ENERGY SAVINGS PLAN

SUBMITTED BY:
Maser Consulting P.A.
REV 4
BPU Approved
2/3/20

MASER CONSULTING P. A.

DCO Energy

Table of Contents

ENERGY SAVINGS PLAN

SECTION 1 – PROJECT OVERVIEW

PROJECT OVERVIEW

The Energy Savings Plan (ESP) is the core of the Energy Savings Improvement Plan (ESIP) process. It describes Brick MUA's preferred Energy Conservation Measures (ECMs), the budget cost for each ECM and the ECM energy savings calculations that self-fund the project via reduced operating costs. The ESP provides Brick MUA the necessary information to decide which proposed ECMs to implement as part of your (ESIP) project. Working with the District's staff, your selected ESIP project would:

1. Self-fund a $1,586,331 project
2. Generates $108,203 in annual energy savings
3. Eligible for $9,000 in *NJ Smart Start* incentives

NOTE: This submitted ESP doesn't constitute any contractual obligation between Brick MUA and Maser Consulting. Any contractual obligations will be performed under separate legal documents per mutual signed agreement of the parties involved and subject to the applicable laws and requirements of the ESIP legislation and State of New Jersey.

To ensure conformance with the requirements of Public Finance Notice LFN 2009-11, the ESP must address the following elements:

- *The results of the energy audit*
- *A description of the energy conservation measures that will comprise the program; (Section 3)*
- *An estimate of greenhouse gas reductions resulting from those energy savings (Section 3);*
- *Identification of all design and compliance issues and identification of who will provide these services; (Section 5)*
- *An assessment of risks involved in the successful implementation of the plan; (Section 5)*
- *Identify the eligibility for, and costs and revenues associated with the PJM Independent System Operator for demand response and curtailable service activities; (Section 3)*
- *Schedules showing calculations of all costs of implementing the proposed energy conservation measures and the projected energy savings; (Section 3)*
- *Maintenance requirements necessary to ensure continued energy savings, and describe how they will be provided; and (Section 6)*
- *If developed by an ESCO, a description of, and cost estimates of a proposed energy savings guarantee. (Section 7)*

In addition, and per LFN 2009-11, the ESP requires several other important elements:

- *The calculations of energy savings must be made in accordance with protocols for their calculation adopted by the BPU. The calculation shall include all applicable State and federal rebates and tax credits, but shall not include the cost of an energy audit and the cost of verifying energy savings. (Section 3)*
- *An independent third party must review the plan and certify that the plan savings were properly calculated pursuant to the BPU protocols.*
- *If an ESCO is used to prepare the plan, the ESCO must provide an estimate of the cost of a guarantee of energy savings. When adopting the plan, the local unit must decide whether or not to accept the guarantee (covered below). (Section 7)*
- *The plan must be verified by an independent third party to ensure that the calculations were made in accordance with the BPU standards and that all required elements of the ESP are covered.*
- *After verification is completed, the governing body must formally adopt the plan. At that point, the plan must be submitted to the Board of Public Utilities where it will be posted on the BPU website. BPU approval is not required. If the contracting unit maintains its own website, the plan must also be posted on that site.*

Maser Consulting looks forward to the third-party review of our energy calculations and Brick MUA's approval of the Energy Savings Plan to implement via the requirements of the ESIP legislation. Your time, effort, and support is appreciated.

ENERGY SAVINGS PLAN

SECTION 2 – BRICK MUA BASELINE

Total Utility Consumption and Site EUI

The Brick MUA Energy Savings Plan includes 35 facilities. To develop the ESP, Maser Consulting was provided with all available utility data (Electric & Natural Gas). Maser Consulting tracked and documented this utility data from March 2016 to February 2017. A listing of the buildings, the total utility consumption, and Energy Usage Index for the 35 facilities is detailed below.

BUILDINGS & FACILITIES		
BUILDING #	BUILDING/FACILITY NAME	SQFT
1	Main Complex	64,894
2	Drum Point Road Pumping Station	2,500
3	Bay Harbor WWPS	2,500
4	Breton Road WWPS	155
5	Burnt Tavern Manor WWPS	150
6	Cape Breton WWPS	50
7	Drum Point Rd WWPS	2,500
8	Eagle Point WWPS	50
9	Eastern Lane WWPS	155
10	Fifth St WWPS	155
11	Greenbriar I WWPS	65
12	Greenbriar II WWPS	57
13	Island Drive WWPS	50
14	Jaywood Manor WWPS	20
15	Lanes Mill WWPS	155
16	Laurel Brook WWPS	150
17	Laurelton WWPS	20
18	Mantoloking Road WWPS	20
19	Paramount Way WWPS	20
20	Pine Meadows WWPS	155
21	Pine View WWPS	192
22	Rivera Drive WWPS	155
23	Riverside Drive WWPS	2,500
24	Sea View Village WWPS	20
25	Sloping Hill WWPS	155
26	Trailer Park WWPS	10
27	Turkey Point WWPS	10
28	Vanada Woods WWPS	155
29	Alaska Booster Station	500
30	Beverly Beach Booster Station	500
31	Burrsville Booster Station	500
32	Mantoloking Road Booster Station	500
33	Morris Avenue Booster Station	500
34	Ridge Road Booster Station	500
35	Reservoir	1,200

Total Utility Consumption and Site EUI

PROJECT DATA		
TOTAL PROJECT SQUARE FOOTAGE	BASELINE ANNUAL ENERGY USAGE (MMBTU)	BASELINE ANNUAL ENERGY COST ($$)
81,218	34,753,688,392	$1,019,463
TOTAL NUMBER OF FACILITIES/BUILDINGS	BASELINE ENERGY USAGE INDEX (BTU/SQFT)	BASELINE ENERGY COST INDEX ($$/SQFT)
35	427,906	$12.55

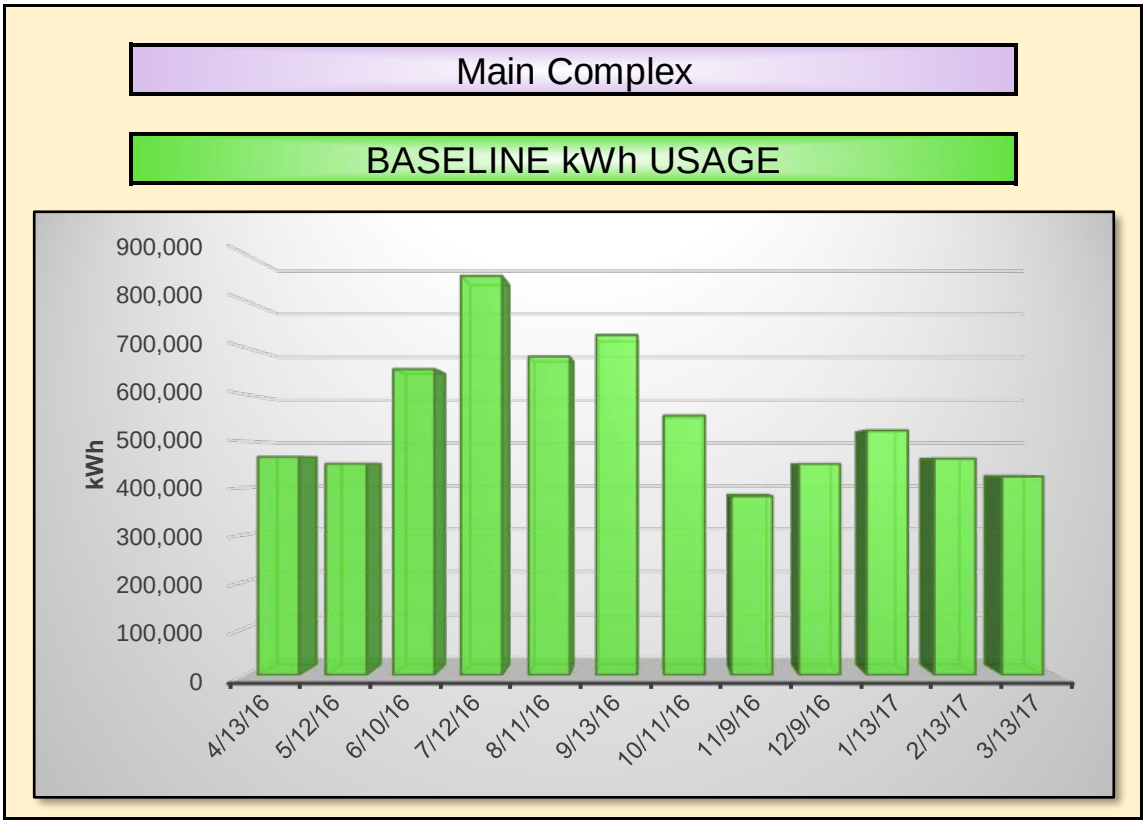
BRICK MUA BUILDINGS/FACILITIES		ELECTRIC					
BUILDING/FACILITY NAME	SQFT	USAGE kWh	DEMAND kW	USAGE kWh / SQFT	USAGE BTU / SQFT	TOTAL COST $$	BLENDED COST $$ / kWh
Main Complex	64,894	6,627,590	1,689	102.1	348,466	$654,100	$0.10
Bay Harbor WWPS	2,500	165,920	0	66.4	226,448	$21,883	$0.13
Breton Road WWPS	155	16,557	0	106.8	364,468	$2,414	$0.15
Burnt Tavern Manor WWPS	150	17,233	0	114.9	391,993	$3,317	$0.19
Cape Breton WWPS	50	2,079	0	41.6	141,871	$449	$0.22
Drum Point Rd WWPS	2,500	272,720	239	109.1	372,208	$33,697	$0.12
Eagle Point WWPS	50	3,078	0	61.6	210,043	$556	$0.18
Eastern Lane WWPS	155	10,484	0	67.6	230,783	$1,616	$0.15
Fifth St WWPS	155	16,559	0	106.8	364,512	$2,496	$0.15
Greenbriar I WWPS	65	11,638	0	179.0	610,905	$2,324	$0.20
Greenbriar II WWPS	57	13,963	0	245.0	835,820	$2,164	$0.15
Island Drive WWPS	50	3,596	0	71.9	245,391	$644	$0.18
Jaywood Manor WWPS	20	5,967	0	298.4	1,017,970	$962	$0.16
Lanes Mill WWPS	155	28,520	0	184.0	627,808	$4,013	$0.14
Laurel Brook WWPS	150	49,360	0	329.1	1,122,775	$6,459	$0.13
Laurelton WWPS	20	9,392	0	469.6	1,602,275	$1,464	$0.16
Paramount Way WWPS	20	20,618	0	1,030.9	3,517,431	$3,160	$0.15
Pine Meadows WWPS	155	21,160	0	136.5	465,793	$2,904	$0.14
Pine View WWPS	192	7,260	0	37.8	129,016	$1,261	$0.17
Rivera Drive WWPS	155	13,001	0	83.9	286,190	$3,082	$0.24
Riverside Drive WWPS	2,500	168,000	65	67.2	229,286	$20,524	$0.12
Sea View Village WWPS	20	3,769	0	188.5	642,991	$620	$0.16
Sloping Hill WWPS	155	13,531	0	87.3	297,857	$1,951	$0.14
Trailer Park WWPS	10	1,255	0	125.5	428,206	$230	$0.18
Turkey Point WWPS	10	6,297	0	629.7	2,148,536	$1,019	$0.16
Vanada Woods WWPS	155	11,806	0	76.2	259,884	$2,796	$0.24
Alaska Booster Station	500	243,520	0	487.0	1,661,780	$31,207	$0.13
Beverly Beach Booster Station	500	80,177	19	160.4	547,128	$9,797	$0.12
Burrsville Booster Station	500	211,410	0	422.8	1,442,662	$26,776	$0.13
Morris Avenue Booster Station	500	117,286	0	234.6	800,360	$18,385	$0.16
Ridge Road Booster Station	500	77,476	0	155.0	528,696	$10,589	$0.14
Reservoir	1,200	239,120	0	199.3	679,898	$29,614	$0.12
TOTALS	**81,218**	**8,818,666**	**1,689**	**108.6**	**370,476**	**$960,146**	**$0.11**

BRICK MUA BUILDINGS/FACILITIES		NATURAL GAS			
BUILDING/FACILITY NAME	SQFT	USAGE THERMS	USAGE BTU / SQFT	TOTAL COST $$	UNIT COST $$ / THERM
Main Complex	64,894	45,967	70,834	54,746	$1.19
Drum Point Road Pumping Station	2,500	0	0	0	-
Bay Harbor WWPS	2,500	0	0	0	-
Breton Road WWPS	155	11	7,097	374	$34.00
Burnt Tavern Manor WWPS	150	0	0	0	-
Cape Breton WWPS	50	0	0	0	-
Drum Point Rd WWPS	2,500	0	0	0	-
Eagle Point WWPS	50	0	0	0	-
Eastern Lane WWPS	155	16	10,323	354	$22.12
Fifth St WWPS	155	0	0	0	-
Greenbriar I WWPS	65	0	0	0	-
Greenbriar II WWPS	57	0	0	0	-
Island Drive WWPS	50	0	0	0	-
Jaywood Manor WWPS	20	0	0	0	-
Lanes Mill WWPS	155	0	0	0	-
Laurel Brook WWPS	150	0	0	0	-
Laurelton WWPS	20	95	475,000	495	$5.21
Paramount Way WWPS	20	0	0	0	-
Pine Meadows WWPS	155	41	26,452	328	$7.99
Pine View WWPS	192	0	0	0	-
Rivera Drive WWPS	155	73	47,097	367	$5.02
Riverside Drive WWPS	2,500	22	880	405	$18.41
Sea View Village WWPS	20	0	0	0	-
Sloping Hill WWPS	155	26	16,774	358	$13.77
Trailer Park WWPS	10	0	0	0	-
Turkey Point WWPS	10	0	0	0	-
Vanada Woods WWPS	155	0	0	0	-
Alaska Booster Station	500	0	0	0	-
Beverly Beach Booster Station	500	0	0	0	-
Burrsville Booster Station	500	0	0	0	-
Mantoloking Road Booster Station	500	41	8,200	357	$8.71
Morris Avenue Booster Station	500	206	41,200	651	$3.16
Ridge Road Booster Station	500	82	16,400	459	$5.59
Reservoir	1,200	0	0	0	-
TOTALS	**81,218**	**46,644**	**57,431**	**$59,317**	**$1.27**

BRICK MUA BUILDINGS/FACILITIES		TOTAL ENERGY	TOTAL COST	SITE EUI	SITE ECI
BUILDING/FACILITY NAME	SQFT	USAGE BTUs	$$	USAGE BTU / SQFT	COST $$ / SQFT
Main Complex	64,894	27,210,037,080	$708,845	419,300	$10.92
Bay Harbor WWPS	2,500	566,119,040	$21,883	226,448	$8.75
Breton Road WWPS	155	57,592,484	$2,788	371,564	$17.98
Burnt Tavern Manor WWPS	150	58,798,996	$3,317	391,993	$22.11
Cape Breton WWPS	50	7,093,548	$449	141,871	$8.99
Drum Point Rd WWPS	2,500	930,520,640	$33,697	372,208	$13.48
Eagle Point WWPS	50	10,502,136	$556	210,043	$11.13
Eastern Lane WWPS	155	37,371,408	$1,970	241,106	$12.71
Fifth St WWPS	155	56,499,308	$2,496	364,512	$16.10
Greenbriar I WWPS	65	39,708,856	$2,324	610,905	$35.75
Greenbriar II WWPS	57	47,641,756	$2,164	835,820	$37.97
Island Drive WWPS	50	12,269,552	$644	245,391	$12.87
Jaywood Manor WWPS	20	20,359,404	$962	1,017,970	$48.11
Lanes Mill WWPS	155	97,310,240	$4,013	627,808	$25.89
Laurel Brook WWPS	150	168,416,320	$6,459	1,122,775	$43.06
Laurelton WWPS	20	41,545,504	$1,959	2,077,275	$97.95
Paramount Way WWPS	20	70,348,616	$3,160	3,517,431	$157.99
Pine Meadows WWPS	155	76,297,920	$3,232	492,245	$20.85
Pine View WWPS	192	24,771,120	$1,261	129,016	$6.57
Rivera Drive WWPS	155	51,659,412	$3,449	333,287	$22.25
Riverside Drive WWPS	2,500	575,416,000	$20,929	230,166	$8.37
Sea View Village WWPS	20	12,859,828	$620	642,991	$30.99
Sloping Hill WWPS	155	48,767,772	$2,309	314,631	$14.90
Trailer Park WWPS	10	4,282,060	$230	428,206	$22.99
Turkey Point WWPS	10	21,485,364	$1,019	2,148,536	$101.93
Vanada Woods WWPS	155	40,282,072	$2,796	259,884	$18.04
Alaska Booster Station	500	830,890,240	$31,207	1,661,780	$62.41
Beverly Beach Booster Station	500	273,563,924	$9,797	547,128	$19.59
Burrsville Booster Station	500	721,330,920	$26,776	1,442,662	$53.55
Morris Avenue Booster Station	500	420,779,832	$19,036	841,560	$38.07
Ridge Road Booster Station	500	272,548,112	$11,048	545,096	$22.10
Reservoir	1,200	815,877,440	$29,614	679,898	$24.68
TOTALS	**81,218**	**34,753,688,392**	**$1,019,463**	**427,906**	**$12.55**

On the following pages is a detailed account of each of the utility accounts and meters provided to Maser Consulting.

