BEFORE THE NEW HAMPSHIRE

PUBLIC UTILITIES COMMISSION

Lakes Region Water Company

Petition for Rate Increase

Docket No. DW 19 – 177

DIRECT TESTIMONY OF THOMAS A. MASON

I. BACKGROUND

Q. Please state your name and business address.

A. My name is Thomas A. Mason and my business address is 420 Governor Wentworth Hwy, PO Box 389, Moultonborough, NH 03254.

Q. What is your role at Lakes Region Water Company?

A. I am President of Lakes Region Water Co., Inc. ("LRWC" or the "Company"). I also serve on its Board of Directors. I supervise LRWC's water operations and capital projects for all of the Company's 19 Community Water Systems, including Dockham Shores.

Q. What is the purpose of your testimony?

A. I offer this testimony to explain the capital and operational improvements that LRWC has made to the Dockham Shores water system which have significantly improved the quality of service provided to customers.

II. ACQUISITION OF THE DOCKHAM SHORES WATER SYSTEM

Q. How did LRWC come to acquire the Dockham Shores water system?

A. In 2015, Colin Robertson owned the Dockham Shores water system with his wife. He approached me and asked if LRWC was interested in purchasing the system. He indicated that the system was not profitable, and he wished to retire. The system needed significant capital improvements that had been recommended by the Department of Environmental Services. *See Attachment A, NHDES Sanitary Survey dated December 5, 2015*. Mr. Robertson did not have the financial or technical ability to make the required improvements to continue to serve customers.

Mr. Robertson agreed to sell the system to LRWC at a loss for $60,000, which was less than its net plant of $88,943 (2015 Form F1, Line 5) at the time. After an initial due diligence, inspections and review of the system, LRWC and Dockham Shores entered into an asset purchase agreement on April 25, 2016.

On May 31, 2016, LRWC submitted a petition to acquire the assets and franchises for approval by the Commission. On November 10, 2016, the Commission approved the acquisition and related financing.

Q. What were LRWC plans when it acquired the system?

A. As part of the application to the Commission, I asked LRWC Field Supervisor Justin Benes to prepare an initial capital improvements plan and cost estimate for

improvements required for LRWC to assume operations. Attachment B is the initial plan prepared by Justin Benes.

LRWC's initial plan addressed the existing underground pit where access was extremely difficult and dangerous and did not comply with OSHA requirements. LRWC's initial plan also included telemetry, wiring, meters and replacement of electrical panels. The total costs were estimated to be $60,000.

Q. When did LRWC acquire the system?

A. LRWC acquired ownership of the Dockham Shores water system on July 1, 2017.

III. CHANGES FOLLOWING ACQUISTION OF DOCKHAM SHORES

Q. How did LRWC's plans for the system change following acquisition?

A. After acquiring the system and operating it for an initial period, it became clear that the system was in considerably worse shape than originally believed. The deteriorated condition of the system was described in detail in response to Staff Data Requests in DW 16 – 619 and in *Attachment C*. By way of summary:

- One of the two storage tanks had failed and the second tank had deteriorated to the point where it was leaking and could not be repaired.
- The well yields were lower than anticipated which required LRWC to impose water use restrictions and bans.
- The system also experienced frequent electric power outages during storm events which required a portable generator to be manually set up. The frequency of power failures was unusual compared to other nearby systems operated by LRWC.

If LRWC had proceeded with its initial plan, it would have only been a temporary fix. The Company would have likely needed to entirely replace the pump station 3 to 4 years later. This would have had an adverse impact on both rates and service to customers.

Q. What did LRWC do as a result of the deteriorated condition of the system?

LRWC hired Lewis Engineering to reassess the pump station and provide recommendations to LRWC. Lewis Engineering's recommendations are included in Attachment C.

By way of summary, Lewis Engineering recommended that the pump station be completely re-designed and re-built to meet current standards through the addition of a new water storage/pump house facility that was relocated next to the existing

wells to eliminate internal electrical problems. The new pump station included a reinforced concrete 15,000-gallon water storage tank, a new pump house building, booster pumps, automatic controls and related equipment. A standby generator was added to address power outages.

Q. When were the improvements to the pump station placed in service?

A. The improvements to the pump station were all completed and placed in service on December 30, 2018.

Q. How do the improvements to the system made by Lakes Region benefit or improve service to customers?

A. The benefits to customers are described in *Attachment C*. These include but are not limited to: (a) increased well yields and storage capacity which has eliminated the need for water bans or restrictions; (b) the elimination of interruptions in service due to power outages; (c) and avoiding the risk of complete system failure.

The improvements have allowed LRWC to fully integrate Dockham Shores into its operations. The pump station is considered a model that LRWC will use as upgrades are needed at other systems.

Q. Does this conclude your testimony?

A. Yes

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

December 8, 2015 *via E-mail*

COLIN ROBERTSON
DOCKHAM SHORES ESTATES WATER CO
361 WEIRS RD
GILFORD NH 03249

Subject: **CWS**: GILFORD: DOCKHAM SHORES ESTATES: PWS # 0882190
SANITARY SURVEY

Dear Mr Robertson:

On November 23, 2015, the New Hampshire Department of Environmental Services, Drinking Water & Groundwater Bureau (DES) performed a sanitary survey inspection of the subject public water system (PWS) pursuant to RSA 485 and Env-Dw 717 and 720. Under these statutes and rules, DES has the responsibility and authority to conduct sanitary surveys of public water systems in New Hampshire.

