using water between 2am and 5am for one night. Conduct a night flow analysis using zone meters and data loggers. If flows never reach 0 gpm, ask residents to look for leaks including running toilets and hoses. Conduct night flow analysis again a week later. If flows remain above 0 gpm, begin trying to pinpoint the leak through opening and closing valves if possible and acoustic leak detection. Repair all leaks discovered. Conduct another night flow analysis. The system will now be tight and the lowest flow will be the baseline flow to compare future analysis to. Submit to DES a leak log for 2014, night flow data and analysis, baseline flows, and the plan of action for if future flows are above baseline.

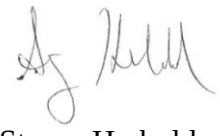
3. By **January 1, 2017**, provide an update to DES on plans to move forward with service metering.

4. Revisions to the Amended WCP shall not be implemented without further approval from DES.

A copy of the Amended WCP and the *Water Conservation Plan Ongoing Compliance Form* may be located by going to the DES website, www.des.nh.gov, clicking on the "A-Z List" in the top right corner of the page, and scrolling down to Water Conservation.

Please feel free to contact me with any questions at (603) 271-0659 or via e-mail at stacey.herbold@des.nh.gov .

Sincerely,



Stacey Herbold
Water Conservation Program
Drinking Water and Groundwater Bureau

ec: Amanda Cavaliere, Tate & Howard
Jenna Rzasa, Tate & Howard
Joe Damour, Primary Operator
Derek Bennett, NHDES *(LD)*
Dan Dudley, NHDES

Water Conservation Plan
Small Community Water System
December 2013

I. Introduction

A. Contact Information

1. **Name and location of system:** Emerald Lake Village District, Physical Address: 5 West Main Street, Hillsboro, NH 03244
   Mailing Address: PO Box 2217 Hillsboro NH 03244
2. **Owner of system and mailing address:** Same as above
3. **Name and mailing address of designer of the water conservation plan:** Jenna Rzasa, P.E., 10 Ferry Street, Suite 310, Concord, NH 03301; (Office) (603)715-2265.

B. System Overview

1. **Reason for new source:** Needed new source due to lack of supply. (Well #11)
2. **Number of connections existing and proposed for each of the following classes:**
   a) **Residential:** Existing – 530 service connections
   b) **Industrial/Commercial/Institutional:** None
   c) **Municipal:** None
3. **Description of any connections that currently receive or will receive more than 20,000 gpd:** None

C. Water Use Trends and Supporting Data/Population Trends

1. **Existing, if applicable, and anticipated seasonal fluctuation in water use and reason for fluctuation:** There are 530 customers within the ELVD system, 34 of which are seasonal in the summer for the lake and in the winter for skiing. The seasonal fluctuation in water use is negligible.
2. **Anticipated growth in population and seasonal fluctuations in population:** Marginal due to small lot sizes and current Town Code regulations associated with the construction of private sewer systems. (Town Code 229-12).
3. **Maximum day yield of existing sources based on 24-hour pumping:** 0.120 million gallons per day (9/4/12).
4. **Average daily water use:** Approximately 58,900 gallons (2012)
5. **Maximum daily water use:** Approximately 120,000 gallons (2012)
6. **Minimum hourly flows (if available):** Not Available

D. Source Meters

1. **Name designation of each water source:** Hummingbird Well, Meetinghouse Well, Patten Hill Well Nos. 6, 7, 8, 9, 11, and Mary Rowe Well.
2. **Meter make, model, size, flow range, and date of last calibration for each existing source meter:** Refer to Table No. 1 below.

Table No. 1
Source Meter Information
Emerald Lake Village District

Well ID	Size (inches)	Type	Manufacturer	Date of Installation
Hummingbird Well (Well 1)	1	multi-jet	Master Meter	11/4/2006
Meeting House Well (Well 4)	1	Mag-meter	Sensus	10/4/2013
Mary Rowe Well (Well 10)	1	multi-jet	Master Meter	6/26/2003
Patten Hill Well No. 6	1	multi-jet	Master Meter	7/14/2005
Patten Hill Well No. 7	1	multi-jet	Elster AMCO	6/18/2011
Patten Hill Well No. 8	1	multi-jet	Master Meter	2/24/2006
Patten Hill Well No. 9	1	multi-jet	Master Meter	6/15/05
Patten Hill Well No. 11	1	paddlewheel	Seametrics	6/12/2011

3. **Meter make, model, size, and flow range for each new water source (if known):** Refer to Table No. 1 above.
4. **Frequency that source meters will be tested/calibrated:** Source meters will be calibrated annually beginning in 2014.
5. **Frequency that source meters will be read (at least every 30 days):** Daily
6. All existing and proposed source meters shall be selected, installed, and maintained in compliance with "Manual of Water Supply Practices M6, Water Meters-Selection, Installation, Testing, and Maintenance," (AWWA 1999).