Main Complex



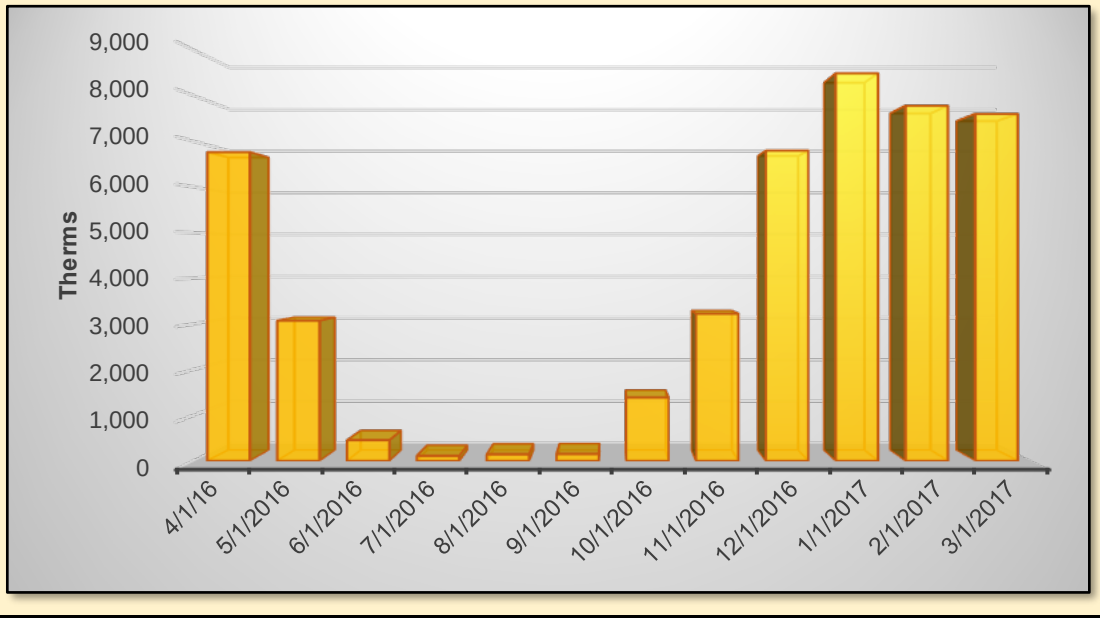
Main Complex						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 018 881 365			Meter #	L13639688		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	465,966	827	$39,431		$4,327	$43,758	$0.094	29	81%	1,589,875,992
4/14/16	5/12/16	451,269	1,307	$38,386		$6,835	$45,221	$0.100	29	50%	1,539,729,828
5/13/16	6/10/16	653,419	1,369	$55,517		$7,737	$63,254	$0.097	29	69%	2,229,465,628
6/11/16	7/12/16	852,779	1,629	$72,386		$9,202	$81,587	$0.096	32	68%	2,909,681,948
7/13/16	8/11/16	680,409	1,689	$57,922		$9,543	$67,465	$0.099	30	56%	2,321,555,508
8/12/16	9/13/16	726,076	1,540	$63,086		$8,702	$71,787	$0.099	33	60%	2,477,371,312
9/14/16	10/11/16	554,106	1,361	$48,453		$7,117	$55,570	$0.100	28	61%	1,890,609,672
10/12/16	11/9/16	381,862	907	$33,374		$4,745	$38,119	$0.100	29	60%	1,302,913,144
11/10/16	12/9/16	450,834	957	$39,402		$5,005	$44,406	$0.098	30	65%	1,538,245,608
12/10/16	1/13/17	522,488	1,160	$45,643		$6,243	$51,887	$0.099	35	54%	1,782,729,056
1/14/17	2/13/17	462,295	1,268	$40,819		$6,897	$47,716	$0.103	31	49%	1,577,350,540
2/14/17	3/13/17	423,999	981	$37,530		$5,334	$42,864	$0.101	28	64%	1,446,684,588
TOTALS		6,625,502	1,689	$571,948	$0	$81,687	$653,634	$0.099	363	45%	22,606,212,824

Main Complex						ELECTRIC METER #2					
Provider:	JCP&L			Account #	100 073 553 263			Meter #	Unmetered		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	174		15	23		38	0.22	29	-	593,688
4/14/16	5/12/16	174		15	23		38	0.22	29	-	593,688
5/13/16	6/10/16	174		15	23		38	0.22	29	-	593,688
6/11/16	7/12/16	174		16	23		38	0.22	32	-	593,688
7/13/16	8/11/16	174		16	23		38	0.22	30	-	593,688
8/12/16	9/13/16	174		16	23		38	0.22	33	-	593,688
9/14/16	10/11/16	174		16	23		39	0.22	28	-	593,688
10/12/16	11/9/16	174		16	23		39	0.22	29	-	593,688
11/10/16	12/9/16	174		16	23		39	0.22	30	-	593,688
12/10/16	1/13/17	174		16	23		39	0.22	35	-	593,688
1/14/17	2/13/17	174		14	27		40	0.23	31	-	593,688
2/14/17	3/13/17	174		16	25		41	0.24	28	-	593,688
TOTALS		2,088	0	182	283	0	465	0.22	363	-	7,124,256

Main Complex											
TOTAL ELECTRIC											
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Days	Load Factor	BTU
466,140	827	$39,446	$23	$4,327	$43,796	$5.23	$0.08	$0.09	29	81%	1,590,469,680
451,443	1307	$38,401	$23	$6,835	$45,259	$5.23	$0.09	$0.10	29	50%	1,540,323,516
653,593	1369	$55,532	$23	$7,737	$63,292	$5.65	$0.08	$0.10	29	69%	2,230,059,316
852,953	1629	$72,401	$23	$9,202	$81,626	$5.65	$0.08	$0.10	32	68%	2,910,275,636
680,583	1689	$57,937	$23	$9,543	$67,504	$5.65	$0.09	$0.10	30	56%	2,322,149,196
726,250	1540	$63,101	$23	$8,702	$71,826	$5.65	$0.09	$0.10	33	60%	2,477,965,000
554,280	1361	$48,469	$23	$7,117	$55,609	$5.23	$0.09	$0.10	28	61%	1,891,203,360
382,036	907	$33,390	$23	$4,745	$38,158	$5.23	$0.09	$0.10	29	61%	1,303,506,832
451,008	957	$39,417	$23	$5,005	$44,445	$5.23	$0.09	$0.10	30	65%	1,538,839,296
522,662	1160	$45,659	$23	$6,243	$51,925	$5.38	$0.09	$0.10	35	54%	1,783,322,744
462,469	1268	$40,832	$27	$6,897	$47,756	$5.44	$0.09	$0.10	31	49%	1,577,944,228
424,173	981	$37,545	$25	$5,334	$42,905	$5.44	$0.09	$0.10	28	64%	1,447,278,276
6,627,590	1689	$572,130	$283	$81,687	$654,100	$5.45	$0.09	$0.10	363	45%	22,613,337,080

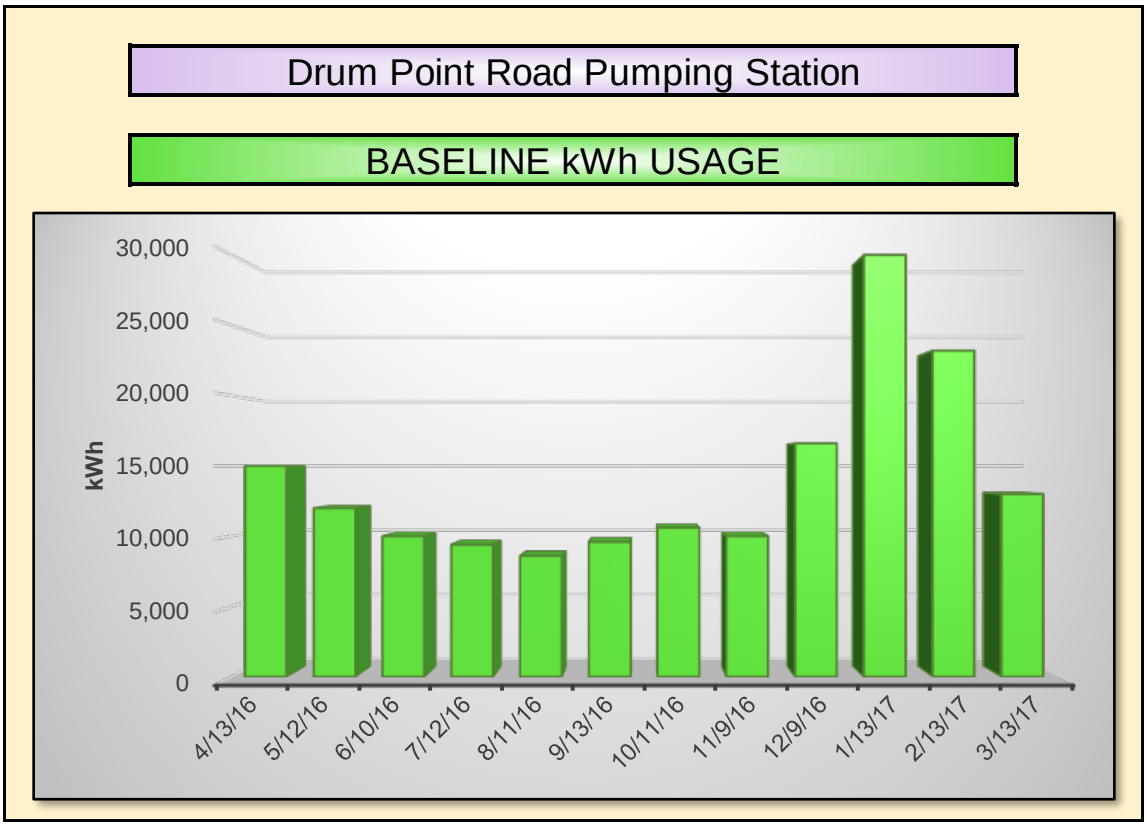
Main Complex

BASELINE NATURAL GAS CONSUMPTION



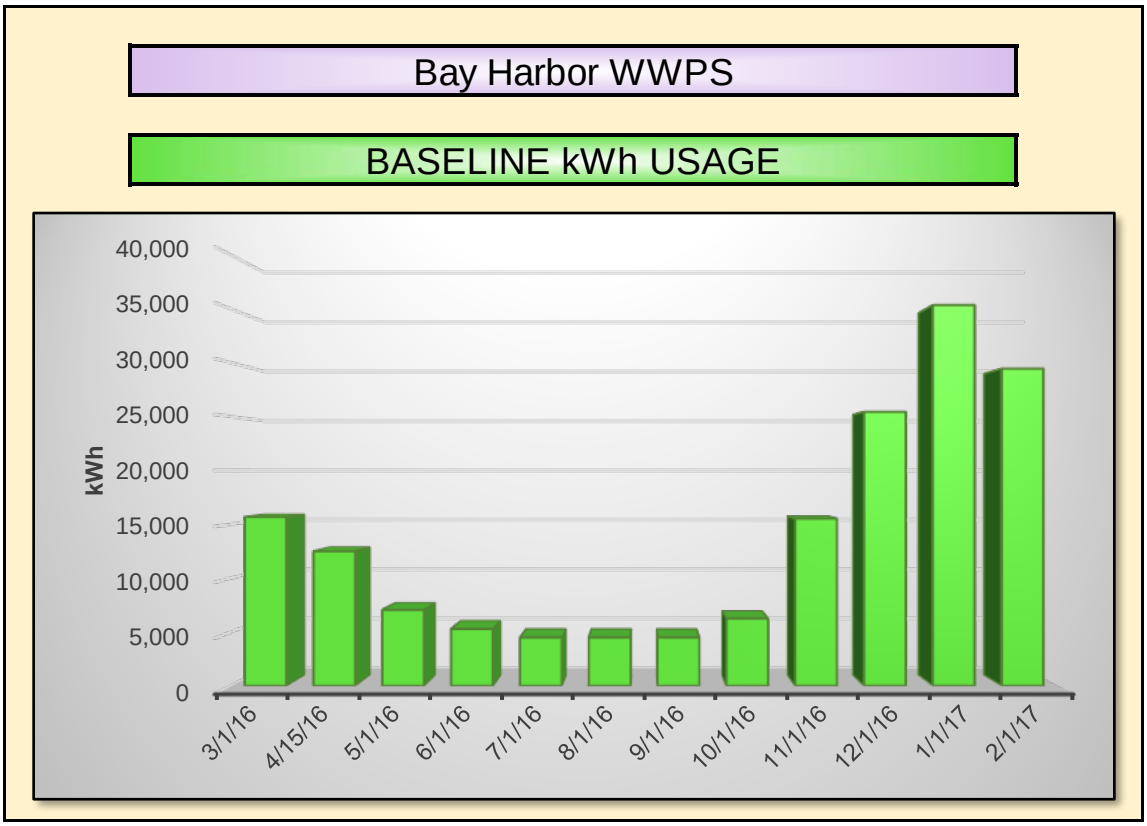
Main Complex					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	6,763	$3,432	$3,080	$6,512	$0.96	676,300,000
4/2/16	5/1/2016	3,071	$2,039	$1,477	$3,516	$1.14	307,100,000
5/2/16	6/1/2016	453	$969	$218	$1,187	$2.62	45,300,000
6/2/16	7/1/2016	111	$821	$53	$874	$7.88	11,100,000
7/2/16	8/1/2016	145	$809	$95	$904	$6.24	14,500,000
8/2/16	9/1/2016	150	$839	$75	$914	$6.10	15,000,000
9/2/16	10/1/2016	1,385	$1,405	$485	$1,890	$1.36	138,500,000
10/2/16	11/1/2016	3,222	$2,369	$1,510	$3,879	$1.20	322,200,000
11/2/16	12/1/2016	6,796	$4,597	$3,389	$7,986	$1.18	679,600,000
12/2/16	1/1/2017	8,489	$5,299	$5,387	$10,686	$1.26	848,900,000
1/2/17	2/1/2017	7,780	$4,629	$3,667	$8,296	$1.07	778,000,000
2/2/17	3/1/2017	7,602	$4,977	$3,123	$8,101	$1.07	760,200,000
TOTALS		45,967	$32,187	$22,559	$54,746	$1.19	4,596,700,000

Drum Point Road Pumping Station



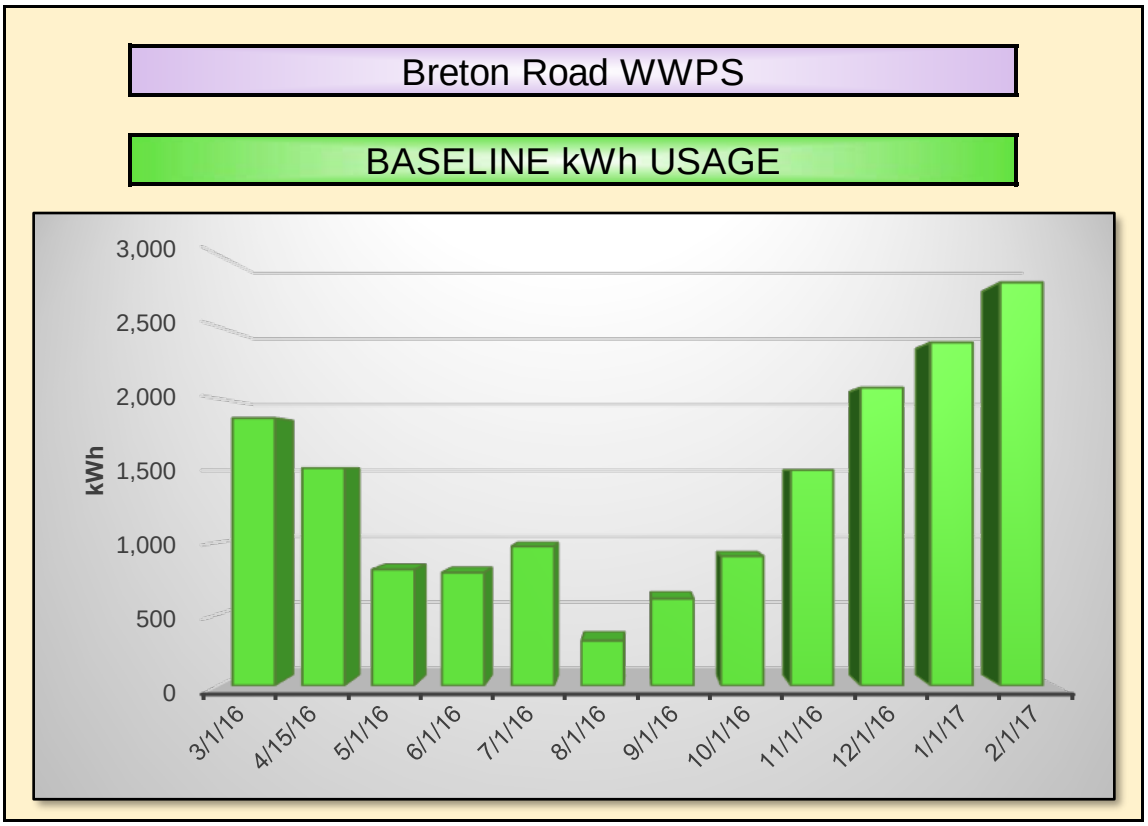
Drum Point Road Pumping Station								ELECTRIC METER #1			
Provider:	JCP&L			Account #				Meter #			
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	15,000	45	$1,615	$1,260	$194	$3,069	$0.205	29	48%	51,180,000
4/14/16	5/12/16	12,000	30	$1,303	$1,008	$112	$2,423	$0.202	29	57%	40,944,000
5/13/16	6/10/16	10,000	33	$1,135	$840	$139	$2,115	$0.211	29	43%	34,120,000
6/11/16	7/12/16	9,400	24	$1,071	$790	$82	$1,942	$0.207	32	52%	32,072,800
7/13/16	8/11/16	8,600	27	$985	$722	$103	$1,811	$0.211	30	44%	29,343,200
8/12/16	9/13/16	9,600	26	$1,104	$806	$97	$2,008	$0.209	33	46%	32,755,200
9/14/16	10/11/16	10,600	25	$1,223	$890	$84	$2,198	$0.207	28	63%	36,167,200
10/12/16	11/9/16	10,000	39	$1,156	$840	$163	$2,159	$0.216	29	37%	34,120,000
11/10/16	12/9/16	16,600	51	$1,883	$1,394	$229	$3,506	$0.211	30	45%	56,639,200
12/10/16	1/13/17	30,000	62	$3,369	$2,520	$309	$6,197	$0.207	35	58%	102,360,000
1/14/17	2/13/17	23,200	65	$2,644	$1,949	$364	$4,957	$0.214	31	48%	79,158,400
2/14/17	3/13/17	13,000	48	$906	$1,092	$253	$2,251	$0.173	28	40%	44,356,000
TOTALS		168,000	65	$18,394	$14,112	$2,130	$34,636	$0.206	363	30%	573,216,000

Bay Harbor WWPS

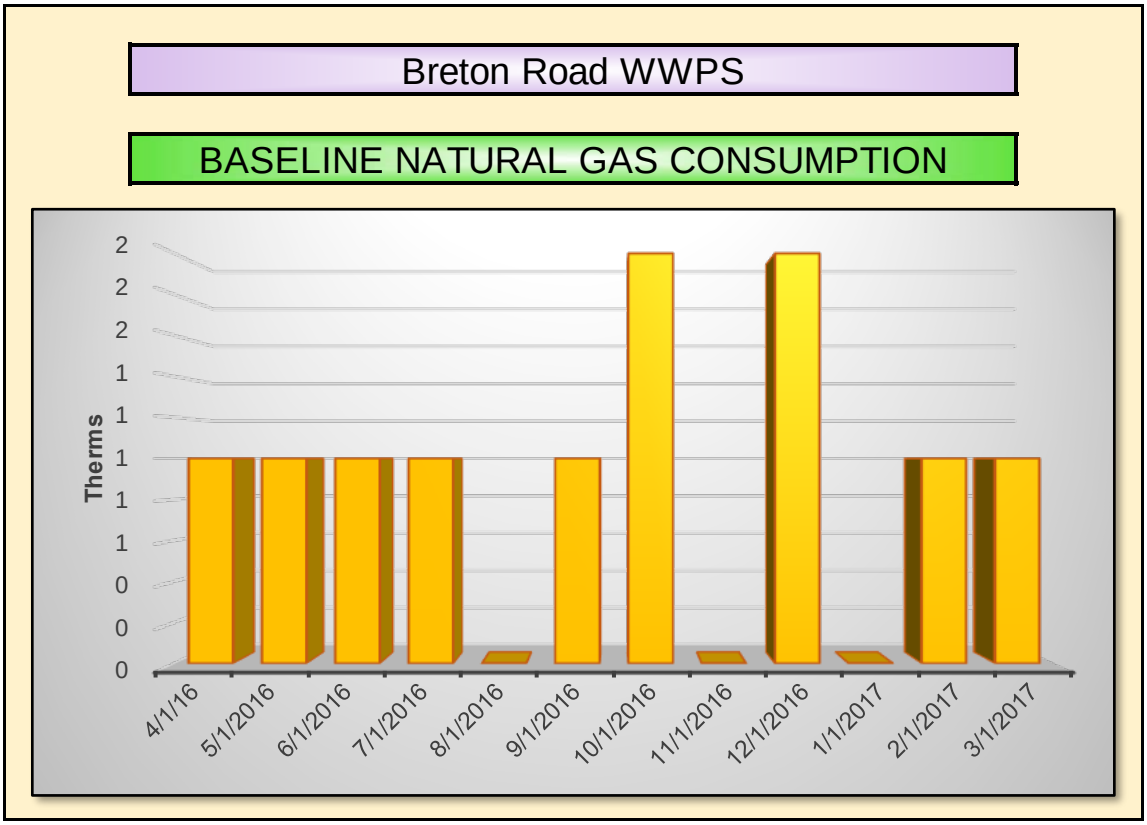


Bay Harbor WWPS								ELECTRIC METER #1			
Provider:				Account #				Meter #			
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	15,680		$1,342	$634		$1,976	$0.126	30	-	53,500,160
3/2/16	4/15/16	12,480		$1,068	$504		$1,572	$0.126	45	-	42,581,760
4/16/16	5/1/16	7,040		$603	$379		$981	$0.139	16	-	24,020,480
5/2/16	6/1/16	5,280		$471	$350		$822	$0.156	31	-	18,015,360
6/2/16	7/1/16	4,480		$400	$336		$736	$0.164	30	-	15,285,760
7/2/16	8/1/16	4,480		$400	$337		$736	$0.164	31	-	15,285,760
8/2/16	9/1/16	4,480		$400	$345		$745	$0.166	31	-	15,285,760
9/2/16	10/1/16	6,240		$557	$380		$937	$0.150	30	-	21,290,880
10/2/16	11/1/16	15,520		$1,385	$604		$1,989	$0.128	31	-	52,954,240
11/2/16	12/1/16	25,440		$2,270	$916		$3,186	$0.125	30	-	86,801,280
12/2/16	1/1/17	35,360		$3,153	$1,259		$4,412	$0.125	31	-	120,648,320
1/2/17	2/1/17	29,440		$2,624	$1,168		$3,792	$0.129	31	-	100,449,280
TOTALS		165,920	0	$14,673	$7,211	$0	$21,883	$0.132	367	-	566,119,040