A sanitary survey consists of a physical review of the main elements of the water system to verify its capability to reliably produce safe drinking water. The eight sanitary survey elements evaluated are: well sources, treatment, distribution, storage, pumping, data records, management and operations.

In attendance at time of the inspection: Amy Rousseau, DES Sanitary Surveyor
Colin Robertson, Dockham Shores Estates Water Co.

SIGNIFICANT DEFICIENCIES

Pursuant to Env-Dw 103.52, a significant deficiency is one that "...can directly and adversely affect a public water system's water quality or that can reduce the water system's reliability and ability to deliver safe drinking water to its customers...". During the survey, the significant deficiencies listed below were observed.

- **Atmospheric Tank Emergency Fill Pipe** - All community water systems with atmospheric storage are required to have the means of accepting an emergency bulk water delivery in the event of pump failure, distribution piping leaks etc. The atmospheric storage tank should be equipped with a capped filler pipe (lockable, if on the exterior) to accommodate water delivery by tank truck. Currently, the filer pipe is covered with a torn careen that can allow the potential entry of contaminants (dirt, water, insects, snakes, rodents, etc.) into the tank.

In order to avoid a violation: within 30 days of the date of the sanitary survey, all significant deficiencies must be corrected or have a Corrective Action Plan (CAP) submitted to the Department for approval. A CAP identifies the work that will be performed, along with a time frame by which the work will be completed.

Env-Dw 717.21 requires that the PWS owner notify us in writing upon the correction of significant deficiencies. Notification must be made within 30 days of completing the corrective action. We request that you provide a photograph with your submittal. Notifications by email submittals are preferred but not required.

SYSTEM DESCRIPTION

Dockham Shores Estates obtains its water from two bedrock wells. Bedrock well # 1 (BRW 1-001), located 50 feet north of bedrock well # 2 is 295 feet deep and yields 30 gallons per minute. The well casing is six inches in diameter and is 42 feet in length. Bedrock well # 2 (BRW 2-002), located 1,000 feet west of the pump house, is 290 feet deep and yields 50 gallons per minute. That well casing is also six inches in diameter with an unknown length. The wells are located about 250-300 feet off Route 11B, out behind house #375. At this site there is a wooden boxed electrical panel, a metering pit, and a yard hydrant source sampling faucet for each well.

Water is pumped from the two bedrock wells, through the metering pit, past the source sampling tap yard hydrants, and over to the underground pump house located on the corner of Margaret Way and Robertson Drive. In the pump house, water passes through ultraviolet radiation for disinfection and a cartridge filter for particulate removal prior to entering a 16,000 gallon atmospheric storage tank. Duplicate 5 HP variable frequency drive booster pumps transfer water to a WellxTrol WX-251 (62 gallon) pre-charged pressure storage tank followed by a DEP sample tap. Treated water is distributed to 60 single family residences serving approximately 150 people.

SANITARY PROTECTIVE AREA

All public water supply system wells require a sanitary protective area (SPA) or protective well radius, under the control of the well owner, within which no septic tanks, leach fields, oil, debris or other hazardous materials may be located or stored. The SPA for your water system is a 200' radius around the well. Currently, the area contains residences 165' from the well heads. Per Env-DW 406.12 (f), permanent buildings are an acceptable use of the SPA and will not be sited as a significant deficiency.

The water system's potential for reduced monitoring and future waivers from a portion of its chemical monitoring requirements shall be diminished by the location of buildings, roadways, parking lots, and other such construction within the well's protective radius.

OPERATOR CERTIFICATION VERIFICATION

Required Certification Grade(s) For Water System: D / T 1A

System's operator:	License #:	Certification Grade (s):
Colin Robertson	863	D 11, T 1

FUTURE CONSTRUCTION OR EXPANSION

Be advised that, under RSA 485:8 (Approval of Construction or Alteration), no new construction, addition or alteration involving the source, treatment, distribution or storage of water in any public water supply system can begin without approval by the Department.

In addition to any significant deficiencies listed above, enclosed are recommendations for system improvements. The ownership and operation of a public water supply system involve many significant responsibilities. Our main concern is to protect the public health. It is also our intention to work with you in solving any water related problems that your system may have. Should you have any questions, please contact me at 603-271-0893 or by e-mail at amy.rousseau@des.nh.gov.

Sincerely,

Amy E. Rousseau

Amy Rousseau
Drinking Water and Groundwater Bureau

Enclosed: Recommendations for System Improvements

December 8, 2015
CWS: GILFORD: DOCKHAM SHORES ESTATES: PWS # 0882190

RECOMMENDED SYSTEM IMPROVEMENTS

The following recommended system improvements and operation and maintenance procedures are noted below to assist you in improving the water system's reliability in providing water to its users.

