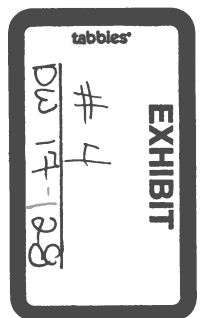


**Pennichuck East Utility, Inc.**  
**2013-2017 Investment in Used and Useful Property, Plant and Equipment - Summary**  
**Rate Hearing Data Request**  
**8/1/2018**

<u>Year</u>	<u>Total \$ Invested</u>
2013	\$ 766,386
2014	\$ 2,645,066
2015	\$ 2,266,059
2016	\$ 2,172,382
2017	\$ 765,577
Total	<u>\$ 8,615,470</u>



**Pennichuck East Utility, Inc.**  
**2013 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$ \$ invested in 2013</b>
Northern Shores Improvements-Carryover (2)	Eliminate Confined Space entry.	#1100000134-3	\$ 8,122
Locke Lake Dam Site Area Main Replacement-Carry Over	See Boisvert Testimony in DW17-128	#1200000058-2	\$ 18,147
Farmstead Generator-Carryover	Completion of Emergency Generator Installation	#1200000071-2	\$ 720
Forrest Hills Generator-Carryover	Completion of Emergency Generator Installation	#1200000084-2	\$ 7,420
Sunrise Estates Generator-Carryover	Completion of Emergency Generator Installation	#1200000089-2	\$ 2,602
Beaver Hollow Generator-Carryover	Completion of Emergency Generator Installation	#1200000111-2	\$ 2,602
Gage Hill Generator-Carryover	Completion of Emergency Generator Installation	#1200000118-2	\$ 2,602
Pine Haven Generator-Carryover	Completion of Emergency Generator Installation	#1200000119-2	\$ 2,602
Shaker Heights Generator-Carryover	Completion of Emergency Generator Installation	#1200000120-2	\$ 3,322
Marsh Road Water Main Relocation-Pelham-Carryover	Replace substandard water main	#1200000138-2	\$ 10,126
New Well Pump - Golf Course, Locke Lake-Carryover	Replace failed well pump	#1200000159-2	\$ 443
Avery Interconnection	See Boisvert Testimony in DW17-128	#1300000034-1	\$ 35,347
Locke Lake Dam Site Phase 2	See Boisvert Testimony in DW17-128	#1300000035-1	\$ 320,171
Hardwood Generator	Install emergency generator at CWS without backup power	#1300000131-1	\$ 31,440
PEU Abandoned Staion Demolition Design	See Boisvert Testimony in DW17-128	#1300000149-1	\$ 3,600
Locke Lake Winwood & Monroe Main Replacement Survey	See Boisvert Testimony in DW17-128	#1300000150-1	\$ 23,328
Spruce Pond-Windham: Windham Vet Hospital Well	See Boisvert Testimony in DW17-128	#1300000157-1	\$ 15,518
2013 Gates - PEU	Replace failed gates	#1300000008-1	\$ 11,191
2013 New Services - PEU	As required by tariff	#1300000009-1	\$ 31,349
2013 Renewed Services - PEU	Replace failed servcies	#1300000010-1	\$ 10,274
2013 Hydrants - PEU	Replaced failed hydrants	#1300000011-1	\$ 3,994
2013 New Meters - PEU	Meters for new customers, per tariff	#1300000012-1	\$ 14,636
2013 Renewed Meters - PEU - Lead Meter Exchanges	As required by Safe Drinking Water Act	#1300000013-1	\$ 124,721
2013 Neptune Replacements - PEU	Replace failed radio meter readers	#1300000014-1	\$ 11,603
Sunrise Estates Pump Control Panel-Carryover(2)	Replace failed portion of SCADA system	#1100000186-3	\$ 5,958
Airstrip Station, Locke Lake - Rebuild Booster #1	Rebuild failed booster pump	#1300000038-18	\$ 1,795
Springwood, LY - Rebuild Booster #1	Rebuild failed booster pump	#1300000038-17	\$ 1,995
Farmstead - Rebuild Booster #1	Rebuild failed booster pump	#1300000038-16	\$ 1,495
Fletchers Corner - Replace Well pump VFD #2	Replace failed well pump starter	#1300000038-15	\$ 1,393
Locke Lake - Well #11 Pump Replacement	Replace failed well pump	#1300000038-14	\$ 7,459
Shaker Heights - Replace Well Pump	Replace failed well pump	#1300000038-13	\$ 4,315
Gage Hill - Replace Booster #1 & #2	Replace failed well pump	#1300000038-12	\$ 1,328
Darrah Pump Station - Rebuild Booster #1	Rebuild failed booster pump	#1300000038-11	\$ 3,695
Shaker Heights - Install New Fence	Install security fence at CWS	#1300000038-10	\$ 1,840

**Pennichuck East Utility, Inc.**  
**2013 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$\$ invested in 2013</b>
Darrah Pump Station - Rebuild Booster 2	Rebuild failed booster pump	#1300000038-9	\$ 3,695
W&E - Replace Chlorine Feed Pump	Replace failed chemical feed pump	#1300000038-8	\$ 1,174
Williamsburg - Rebuild/Replace Pump 3 and VFD	Replace failed booster pump and pump starter	#1300000038-7	\$ 7,123
Ministerial Heights - Rebuild Booster #2	Rebuild failed booster pump	#1300000038-6	\$ 2,495
Gage Hill - Replace Well Pump	Rebuild failed booster pump	#1300000038-5	\$ 2,335
Williamsburg Station: Re-build Booster Pump #1	Rebuild failed booster pump	#1300000038-4	\$ 3,695
Williamsburg Station: Re-build Booster #2	Rebuild failed booster pump	#1300000038-3	\$ 4,383
Stone Sled, Bow - Replace Well Pump #2	Replace failed well pump	#1300000038-2	\$ 4,204
Install Cellular Communication Device - Gage Hill, Pelham	Add SCADA communications to Station	#1300000142-1	\$ 2,705
Stone Sled, Bow - Replace Well #1	Replace failed well pump	#1300000156-1	\$ 2,269
Spruce Pond, Windham - Repair Damage to Electrical System	Replace sections of failed electrical equipment due to lightening	#1300000158-1	\$ 5,156
<b>Pennichuck East Utilities 2013 Capital Expenditures -</b>			<b>\$ 766,386</b>