Breton Road WWPS

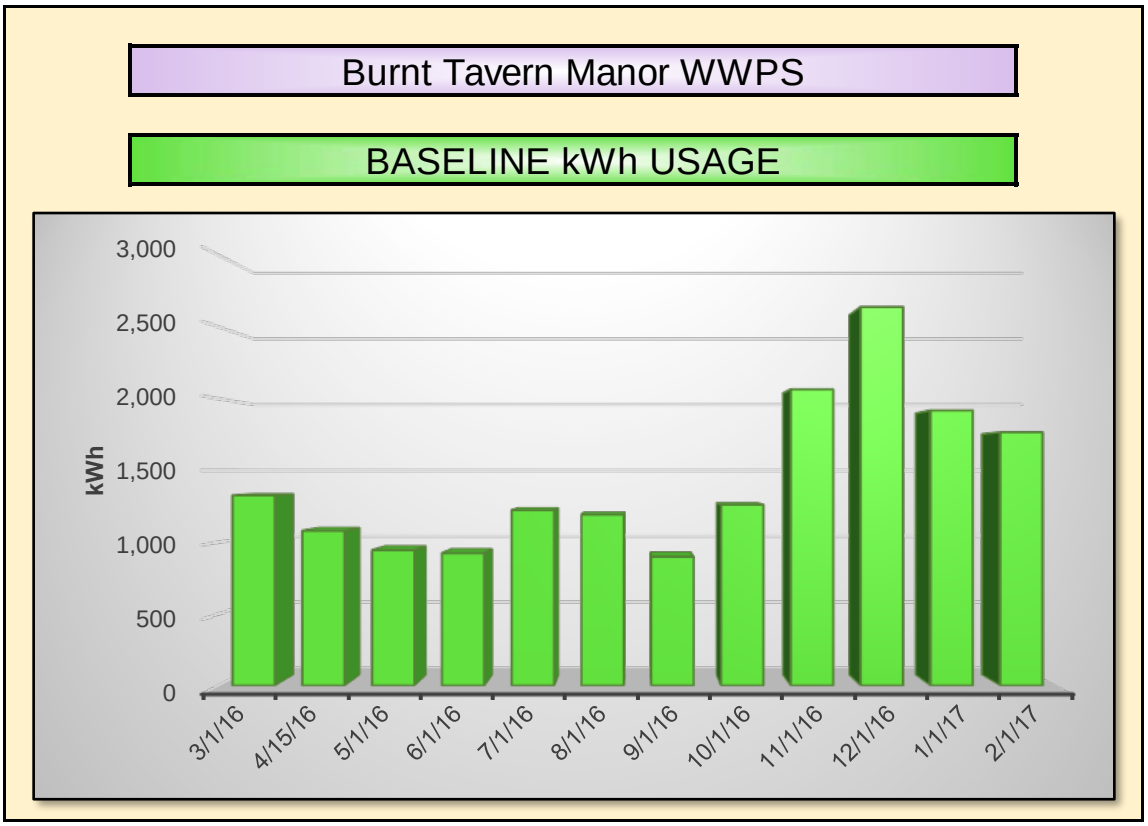


Breton Road WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #				Meter #			
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	1,865		$162	$90		$253	$0.135	30	-	6,363,380
3/2/16	4/15/16	1,517		$130	$83		$213	$0.141	45	-	5,176,004
4/16/16	5/1/16	810		$69	$62		$131	$0.162	16	-	2,763,720
5/2/16	6/1/16	788		$70	$64		$134	$0.170	31	-	2,688,656
6/2/16	7/1/16	971		$87	$76		$163	$0.167	30	-	3,313,052
7/2/16	8/1/16	314		$28	$31		$59	$0.189	31	-	1,071,368
8/2/16	9/1/16	606		$54	$52		$106	$0.176	31	-	2,067,672
9/2/16	10/1/16	902		$81	$64		$144	$0.160	30	-	3,077,624
10/2/16	11/1/16	1,504		$134	$87		$221	$0.147	31	-	5,131,648
11/2/16	12/1/16	2,077		$185	$99		$284	$0.137	30	-	7,086,724
12/2/16	1/1/17	2,392		$213	$113		$326	$0.136	31	-	8,161,504
1/2/17	2/1/17	2,811		$251	$128		$379	$0.135	31	-	9,591,132
TOTALS		16,557	0	$1,464	$949	$0	$2,414	$0.146	367	-	56,492,484



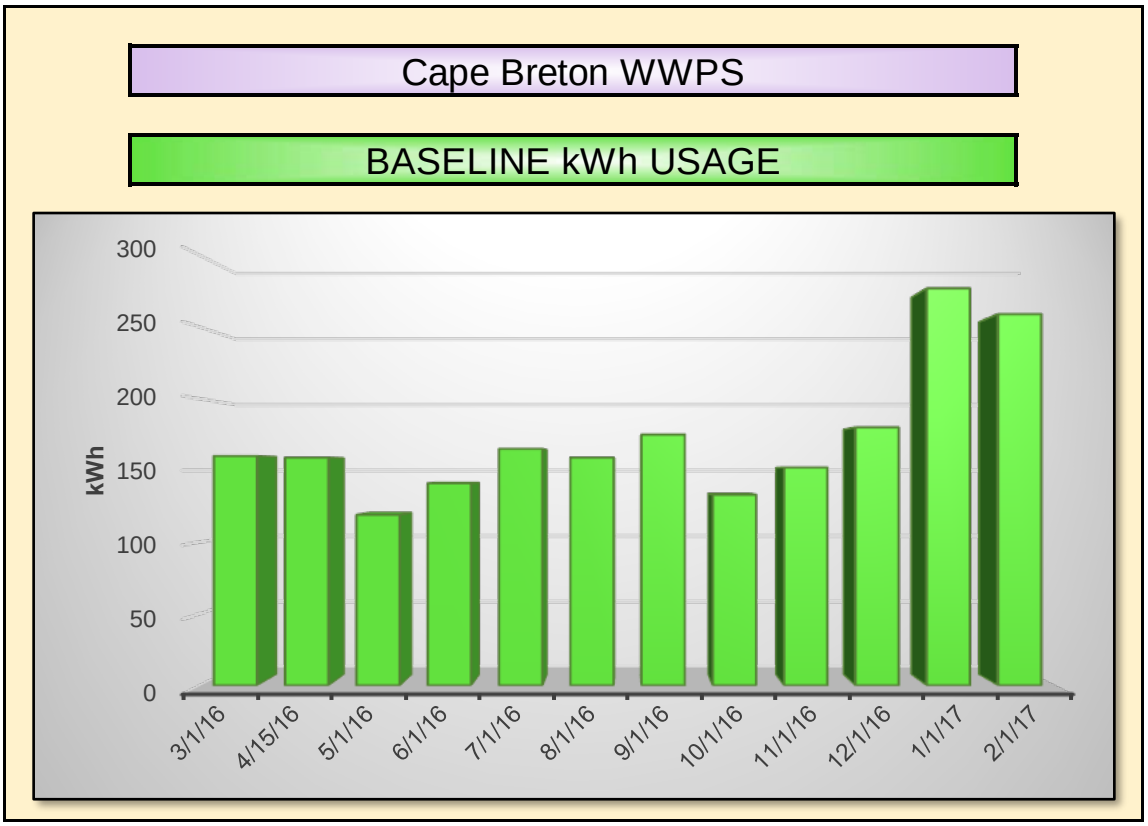
Breton Road WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	1	$75	$0	$76	$75.90	100,000
4/2/16	5/1/2016	1	$26	$0	$26	$26.04	100,000
5/2/16	6/1/2016	1	$26	$0	$26	$26.04	100,000
6/2/16	7/1/2016	1	$26	$0	$26	$26.03	100,000
7/2/16	8/1/2016	0	$25	$0	$25	-	0
8/2/16	9/1/2016	1	$26	$0	$26	$26.03	100,000
9/2/16	10/1/2016	2	$27	$1	$28	$14.17	200,000
10/2/16	11/1/2016	0	$21	$0	$21	-	0
11/2/16	12/1/2016	2	$36	$1	$37	$18.40	200,000
12/2/16	1/1/2017	0	$27	$0	$27	-	0
1/2/17	2/1/2017	1	$27	$0	$28	$27.74	100,000
2/2/17	3/1/2017	1	$27	$0	$28	$27.88	100,000
TOTALS		11	$369	$5	$374	$34.00	1,100,000

Burnt Tavern Manor WWPS



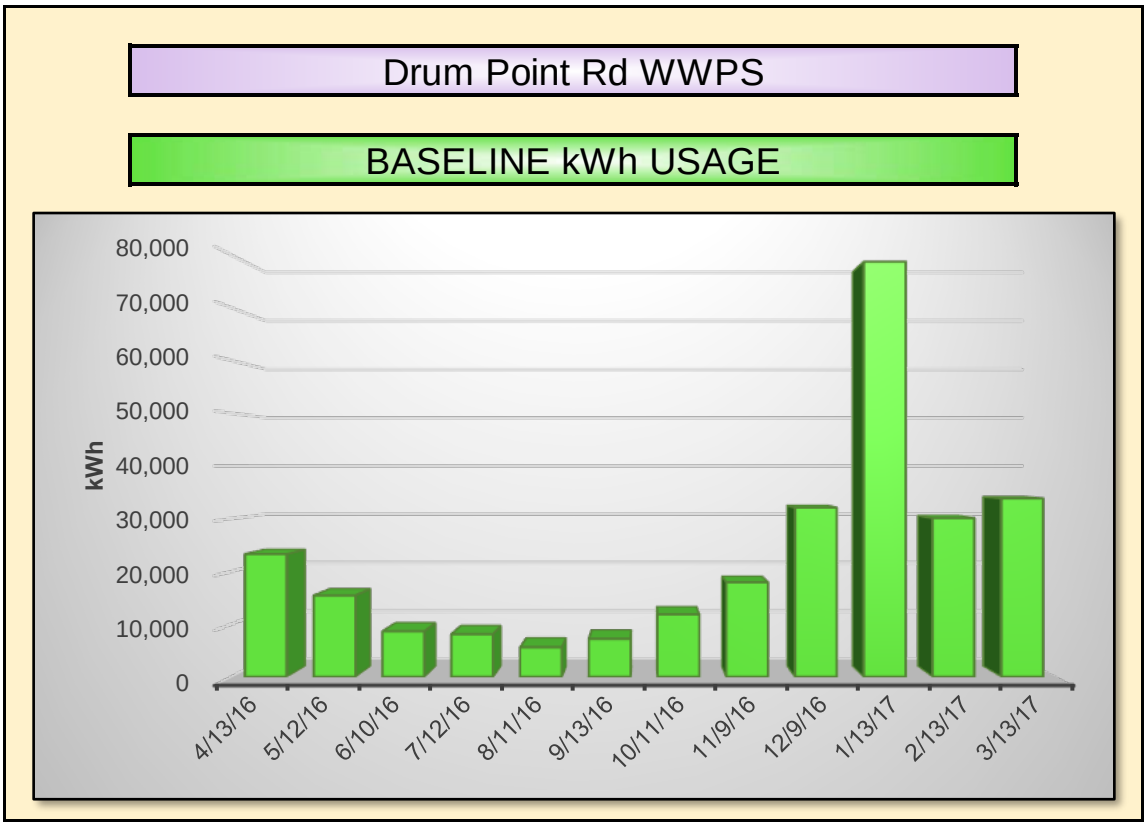
Burnt Tavern Manor WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 018 883 619			Meter #	G35515938		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	1,326		$114	$80		$194	$0.146	30	-	4,524,312
3/2/16	4/15/16	1,079		$92	$76		$168	$0.156	45	-	3,681,548
4/16/16	5/1/16	944		$81	$71		$151	$0.160	16	-	3,220,928
5/2/16	6/1/16	923		$82	$73		$155	$0.168	31	-	3,149,276
6/2/16	7/1/16	1,223		$109	$82		$191	$0.157	30	-	4,172,876
7/2/16	8/1/16	1,192		$106	$819		$925	$0.776	31	-	4,067,104
8/2/16	9/1/16	898		$80	$73		$153	$0.170	31	-	3,063,976
9/2/16	10/1/16	1,260		$112	$82		$195	$0.154	30	-	4,299,120
10/2/16	11/1/16	2,065		$184	$99		$283	$0.137	31	-	7,045,780
11/2/16	12/1/16	2,639		$236	$113		$348	$0.132	30	-	9,004,268
12/2/16	1/1/17	1,918		$171	$103		$274	$0.143	31	-	6,544,216
1/2/17	2/1/17	1,766		$157	$122		$279	$0.158	31	-	6,025,592
TOTALS		**17,233**	**0**	**$1,525**	**$1,792**	**$0**	**$3,317**	**$0.192**	**367**	**-**	**58,798,996**

Cape Breton WWPS



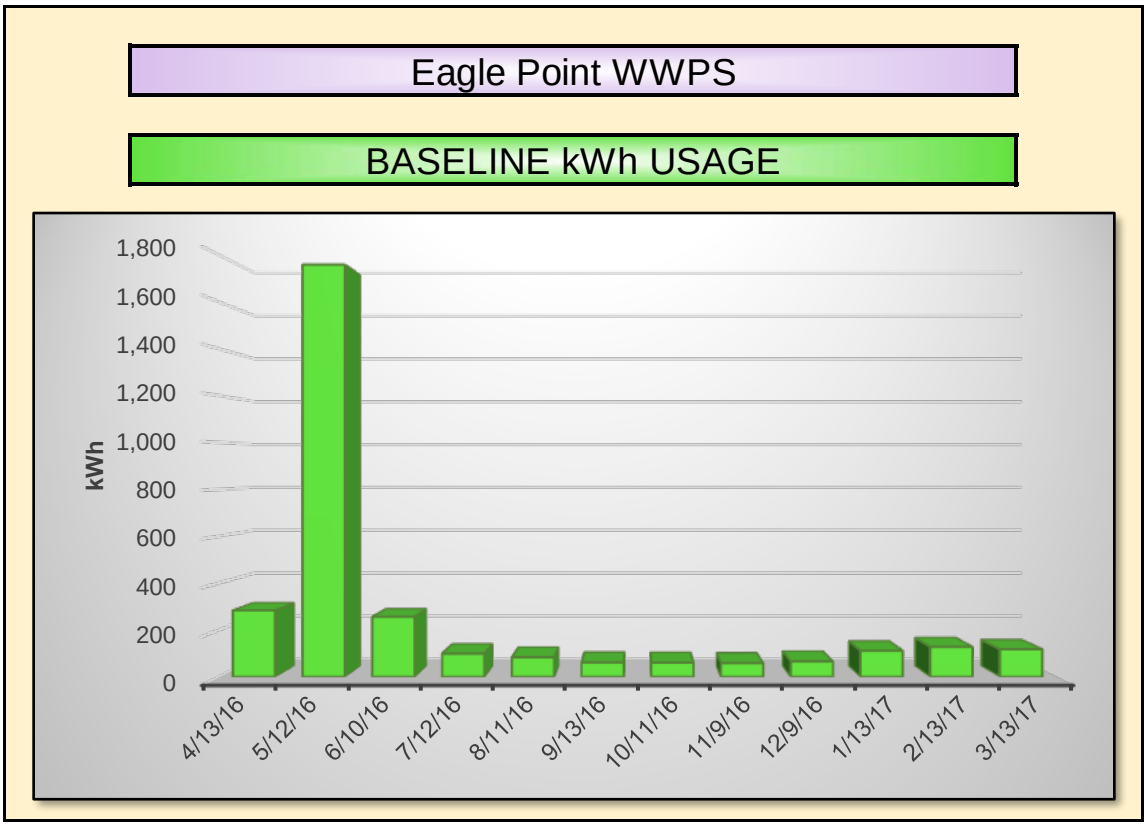
Cape Breton WWPS								ELECTRIC METER #1			
Provider:				Account #				Meter #			
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	160		$14	$20		$34	$0.213	30	-	545,920
3/2/16	4/15/16	159		$14	$20		$34	$0.213	45	-	542,508
4/16/16	5/1/16	119		$10	$18		$28	$0.234	16	-	406,028
5/2/16	6/1/16	141		$13	$20		$32	$0.229	31	-	481,092
6/2/16	7/1/16	165		$15	$21		$36	$0.218	30	-	562,980
7/2/16	8/1/16	159		$14	$21		$35	$0.221	31	-	542,508
8/2/16	9/1/16	175		$16	$22		$38	$0.217	31	-	597,100
9/2/16	10/1/16	133		$12	$19		$31	$0.232	30	-	453,796
10/2/16	11/1/16	152		$14	$20		$34	$0.222	31	-	518,624
11/2/16	12/1/16	180		$16	$22		$38	$0.212	30	-	614,160
12/2/16	1/1/17	277		$25	$30		$55	$0.199	31	-	945,124
1/2/17	2/1/17	259		$23	$32		$55	$0.211	31	-	883,708
TOTALS		2,079	0	$184	$265	$0	$449	$0.216	367	-	7,093,548