Frost Free Yard Hydrants

Your water system was observed to include frost free hydrants (stop and waste valves) at the well heads for obtaining source samples from each of your two wells. Beginning July 2011, the NHDES, with reference to the International Plumbing Code (IPC) recognizes such a fixture as a cross connection, and the distribution system would need to be protected with an appropriate backflow device. **The following excerpt is from the 2015 IPC**:

> **608.7 Valves and outlets prohibited below grade**. Potable water outlets and combination stop and waste valves shall not be installed underground or below grade. Freeze proof yard hydrants that drain the riser into the ground are considered to be stop-and-waste valves.
>
> **Exception**: Freeze proof yard hydrants that drain the riser into the ground shall be permitted to be installed, provided that the potable water supply to such hydrants is protected upstream of the hydrants in accordance with Section 608 and the hydrants are permanently identified as nonpotable outlets by approved signage that reads as follows: "Caution, Nonpotable Water. Do Not Drink".

The NHDES is currently advising systems of the risks associated with these fixtures and recommending that systems consider alternative fixtures. NHDES is also researching policies used by other states relative to the prohibition of such devices in the distribution system and may develop a policy for prohibiting these fixtures.

Gate Valves

To ensure that gate valves are in working order, routine maintenance and exercising are required. Frequently, in older systems, there is an inadequate knowledge of valve location, or if known, these valves have become inaccessible due to subsequent construction, (i.e. buried under roadways). This makes routine maintenance impossible and greatly slows down emergency response. If a break occurs in a water main, crews must first locate nearby valves before they can shut the section down. This increases both the amount of time that the system is inoperable and the danger of extensive contamination to the system.

It is therefore recommended that routine valve inspections be conducted once a year in which the following tasks are performed:

1. Verify the exact location of all valves boxes.
2. Inspect the valve stem and nut for damage and possible leakage.
3. Close the valve fully, and record the number of turns to the fully closed position.
4. Reopen the valve and reestablish flow.
5. Clean the valve box cover seat.

Records should be upgraded to include a means to easily identify the location of all valves. Records should also include measurements from at least two reference points, the type of valve, and the number of turns required to open or close the valve.

Flushing

Distribution systems are normally flushed once a year through the blow-offs. In some water systems, the flushing must be done more often to keep sediment and sand in the piping under control. The flushing should be done during time of minimum water use. The frequency of flushing should be such that it prevents legitimate consumer complaints. Each gate valve on the water system should be turned annually to counteract mineral buildup and the subsequent jamming of the valve.

Leak Detection Survey

At least once a year the system should be checked for leakage. This can be accomplished in the following way. The water system's customers should be asked not to use any water between midnight to 6:00 A.M. on a particular evening. The water system operator should check system usage during this period by noting the usage on the meter or any change in the water level in your vented storage tanks (supply sources turned off). If there is any significant system demand, this can be attributed to leakage.

It is important to note that the force from this leakage sets in motion sand particles in the soil that will abrade the general area of the pipe ultimately to the point of total failure. The noise of this running water can normally be heard through the use of geophones, even though the leak has not surfaced. Intermediate and larger municipal water systems in your area likely have geophones and may be willing to loan them to you. If not, please contact our office for a list of contractors with this or more specialized types of equipment.

Attachment B

LAKES REGION WATER COMPANY INC.

420 Governor Wentworth Highway, PO Box 389
Moultonborough, NH 03254
Telephone: 603-476-2348, Fax: 603-476-2721

DOCKHAM SHORES ESTATES
PROPOSED CAPITAL IMPROVEMENTS

WELL FIELD
Beginning at the well field, the source meters for each well are 20+ yrs. old. These meters are located in concrete pits and are confined spaces. This makes reading not only difficult but dangerous for any operator. Meters proposed are able to be installed above ground in the building proposed. This allows not only better monitoring, but the ability to view the meters on Telemetry. The wells run currently on a float system in the Atmospheric Storage tank. Unfortunately the signal wire that is DIRECTLY buried in the ground has long outlived its life expectancy. Moving to a wireless signal system (Devar) enables the well cycles to accurately run without the use of a buried cable.

PUMP STATION
The existing pump station, though semi-functional, is in EXTREME need of improvement. It is in a "confined space", OSHA requirements are similar to NHDES and for good reason. A bulkhead can be easily installed to comply with requirements. The existing station is also very wet due to ground water. All electrical panels and controls should be moved upstairs to the proposed building. This prevents premature failure of electronics due to dampness and corrosion. The proposed panel will also be able to run both well pumps, boosters, monitor tank height, pressure, and outbound flow and send alarms to operators upon ANY system problems.

IN CLOSING
Dockham Shores system is outdated in many ways and needs upgrading- it has functioned for 40+ years. Customers will have a more reliable, worry free infrastructure with these proposed improvements. This translates to quicker response to problems, less down time to customers and overall a better view of the system parameters.

IMPROVEMENTS WILL ADDRESS
- Confined space hazard in well meter pits and pump station
- Inadequate components: buried signal wire to wells from pump station (900' plus of 40 yr old wire), well meters way past expected life (inaccurate source readings) and existing well panel near wells has rodents living inside it.
- Telemetry makes monitoring the system easier.
- Badger meters will create accurate readings.
- Electrical panel will be moved to a dry location.