**Pennichuck East Utility, Inc.**  
**2014 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$ \$ invested in 2014</b>
Liberty Tree - Replace Station and Treatment-Carryover (4)	See Boisvert Testimony in DW17-128	#1100000131-4	\$ 150,524
Avery Interconnection - Carryover	See Boisvert Testimony in DW17-128	#1300000034-2	\$ 648,264
Locke Lake Dam Site Phase 2 - Carryover	See Boisvert Testimony in DW17-128	#1300000035-2	\$ 149,958
W&E Water Main Replacement	See Boisvert Testimony in DW17-128	#1400000089-1	\$ 658,003
Hardwood Estates Pump Station Replacement	See Boisvert Testimony in DW17-128	#1400000090-1	\$ 190,580
PEU Station Demolitions	See Boisvert Testimony in DW17-128	#1400000091-1	\$ 29,471
Locke Lake, Winwood and Monroe Phase 1	See Boisvert Testimony in DW17-128	#1400000093-1	\$ 470,002
Bow Highlands 4" Main Relocation	Relocate water main in NHDOT ROW as required by NHDOT in conjunction with expansion of Turnpike rest facilities.	#1400000147-1	\$ 16,589
Windham Animal Hospital Replacement Source of Supply	See Boisvert Testimony in DW17-128	#1400000151-1	\$ 46,003
Coteville Road Easement Aquisition - Londonderry	Water main was installed on private property by former owner. PEU discovered this when installing a main to stop service. PEU had to negotiate an easement purchase for the existing water main from a private land owner.	#1400000157-1	\$ 16,993
2014 New Services - PEU	As required by tariff	#1400000013-1	\$ 17,574
2014 Renewed Services - PEU	Replacement of failed services	#1400000014-1	\$ 12,591
2014 Hydrants - PEU	Replacement of failed hydrants	#1400000015-1	\$ 8,925
2014 Gates - PEU	Replacement of failed gates	#1400000016-1	\$ 28,529
2014 New Meters - PEU	Meters for new customers, per tariff	#1400000017-1	\$ 20,345
2014 Renewed Meters - PEU - Lead Meter Exchanges	As required by Safe Drinking Water Act	#1400000018-1	\$ 100,698
Fletcher's Corner - Replace Well Pump VFD #2	Replace Failed well pump	#1400000096-19	\$ 1,293
Darrah - Replace Booster Pump VFD #2	Replace failed electrical drive for booster pump	#1400000096-18	\$ 2,159
Castle Reach - Replace Booster Pump #1	Replace failed booster pump	#1400000096-17	\$ 1,570
Pioneer Park - Replace Booster Pump #1	Replace failed booster pump	#1400000096-16	\$ 1,060
Spruce Pond, Windham - Replace Chlorine Feed Pump	Replace failed chemical feed pump	#1400000096-15	\$ 1,301
Daniels Lake, Weare - Replace Chlorine Feed Pump	Replace failed chemical feed pump	#1400000096-14	\$ 989
Spruce Pond, Windham - Replace PLC Analog Output Card	Replace failed SCADA equipment	#1400000096-13	\$ 1,422
Williamsburg, Pelham-Replace Well Pump #1	Replace failed well pump	#1400000096-12	\$ 6,428
Liberty Tree, Raymond-Replace Pump, Wire, Piping Well #1	Replace failed well pump	#1400000096-11	\$ 5,256
Fletcher's Corner Windham-Rebuild Booster Pump #2	Replace failed booster pump	#1400000096-10	\$ 2,695
Hardwood, Windham - Replace Pump, Piping, & Wire Well #3	Replace failed well pump	#1400000096-9	\$ 2,227
Hardwood, Windham - Replace Pump, Piping, & Wire Well #4	Replace failed well pump	#1400000096-8	\$ 4,691
Fletchers Corner, Windham - Rebuild Booster #1	Rebuilid failed booster pump	#1400000096-7	\$ 2,695
White Rock, Bow - Replace Transfer Switch to Control Board	Replace failed emergency generator automatic transfer switch	#1400000096-6	\$ 1,598

**Pennichuck East Utility, Inc.**  
**2014 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$\$ invested in 2014</b>
Spruce Pond, Windham - Replace Chemical Feed Pump	Replace failed chemical feed pump	#1400000096-5	\$ 1,256
W&E - Replace Pump, Piping & Wire to Well #3	Replace failed well pump	#1400000096-4	\$ 9,770
Pinehaven, Londonderry - Replace Booster #1	Rebuild failed booster pump	#1400000096-2	\$ 3,807
Gage Hill: Replace 3 Hydro-Pneumatic Tanks	Replace failing Hydro-Pneumatic tanks	#1400000098-2	\$ 1,909
Integrate SCADA - Spruce Pond, Windham	Add SCADA communications to Station	#1400000099-1	\$ 4,692
Install Cellular Communications - Lamplighter, Windham	Add SCADA communications to Station	#1400000100-2	\$ 2,232
Spruce Pond, Windham - Lighting Strike/Power Surge	Replace sections of failed electrical equipment due to lightening strike	#1400000129-1	\$ 10,857
007 - Spruce Pond: Replace Permanganate Feed Pump	Replace failed chemical feed pump	#1400000143-1	\$ 1,170
007 - Hardwood: Replace Chlorine Feed Pump	Replace failed chemical feed pump	#1400000144-1	\$ 1,170
007 - White Rock: Replace Well Pump #2	Replace failed well pump	#1400000145-1	\$ 1,569
007 - White Rock: Replace Well Pump #1	Replace failed well pump	#1400000146-1	\$ 1,585
White Rock - Replace Main Electric Service Line	Replace failed electrical entrance	#1400000149-1	\$ 4,619
<b>Pennichuck East Utilities 2014 Capital Expenditures -</b>			<b>\$ 2,645,066</b>