Drum Point Rd WWPS



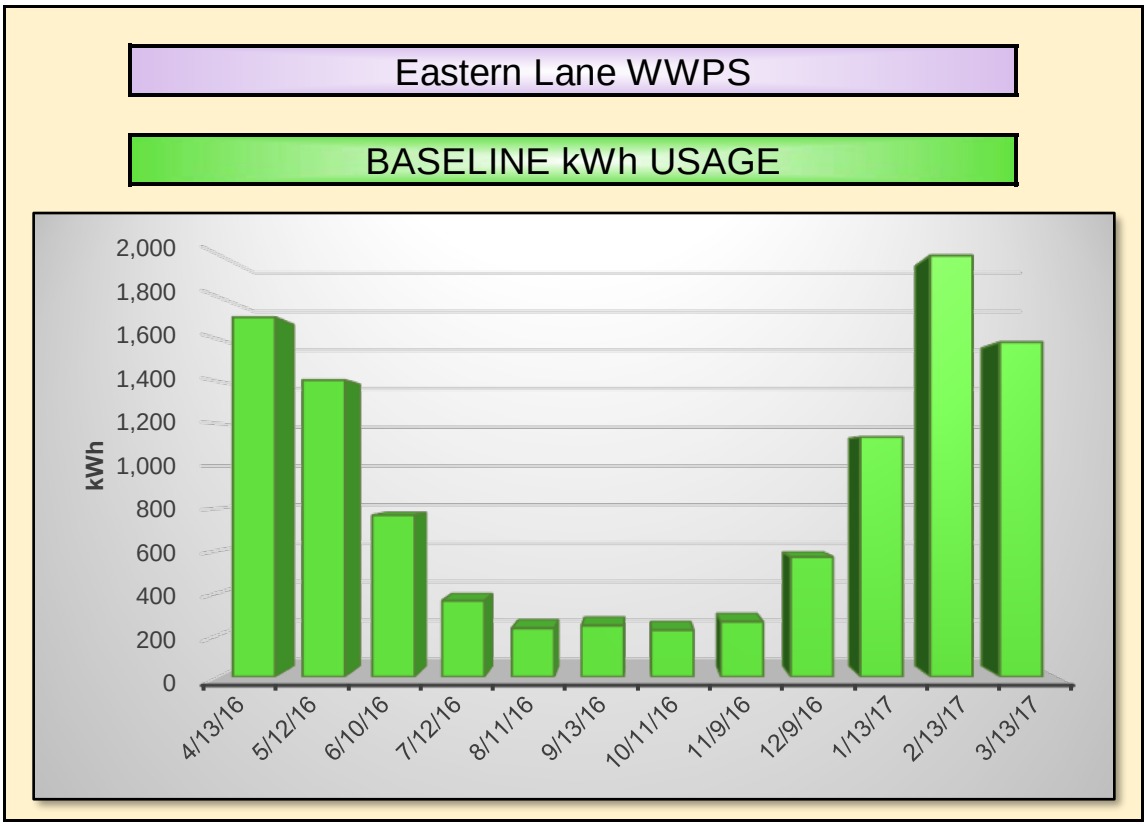
Drum Point Rd WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 014 473 563			Meter #	S309585710		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	23,280	57	$2,475		$262	$2,737	$0.118	29	59%	79,431,360
4/14/16	5/12/16	15,440	45	$1,660		$199	$1,859	$0.120	29	49%	52,681,280
5/13/16	6/10/16	8,640	57	$989		$157	$1,146	$0.133	29	22%	29,479,680
6/11/16	7/12/16	8,080	57	$929		$157	$1,085	$0.134	32	18%	27,568,960
7/13/16	8/11/16	5,600	57	$663		$157	$819	$0.146	30	14%	19,107,200
8/12/16	9/13/16	7,200	57	$847		$157	$1,004	$0.139	33	16%	24,566,400
9/14/16	10/11/16	11,840	47	$1,359		$210	$1,569	$0.133	28	37%	40,398,080
10/12/16	11/9/16	17,920	51	$2,028		$232	$2,260	$0.126	29	50%	61,143,040
11/10/16	12/9/16	32,080	58	$3,586		$266	$3,853	$0.120	30	77%	109,456,960
12/10/16	1/13/17	78,720	239	$8,066		$1,282	$9,349	$0.119	35	39%	268,592,640
1/14/17	2/13/17	30,080	67	$3,414		$378	$3,792	$0.126	31	60%	102,632,960
2/14/17	3/13/17	33,840	67	$3,847		$376	$4,223	$0.125	28	75%	115,462,080
TOTALS		272,720	239	$29,865	$0	$3,832	$33,697	$0.124	363	13%	930,520,640

Eagle Point WWPS

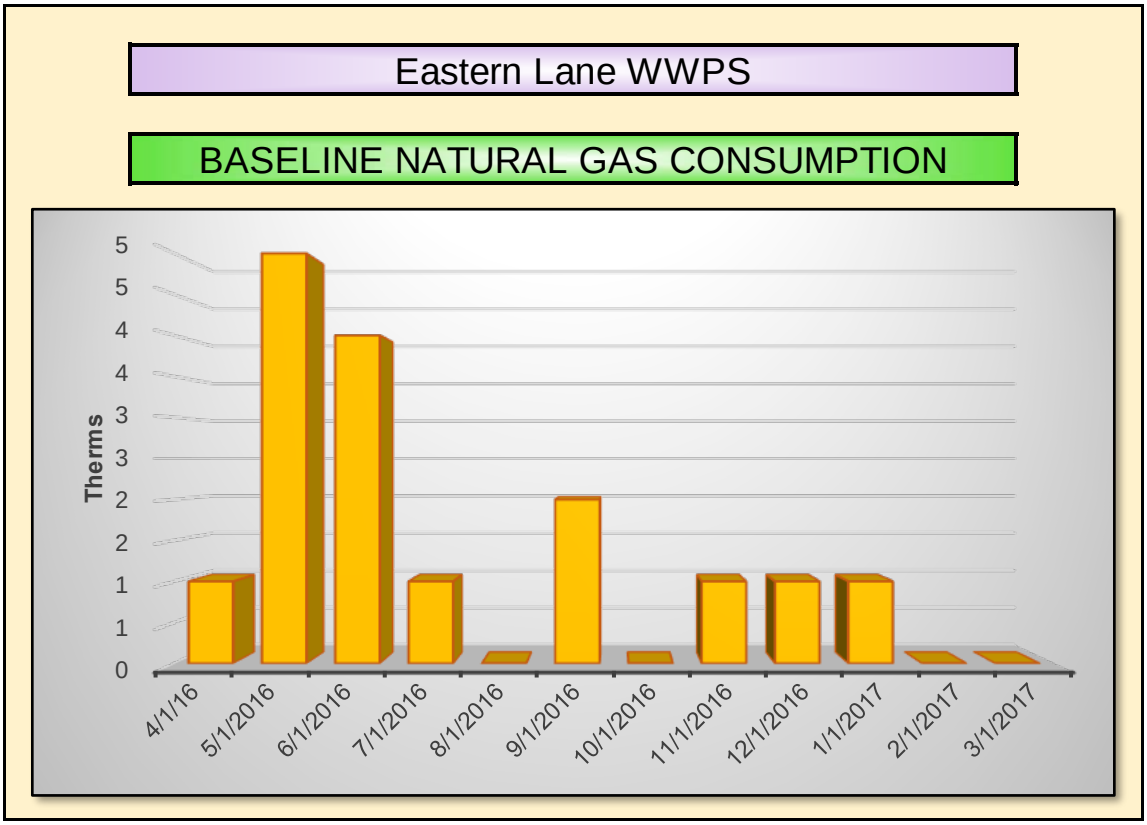


Eagle Point WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 014 053 126			Meter #	S313400034		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	283		$24	$28		$52	$0.185	29	-	965,596
4/14/16	5/12/16	1,759		$151	$88		$238	$0.136	29	-	6,001,708
5/13/16	6/10/16	256		$22	$26		$48	$0.189	29	-	873,472
6/11/16	7/12/16	98		$9	$17		$25	$0.260	32	-	334,376
7/13/16	8/11/16	83		$7	$16		$23	$0.279	30	-	283,196
8/12/16	9/13/16	61		$5	$14		$20	$0.323	33	-	208,132
9/14/16	10/11/16	60		$5	$14		$20	$0.327	28	-	204,720
10/12/16	11/9/16	58		$5	$14		$19	$0.330	29	-	197,896
11/10/16	12/9/16	65		$6	$14		$20	$0.311	30	-	221,780
12/10/16	1/13/17	111		$10	$17		$27	$0.247	35	-	378,732
1/14/17	2/13/17	127		$11	$20		$31	$0.247	31	-	433,324
2/14/17	3/13/17	117		$10	$21		$31	$0.267	28	-	399,204
TOTALS		3,078	0	$266	$290	$0	$556	$0.181	363	-	10,502,136

Eastern Lane WWPS

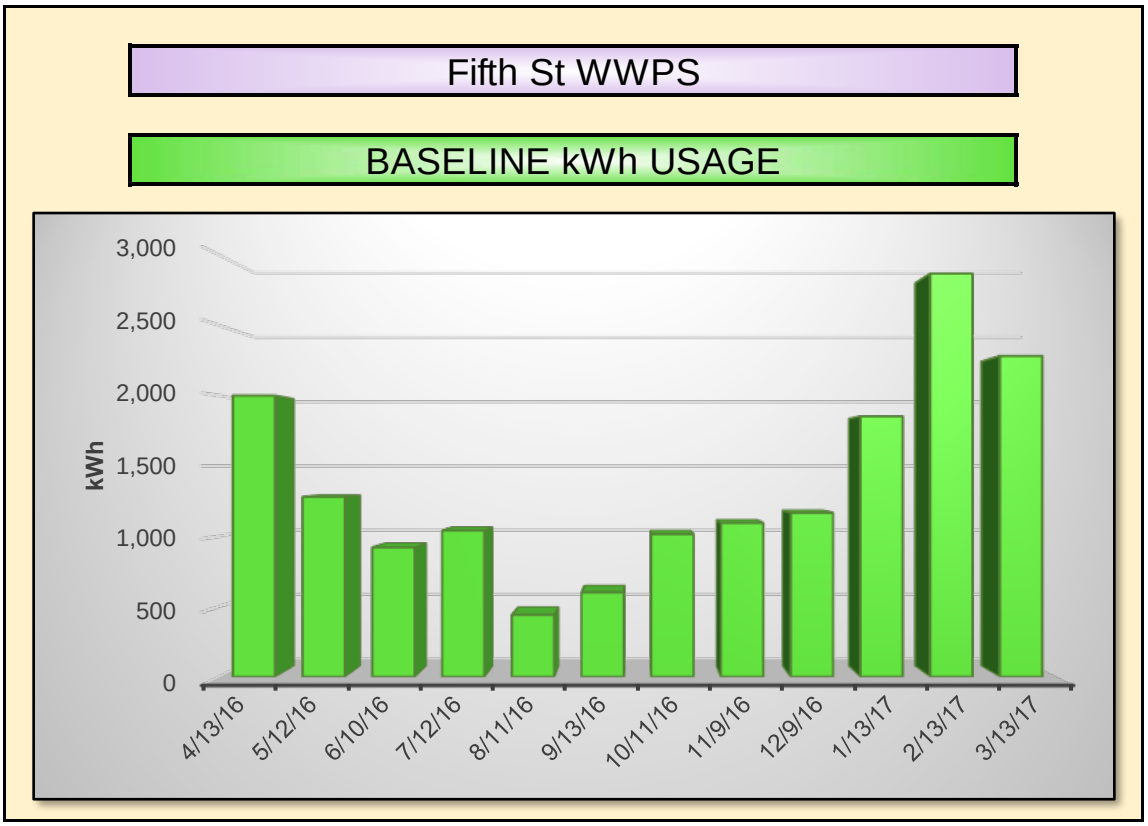


Eastern Lane WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100 018 126 399			Meter #	S310435871		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	1,705		$146	$87		$233	$0.137	29	-	5,817,460
4/14/16	5/12/16	1,407		$120	$81		$202	$0.143	29	-	4,800,684
5/13/16	6/10/16	766		$66	$59		$125	$0.163	29	-	2,613,592
6/11/16	7/12/16	361		$32	$35		$67	$0.185	32	-	1,231,732
7/13/16	8/11/16	230		$21	$26		$46	$0.201	30	-	784,760
8/12/16	9/13/16	243		$22	$27		$48	$0.199	33	-	829,116
9/14/16	10/11/16	221		$20	$25		$45	$0.204	28	-	754,052
10/12/16	11/9/16	261		$23	$27		$51	$0.194	29	-	890,532
11/10/16	12/9/16	568		$51	$48		$98	$0.173	30	-	1,938,016
12/10/16	1/13/17	1,137		$101	$79		$181	$0.159	35	-	3,879,444
1/14/17	2/13/17	1,998		$178	$101		$279	$0.140	31	-	6,817,176
2/14/17	3/13/17	1,587		$141	$100		$242	$0.152	28	-	5,414,844
TOTALS		10,484	0	$921	$695	$0	$1,616	$0.154	363	-	35,771,408



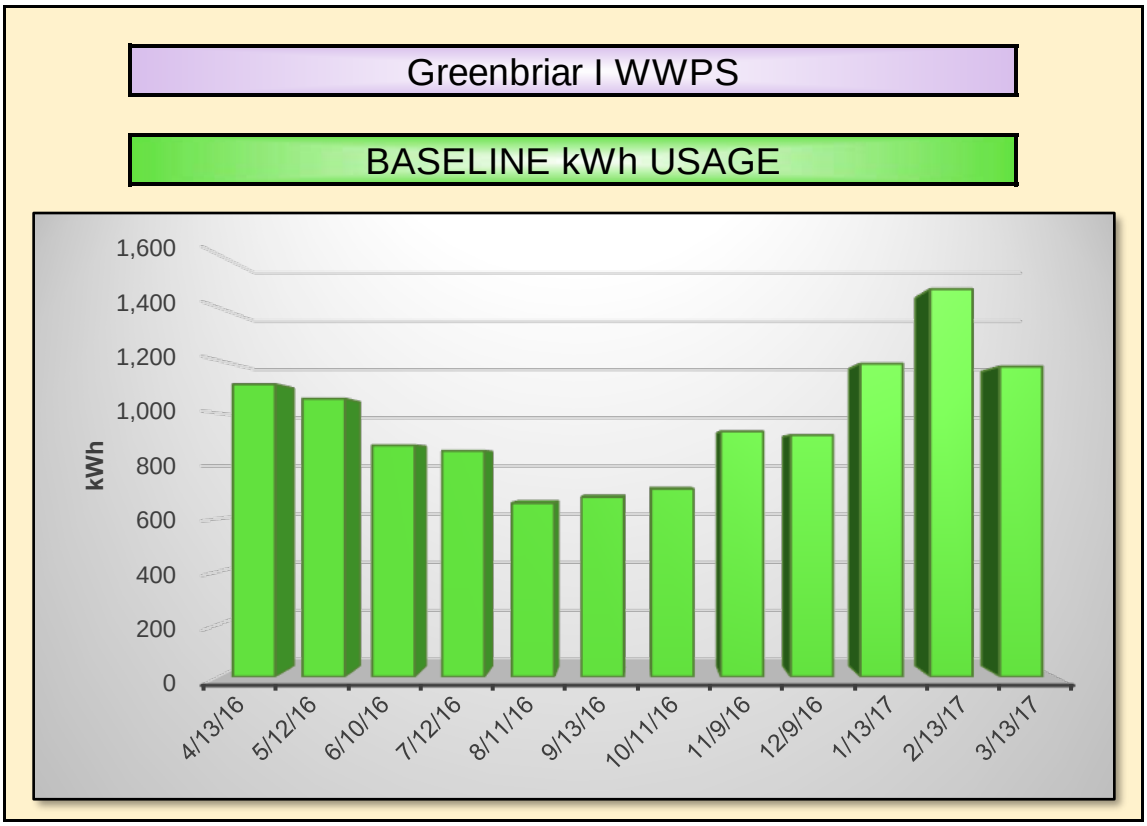
Eastern Lane WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	1	$51	$0	$51	$50.99	100,000
4/2/16	5/1/2016	5	$27	$2	$29	$5.83	500,000
5/2/16	6/1/2016	4	$25	$1	$26	$6.54	400,000
6/2/16	7/1/2016	1	$26	$0	$26	$26.04	100,000
7/2/16	8/1/2016	0	$25	$0	$25	-	0
8/2/16	9/1/2016	2	$26	$1	$27	$13.54	200,000
9/2/16	10/1/2016	0	$26	$0	$26	-	0
10/2/16	11/1/2016	1	$27	$0	$28	$27.89	100,000
11/2/16	12/1/2016	1	$27	$0	$28	$27.78	100,000
12/2/16	1/1/2017	1	$27	$0	$28	$27.78	100,000
1/2/17	2/1/2017	0	$27	$0	$27	-	0
2/2/17	3/1/2017	0	$33	$0	$33	-	0
TOTALS		16	$347	$7	$354	$22.12	1,600,000

Fifth St WWPS



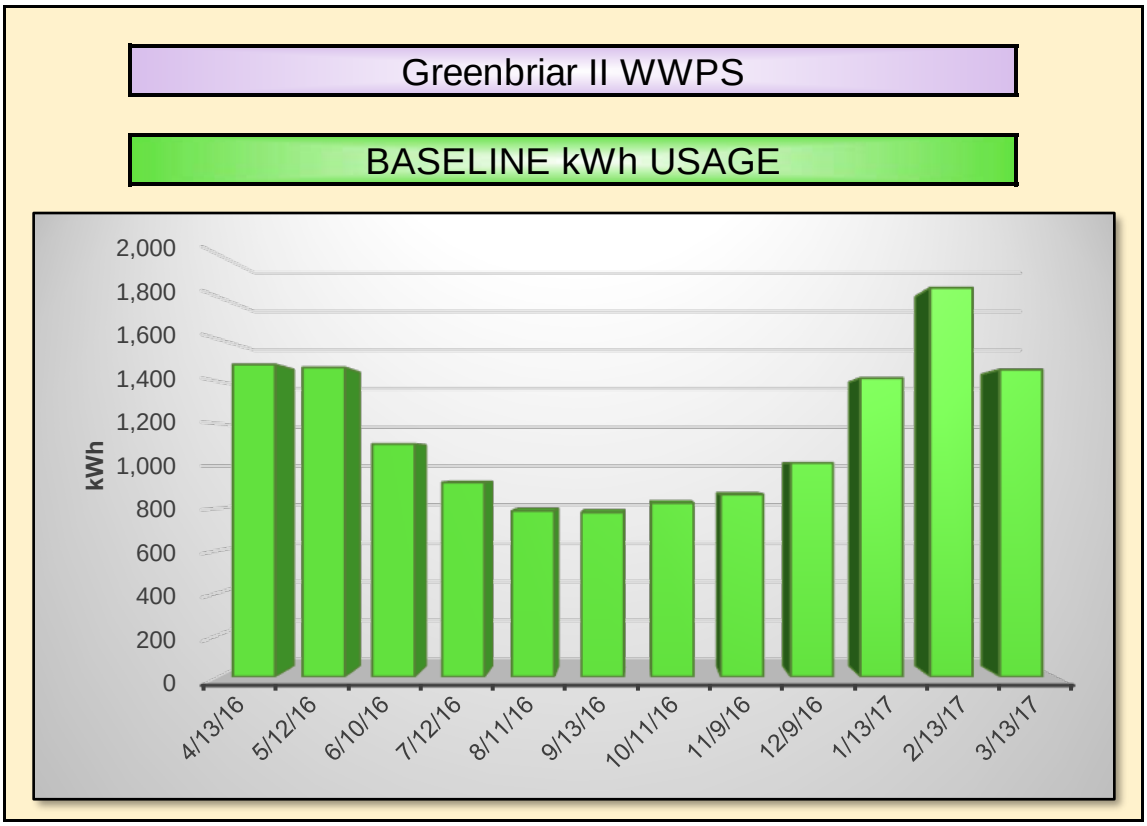
Fifth St WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 018 813 632			Meter #	S31333855		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	2,000		$171	$92		$263	$0.132	29	-	6,824,000
4/14/16	5/12/16	1,280		$110	$79		$189	$0.147	29	-	4,367,360
5/13/16	6/10/16	920		$79	$69		$148	$0.160	29	-	3,139,040
6/11/16	7/12/16	1,040		$93	$79		$171	$0.165	32	-	3,548,480
7/13/16	8/11/16	440		$39	$40		$79	$0.180	30	-	1,501,280
8/12/16	9/13/16	601		$54	$66		$120	$0.199	33	-	2,050,612
9/14/16	10/11/16	1,014		$90	$86		$176	$0.174	28	-	3,459,768
10/12/16	11/9/16	1,094		$98	$85		$183	$0.167	29	-	3,732,728
11/10/16	12/9/16	1,166		$104	$87		$191	$0.164	30	-	3,978,392
12/10/16	1/13/17	1,853		$166	$101		$267	$0.144	35	-	6,322,436
1/14/17	2/13/17	2,869		$256	$126		$382	$0.133	31	-	9,789,028
2/14/17	3/13/17	2,282		$203	$124		$327	$0.143	28	-	7,786,184
TOTALS		16,559	0	$1,462	$1,033	$0	$2,496	$0.151	363	-	56,499,308