Justin Benes
Field Supervisor

Email: Lrwater@Lakesregionwater.com
Website: www.Lakesregionwater.com

Date Request Received: 03/11/19 Date of Response: 03/25/19

Request No. 1-1 Witness: Leah Valladares

REQUEST: Re: Exhibit B of Original Filing

Exhibit B of the Original Petition, written by Justin Benes, Lakes Region Field Supervisor, discusses the proposed Pump Station: "It [existing pump station] is in a "confined space", OSHA requirements are similar to NHDES and for good reason. A bulkhead can be easily installed to comply with requirements … All electrical panels and controls should be moved upstairs to the proposed building." Please explain why the bulkhead/building, proposed by Lakes Region's Field Supervisor, to be built above the original "confined space" did not address NHDES requirements. Please provide supporting documentation.

RESPONSE:

After further review of the existing pump station site and discussion with the Engineer, the decision was made to change the pump station site to the well location for the following reasons;

1. Engineer hired for the permitting process advised it was not a practical location.
2. Hydropneumatic Tank had failed and was abandoned,
3. Storage Tank was deteriorating (re welded in 2008),
4. Piping from well field to tank had obstructions,
5. Electrical between well field and tank deteriorated and needed replacing,
6. The existing site was located on the edge of and under a customer's landscaped front yard.

See attached as built plans. DR Staff 1-1 A

Date Request Received: 03/11/19 Date of Response:03/25/19

Request No. 1-2 Witness: Leah Valladares

REQUEST: Re: Audit Report Page 7, Account 307 – Wells, $5,665

There was no estimate for Well costs (See Original Petition Exhibit D: SPS 5). Please explain why the well deepening and reinstallation of the well pump was required and completed when it had not been included in the original estimate for improvements. Please provide supporting documentation.

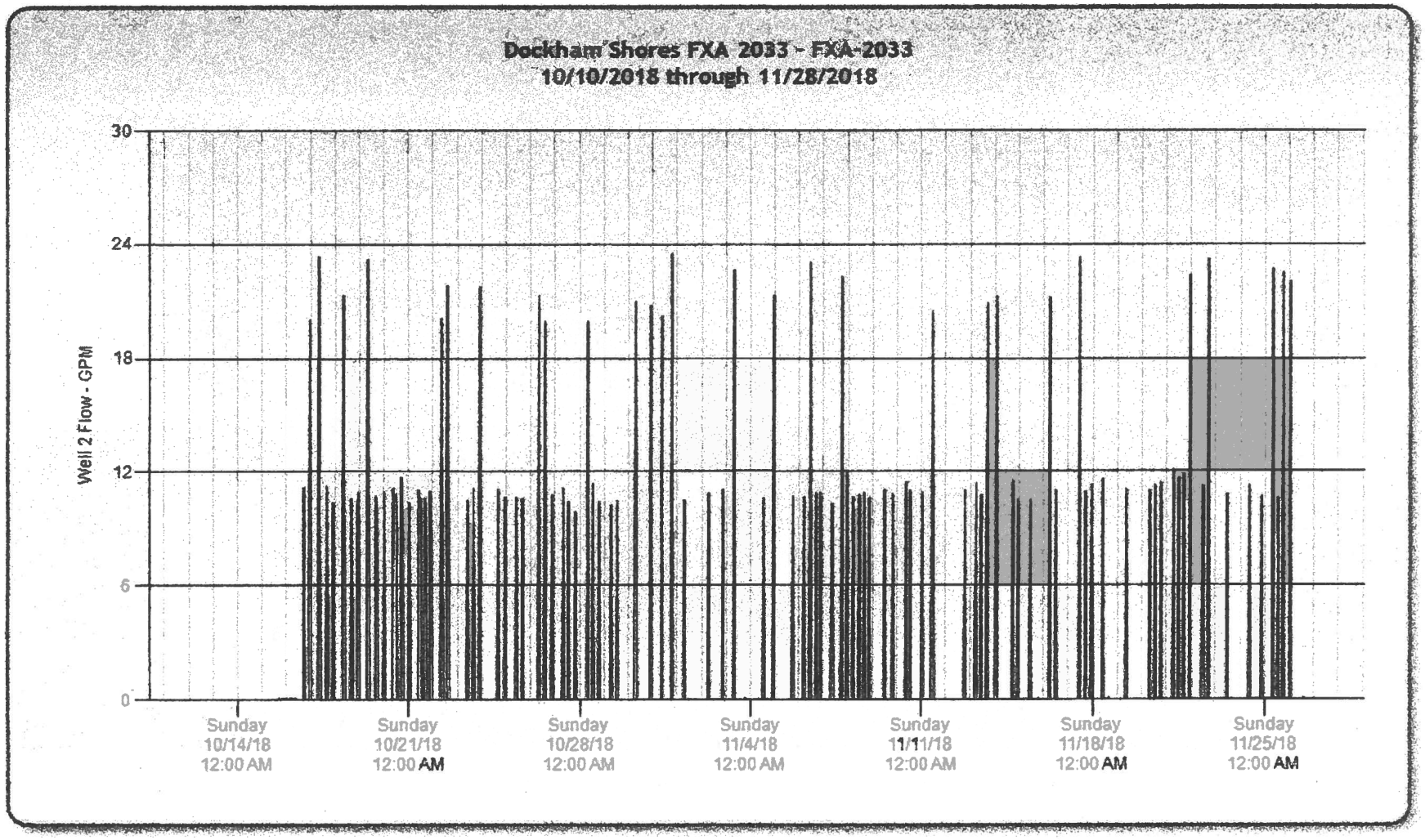
RESPONSE:

At the time the original estimate was prepared, Lakes Region understood that BRW#2 produced 50gpm as indicated in the NHDES records (see attached DR Staff 1-2 D). After completion of the new pump station and storage facility, tests of BRW #2 showed a yield of only 10gpm. This yield was insufficant to meet service requirements. to provide service. Unfortunately, after the new station was in place, the well yield stayed the same and the Company elected to drill BRW#2 well to 445' (original depth was 290'). BRW #2 well was run for 26 hours after the installation of new 3-phase, 240V submersible and other various equipment. Upon completion of various static level readings within a 26-hour span, a total of 20.22gpm was calculated. (see attached DR Staff 1-2 A & B- Telemetry flow charts before/after)

Improvements to the well yields were critical to provide service to customers. Due to low yield during the summer of 2018, the wells could not keep the old storage tank full which necessitated water bans and restrictions. A ban was issued 06/03/18 and lifted 06/08/2018 when the storage had recovered. The Company had to re-issue a ban on 06/11/2018. (see attached DR Staff 1-2 C- Storage Level chart). Lakes Region would have included well information had the actual yields been known at the time the original estimate was provided. However, this information was not known at the time the original estimate was prepared and approved.

DR Staff 1-2 A

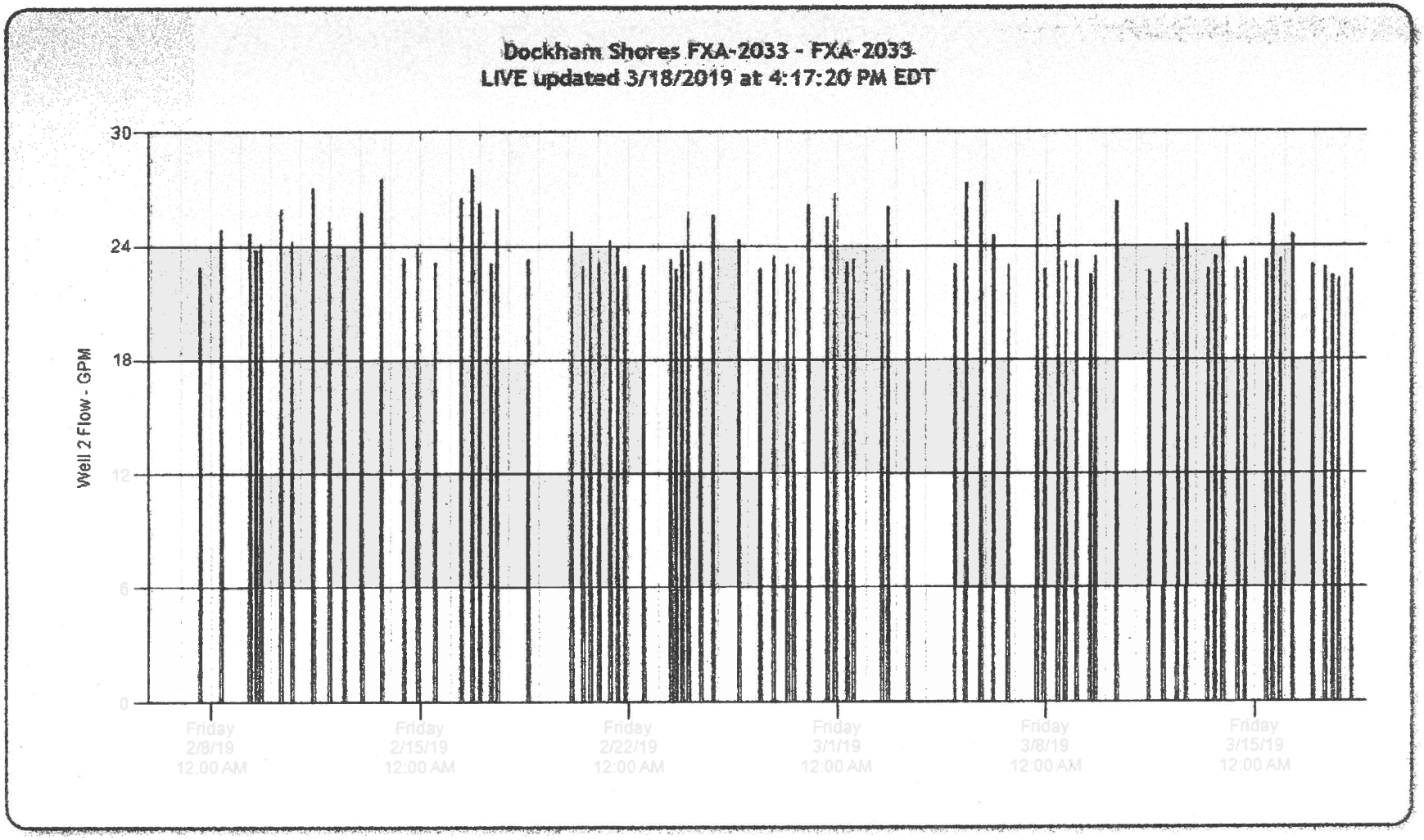
Prior to deepening