**Pennichuck East Utility, Inc.**  
**2015 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$\$ invested in 2015</b>
W&E Water Main Replacement - 2015 carry over	See Boisvert Testimony in DW17-128	#1400000089-2	\$ 21,905
Hardwood Estates Pump Station Replacement	See Boisvert Testimony in DW17-128	#1400000090-2	\$ 598,331
PEU Station Demolitions	Demolish stations that were no longer being used	#1400000091-2	\$ 222,181
Locke Lake, Winwood and Monroe Phase 1 - (2014 carryover)	See Boisvert Testimony in DW17-128	#1400000093-2	\$ 17,131
Locke Lake, Winwood and Monroe Phase 2	See Boisvert Testimony in DW17-128	#1500000028-1	\$ 524,856
W&E Waterline (2015 Phase)	See Boisvert Testimony in DW17-128	#1500000031-1	\$ 547,582
Locke Lake 2016 - Varney Road Area Main Replacement Survey and Design	See Boisvert Testimony in DW17-128	#1500000141-1	\$ 13,126
White Rock - White Rock Sr. Living 2" Air Release	Install Air Release to eliminate air accumulation at high spot in water main.	#1500000142-1	\$ 1,495
2015 New Services - PEU	As required by tariff	#1500000001-1	\$ 18,173
2015 Renewed Services - PEU	Replacement of failed services	#1500000002-1	\$ 21,664
2015 Hydrants - PEU	Replacement of failed hydrants	#1500000003-1	\$ 8,295
2015 Gates - PEU	Replacement of failed gates	#1500000004-1	\$ 20,691
2015 Renewed Meters - PEU - Lead Meter Exchanges	As required by Safe Drinking Water Act	#1500000006-1	\$ 121,179
Spruce Pond - Install Cellular Communication and Surge Protection	Add SCADA communications to Station	#1400000099-2	\$ 2,185
Hardwood - Replace Well Pump, Piping and Wire Well #5	Replace failed well pump.	#1500000033-15	\$ 3,353
Castle Reach - Replace Well Pump, Piping and Wire Well #2	Replace failed well pump.	#1500000033-14	\$ 8,194
W and E - Replace Permanganate Chemical Feed Pump	Replace failed chemical feed pump.	#1500000033-13	\$ 1,083
Clearwater Estates - Rebuild Pump #1	Rebuild failed booster pump.	#1500000033-12	\$ 1,995
Pine Haven - Replace Booster Pump #2	Replace failed booster pump.	#1500000033-11	\$ 2,624
Darrah Booster Station - Replace Pump Motor #3	Replace failed booster pump motor.	#1500000033-10	\$ 1,995
Fletcher's Corner - Replace Pump, Piping & Wire - Well #1	Replace failed booster pump.	#1500000033-9	\$ 6,705
Pine Haven - Replace Well Pump #2	Replace failed well pump.	#1500000033-8	\$ 1,091
Hardwood - Well #4 Pump, Wire & Pipe	Replace failed well pump.	#1500000033-7	\$ 5,250
W&E - Replace Well Pump, Piping and Wire at Well #4	Replace failed well pump.	#1500000033-6	\$ 10,014
Peacham Rd., Locke Lake - Replace Well #13 Pump & Piping	Replace failed well pump.	#1500000033-5	\$ 6,302
Hi-Lo - Replace Well Pump & Piping, Well #4	Replace failed well pump.	#1500000033-4	\$ 5,554
Peacham Rd., Locke Lake - Replace Well #15 Pump & Piping	Replace failed well pump.	#1500000033-3	\$ 9,097
Peacham Rd., Locke Lake - Replace Well #14 Pump & Piping	Replace failed well pump.	#1500000033-2	\$ 5,386
Locke Lake - Replace Well #10 Pump, Wire & Pipe	Replace failed well pump.	#1500000033-1	\$ 13,717
PEU Share of Weinstein Improvement	As required by water supply contract with Town of Hudson	#1500000039-1	\$ 19,076
White Rock Sr. Living - Replace Chlorine Analyzer	Replaced failed Chlorine analyzer	#1500000086-1	\$ 3,275
Winnisquam Village - Replace Mag. Meter with Compound Meter	Replaced under registering distribution entry point meter.	#1500000121-1	\$ 7,211
Liberty Tree - Replace Generator Controls	Replace failed generator control panel.	#1500000124-1	\$ 4,122

**Pennichuck East Utility, Inc.**  
**2015 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$\$ invested in 2015</b>
Peacham Rd. Station, Locke Lake - Replace Master Meter	Replaced under registering distribution entry point meter.	#1500000125-1	\$ 4,887
Meadowview Station - Rebuild Booster #3	Replace failed booster pump.	#1600000019-1	\$ 2,995
Williamsburg - Replace Chlorine Feed Pump	Replace failed chemical feed pump.	#1600000020-1	\$ 1,261
Forrest Ridge - Replace Magnetic Master Flow Meter	Replaced under registering distribution entry point meter.	#1600000021-1	\$ 2,078
<b>Pennichuck East Utilities 2015 Capital Expenditures -</b>			<b>\$ 2,266,059</b>