Greenbriar I WWPS



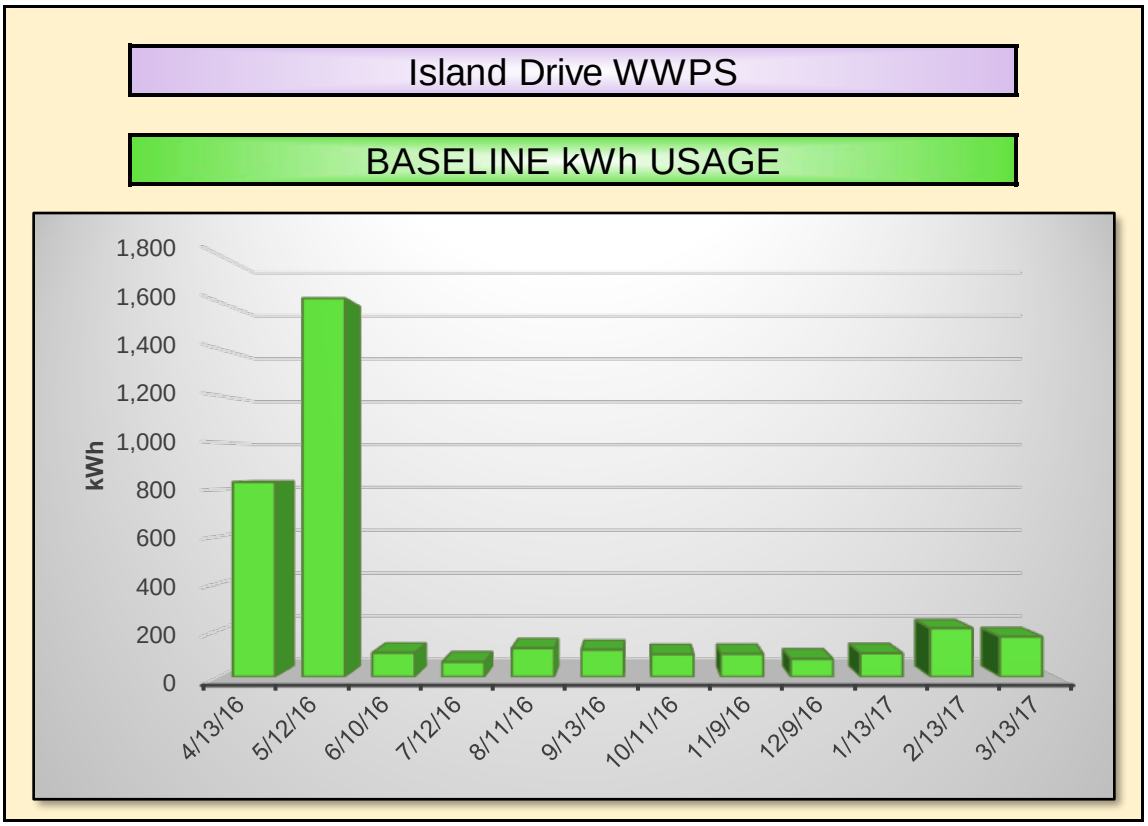
Greenbriar I WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 014 688 947			Meter #	S313334379		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	1,110		$95	$69		$164	$0.147	29	-	3,787,320
4/14/16	5/12/16	1,055		$90	$68		$158	$0.150	29	-	3,599,660
5/13/16	6/10/16	878		$75	$59		$134	$0.153	29	-	2,995,736
6/11/16	7/12/16	857		$76	$61		$137	$0.160	32	-	2,924,084
7/13/16	8/11/16	659		$59	$48		$106	$0.161	30	-	2,248,508
8/12/16	9/13/16	682		$601	$49		$650	$0.953	33	-	2,326,984
9/14/16	10/11/16	713		$64	$52		$116	$0.162	28	-	2,432,756
10/12/16	11/9/16	931		$74	$58		$132	$0.142	29	-	3,176,572
11/10/16	12/9/16	917		$82	$64		$145	$0.159	30	-	3,128,804
12/10/16	1/13/17	1,188		$106	$73		$179	$0.151	35	-	4,053,456
1/14/17	2/13/17	1,471		$131	$83		$215	$0.146	31	-	5,019,052
2/14/17	3/13/17	1,177		$105	$83		$188	$0.160	28	-	4,015,924
TOTALS		11,638	0	$1,558	$765	$0	$2,324	$0.200	363	-	39,708,856

Greenbriar II WWPS



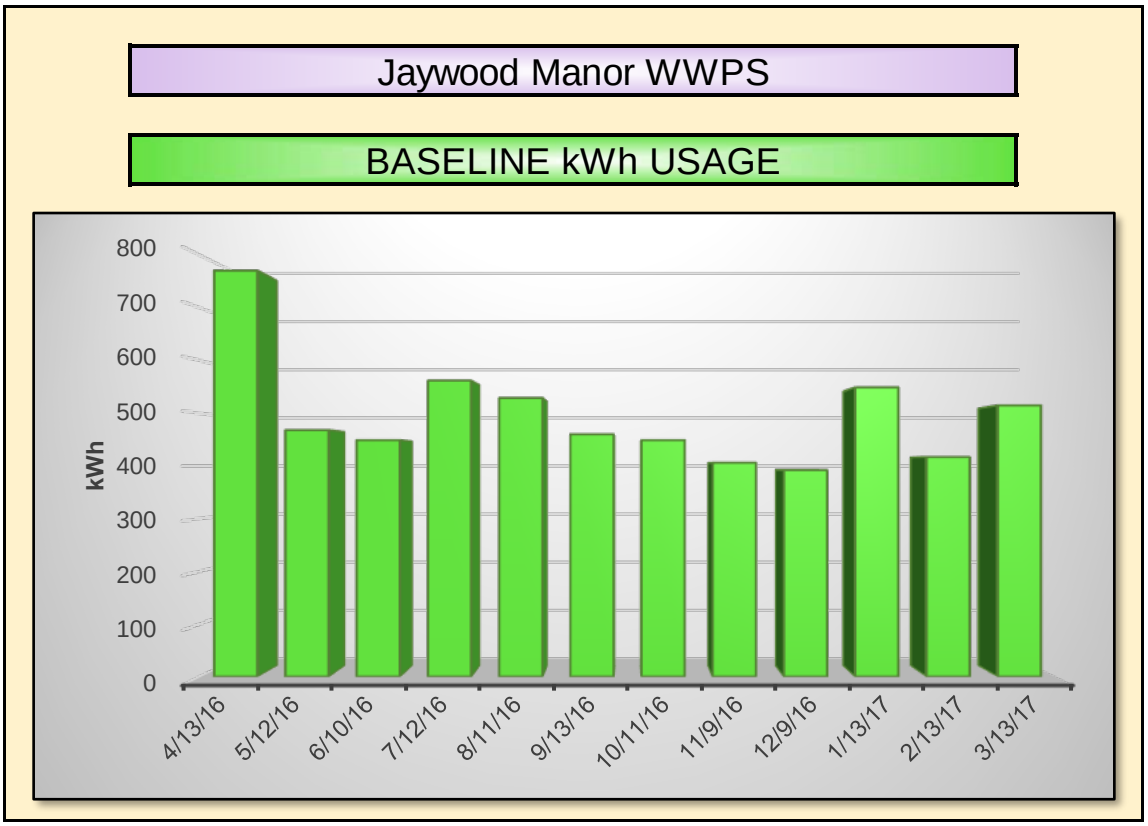
Greenbriar II WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 015 690 686			Meter #	G35511966		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	1,481		$127	$83		$209	$0.141	29	-	5,053,172
4/14/16	5/12/16	1,467		$126	$82		$208	$0.142	29	-	5,005,404
5/13/16	6/10/16	1,104		$95	$76		$170	$0.154	29	-	3,766,848
6/11/16	7/12/16	922		$82	$73		$155	$0.168	32	-	3,145,864
7/13/16	8/11/16	787		$70	$63		$134	$0.170	30	-	2,685,244
8/12/16	9/13/16	780		$70	$63		$133	$0.170	33	-	2,661,360
9/14/16	10/11/16	824		$74	$67		$141	$0.171	28	-	2,811,488
10/12/16	11/9/16	865		$77	$68		$145	$0.167	29	-	2,951,380
11/10/16	12/9/16	1,014		$90	$77		$167	$0.165	30	-	3,459,768
12/10/16	1/13/17	1,417		$126	$85		$211	$0.149	35	-	4,834,804
1/14/17	2/13/17	1,845		$165	$99		$264	$0.143	31	-	6,295,140
2/14/17	3/13/17	1,457		$130	$98		$228	$0.156	28	-	4,971,284
TOTALS		**13,963**	**0**	**$1,231**	**$933**	**$0**	**$2,164**	**$0.155**	**363**	**-**	**47,641,756**

Island Drive WWPS



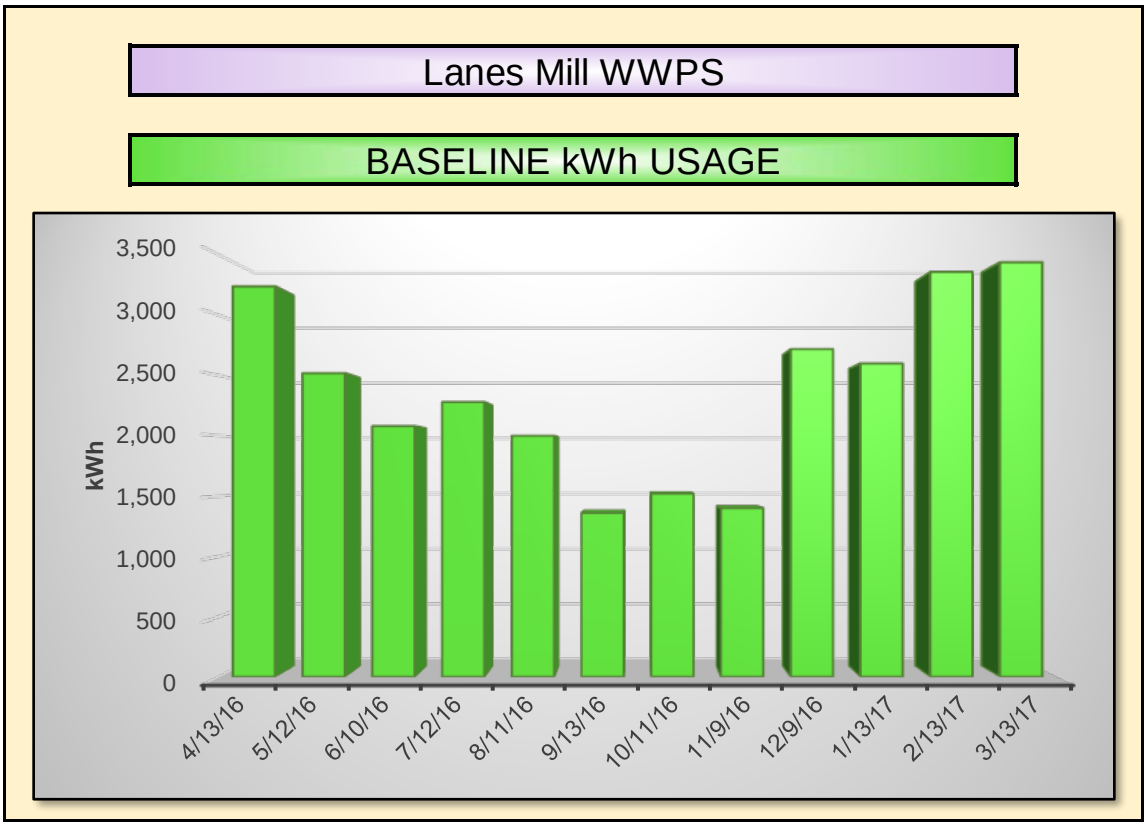
Island Drive WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 018 642 775			Meter #	S313460034		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	831		$71	$63		$134	$0.162	29	-	2,835,372
4/14/16	5/12/16	1,616		$138	$85		$224	$0.138	29	-	5,513,792
5/13/16	6/10/16	102		$9	$17		$25	$0.248	29	-	348,024
6/11/16	7/12/16	63		$6	$14		$20	$0.317	32	-	214,956
7/13/16	8/11/16	122		$11	$18		$29	$0.240	30	-	416,264
8/12/16	9/13/16	115		$10	$18		$28	$0.245	33	-	392,380
9/14/16	10/11/16	96		$9	$17		$25	$0.264	28	-	327,552
10/12/16	11/9/16	97		$9	$17		$25	$0.260	29	-	330,964
11/10/16	12/9/16	76		$7	$15		$22	$0.288	30	-	259,312
12/10/16	1/13/17	100		$9	$17		$26	$0.257	35	-	341,200
1/14/17	2/13/17	207		$18	$26		$45	$0.217	31	-	706,284
2/14/17	3/13/17	171		$15	$25		$40	$0.235	28	-	583,452
TOTALS		3,596	0	$312	$332	$0	$644	$0.179	363	-	12,269,552

Jaywood Manor WWPS



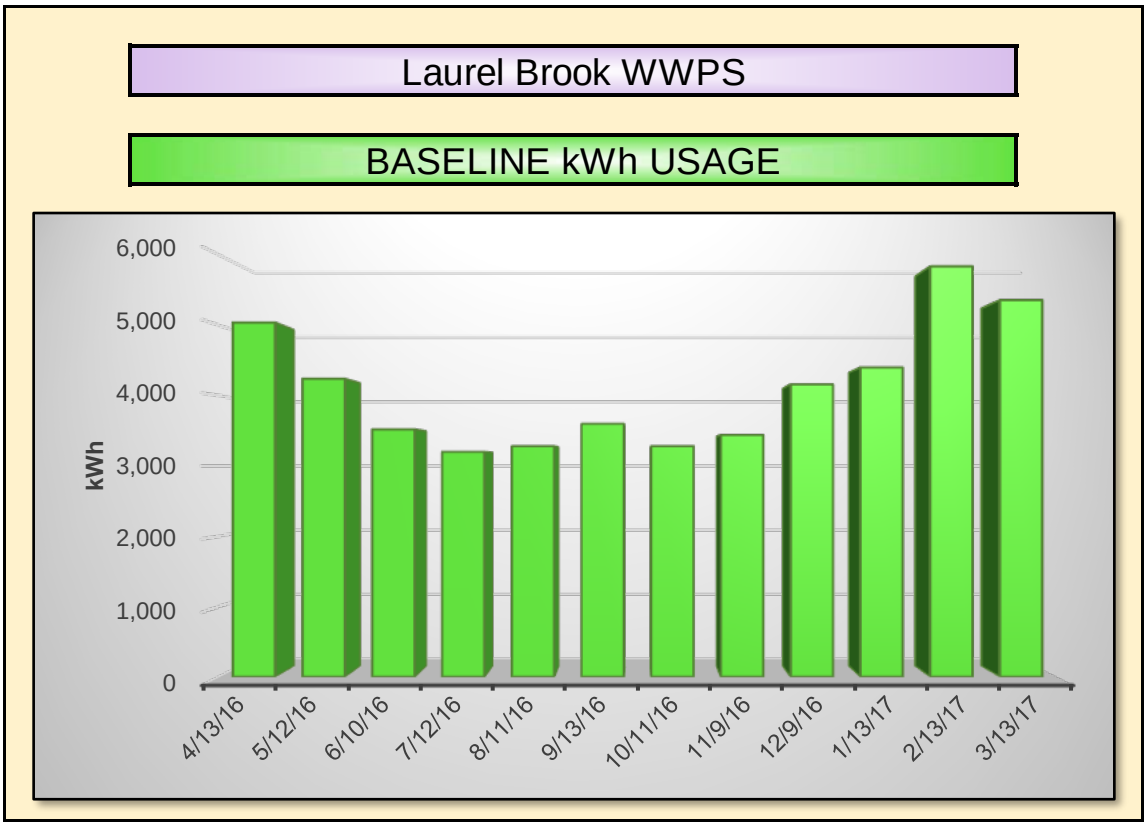
Jaywood Manor WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100 013 209 877			Meter #	S60194258		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	771		$66	$52		$118	$0.153	29	-	2,630,652
4/14/16	5/12/16	468		$40	$33		$73	$0.155	29	-	1,596,816
5/13/16	6/10/16	449		$38	$31		$70	$0.156	29	-	1,531,988
6/11/16	7/12/16	562		$50	$41		$91	$0.162	32	-	1,917,544
7/13/16	8/11/16	529		$47	$39		$86	$0.162	30	-	1,804,948
8/12/16	9/13/16	460		$41	$34		$75	$0.163	33	-	1,569,520
9/14/16	10/11/16	449		$40	$34		$74	$0.165	28	-	1,531,988
10/12/16	11/9/16	406		$36	$30		$66	$0.163	29	-	1,385,272
11/10/16	12/9/16	392		$35	$29		$64	$0.163	30	-	1,337,504
12/10/16	1/13/17	549		$49	$39		$88	$0.161	35	-	1,873,188
1/14/17	2/13/17	417		$37	$32		$70	$0.167	31	-	1,422,804
2/14/17	3/13/17	515		$46	$42		$88	$0.171	28	-	1,757,180
TOTALS		**5,967**	**0**	**$526**	**$436**	**$0**	**$962**	**$0.161**	**363**	**-**	**20,359,404**

Lanes Mill WWPS



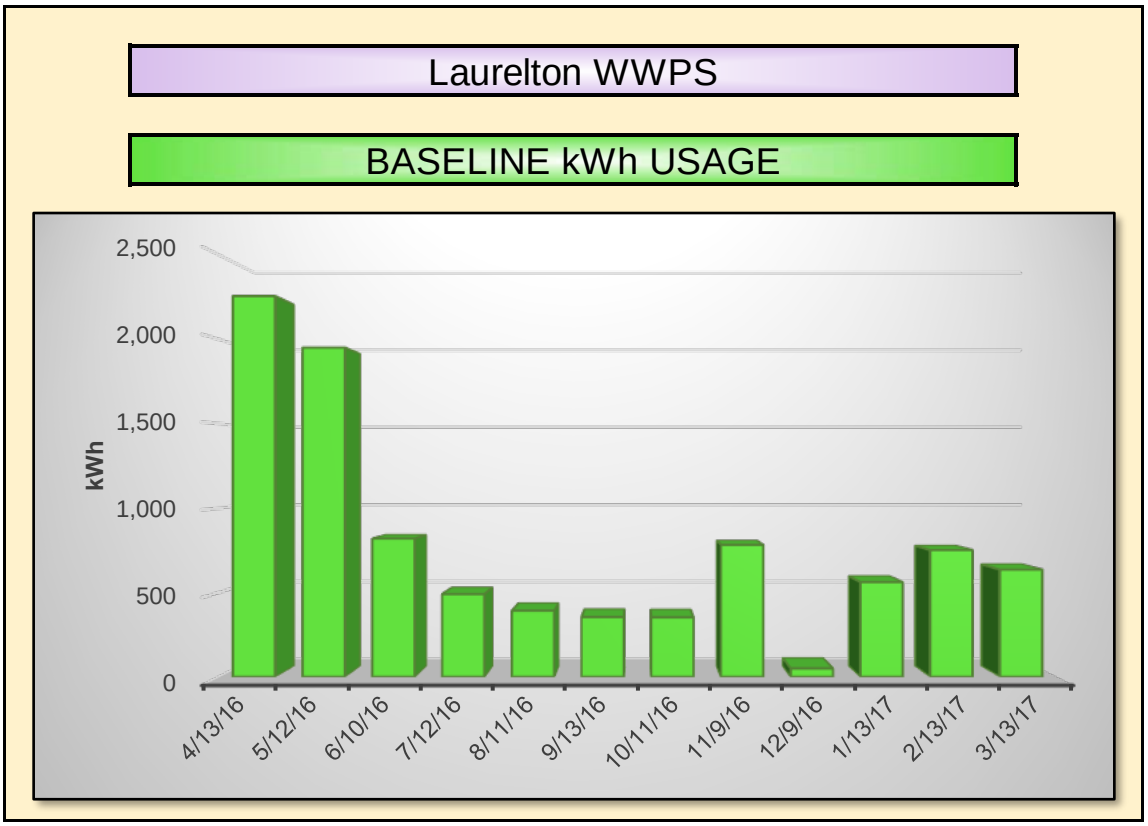
Lanes Mill WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100 015 150 087			Meter #	G28658707		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	3,240		$277	$141		$418	$0.129	29	-	11,054,880
4/14/16	5/12/16	2,520		$216	$128		$343	$0.136	29	-	8,598,240
5/13/16	6/10/16	2,080		$178	$120		$298	$0.143	29	-	7,096,960
6/11/16	7/12/16	2,280		$203	$127		$331	$0.145	32	-	7,779,360
7/13/16	8/11/16	2,000		$178	$98		$277	$0.138	30	-	6,824,000
8/12/16	9/13/16	1,360		$121	$87		$208	$0.153	33	-	4,640,320
9/14/16	10/11/16	1,520		$136	$92		$228	$0.150	28	-	5,186,240
10/12/16	11/9/16	1,400		$125	$95		$220	$0.157	29	-	4,776,800
11/10/16	12/9/16	2,720		$243	$117		$360	$0.132	30	-	9,280,640
12/10/16	1/13/17	2,600		$323	$115		$438	$0.168	35	-	8,871,200
1/14/17	2/13/17	3,360		$300	$139		$438	$0.131	31	-	11,464,320
2/14/17	3/13/17	3,440		$307	$148		$455	$0.132	28	-	11,737,280
TOTALS		28,520	0	$2,607	$1,406	$0	$4,013	$0.141	363	-	97,310,240