Attachment C

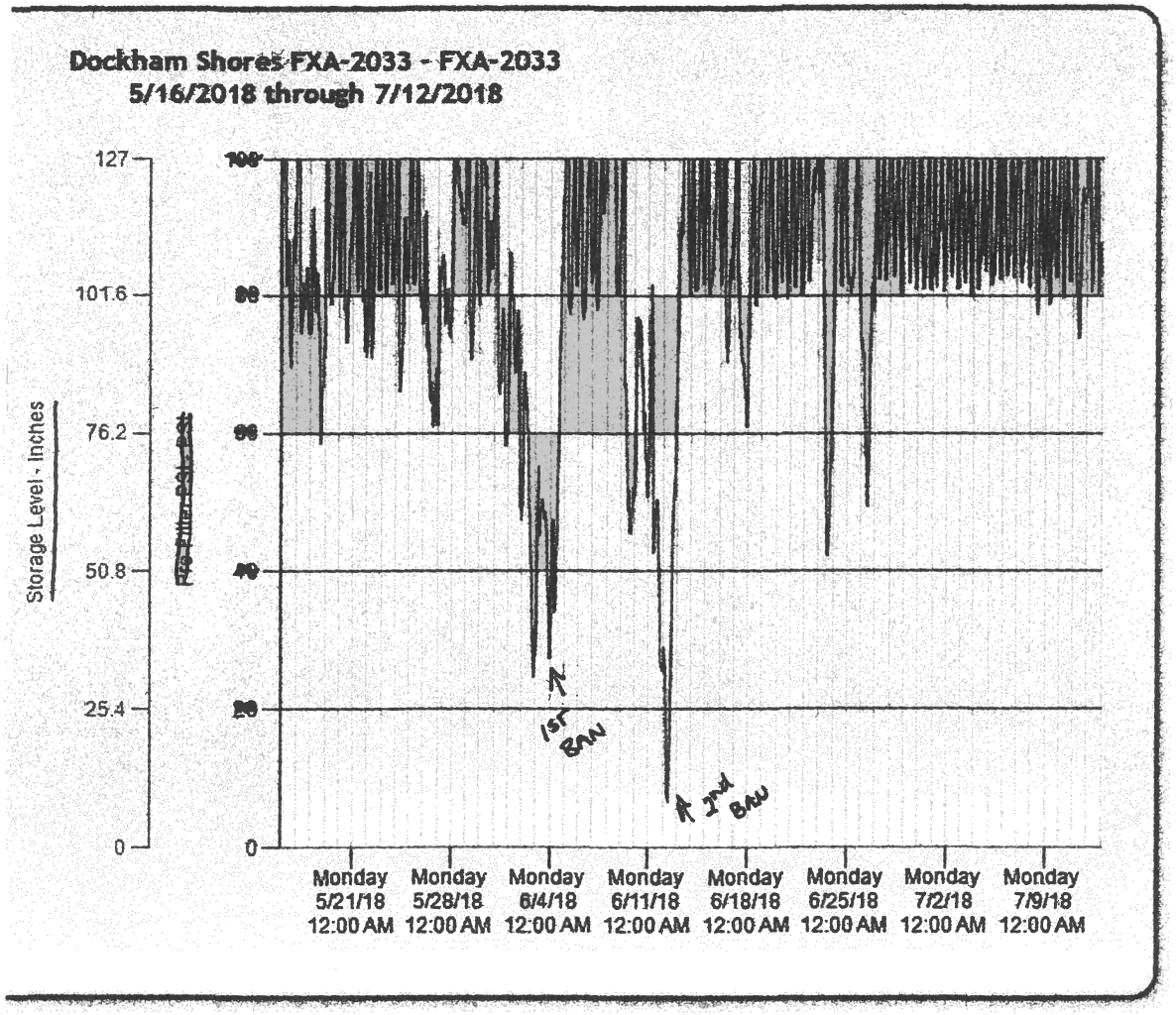
DR Staff 1-2 B

Post deepening



Attachment C

DR Staff 1-2 C



Attachment C

Date Request Received: 03/11/19 Date of Response:03/25/19

Request No. 1-3 Witness: Leah Valladares

REQUEST: Re: Audit Report Page 7, Account 310 – Power Generation Equipment, $29,617

There was no estimate for Power Generation Equipment (See Original Petition Exhibit D: SPS 5). Please explain why a backup generator was required and installed when it had not been included in the original estimate. Please provide supporting documentation.

RESPONSE:

The Power Generation Equipment became necessary due to the change in design to an above grade pump station in order to protect the newly installed assets and to protect public health. A power failure in the above ground pump station could have potential catastrophic consequences such as:

a) Assets freezing during the winter months.
b) Potential cross connection occurrence.
c) Health risk from depressurized pipes.

NH DES has recommended installation of backup generators for pump stations due to the increase in storms over the last several years. During the October 2017 storm Dockham Shores was out of power for three (3) days. (See attached DR Staff 1-3 A- E-18 report).

Customers have expressed via phone conversations the frequency of outages and the desire for a backup generator.

Form E-18: Report of Interruptions in Service over 30 Minutes Duration

Company Name: Lakes Region Water Company Inc.