**Pennichuck East Utility, Inc.**  
**2016 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$\$ invested in 2016</b>
Hardwood Estates Pump Station Replacement	See Boisvert Testimony in DW17-128	#1400000090-3	\$ 36,003
PEU Station Demolitions	See Boisvert Testimony in DW17-128	#1400000091-3	\$ 13,174
Locke Lake, Winwood and Monroe Phase 2 (carryover 2016)	See Boisvert Testimony in DW17-128	#1500000028-2	\$ 19,535
W&E Waterline (2015 Phase) 2016 carryover	See Boisvert Testimony in DW17-128	#1500000031-3	\$ 5,254
Stone Sled Station Treatment Upgrades	Upgrade treatment to SDWA water quality standards for Arsenic, Iron and Manganese	#1600000025-1	\$ 66,282
Locke Lake Varney Road Area	See Boisvert Testimony in DW17-128	#1600000087-1	\$ 1,652,211
Hardwood New Source	Develop additional well. Existing wells were not meeting domestic demands	#1600000147-1	\$ 51,307
Upgrades to Old Windham Road Booster Station	Upgrades to pumps to meet increased domestic demands	#1600000148-1	\$ 20,937
Route 128 Main Extension - Hydrants	Hydrants added to NHDES funded MTBE project	#1600000159-1	\$ 22,500
2016 New Services - PEU	As required by tariff	#1600000008-1	\$ 65,971
2016 Renewed Services - PEU	Replacement of failed services	#1600000009-1	\$ 21,693
2016 Gates - PEU	Replacement of failed gates	#1600000011-1	\$ 6,688
2016 Renewed Meters - PEU - Lead Meter Exchanges	As required by Safe Drinking Water Act	#1600000012-1	\$ 108,278
PEU Share of Weinstein Improvement	As required by water supply contract with Town of Hudson	#1500000039-2	\$ 2,987
Locke Lake, Golf Course - Replace Pump Well #9	Replace failed well pump	#1600000090-4	\$ 2,397
Locke Lake - Replace Pump, Wire and Piping - Well #3	Replace failed well pump	#1600000090-3	\$ 5,679
Beaver Hollow - Rebuild Booster Pump #2	Replace failed well pump	#1600000090-2	\$ 1,995
Booster/Well/Chemical Feed Pump Replacements	Replace various failed chem feed and booster pumps	#1600000090-1	\$ 8,110
Hardwood - Install Radio Tower	Add SCADA communications to Station	#1600000096-4	\$ 11,016
Thurston Woods - Replace Electronic Flow Meter	Replace failed SCADA equipment	#1600000096-3	\$ 1,838
W and E - Install Cellular Communication Device	Add SCADA communications to Station	#1600000096-2	\$ 2,398
Locke Lake - Replace SCADA Computer	Replace failed SCADA equipment	#1600000096-1	\$ 5,490
Rehabilitate 2 Wells, White Rock Station	Rehabilitate wells to restore lost well capacity	#1600000097-1	\$ 40,642
<b>Pennichuck East Utilities 2016 Capital Expenditures -</b>			<b>\$ 2,172,382</b>



**Pennichuck East Utility, Inc.**  
**2017 Investment in Used and Useful Property, Plant and Equipment**  
**Rate Hearing Data Request**  
**8/1/2018**

<b>Project Name</b>	<b>Project Description/Need</b>	<b>Project #</b>	<b>\$\$ invested in 2017</b>
Stone Sled Station Upgrades (2017 carryover)	Upgrade treatment to SDWA water quality standards for Arsenic, Iron and Manganese	#1600000025-2	\$ 12,178
Stone Sled Station Upgrades		#1600000025-1	\$ 66,684
Litchfield Hydraulic Model - Asset Management	Model necessary to design pumping station that is part of interconnection between PWW and PEU to provide required source of supply to Litchfield.	#1700000001-1	\$ 51,900
Hardwood New Source (2017 carryover)	New Well at Hardwood CWS to replace lost capacity of existing wells	#1700000087-1	\$ 112,949
Hardwood New Source (2016)		#1600000147-1	\$ 51,173
Braemar Woods Main Extension	PEU tariffed 1x Revenue Investment in Main Extension	#1700000111-1	\$ 7,392
Pine Haven Land Acquisition	Purchase land for Pine Haven CWS due to expiration of easement that allowed PEU to operate and maintain the CWS Booster Station and wells for this CWS.	#1700000122-1	\$ 95,290
2017 New Services - PEU	As required by tariff	#1700000008-1	\$ 76,749
2017 Renewed Services - PEU	Replacement of failed services	#1700000009-1	\$ 27,094
2017 Gate Replacements - PEU	Replacement of failed gates	#1700000011-1	\$ 538
2016 Renewed Meters - PEU - Lead Meter Exchanges	As required by Safe Drinking Water Act	#1700000012-1	\$ 164,830
Booster/Well/Chemical Feed Pump Replacements - PEU	Replace failed well, booster and chemical feed pumps	#1700000013-1	\$ 56,471
Shaker Heights - Install Water Softening System	Added treatment to soften water and remove excess iron	#1700000089-3	\$ 16,012
Ministerial Heights - Install Radon Treatment	Added treatment to reduce levels of radon	#1700000089-2	\$ 12,825
PEU-Hudson Wholesale Cellular Meter Readers <sup>2</sup>	Install 13 Cellular Meter Interface units to allow remote reading of wholesale meters	#1700000121-1	\$ 3,494
WESCO pressure vessel replacement	Replaced failed hydropneumatic tanks	#1700000126-1	\$ 9,996
<b>Pennichuck East Utilities 2017 Capital Expenditures -</b>			<b>\$ 765,577</b>

1. An individual listing of failed well, booster and chemical feed pumps by water system is available if one is required.
2. Investment will reduce annual meter reading labor, benefits and truck expenses by about \$7,750 per year

**STATE OF NEW HAMPSHIRE**  
**BEFORE THE**  
**PUBLIC UTILITIES COMMISSION**

Docket No. DW 17-128

Pennichuck East Utility, Inc.  
Request for Change in Rates

**DIRECT PREFILED TESTIMONY OF JOHN J. BOISVERT**  
**IN SUPPORT OF PERMANENT RATES**

October 18, 2017

1                    **Professional and Educational Background**

2    **Q.     What is your name and what is your position with Pennichuck East Utility, Inc.?**

3    A.     My name is John J. Boisvert. I am the Chief Engineer of Pennichuck Water Works,  
4           Inc. ("PWW"), which provides services to PEU, Inc. ("PEU" or the "Company")  
5           pursuant to a management allocation agreement. I have worked for PWW since  
6           February 1, 2006. I am a licensed professional engineer in New Hampshire and  
7           Maine.