II. System Side Management

A. Metering and Water Accounting

1. Service Meters

a. How many un-metered connections exist? The District water customers are not currently metered.

b. Will separate irrigation meters be installed? Not Applicable

c. Statement that all service connections will be metered within 3 years for existing systems and prior to system startup for new landlord owned systems. The District is requesting a waiver on metering the water services within the District's water distribution system for 5 years from the date of approval of this submittal. The District is currently focusing on the installation of water mains within the distribution system to water transmission and reduce the number of water main breaks on some of the more problematic areas within the system as the majority of the system is comprised of plastic water mains and installing dataloggers in the system. .

d. Frequency that service meters will be read (at least every 90 days). Not applicable at this time. Meter reading frequency will be determined once the meters are installed.

e. Description of all methods that will be used to read service meters. Not applicable

f. Expected number of days needed to read all service meters. Not applicable

g. Proposed rate of meter testing and/or meter change out. Not applicable

h. Statement that service meters will be selected, installed, and maintained in accordance with "Manual of Water Supply Practices M6, Water Meters-Selection, Installation, Testing, and Maintenance," (American Water Works Association, 1999). The District is requesting a waiver on this requirement in accordance with response to 1c above. In the future, the service meters will be selected, installed

and maintained in accordance with AWWA's "Manual of Water Supply Practices M6, Water Meters – Selection, Installation, Testing and Maintenance".

2. Water Audit

   a. Most recent water audit, differentiating between apparent and real losses, and estimate of non-revenue water and the year it was estimated. Since the water system services are not currently metered, a water audit has not been conducted.

   b. Frequency that water audit will be conducted (at least annually). Statement that water audit will be calculated in accordance with "Manual of Water Supply Practices M36, Water Audits and Loss Control Programs" (American Water Works Association, 2009). Requesting a waiver for five years from approval of this submittal. Once service meters are installed, a water audit will be conducted annually in accordance with AWWA M36 Water Audits and Loss Control Programs.

   c. Statement that the water system shall prepare and submit a response plan to the department within 60 days if the percentage of non-revenue water exceeds 15 percent of the total water introduced to the water system. The response plan shall identify how the water system intends to reduce the percentage of non-revenue water to below 15 percent within two years. Requesting a waiver for 5 years from approval of this submittal.

3. Conservation Rate Structure and Billing

   a. Description of proposed rate structure and timeline for implementation (no later than 5 years from source water approval for existing systems and prior to system startup for landlord owned systems). If unknown, provide a statement that the water system will adopt a rate structure that complies with 2101.04 (o) and that DES will be notified of the new structure no later than the first billing cycle.
   A water rate study will be completed before changing the current rate structure, which is a flat rate per each connection. The proposed water rate structure will comply with 2101.04, and DES will be notified of the new structure upon approval from the Board of Water Commissioners.

   b. If irrigation meters are installed, will irrigation water be billed at a different rate?

   c. Will a seasonal rate structure be utilized in addition to the general rate structure?

   d. Proposed billing frequency (minimum is quarterly).

   e. Informative billing practices to be used (ex. water use in gallons / usage history).

B. Leak Detection

1. **Summary of findings for the most recent leak detection surveys including the following information:**
   a) **Year(s) conducted:** 2011
   b) **Number of leaks found:** 20 leaks were found, 6 of which were in water mains that have recently been replaced as part of the DWSRF Water Main Improvements project constructed in 2012/2013.
   c) **Estimated losses recovered:** Not Reported
   d) **Percent of system surveyed:** 100 percent
2. **Are pipe locations known? If not, include a statement that a pipe location survey will be conducted in order to perform leak detection:** Yes
3. **Breakdown of pipe material, age, and length:** The majority of system is composed of approximately 14 miles of water mains ranging in size from two to eight inches in diameter. Approximately 2.5 miles of 8-inch diameter ductile iron water main was recently installed from the water storage tank on Patten Hill Road, Pine Glen Road, Gould Pond Road, Emerald Drive, and Hummingbird Lane to improve water transmission throughout the system. The remainder of the system is comprised of plastic water mains.
4. **Availability of contact points and adequacy of spacing:** The technician "correlated" on direct contact points such as main line gate valves, fire hydrants, meter/curb valves, blow-offs, etc. Correlation distances of 500 to 700 feet were easily attainable. In areas where the distance was extreme between contact points, the technician used a ground-mic over the main approximately every six to ten feet. This method allowed for comprehensive coverage of the system, and all leak sounds were investigated and located.
5. **Is pipe material non-metallic? If yes, as leaks are difficult to acoustically detect in non-metallic systems, what additional measures will be taken to detect leaks?** Ground microphones are used to listen directly over the water main every six to ten feet.
6. **Will zone meters be installed to assist with leak detection identification and location?** Yes. An SRF funded project is proposed and includes the installation of approximately six leak loggers within the water distribution system. Work is anticipated to commence in 2014.
7. **Describe the leak detection method to be used:** Four dataloggers are anticipated to be installed in Spring 2014 within existing 5-foot diameter manholes located on Gould Pond Road, Emerald Drive, Spring Street, and Patten Hill Road. The dataloggers will record the flow through the water main at each of the four locations every 15 minutes, andthe data will be compiled and stored using a data management software compatible with the dataloggers. The data will be used to track demand and flow trends within the ELVD's water distribution system. Historical data will then be compared to existing data, and discrepancies will be monitored. Data will also be analyzed during low flow conditions; between 2am and 5am on a weekly basis to create a baseline, which will then be provided to NH DES. A sudden change in flow could indicate a leak within the system. Leak detection equipment, such as correlators, can then be used to pinpoint the location. Once a leak is identified, it will be immediately repaired, if possible, or within 60 days. The date the leak was