Name & Title of Person who Supervised this Report: Justin Benes, Field Supervisor

Reporting Month/Date: November 2017

Signature:

Water System	Date/Time Outage Began	Date/Time Outage Ended	Service Location(s) Affected	Approx.# Affected	Cause (If Known)	Prevention Steps	Methods to Notify Customers?
BH	10/30/2017 12:00AM	11/02/2017 9:30AM	Lane, Oxbow Lane, Long Ridge Drive	70	Power Outage from Storm	NA	Website
GG	10/30/2017 12:30AM	11/02/2017 11:00AM	Drive, Hawthorne Way, Hazelnut Road, Heather Lane, Hedgewood Circle	60	Power Outage from Storm	NA	Website
175E	10/30/2017 1:30AM	11/02/2017 10:00AM	Lane, Lotus Lane, Notch Spur Road, Rainbow Lane, Stonington Road, Sunrise Hill Road	45	Power Outage from Storm	NA	Website
PC	10/30/2017 12:00AM	11/01/2017 6:00PM	Ashley Drive, Colonial Road, Fern Condo, Heritage, McKinley Road, Pendleton Road, Plantation Road, Regis Road, Roosevelt Road, Zebley Shores	80	Power Outage from Storm	NA	Website
WC	10/30/2017 12:00AM	11/01/2017 6:00PM	Wentworth Cove Road, Pine Notch Circle, Rolling Lane, Summit Ave , Woodvale Drive	70	Power Outage from Storm	NA	Website
WP	10/30/2017 12:00AM	11/01/2017 4:00PM	Long Island Road, Tall Pine Road, West Point Road, Woodrin Road	78	Power Outage from Storm	NA	Website
DS	10/30/2017 12:00AM	11/01/2017 3:30PM	Baxter Court, Colmar Court, Dockham Shores Road, Margaret Way, Robertson Drive, Sanborn Road, Weirs Road	66	Power Outage from Storm	NA	Website

Date Request Received: 03/11/19 Date of Response:03/25/19

Request No. 1-4 Witness: Leah Valladares

REQUEST: **Re: Audit Report Page 8, Account 311 – Pumping Equipment, $31,449**

The estimate of $6,600 appears to have been made up of 2-2" Badger meters in the Wells and 1-2" meter in the Pump Station (See Original Petition Exhibit D: SPS 5). Costs for these meters appear to have been accounted for in Account 334, Meters, totaling $7,002. Please explain why it appears that pumps were replaced when they were not included in the original estimate. Please provide supporting documentation.

RESPONSE:

The new engineered design of the pump station required different pumping equipment than originally proposed. (see attached DR Staff 1-4 A Design Summary and DR Staff 1-1A)

ENGINEERING DESIGN & OPERATIONAL SUMMARY
DOCKHAM SHORES WATER IMPROVEMENTS
PWS # 0882190
GILFORD, NEW HAMPSHIRE
April 2018

The Dockham Shores PWS #0882190 is located on the northeasterly side of Route 11B in Gilford, NH. Dockham Shores is owned by Lakes Region Water Company of Moultonborough. The existing water facilities are being upgraded to current standards through the addition of a new water storage / pump house facility that will be located proximate to the existing two bedrock wells that provide water to this system.

This document describes the engineering and operation of water improvements at this PWS. The new Pump House facilities include a reinforced concrete 15,000-gallon water storage tank, Pump House building, booster pumps, automatic controls and related equipment. There is provision for water treatment, and for a standby generator.

The design of the improvements will operate automatically, with Wells operation based on tank levels. Booster pumps will be VFD controlled. There are two pre-charged pressure tanks that allow boosters to shut off during low flow conditions. Water use, based on NHPUC records shows average use within this 63 home community to be 6,900+/- gallons per day. A peak day calculated at 2.0 times = 13,800 gallons. The reported well pumping capacity from 2 onsite wells is 50 gpm and 60 gpm respectively. Wells 1 & 2 are located proximate to the new Pump House. Atmospheric Tank level will be used to start and stop the respective well pumps. A submersible level transducer will provide water level readings.

New Pump House - The water improvement project will include the construction of a new water pump house building on the site. A pre-cast reinforced concrete water storage tank will act as the building's foundation. The building is 11'4" W x 27'4" L x 8'0" H ceiling height. This is an insulated wood framed structure that uses manufactured roof trusses (80 psf snow load and 20 psf ceiling load), a painted plywood interior, Zip exterior sheathing with vinyl siding, and an insulated metal

access door. A Zip Roofing System, 25-year fiberglass / asphalt shingles will also be used. A Bilco, or equal, roof access hatch will allow access to the line-shaft turbine booster pumps. The reinforced concrete water storage tank has 8' floor to ceiling height, with an outside screened vent / overflow, and two access hatches located inside the Pump House. The tank acts at the frost wall foundation and floor slab. A floor drain will be located inside the station. The floor drain will have a rodent screen. A flood alarm will be part of the station.

System Connection and Water Supplies - The pump house will be connected into the existing 3" diameter water distribution system.

The water supply wells will each have individual 1" meters, check valves, pressure relief valves, sampling taps, 2.5" - 100 psi liquid filled pressure gauges and flushing valves to daylight. Provision has been made for future water treatment, if needed. An existing UV unit may be transferred from the existing pump house to be used in the new pump house.