8    **Q.     Please describe your educational background.**

9    A.     I have a Bachelor of Science degree and a Master of Science degree in Civil  
10          Engineering from the University of New Hampshire in Durham, New Hampshire. I  
11          also have a Master's degree in Environmental Law and Policy from Vermont Law  
12          School in South Royalton, Vermont.

13   **Q.     Please describe your professional background.**

14   A.     Prior to joining PWW, I served as a Team Leader for Weston & Sampson Engineers  
15          of Portsmouth, New Hampshire in their Water Practices Group from 2000 to 2006.  
16          Prior to Weston & Sampson, I was employed by the Layne Christensen Company of  
17          Shawnee Mission, Kansas as Regional Manager for their Geosciences Division in  
18          Dracut, Massachusetts from 1994 to 2000. I completed graduate school in 1992 and  
19          was employed by Hoyle, Tanner, & Associates of Manchester, New Hampshire as a  
20          Project Engineer from 1992 to 1994. Prior to entering full time graduate programs at  
21          the University of New Hampshire and Vermont Law School, I was employed by Civil  
22          Consultants of South Berwick, Maine as a Project Engineer from 1986 to 1989 and by

1 Underwood Engineers of Portsmouth, New Hampshire as a project Engineer from  
2 1985 to 1986.

3 **Q. What are your responsibilities as Chief Engineer of the Company?**

4 A. As Chief Engineer, I am responsible for the planning, design, permitting,  
5 construction, and startup of major capital projects, including pipelines,  
6 reservoirs/dams, building structures, pumping facilities, treatment facilities, and  
7 groundwater supplies. I provide regular technical assistance to PWW's Water Supply  
8 Department, Operations Department, Customer Service Department, and Senior  
9 Management.

10 **Q. What is the purpose of your testimony?**

11 A. I will be providing details of the Company's major capital expenditures for  
12 improvements made to our PEU water systems from 2014 through 2016 and capital  
13 projects that will be placed into service in 2017. Many of these projects will be  
14 familiar to the Commission as they were described in financing petitions submitted by  
15 the Company. Commission Orders 25,541, 25,650, 25,746, 25,758, 25,773, 25,890  
16 and 26,006 regarding financing are attached to this testimony for reference JJB-1.

17  
18 **Overview of Capital Expenditures**

19 **Q. Did the Company make capital expenditures during the period of January 1,**  
20 **2013 through December 31, 2016 to its distribution, storage, treatment, and**  
21 **supply facilities?**

22 A. Yes. The Company made capital expenditures totaling approximately \$7.5 million  
23 from 2013 through 2016

1 Q. Are all of the capital expenditures completed during the period (and described  
2 further below) currently used and useful?

3 A. Yes.

4 Q. What were the major focal points of the Company's capital projects in the  
5 period of 2013 through 2016?

6 A. The Company's focus continues to be multifaceted and includes replacing and/or  
7 upgrading water treatment facilities to ensure compliance with all State and Federal  
8 Drinking Water Regulations, replacing aging infrastructure including treatment and  
9 pumping stations and water mains and services, and completing water supply and  
10 water quality improvement projects for its stand-alone community water systems.

11 Each of the major project areas are described in more detail below.

12 **Source of Supply, Water Treatment, Pumping, and Storage Expenditures**

13 Q. What are the other major projects that the Company completed to ensure  
14 sufficient source of supply, treatment, pumping capacity, distribution and  
15 system storage?

16 A. There were several such projects. They will be addressed as detailed below by water  
17 system.

18 **Locke Lake CWS Water Main Replacement 2013-2016 (Barnstead)**

19 The Locke Lake distribution system replacement projects were all financed with  
20 NHDES State Revolving Fund Loans as described in Commission Orders attached to  
21 this testimony.

22 The projects include the following:

- 23 ○ Locke Lake Dam Site Road Area Phase 2 (2014)

- Locke Lake Winwood & Monroe Area Phase 1 (2014)
- Locke Lake Winwood & Monroe Area Phase 2 (2015)
- Locke Lake Varney Road Area (2016)

The total cost for completing the projects detailed above was approximately \$2,859,000.

When the Company acquired the Locke Lake water system in 2006 many deficiencies were known and several more were identified. Water quality and water storage issues were addressed early on while distribution repairs and improvements have been completed over time. There is approximately 53,600 LF of the original 104,000 LF of water main remaining in the Locke Lake Water System. Of the original water main, approximately 24,800 LF is 4-inch and 3-inch schedule 40 glued joint PVC electrical conduit and approximately 28,800 LF is 2-inch 160 PSI IPS HDPE with nylon stab fittings or 2-inch SDR21 PVC with glued joints. Neither type of pipe meets the AWWA standard for water mains. The schedule 40 glued joint PVC (all sizes) is consistently failing at the joints while the 2-inch HDPE consistently fails at the nylon stab fittings. Over the past seven years (2010 -2016) the Company repaired more than 81 leaks in the Locke Lake Water System; 34 have been water main breaks, with the remaining 47 leaks occurring on the main to stop portion of a service.