Laurel Brook WWPS

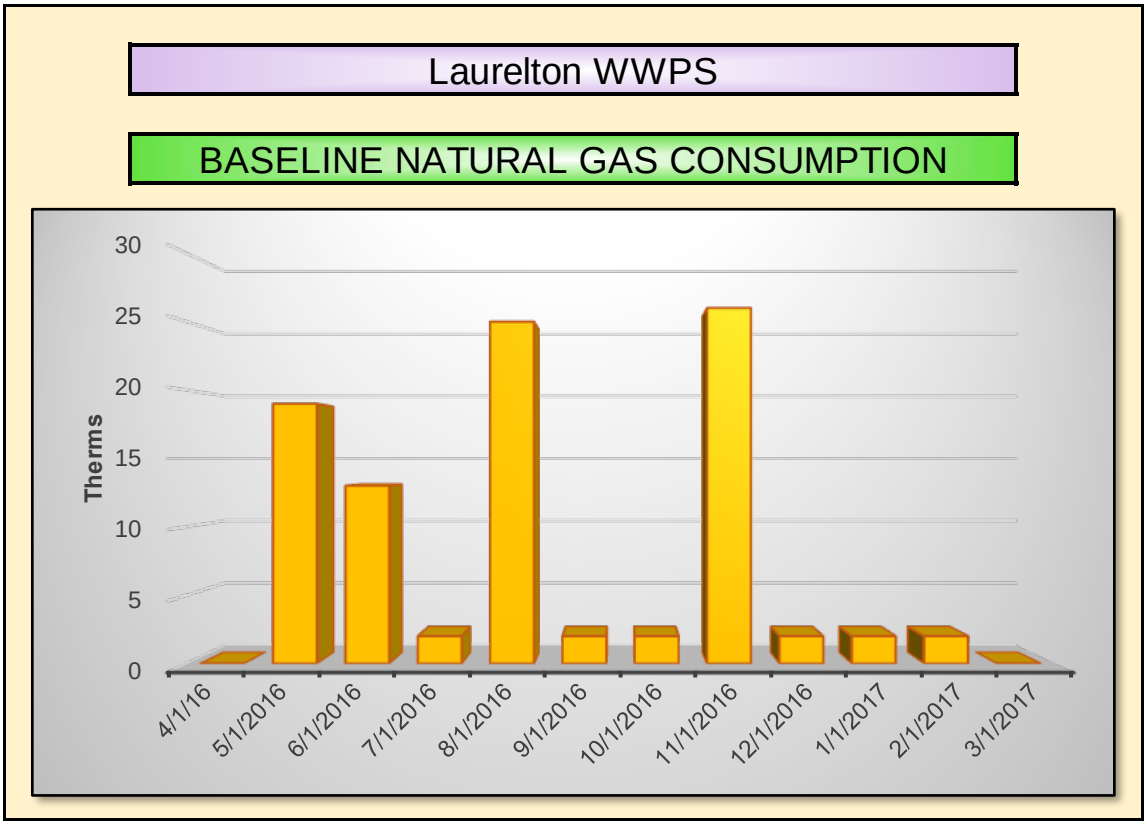


Laurel Brook WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 017 867 589			Meter #	S07045333		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	5,040		$431	$211		$643	$0.128	29	-	17,196,480
4/14/16	5/12/16	4,240		$363	$183		$546	$0.129	29	-	14,466,880
5/13/16	6/10/16	3,520		$301	$151		$452	$0.128	29	-	12,010,240
6/11/16	7/12/16	3,200		$285	$149		$434	$0.136	32	-	10,918,400
7/13/16	8/11/16	3,280		$286	$151		$436	$0.133	30	-	11,191,360
8/12/16	9/13/16	3,600		$293	$157		$449	$0.125	33	-	12,283,200
9/14/16	10/11/16	3,280		$321	$156		$478	$0.146	28	-	11,191,360
10/12/16	11/9/16	3,440		$293	$225		$517	$0.150	29	-	11,737,280
11/10/16	12/9/16	4,160		$307	$240		$547	$0.132	30	-	14,193,920
12/10/16	1/13/17	4,400		$371	$195		$566	$0.129	35	-	15,012,800
1/14/17	2/13/17	5,840		$393	$236		$628	$0.108	31	-	19,926,080
2/14/17	3/13/17	5,360		$521	$240		$761	$0.142	28	-	18,288,320
TOTALS		**49,360**	**0**	**$4,165**	**$2,295**	**$0**	**$6,459**	**$0.131**	**363**	**-**	**168,416,320**

Laurelton WWPS

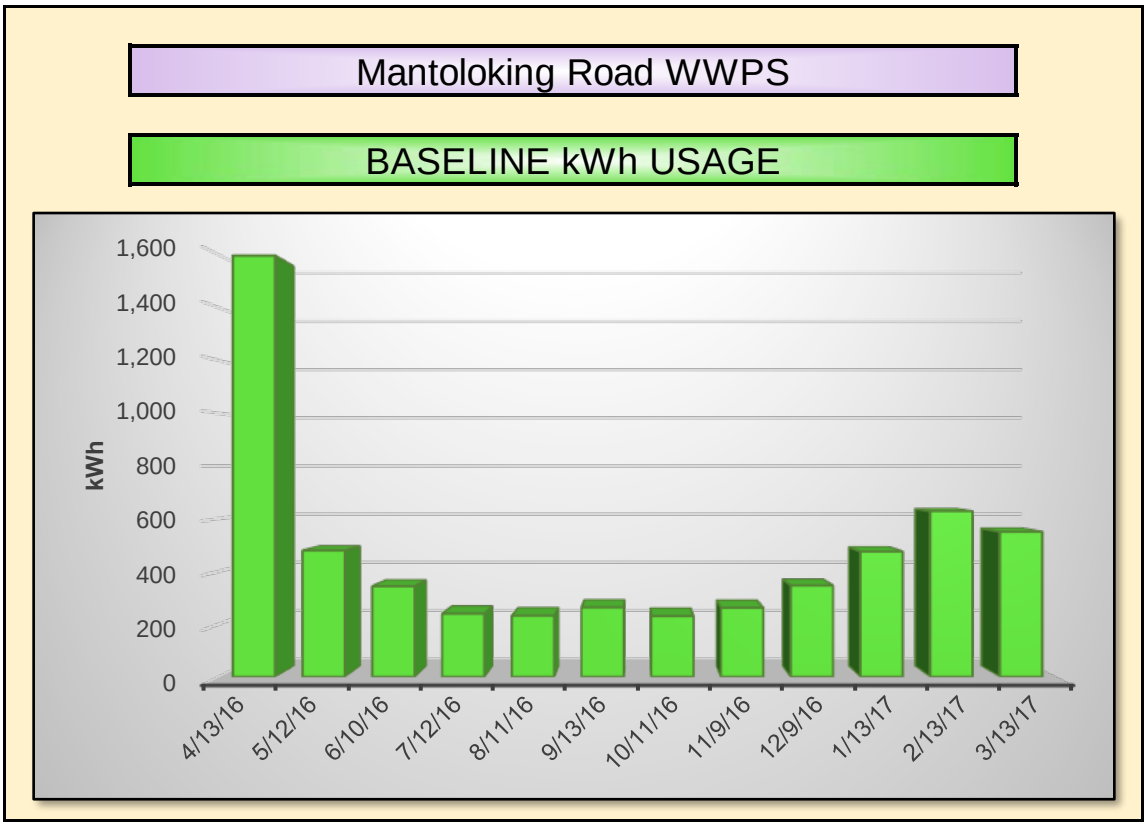


Laurelton WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 018 367 803			Meter #	S33334380		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	2,257		$193	$97		$290	$0.129	29	-	7,700,884
4/14/16	5/12/16	1,951		$167	$91		$258	$0.132	29	-	6,656,812
5/13/16	6/10/16	819		$70	$62		$132	$0.162	29	-	2,794,428
6/11/16	7/12/16	490		$44	$43		$87	$0.178	32	-	1,671,880
7/13/16	8/11/16	391		$35	$37		$72	$0.183	30	-	1,334,092
8/12/16	9/13/16	354		$32	$34		$66	$0.186	33	-	1,207,848
9/14/16	10/11/16	352		$31	$34		$66	$0.187	28	-	1,201,024
10/12/16	11/9/16	782		$70	$62		$132	$0.169	29	-	2,668,184
11/10/16	12/9/16	49		$4	$13		$18	$0.362	30	-	167,188
12/10/16	1/13/17	561		$50	$47		$97	$0.174	35	-	1,914,132
1/14/17	2/13/17	751		$67	$63		$130	$0.173	31	-	2,562,412
2/14/17	3/13/17	635		$57	$60		$117	$0.184	28	-	2,166,620
TOTALS		9,392	0	$820	$644	$0	$1,464	$0.156	363	-	32,045,504

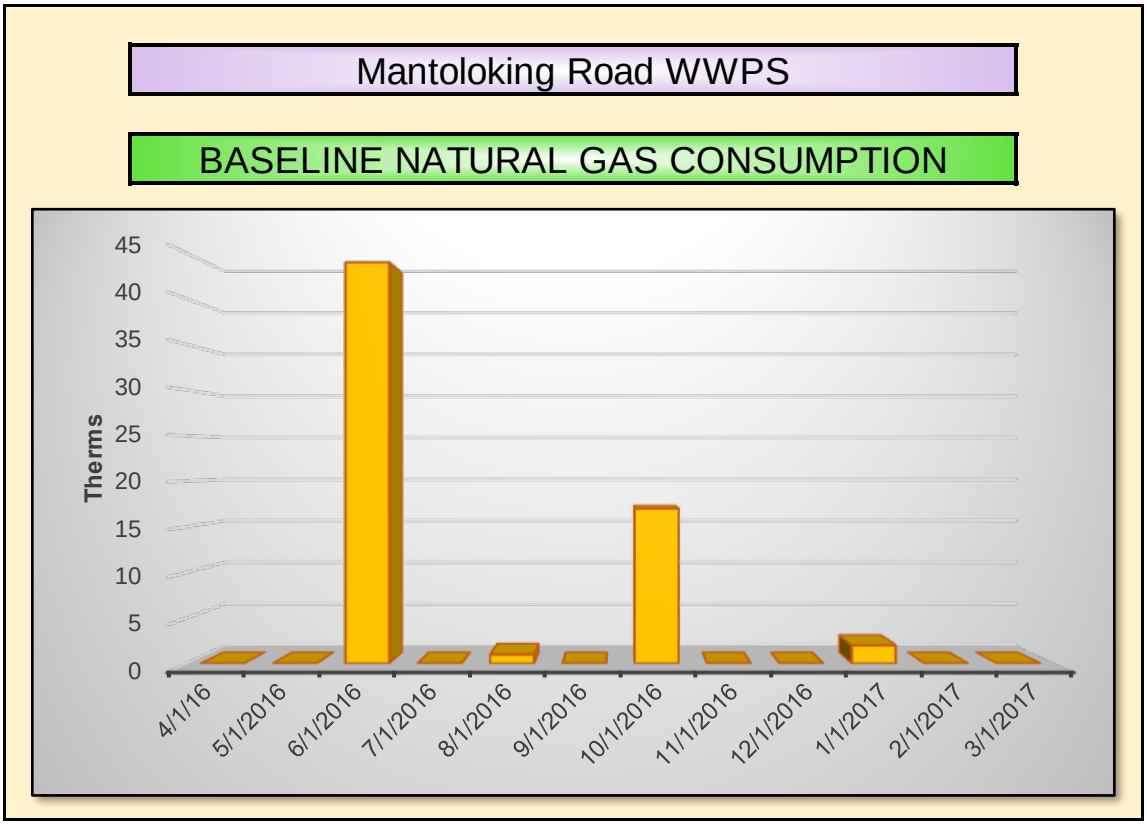


Laurelton WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	0	$0	$0	$0	-	0
4/2/16	5/1/2016	19	$26	$8	$34	$1.80	1,900,000
5/2/16	6/1/2016	13	$31	$5	$36	$2.81	1,300,000
6/2/16	7/1/2016	2	$26	$1	$27	$13.54	200,000
7/2/16	8/1/2016	25	$36	$10	$47	$1.87	2,500,000
8/2/16	9/1/2016	2	$51	$1	$52	$26.04	200,000
9/2/16	10/1/2016	2	$81	$1	$82	$40.91	200,000
10/2/16	11/1/2016	26	$41	$10	$50	$1.94	2,600,000
11/2/16	12/1/2016	2	$81	$1	$82	$40.90	200,000
12/2/16	1/1/2017	2	$28	$1	$29	$14.36	200,000
1/2/17	2/1/2017	2	$28	$1	$29	$14.36	200,000
2/2/17	3/1/2017	0	$27	$0	$27	-	0
TOTALS		95	$456	$39	$495	$5.21	9,500,000

Mantoloking Road WWPS

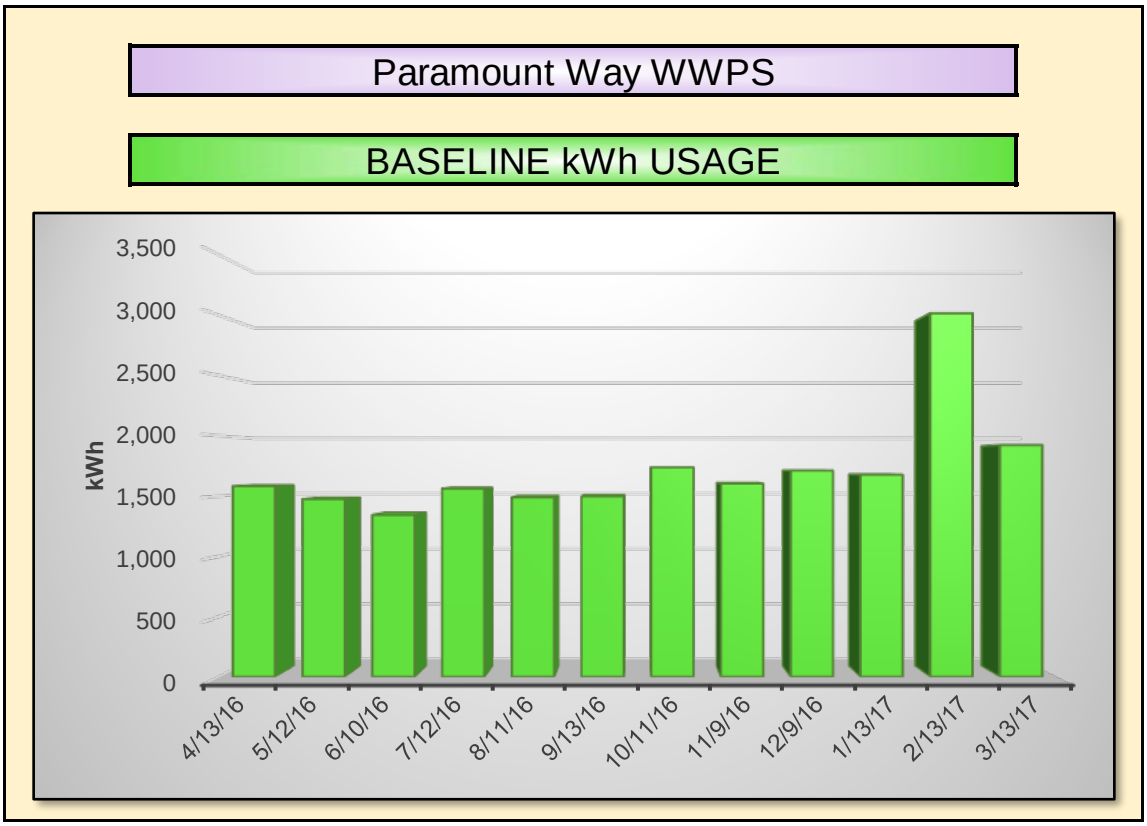


Mantoloking Road WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 013 658 784			Meter #	S3134004311		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
3/16/16	4/13/16	1,598		$137	$85		$222	$0.139	29	-	5,452,376
4/14/16	5/12/16	479		$41	$41		$82	$0.170	29	-	1,634,348
5/13/16	6/10/16	343		$29	$32		$61	$0.179	29	-	1,170,316
6/11/16	7/12/16	239		$21	$26		$48	$0.199	32	-	815,468
7/13/16	8/11/16	232		$21	$26		$47	$0.201	30	-	791,584
8/12/16	9/13/16	263		$23	$28		$51	$0.196	33	-	897,356
9/14/16	10/11/16	230		$21	$26		$47	$0.202	28	-	784,760
10/12/16	11/9/16	262		$23	$28		$51	$0.194	29	-	893,944
11/10/16	12/9/16	346		$31	$33		$64	$0.185	30	-	1,180,552
12/10/16	1/13/17	475		$42	$42		$84	$0.177	35	-	1,620,700
1/14/17	2/13/17	628		$56	$55		$111	$0.177	31	-	2,142,736
2/14/17	3/13/17	550		$49	$54		$103	$0.187	28	-	1,876,600
TOTALS		**5,645**	**0**	**$495**	**$475**	**$0**	**$969**	**$0.172**	**363**	**-**	**19,260,740**



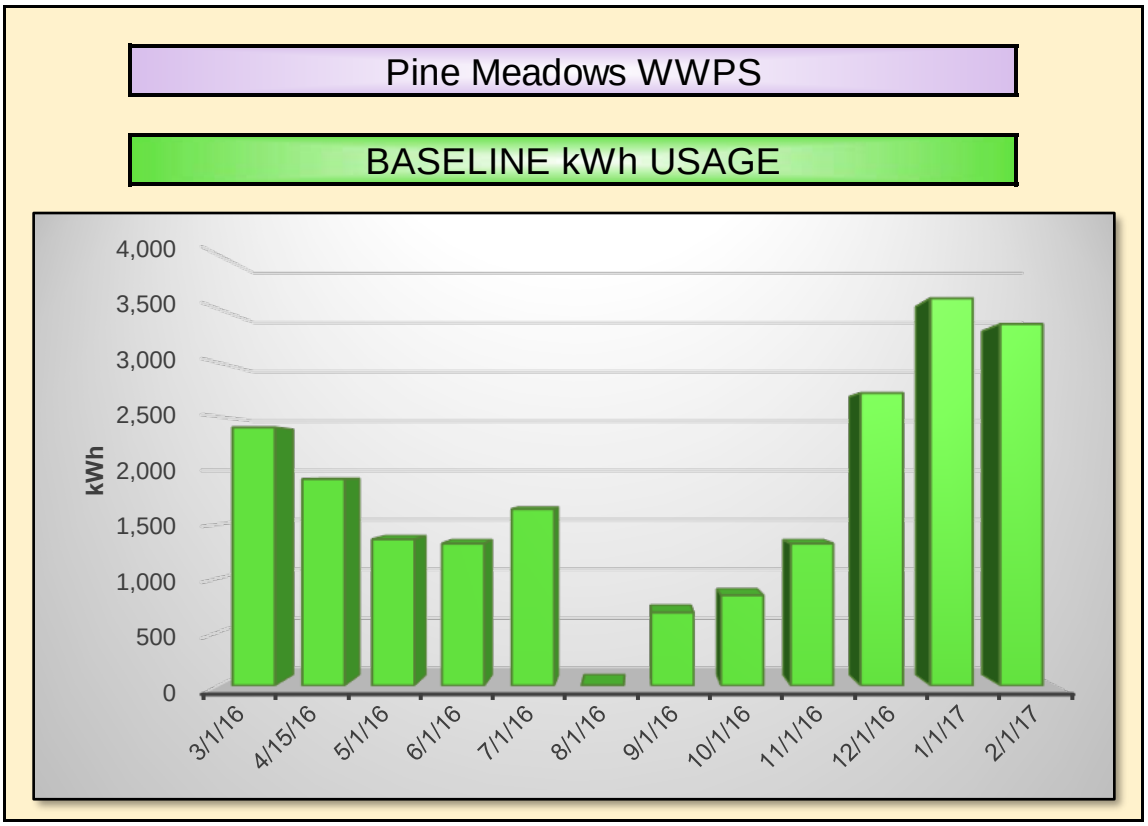
Mantoloking Road WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	0	$0	$0	$0	-	0
4/2/16	5/1/2016	0	$125	$0	$125	-	0
5/2/16	6/1/2016	44	$48	$18	$66	$1.50	4,400,000
6/2/16	7/1/2016	0	$25	$0	$25	-	0
7/2/16	8/1/2016	1	$26	$0	$26	$26.03	100,000
8/2/16	9/1/2016	0	$0	$0	$0	-	0
9/2/16	10/1/2016	17	$35	$7	$41	$2.43	1,700,000
10/2/16	11/1/2016	0	$27	$0	$27	-	0
11/2/16	12/1/2016	0	$27	$0	$27	-	0
12/2/16	1/1/2017	2	$28	$1	$29	$14.37	200,000
1/2/17	2/1/2017	0	$27	$0	$27	-	0
2/2/17	3/1/2017	0	$32	$0	$32	-	0
TOTALS		64	$399	$26	$425	$6.64	6,400,000