detected and repaired, location of the leak, leak description, estimated flow rate of leak, estimated water lost, etc. will be recorded.

8. The leak detections will be conducted in accordance with "Manual of Water Supply Practices M36, Water Audits, and Loss Control Programs" (American Water Works Association, 2009).
9. All leaks discovered will be repaired within 60 days unless a waiver is obtained in accordance with Env-Wq 2101.09.

C. Pressure Management

1. **Existing minimum distribution pressure (anticipated pressure for new landlord owned systems):** 35 psi
2. **Existing maximum distribution pressure (anticipated for new landlord owned systems):** 80 psi
3. **How is pressure currently monitored and how will pressure continue to be monitored?** N/A
4. **What method will be used to reduce pressures in zones found to be in excess of 80 psi?** Individual PRV's can be installed for houses located within a zone experiencing pressures greater than 80 psi upon request by the homeowner.
5. **What will be the timeframe for reduction (at least within 1 year of source water approval)?** N/A
6. **If pressure reduction is not technically feasible, please explain why and describe what additional steps the water system will take to monitor and repair leakage within these zones?** Pressure reduction is not feasible for the ELVD system is a one pressure zone system with varying topography.

D. Intentional Water Loss

1. **Are there "bleeders" used within the system at dead ends to improve water quality or prevent freeze-up? If yes, what looping opportunities exist?** Yes, but it has been 10 years since used.
2. **Are storage tanks intentionally allowed to overflow because of system hydraulics or water quality concerns? If yes, what opportunities exist for the installation of altitude valves or tank mixing systems?** No

III. Consumption Side Management

A. Educational Outreach Initiative

1. **Informational materials that will be used:** Water efficiency materials will be issued twice a year to customers. Materials will come from the DES Water Conservation Website or the EPA WaterSense Website. Water Conservation tips are posted on ELVD's website and at the water treatment facility. These tips are also published in the ELVD's Annual Report and Annual Water Quality Report.
2. **Other outreach plans?** A Water Conservation Booth will be set up at the annual meeting and is open to the public.

IV. Zoning Ordinance / Bylaws

A. Are connections to the water system subject to any of the following water efficiency ordinances or bylaws? There are no existing water efficiency ordinances or bylaws. The town regulates zoning. The District has also formed a Planning Board that will contribute to future water efficiency ordinances and bylaws.

1. **Indoor**
   a) **Water efficient fixtures beyond the existing plumbing code.**
2. **Landscaping**
   a) **Minimum topsoil requirements.**
   b) **Use of native/drought tolerant plants and grasses.**
   c) **Area and slope restrictions for turf grass.**
3. **Irrigation System**
   a) **Prohibition or restrictions to irrigation systems.**
   b) **Require soil moisture sensors.**
   c) **Require rain sensors.**
4. **Other water efficiency ordinances**

V. Water Use Restrictions

A. What is the water system's plan relative to implementing water restrictions? In the past, water restrictions have been implemented during the summer months and during dry weather. The water ban typically includes limiting the days during the week that washing cars and watering gardens and lawns is permitted. All hoses must have a trigger nozzle that will shut off automatically when not in use. There is a continuous water ban on filling pools or unattended watering of lawns and gardens. The ELVD will implement demand management practices and consider implementing restrictions with triggers (voluntary use restrictions, odd/even day use, and mandatory restrictions) based on weather conditions, withdrawals, and pumping rates of the sources.

B. Who is responsible for enforcing restrictions? The ELVD and Commissioners are responsible for enforcement.

VI. Reporting and Implementation

A. Include the following statements:

1. The water system will submit a form supplied by DES once every three years documenting how compliance with the requirements of Env-Wq 2101 is being achieved.
2. Activities outlined in the water conservation plan will be completed by water system personnel under the supervision of a certified water system operator.

I certify that I have read this Water Conservation Plan, understand the responsibilities of the water system as referenced in the plan, and that all information provided is complete, accurate, and not misleading.

Owner Name (print): Troy Cornock

Owner Signature: _____ Date: 1/29/14

Owner Name (print): John Dahood

Owner Name (print): _____ 1/29/2014

Owner Signature: _____ Date: _____

Owner Name (print): _____