When the system was acquired in 2006, unaccounted for water in the Locke Lake Water system constantly exceeded 60 gpm, or about 125% unaccounted for water. Unaccounted for water currently averages about 15 gpm, or about 14%. Although the level of unaccounted water in the overall system has decreased significantly from the main replacement projects that the Company has undertaken over the past several years, the level of unaccounted for water continues to remain elevated but has become more

1 manageable. Nevertheless, as soon as one leak is found and repaired in the parts of the  
2 original mains still in use, another leak frequently develops in a different location. The  
3 Company believes that the only way to eliminate the constant leakage is to replace all the  
4 water mains and water services (main to stop). The current main replacement program  
5 along with a diligent effort at leak detection is responsible for the reduction in  
6 unaccounted for water.

7 Based on an average of the 2011 through 2015 construction costs, the Company replaced  
8 water main for about \$72 per LF (including services). The Company believes that a  
9 program to closely monitor the remaining sections for the next 3 to 5 years will allow  
10 future main replacement projects to be more focused, if necessary. Over time, the  
11 Company targeted its total investment per customer in Locke Lake to approximately  
12 equal the amount it invested per non-Locke Lake customer in PEU.

13 The 2016 work in the Varney Road area represented acceleration in water main  
14 replacement from prior years (approximately four years work) at Locke Lake. The Town  
15 of Barnstead is reconstructing and will re-pave the entire length of Varney Road in 2017.  
16 Varney Road is one of the major roads in Locke Lake, as well as one of the few that are  
17 paved. The water main on Varney Road was one of the more problematic mains with  
18 respect to pipe failure and leakage. Varney Road also had several streets and water mains  
19 that connect into it. The Locke Lake Varney Road Project replaced water main in Varney  
20 Road and water main and services in those connecting/area streets in order to:

- 21 • Minimize the need for heavy construction vehicles to use Varney Road by  
22 completing all pipeline work prior to reconstruction of Varney Road. This  
23 minimized the potential for damage to a newly reconstructed street, which the

1 Company might be held responsible for, if construction on nearby streets were  
2 to occur after 2017.

- 3 • This work completed replacement in the last most pressing area of  
4 substandard piping in Locke Lake. Other areas in Locke Lake with original  
5 piping have not experienced a similar degree of failure and leakage. Until  
6 2016, the Company had deferred replacing the main in Varney Road as it  
7 would cause the Company to assume significant pavement restoration costs.  
8 However, with the Town of Barnstead reconstructing Varney Road in 2017,  
9 the Company's road restoration costs for this project were approximately one-  
10 third of what they would be absent the Town's participation.

- 11 • By completing this sizeable project in 2016, the company:
  - 12 ○ Improved the ability to investigate, reduce and manage leakage.
  - 13 ○ Reduced overall cost for the project by partnering with the Town.
  - 14 ○ Relieved residents (customers) in Locke Lake of continuous  
15 summer/fall construction that has been occurring since 2006. The  
16 Company's plan is to step back from major water main construction  
17 activity for a period of four to five years, unless specific circumstances  
18 necessitate further water main replacement.

19 The Company will continue to monitor the remaining original pipe in Locke Lake and  
20 balance the impact of additional water main replacement in Locke Lake against the  
21 cost of continued leakage and the associated rate impact.

## 22 **W&E CWS (Windham)**

### 23 W&E Water Main Replacement 2014 & 2015



1 The W&E Water System is an independent Community Water System that provides  
2 water service to 222 customers. The W&E Water System is located in Windham,  
3 NH. The W&E system contains approximately 44,000 linear feet of 2, 3, 4, 6, and 8  
4 inch diameter water main. Water mains installed after the Company acquired the  
5 system in 1998 are consistent with AWWA standards. This project replaced  
6 approximately 8,800 feet of the 24,800 feet of 2, and 3 inch diameter polyethylene  
7 (“PE”) and PVC water main that does not meet current AWWA standards and  
8 replaced all main to stop sections of customer services. The system has had  
9 approximately 80 failures since 1998. The W&E system often experiences spikes in  
10 unaccounted for water loss of 20%. This amount of leakage and failure is critical for  
11 a system with limited supply. Project costs were approximately \$1,063,000

#### 12 W&E Water Main Relocation Interstate 93 Expansion

13 The relocation and expansion of Interstate 93 in the area of Route 111A (Range  
14 Road) by the NHDOT required the Company relocate an existing water main and the  
15 transmission main from W&E Well No,3 to avoid overpass bridge abutments and  
16 new road alignment. The work was included into the NHDOT project by force  
17 account. Project costs were approximately \$132,000

#### 18 **Avery Estates CWS (Londonderry)**

#### 19 Hudson, Hickory Woods, and Avery Estates CWS Interconnection

20 The Avery Water System was operated as an independent Community Water System  
21 providing water service to 47 residential customers. The Avery Water System is  
22 located in Londonderry, NH. The existing Avery Station, treatment and atmospheric  
23 tanks were in need of replacement. The Company currently treats the water for

1 hardness, arsenic, iron & manganese control, corrosion control, disinfection, sediment  
2 filtration and radon. The Company evaluated three options to correct the current  
3 water quality problems, deteriorating building and rusting atmospheric tanks:

- 4 1. Rebuild the Avery Booster Station, storage and treatment systems.
- 5 2. Interconnect the Avery CWS to the Town of Hudson water system.
- 6 3. Interconnect the Avery CWS to the Londonderry Core Water System.