Master Water Meter and Controls - The Pump House uses a 2" Badger M2000 master water meter measuring in gallons, a submersible tank level pressure transducer to supply water level data to start and stop well pumps. Smart Drives will be used to operate the 5 h.p. VFD water booster pumps, using input from a 0-100 psi WIKA discharge pressure transducer and the 2" master water meter. There will be 4.5" liquid filled pressure gauge (0 – 100 psi), twin 119-gallon pre-charged pressure tanks, sampling taps, and provision for emergency chlorination. There is also a high-level alarm, a low water warning and an emergency low water shut off for the booster pumps that will be connected into the GS-400 automatic monitoring / alarm system.

Electrical Service, VFD Booster Pumps, Heat, Lights, Ventilation - The station will use a new single phase 200 A/240-120 VAC, 1- phase electrical service. The Smart Drives area VFD's that create 3 phase power for the Booster Pumps. Well pumps will remain across the line start. Heat is provided from 2 – 3 KW electric heaters. There are 3 – 48" long, water resistant fluorescent lights, an automatic

ventilation fan, with motor operated air inlet vent that operates based on temperature rise.

Additional details are found on the Plan Set, and Data Sheets are included within the balance of this document.

Pump House Automatic Operation - The standard operation will be as follows, starting from the atmospheric tank being full, and the Pump House at 70-psi full system discharge pressure, with booster pumps "off":

1. As water is used in the system, the first water is supplied from the pre-charged pressure tanks. As pressure drops to 55 psi, the "lead" VFD booster pump starts and runs. As demand is met and pressure is restored with flow below 3 gpm for more than 60 seconds, this pump shuts off. The "lag" booster pump will start and run as "lead" during the next cycle. If water flow from the lead pump exceeds 60 gpm, the lag booster will start and run. If flow exceeds 80 gpm for 1 minute, a high flow alarm is sent. If the discharge pressure with one booster running drops to 50 psi, the lag booster will start and run until pressure is restored. If pressure drops to 35 psi, or is above 75 psi, either condition will activate an alarm. Alarm and booster starting and stopping pressures are operator adjustable on the Smart Drive. The boosters will have 2 minute minimum run times programmed. Pump speed will vary to maintain the set discharge pressure which will be 65+/- psi, with a 5 psi bump-up just before shutting off. The booster pumps are line-shaft submersible turbine pumps mounted inside the pump house. A roof hatch allows easy removal for maintenance.

2. As water is used in the system and the atmospheric tank drops from Full at 92" to 86", a well pump will start and run until the Full level is reached. If the level goes to 94" a highwater alarm will be activated. If the water level continues to drop to 80" the lag well pump will start and run until the tank is refilled. If the tank drops to 55" there will be a low water warning alarm activated. If the water continues to drop to 40", there is a second alarm and the booster pumps

will be automatically shut down to prevent pump damage. Alarm levels, and well starting and stopping level, are operator adjustable.

3. A GS-400, cell phone based, automated monitoring and alarm system will be included in the station. This system may be accessed through a secure web portal and will send alarm and status signals to responsible party's smart phone.

Following construction, commissioning, and start- up with NH-DWGB approval, as-Built Drawings and an IOM manual will be provided.

Date Request Received: 03/11/19 Date of Response:03/25/19

Request No. 1-5 Witness: Leah Valladares

REQUEST: Re: Audit Report Page 8-9, Account 330 – Tank, $29,975
There was no estimate for a water tank (See Original Petition Exhibit D SPS 5). Please explain why a 15,000 gallon precast concrete water tank, and appurtenances, was purchased when it was not included in the original estimate. Please provide supporting documentation.

RESPONSE:

The design of the new pump station required a new water tank. The old water tank had been repaired and coated in 2008, upon inspection by Bruce Lewis of Lewis Engineering, it was advised to replace due to the old water tank being unserviceable.

(See attachment DR Staff 1-1 A and DR Staff 1-4 A)

Lewis Engineering, PLLC
44 Stark Lane
Litchfield, NH 03052
lewis.h2o@comcast.net

March 26, 2019

Mr. Tom Mason, Jr., President
Lakes Region Water Company, Inc.
P.O. Box 309
Moultonborough, NH 03254
Sent By: Email

Re: Dockham Shores Water System Improvements

Dear Tom:

As requested, the following is intended to summarize the steps associated with the improvements that were

Initially, the existing Dockham Shores PWS facilities were thought to be reasonably operable, and that making a few improvements to the well field area, and at the water storage/pump house facility would suffice.

As the operation of the facilities were more closely looked at, it became apparent that a number of items were effectively at the end of their useful life, and in some cases did not meet current NHDWGB, general water works, or OSHA standards. Items such as restricted confined space entry into underground structures, a pump house that was subject to flooding, electrical equipment and controls that were corroded, and the single well line between the well field and pump house (approximately 1,400 feet) that had a severe restriction to flow, and needed to be replaced, were among the major items that lead to the decision to design and install new facilities meeting current NHDWGB and industry standards.

In conjunction with LRWC, design work was undertaken by Lewis Engineering. This design was reviewed and approved by NHDWGB in their correspondence dated May 18th, 2018. Following this a full Planning Board review was mandated by the Town. Construction was able to begin following this approval. The new facilities will provide Dockham Shores with years of reliable service and efficient operations and monitoring meeting State standards.

After review, please let us know if any additional information would be helpful.

Respectfully,
Lewis Engineering, PLLC

Bruce W. Lewis, P.E., Manager

2017013 Dockham Shores