Paramount Way WWPS



Paramount Way WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 013 252 042			Meter #	G35545762		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	1,582		$135	$109		$245	$0.155	29	-	5,397,784
4/14/16	5/12/16	1,474		$126	$95		$221	$0.150	29	-	5,029,288
5/13/16	6/10/16	1,343		$115	$92		$207	$0.154	29	-	4,582,316
6/11/16	7/12/16	1,562		$139	$110		$250	$0.160	32	-	5,329,544
7/13/16	8/11/16	1,490		$133	$99		$232	$0.156	30	-	5,083,880
8/12/16	9/13/16	1,498		$133	$111		$245	$0.163	33	-	5,111,176
9/14/16	10/11/16	1,738		$155	$106		$261	$0.150	28	-	5,930,056
10/12/16	11/9/16	1,603		$143	$109		$252	$0.157	29	-	5,469,436
11/10/16	12/9/16	1,711		$153	$111		$264	$0.154	30	-	5,837,932
12/10/16	1/13/17	1,677		$150	$102		$252	$0.150	35	-	5,721,924
1/14/17	2/13/17	3,017		$269	$151		$420	$0.139	31	-	10,294,004
2/14/17	3/13/17	1,923		$171	$142		$313	$0.163	28	-	6,561,276
TOTALS		20,618	0	$1,823	$1,337	$0	$3,160	$0.153	363	-	70,348,616

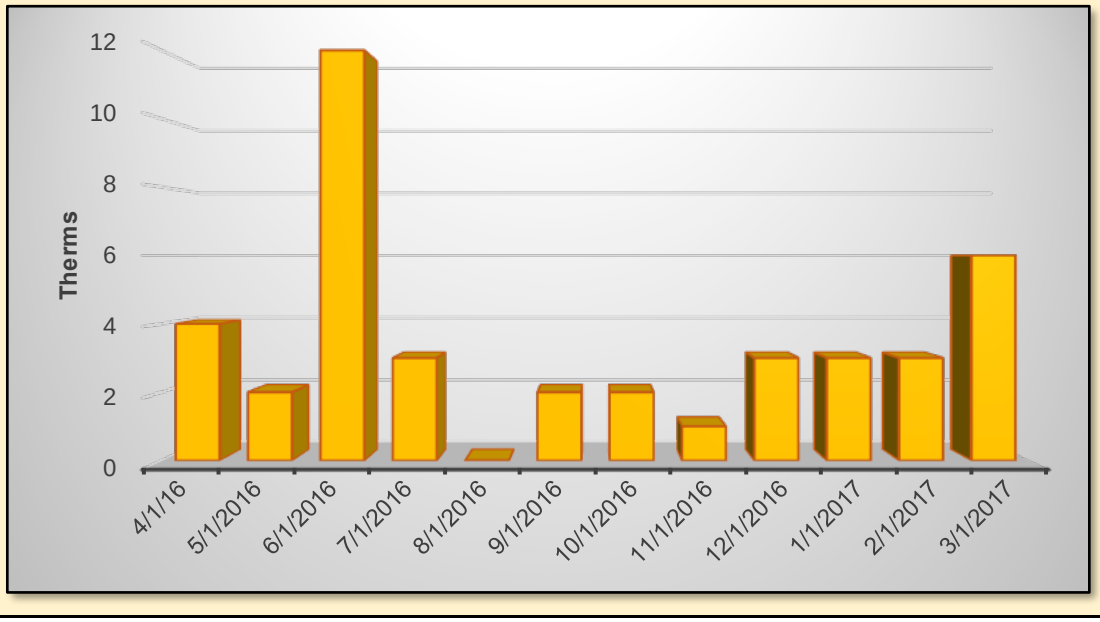
Pine Meadows WWPS



Pine Meadows WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 017 632 959			Meter #	S07045333		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	2,400		$205	$100		$305	$0.127	30	-	8,188,800
3/2/16	4/15/16	1,920		$164	$91		$255	$0.133	45	-	6,551,040
4/16/16	5/1/16	1,360		$116	$80		$197	$0.145	16	-	4,640,320
5/2/16	6/1/16	1,320		$118	$84		$202	$0.153	31	-	4,503,840
6/2/16	7/1/16	1,640		$146	$90		$236	$0.144	30	-	5,595,680
7/2/16	8/1/16	0		$0	$0		$0	-	31	-	0
8/2/16	9/1/16	680		$61	$57		$118	$0.173	31	-	2,320,160
9/2/16	10/1/16	840		$75	$66		$141	$0.168	30	-	2,866,080
10/2/16	11/1/16	1,320		$118	$83		$201	$0.152	31	-	4,503,840
11/2/16	12/1/16	2,720		$243	$112		$355	$0.130	30	-	9,280,640
12/2/16	1/1/17	3,600		$321	$135		$456	$0.127	31	-	12,283,200
1/2/17	2/1/17	3,360		$299	$140		$439	$0.131	31	-	11,464,320
TOTALS		21,160	0	$1,867	$1,037	$0	$2,904	$0.137	367	-	72,197,920

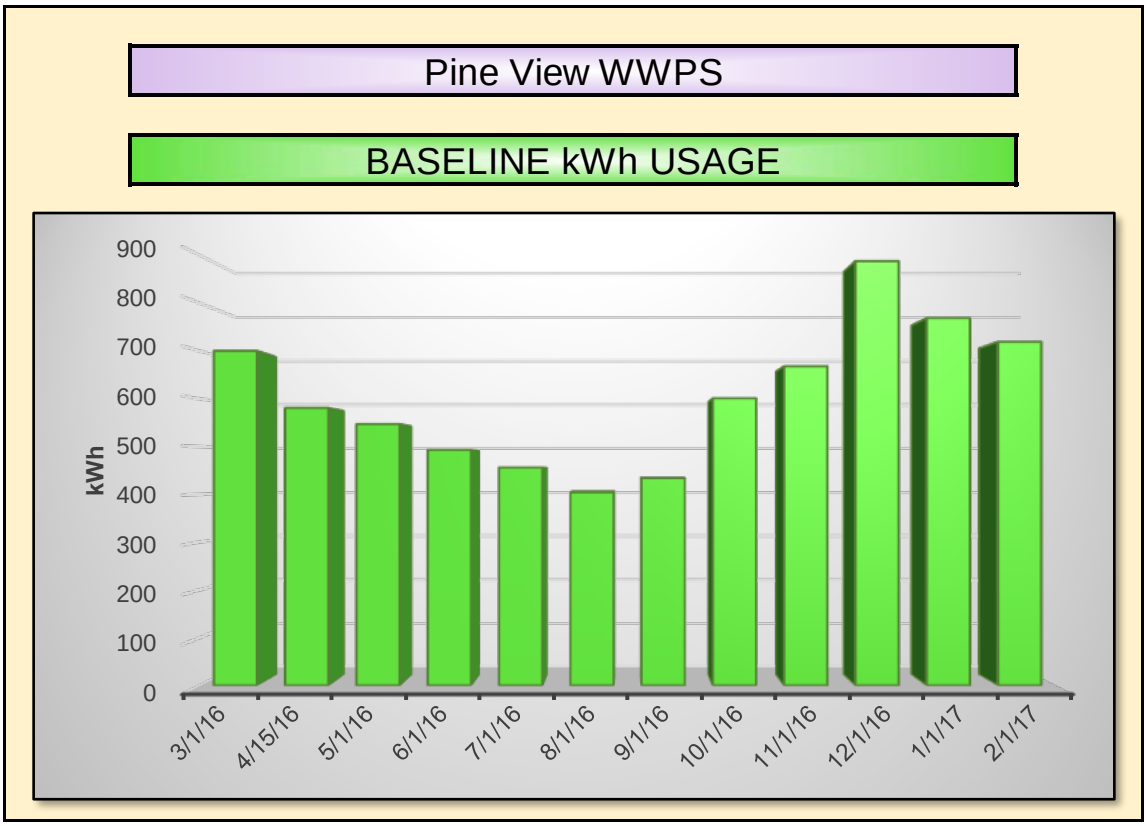
Pine Meadows WWPS

BASELINE NATURAL GAS CONSUMPTION



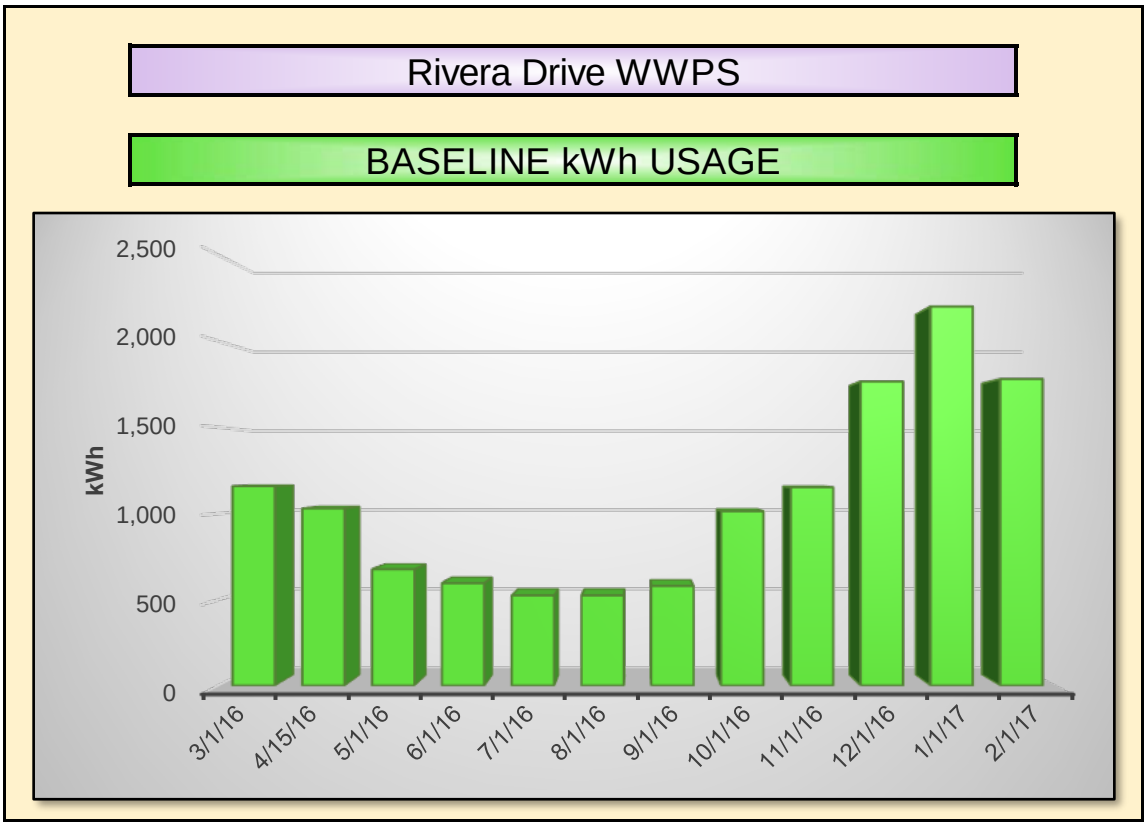
Pine Meadows WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	4	$27	$2	$29	$7.18	400,000
4/2/16	5/1/2016	2	$26	$1	$27	$13.44	200,000
5/2/16	6/1/2016	12	$30	$5	$35	$2.94	1,200,000
6/2/16	7/1/2016	3	$26	$1	$28	$9.26	300,000
7/2/16	8/1/2016	0	$0	$0	$0	-	0
8/2/16	9/1/2016	2	$26	$1	$27	$13.43	200,000
9/2/16	10/1/2016	2	$27	$1	$28	$14.05	200,000
10/2/16	11/1/2016	1	$22	$0	$22	$22.39	100,000
11/2/16	12/1/2016	3	$34	$1	$35	$11.59	300,000
12/2/16	1/1/2017	3	$28	$1	$29	$9.80	300,000
1/2/17	2/1/2017	3	$28	$1	$29	$9.80	300,000
2/2/17	3/1/2017	6	$36	$2	$38	$6.34	600,000
TOTALS		41	$311	$17	$328	$7.99	4,100,000

Pine View WWPS

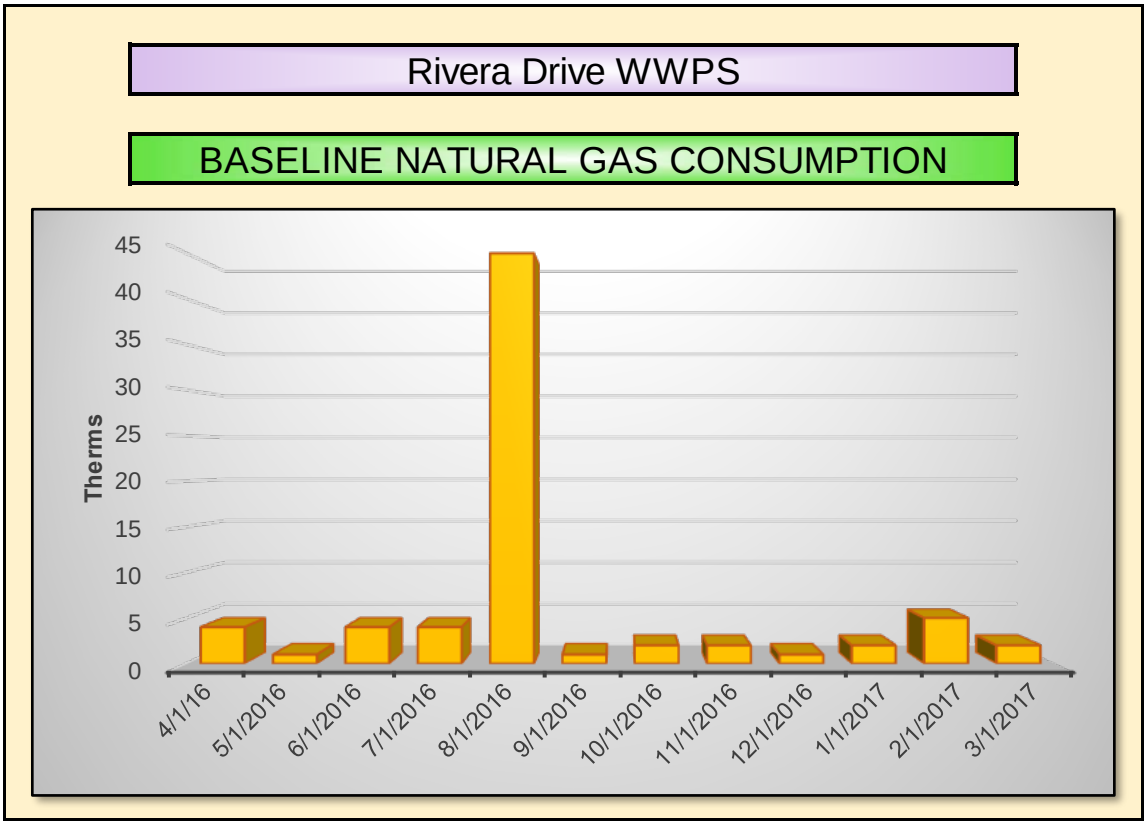


Pine View WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100 017 632 959			Meter #	S07045333		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	700		$60	$55		$115	$0.164	30	-	2,388,400
3/2/16	4/15/16	581		$50	$47		$97	$0.167	45	-	1,982,372
4/16/16	5/1/16	547		$47	$45		$92	$0.168	16	-	1,866,364
5/2/16	6/1/16	493		$44	$44		$88	$0.178	31	-	1,682,116
6/2/16	7/1/16	456		$41	$41		$82	$0.179	30	-	1,555,872
7/2/16	8/1/16	404		$36	$38		$74	$0.182	31	-	1,378,448
8/2/16	9/1/16	434		$39	$40		$79	$0.182	31	-	1,480,808
9/2/16	10/1/16	601		$56	$50		$106	$0.176	30	-	2,050,612
10/2/16	11/1/16	668		$60	$54		$114	$0.171	31	-	2,279,216
11/2/16	12/1/16	888		$79	$69		$148	$0.167	30	-	3,029,856
12/2/16	1/1/17	769		$69	$69		$137	$0.178	31	-	2,623,828
1/2/17	2/1/17	719		$64	$67		$131	$0.182	31	-	2,453,228
TOTALS		7,260	0	$643	$618	$0	$1,261	$0.174	367	-	24,771,120