7 The Company completed a detailed analysis of whether onsite treatment or one of the  
8 interconnection options provided the lowest life cycle cost. A copy of life cycle  
9 analysis comparing the onsite rebuild versus the interconnection options was provided  
10 in the Company's financing petition. That analysis showed the Hudson  
11 Interconnection option had the lowest life cycle cost in conjunction with a private  
12 development, Hickory Woods. The project included construction of a pumping  
13 station in Hudson and extending a new 12" water main from the booster station to the  
14 Hickory Woods development project in Londonderry. The Avery Interconnection  
15 began at the end of the Hickory Woods water main. Project costs included a  
16 contribution to the Hudson water booster station and the upsizing of developer  
17 installed water main from 8 inch diameter to 12 inch diameter in order to  
18 accommodate the additional domestic demand and fire flow from the extension of the  
19 main to Avery Estates. Project costs were approximately \$750,000

## 20 **Spruce Pond CWS (Windham)**

### 21 Spruce Pond – Windham Animal Hospital Well Replacement

22 The company acquired the Spruce Pond CWS system in 2008 from a private  
23 developer. The wells servicing the system were approved by the NHDES under the

1 Large Groundwater withdrawal rules. Testing of the Spruce Pond wells during the  
2 permitting phase indicated a hydraulic connection between the Spruce Pond wells and  
3 some neighboring private wells. One of the private wells servicing the Windham  
4 Animal Hospital exhibited the potential for negative impacts once the Spruce Pond  
5 wells reached capacity at full build out. The Spruce Pond wells were approved by the  
6 NHDES with a source replacement plan should a private well be negatively impacted.  
7 In 2013, the Windham Animal Hospital reported to the NHDES and Pennichuck that  
8 its well went dry. The Company evaluated the options to replace the private water  
9 source and determined the best option was to drill the Windham Animal Hospital a  
10 new well on their property. Connecting the Windham Animal Hospital to the Spruce  
11 Pond system would have required Town of Windham Planning Board approval  
12 leaving a new well on their property as the most feasible and timely option. The  
13 project included drilling of the well, constructing over 400 feet of pipeline to the  
14 hospital building, and installing electrical power and water treatment to meet drinking  
15 water standards (manganese filtration, arsenic removal, and hardness). Project costs  
16 were approximately \$60,000.

#### 17 **Hardwood CWS (Windham)**

18 Improvements to the Hardwood CWS included the addition of an emergency standby  
19 generator, a complete reconstruction of the station structure including treatment  
20 process, controls and pumping system, finished water storage and a new water supply  
21 well. The Company installed the emergency generator first as planning and design  
22 was underway for a replacement station. The generator would power the existing  
23 facility in an emergency and was sized to be re-used at the new facility when

constructed. The station was aging and the existing steel water storage tanks had considerable deep corrosion such that repair and rehabilitation of them would not be feasible. In addition, space was added to the station to accommodate treatment equipment over time resulting in too little room to replace the treatment without taking the system off line, which would likely have triggered water quality violations. The new station was constructed at the same location. The work included a new building, new pumping equipment, iron & manganese filtration, water softening, disinfection corrosion control, and finished water storage. The final phase of the Hardwood improvements was the siting and permitting of a new well to replace lost capacity of the existing wells. During 2016 in particular, as well as previous years, the Company needed to truck bulk water to the station to make up demand (even with full outside use restrictions) that could not be met by the existing wells. The Company began the process of siting and permitting a new well in 2016. The well was place into service in August of 2017 after the construction of pipeline, electrical service and access in order to tie the new well into the treatment process. The well was place into service outside of the 2016 test year. The Company is requesting the new well be included in a step increase for work completed in 2017 as discuss below. Project costs are approximately \$820,000, exclusive of the \$132,000 that was invested in the new well that went on line in August of 2017.

#### **Stone Sled CWS (Bow)**

##### **Stone Sled Station Improvements**

The improvements included an upgrade of the treatment process to remove iron, manganese and arsenic in the two existing wells at Stone Sled Station by replacing

1 the existing water softener and arsenic filters. The existing treatment at Stone Sled  
2 used a water softener to remove iron and manganese followed by two arsenic filters .  
3 High concentrations of brine backwash water from the softener were killing grass and  
4 plantings around the station. The softener was not effectively removing the high  
5 levels of iron. A new method of treatment for the removal of iron and manganese  
6 was needed. This project added iron and manganese filters eliminating the need for  
7 the softener and brine regeneration. Project costs were approximately \$70,000

### 8 **Station Demolitions**

9 The Company began the process of demolishing pumping/treatment stations, storage  
10 tanks and wells that were no longer in service in PEU. These existing facilities  
11 carried property tax burdens. Additionally the existing onsite wells that were no  
12 longer in use were required to be grout filled according to NHDES regulations. .

13 Abandoned facilities that were demolished were located at the following locations:

- 14 • Avery Estates (Londonderry)
- 15 • Birch Hill (Conway)
- 16 • Locke Lake (Barnstead)
- 17 • Green Hills (Raymond)
- 18 • Maple Hills (Derry)
- 19 • Oakwood (Derry)

20 Project costs were approximately \$220,000.

### 21 **PEU contribution to Town of Hudson Facilities**

#### 22 Hudson Old Windham Station Improvements

1 The Company provides water to customers along Route 128 in Windham and Pelham  
2 in accordance with a water purchase agreement with Hudson. Purchased water for  
3 this area passes through Hudson's Old Windham Road Booster Station. Growth and  
4 expansion in Hudson as well as modest growth and expansion of the Company's  
5 customer base served by the station required upgrades to the station be completed.  
6 The Company contributed to the cost of the upgrades based on its percentage of the  
7 flow passing through the station in accordance with its purchased water contract with  
8 the Town. Project costs were approximately \$21,000

### 9 **2017 Step Projects**

#### 10 Hardwood CWS New Source

11 The three existing wells at Hardwood CWS have declining yields and are not capable  
12 of producing enough water to meet demands during the summer months even with  
13 outside use restrictions. Water had to be trucked in on a weekly basis to keep the  
14 storage tanks full and to supply customers with enough water for domestic use in  
15 2016. To restore lost capacity, the Company completed a geophysical survey on the  
16 Hardwood property to identify potential well sites. The geophysics identified two  
17 potential locations and a well was drilled at the location closest to existing  
18 infrastructure and the treatment facility. Testing determined the new well would have  
19 sufficient flow capacity to make up the supply shortfall and it was subsequently  
20 approved by the NHDES. Electric power and pipeline were extended to the new well  
21 and the well was placed into service in August 2017. Project costs are expected to be  
22 \$132,000.

#### 23 Maple Hills - Brady Avenue Water Main Replacement Phase 1 (Derry)

1 The Brady Avenue replacement project coincides with a Town of Derry sewer and  
2 street reconstruction project. The project is funded by a NHDES SRF loan. The  
3 Company is taking advantage of the Town's work to replace an existing 1.5 inch  
4 diameter water main (originally thought to be 3 inch diameter) on Brady which serves  
5 at least 22 homes with an 8 inch water main. By coordinating the work with Derry,  
6 the Company saves significant street reconstruction costs. Because of the project  
7 start, the project needs to be completed in two phases due to the need to place road  
8 pavement before winter. Phase 1 of the project includes approximately 1,900 feet of  
9 the total 4,000 feet of main in the project. The phase 1 water main will be in service  
10 before the end of 2017. Phase 1 costs are expected to be \$200,000.

11 Hillcrest Road Water Main Replacement Litchfield, NH

12 The Hillcrest Road project has received SRF Loan financing and was planned for  
13 construction in 2017. Because of the significant amount a water main construction  
14 taking place in Litchfield due to PFOA contamination, staffing the project to  
15 complete the design and bid documents had to be delayed. The result is the Company  
16 will complete the design in late 2017 for bidding and construction in the second and  
17 third quarter of 2018 and will not be requested as a 2017 Step Project.

18 **Q. Is this expected to be the anticipated level of pipeline replacement/rehabilitation**  
19 **in the future for PEU?**

20 **A.** Water main replacement in Locke Lake will be in a holding pattern through 2019  
21 unless conditions with respect to the older piping rapidly deteriorate. Other  
22 replacement projects on the horizon may be:

- Replacement a large area of W&E (Windham) with original small diameter piping. The effort will be similar in size to the work completed in 2014 and 2015 and would be timed to coincide with a Town paving project.
- Replacement of the Gage Hill (Pelham) CWS piping network. Gage Hill has had numerous leak repairs since the Company acquired the system. This effort will be timed to coincide with a Town paving project as well as completed in a year where it will not compete for capital with priority projects.
- Replacement and addition of piping in Williamsburg (Pelham Core) CWS (Pelham) will be required to address the need to replace existing undersized and substandard piping with larger piping. The replacement along with the addition of water main to complete a pipeline loop will improve flow and pressure as well as allow for fire protection in an area where it is currently unavailable.

**Q. Are there other major projects planned by PEU in 2018, 2019, and 2020? If so can you briefly describe them?**

**A.** Yes. The Company is planning four major projects in this time period including:

1. PEU – PWW Interconnection

The Interconnection was originally planned for 2016 but now has been shifted to 2018 because of environmental permitting of the pipeline crossing of the Merrimack River between Merrimack, NH and Litchfield, NH. The project is being funded in part with an SRF loan as approved in NHPUC Order No. 26,006 and NHPUC Order No. 26,026. The project budget is approximately \$3.0M



2. Atkinson Commerce Park CWS Station Improvements

The Commerce Park Station currently serves five commercial accounts and it is expected to add three more accounts by the end of 2017. The station provides both domestic and fire protection flows. An evaluation of the station completed by the Company in 2016 found the pumping capacity insufficient to meet the required fire flow due to aging piping internal to the station and undersized pumps and controls. The work anticipates replacement of the station adjacent to the existing station and the addition of emergency standby power. The project budget is approximately \$0.3M

3. Londonderry Core Water Storage Tank

The Company is in the initial planning stage for a new 1.1 million gallon tank to serve the Londonderry Core water system. Increases in customer base over time and the addition of a large private development in the Exit 4 area of Interstate 93 will begin to exceed the peak pumping capacity of the Mountain Homes Booster Station that feeds the majority of the Londonderry Core system. The Company is in discussions with the private developer to fund approximately 50% of the capital cost of the tank while the remaining 50% will be funded by a surcharge on new customer growth and by existing customers through decreased purchased water costs. The Company will receive a lower volumetric rate from Manchester Water Works once the tank is in service. The project budget is approximately \$2.6M.

4. Locke Lake CWS Source of Supply

The Company is currently operating under a Corrective Action Plan (CAP) to address water source capacity at the Locke Lake CWS. The CAP is a result of

“significant deficiencies” identified by the NHDES. The Company estimates it may take up to three years to locate, acquire, permit, and construct a new water source to meet the current water demands of the system. The Company anticipates design and permitting to take place in 2018 and 2019 while construction is anticipated in 2020. The project budget is still not well defined but could run between \$1.5 to 3.0M dependent upon the final identified water supply solution.

**Q. Did the Company make investments to add or replace customer services, hydrants, valves, and meters in 2014-2016?**

A. Yes, the table below presents the number of new and renewed services, new and renewed hydrants, added or replaced system valves, and the number of meters replaced at an investment of approximately \$1.0M.

Feature/Year	2014	2015	2016	Total
Services (new)	3	8	20	35
Services (renewed)	2	7	8	24
Hydrants (new)	0	1	0	1
Hydrants (renewed)	2	0	0	3
Valves	9	10	3	26
Meters – Replacement of leaded brass meters	651	492	476	2535

**Q. What other types of capital expenditures has the Company undertaken to maintain and enhance service?**

1    **A.**     There have been other efforts classified as capital projects that fall into this general  
2           category. These projects are predominantly replacements of plant and equipment as  
3           well as technology upgrades that improve operational efficiency. Examples of these  
4           projects include: booster pump replacements, well pump replacements, treatment  
5           equipment upgrades and replacements, filter media change outs, improvements to  
6           buildings (such as new roofs), electrical system upgrades, SCADA &  
7           communications additions.

8

9    **Q.**     **Does this complete your testimony?**

10   **A.**     Yes.

11