Rivera Drive WWPS

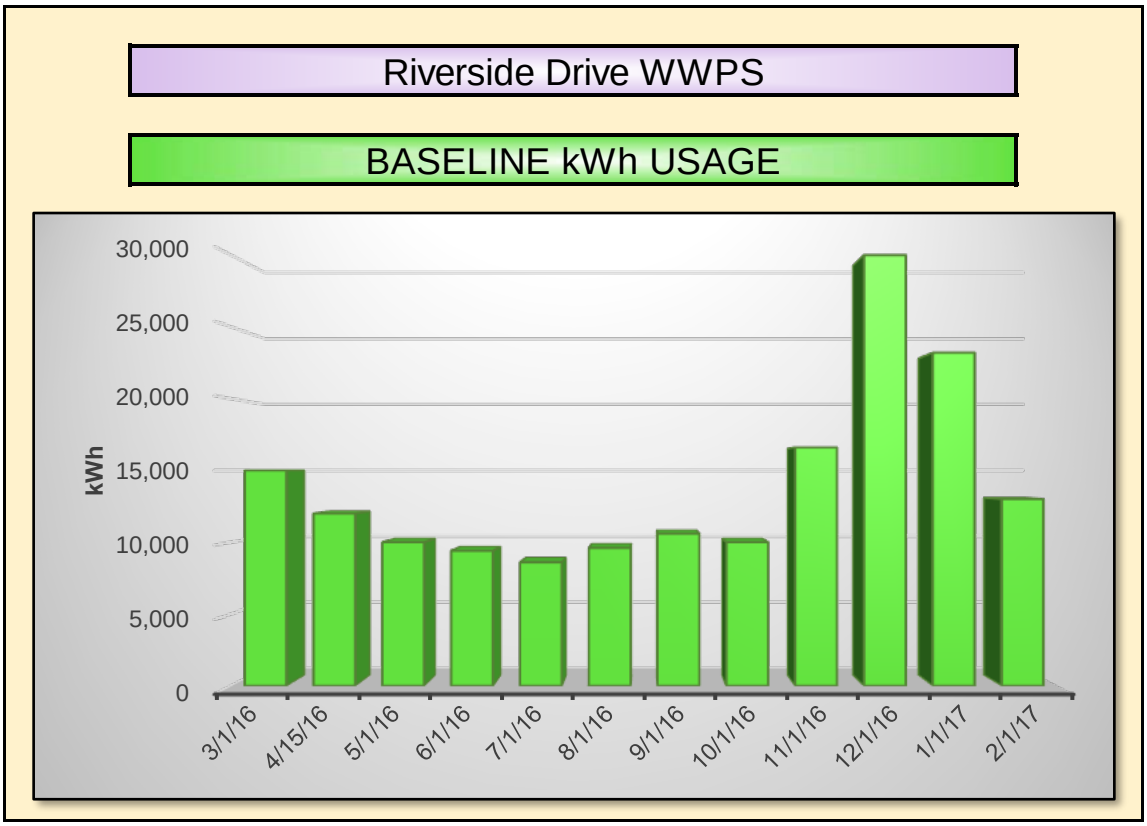


Rivera Drive WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100012942593			Meter #	G28568627		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
2/1/16	3/1/16	1,159		$176			$176	$0.152	30	-	3,954,508
3/2/16	4/15/16	1,029		$163			$163	$0.158	45	-	3,510,948
4/16/16	5/1/16	676		$116			$116	$0.172	16	-	2,306,512
5/2/16	6/1/16	595		$104			$104	$0.174	31	-	2,030,140
6/2/16	7/1/16	524		$92			$92	$0.176	30	-	1,787,888
7/2/16	8/1/16	524		$93			$93	$0.178	31	-	1,787,888
8/2/16	9/1/16	579		$100			$100	$0.173	31	-	1,975,548
9/2/16	10/1/16	1,013		$167			$167	$0.165	30	-	3,456,356
10/2/16	11/1/16	1,152		$1,136			$1,136	$0.986	31	-	3,930,624
11/2/16	12/1/16	1,767		$360			$360	$0.204	30	-	6,029,004
12/2/16	1/1/17	2,202		$310			$310	$0.141	31	-	7,513,224
1/2/17	2/1/17	1,781		$265			$265	$0.149	31	-	6,076,772
TOTALS		13,001	0	$3,082	$0	$0	$3,082	$0.237	367	-	44,359,412

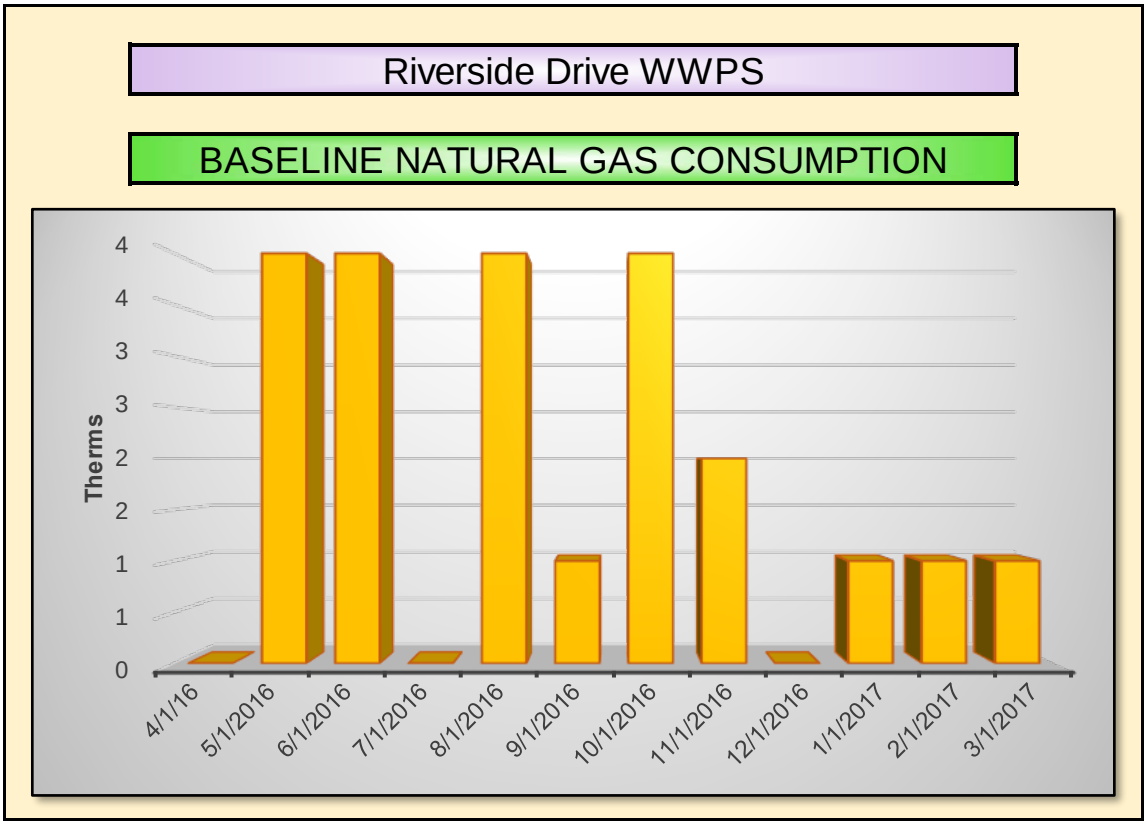


Rivera Drive WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	4	$27	$1	$28	$7.03	400,000
4/2/16	5/1/2016	1	$26	$0	$26	$26.04	100,000
5/2/16	6/1/2016	4	$27	$1	$28	$7.03	400,000
6/2/16	7/1/2016	4	$27	$1	$28	$7.03	400,000
7/2/16	8/1/2016	45	$46	$19	$64	$1.43	4,500,000
8/2/16	9/1/2016	1	$26	$0	$26	$26.03	100,000
9/2/16	10/1/2016	2	$28	$1	$29	$14.27	200,000
10/2/16	11/1/2016	2	$23	$1	$24	$11.78	200,000
11/2/16	12/1/2016	1	$27	$0	$28	$27.78	100,000
12/2/16	1/1/2017	2	$28	$1	$29	$14.37	200,000
1/2/17	2/1/2017	5	$27	$2	$29	$5.81	500,000
2/2/17	3/1/2017	2	$27	$1	$28	$14.16	200,000
TOTALS		73	$337	$30	$367	$5.02	7,300,000

Riverside Drive WWPS

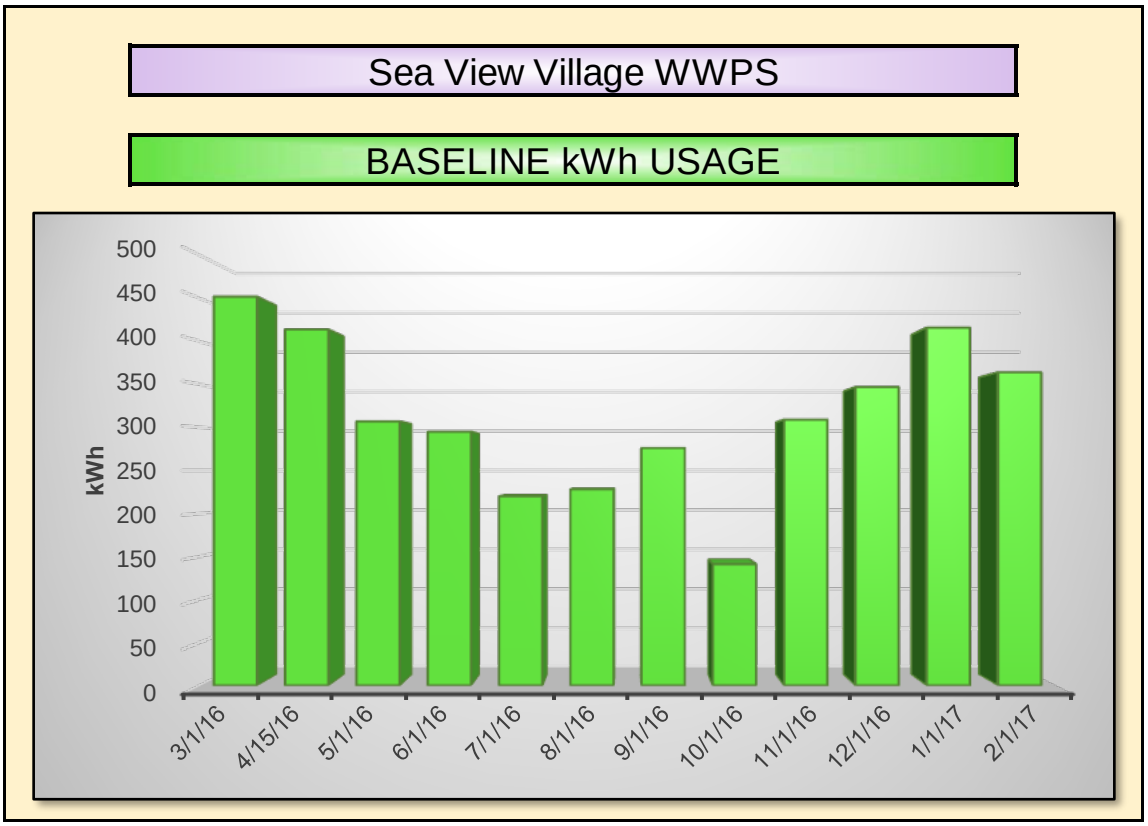


Riverside Drive WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100012783633			Meter #	S313133271		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
2/1/16	3/1/16	15,000	45	$1,615		$194	$1,809	$0.121	30	47%	51,180,000
3/2/16	4/15/16	12,000	30	$1,303		$112	$1,415	$0.118	45	37%	40,944,000
4/16/16	5/1/16	10,000	33	$1,135		$139	$1,275	$0.127	16	78%	34,120,000
5/2/16	6/1/16	9,400	24	$1,071		$82	$1,153	$0.123	31	54%	32,072,800
6/2/16	7/1/16	8,600	27	$985		$103	$1,088	$0.127	30	44%	29,343,200
7/2/16	8/1/16	9,600	26	$1,104		$97	$1,202	$0.125	31	49%	32,755,200
8/2/16	9/1/16	10,600	25	$1,223		$84	$1,308	$0.123	31	57%	36,167,200
9/2/16	10/1/16	10,000	39	$1,156		$163	$1,319	$0.132	30	36%	34,120,000
10/2/16	11/1/16	16,600	51	$1,883		$229	$2,111	$0.127	31	44%	56,639,200
11/2/16	12/1/16	30,000	62	$3,369		$309	$3,677	$0.123	30	68%	102,360,000
12/2/16	1/1/17	23,200	65	$2,644		$364	$3,008	$0.130	31	48%	79,158,400
1/2/17	2/1/17	13,000	48	$906		$253	$1,159	$0.089	31	36%	44,356,000
TOTALS		168,000	65	$18,394	$0	$2,130	$20,524	$0.122	367	29%	573,216,000



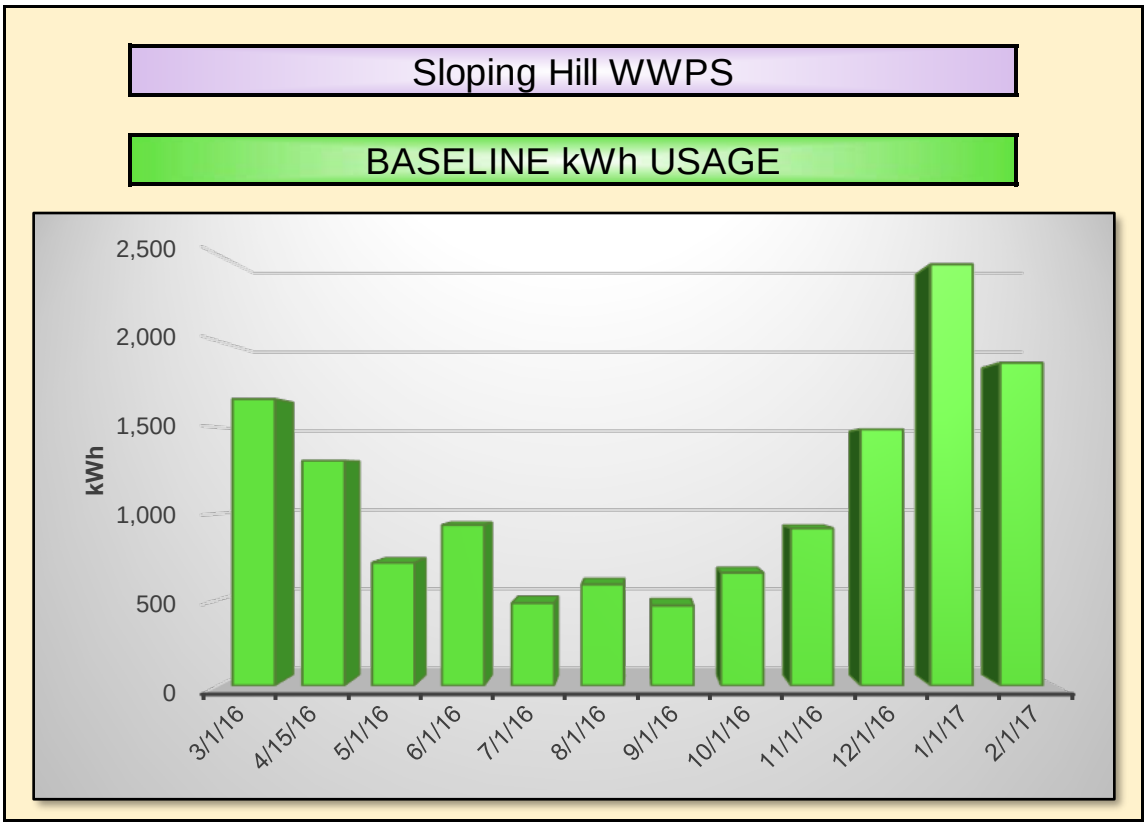
Riverside Drive WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	0	$25	$0	$25	-	0
4/2/16	5/1/2016	4	$27	$1	$28	$7.03	400,000
5/2/16	6/1/2016	4	$27	$1	$28	$7.03	400,000
6/2/16	7/1/2016	0	$50	$0	$50	-	0
7/2/16	8/1/2016	4	$27	$1	$28	$7.03	400,000
8/2/16	9/1/2016	1	$51	$0	$51	$51.03	100,000
9/2/16	10/1/2016	4	$28	$1	$29	$7.36	400,000
10/2/16	11/1/2016	2	$54	$1	$55	$27.45	200,000
11/2/16	12/1/2016	0	$27	$0	$27	-	0
12/2/16	1/1/2017	1	$27	$0	$28	$27.75	100,000
1/2/17	2/1/2017	1	$27	$0	$28	$27.74	100,000
2/2/17	3/1/2017	1	$27	$0	$28	$27.88	100,000
TOTALS		22	$396	$9	$405	$18.41	2,200,000

Sea View Village WWPS



Sea View Village WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 018 098 655			Meter #	S94053064		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	452		$39	$32		$70	$0.156	30	-	1,542,224
3/2/16	4/15/16	414		$35	$29		$65	$0.156	45	-	1,412,568
4/16/16	5/1/16	307		$26	$20		$47	$0.152	16	-	1,047,484
5/2/16	6/1/16	295		$26	$23		$49	$0.167	31	-	1,006,540
6/2/16	7/1/16	220		$20	$18		$37	$0.170	30	-	750,640
7/2/16	8/1/16	228		$20	$18		$39	$0.170	31	-	777,936
8/2/16	9/1/16	276		$25	$22		$47	$0.169	31	-	941,712
9/2/16	10/1/16	141		$13	$12		$25	$0.175	30	-	481,092
10/2/16	11/1/16	309		$28	$23		$51	$0.165	31	-	1,054,308
11/2/16	12/1/16	347		$31	$26		$57	$0.164	30	-	1,183,964
12/2/16	1/1/17	416		$37	$33		$70	$0.169	31	-	1,419,392
1/2/17	2/1/17	364		$32	$31		$63	$0.174	31	-	1,241,968
TOTALS		3,769	0	$332	$288	$0	$620	$0.164	367	-	12,859,828

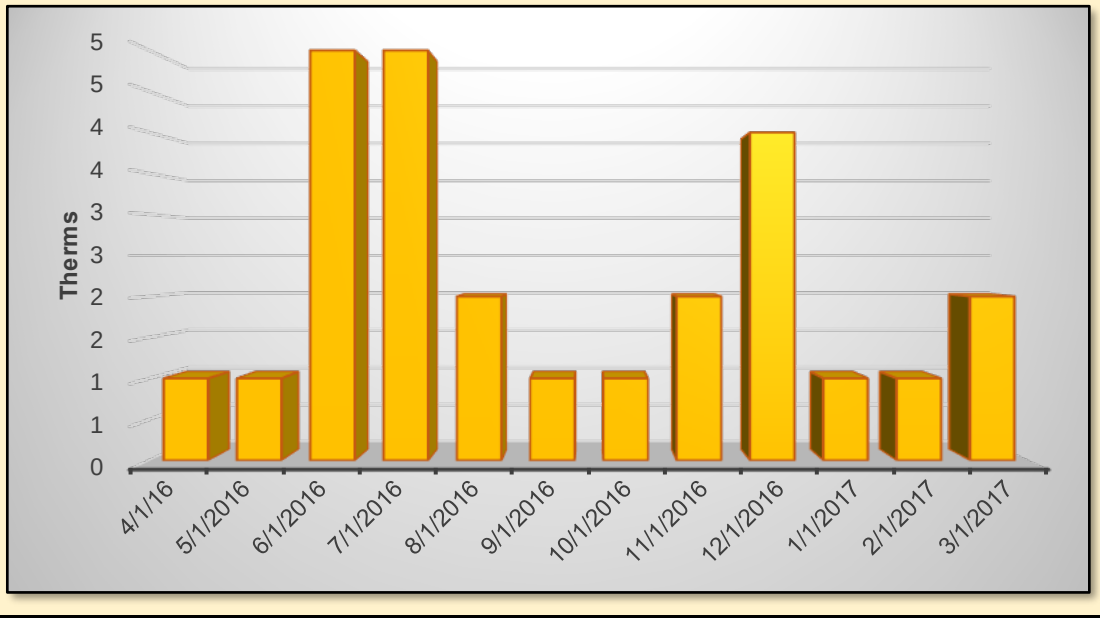
Sloping Hill WWPS



Sloping Hill WWPS						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 018 643 880			Meter #	G28142273		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	1,665		$143	$86		$229	$0.137	30	-	5,680,980
3/2/16	4/15/16	1,306		$12	$79		$91	$0.070	45	-	4,456,072
4/16/16	5/1/16	714		$61	$56		$117	$0.164	16	-	2,436,168
5/2/16	6/1/16	933		$83	$73		$157	$0.168	31	-	3,183,396
6/2/16	7/1/16	479		$43	$43		$85	$0.178	30	-	1,634,348
7/2/16	8/1/16	588		$52	$50		$102	$0.174	31	-	2,006,256
8/2/16	9/1/16	465		$41	$42		$84	$0.180	31	-	1,586,580
9/2/16	10/1/16	656		$59	$54		$112	$0.171	30	-	2,238,272
10/2/16	11/1/16	914		$82	$71		$152	$0.167	31	-	3,118,568
11/2/16	12/1/16	1,489		$133	$87		$219	$0.147	30	-	5,080,468
12/2/16	1/1/17	2,447		$218	$110		$329	$0.134	31	-	8,349,164
1/2/17	2/1/17	1,875		$167	$107		$274	$0.146	31	-	6,397,500
TOTALS		**13,531**	**0**	**$1,094**	**$857**	**$0**	**$1,951**	**$0.144**	**367**	**-**	**46,167,772**

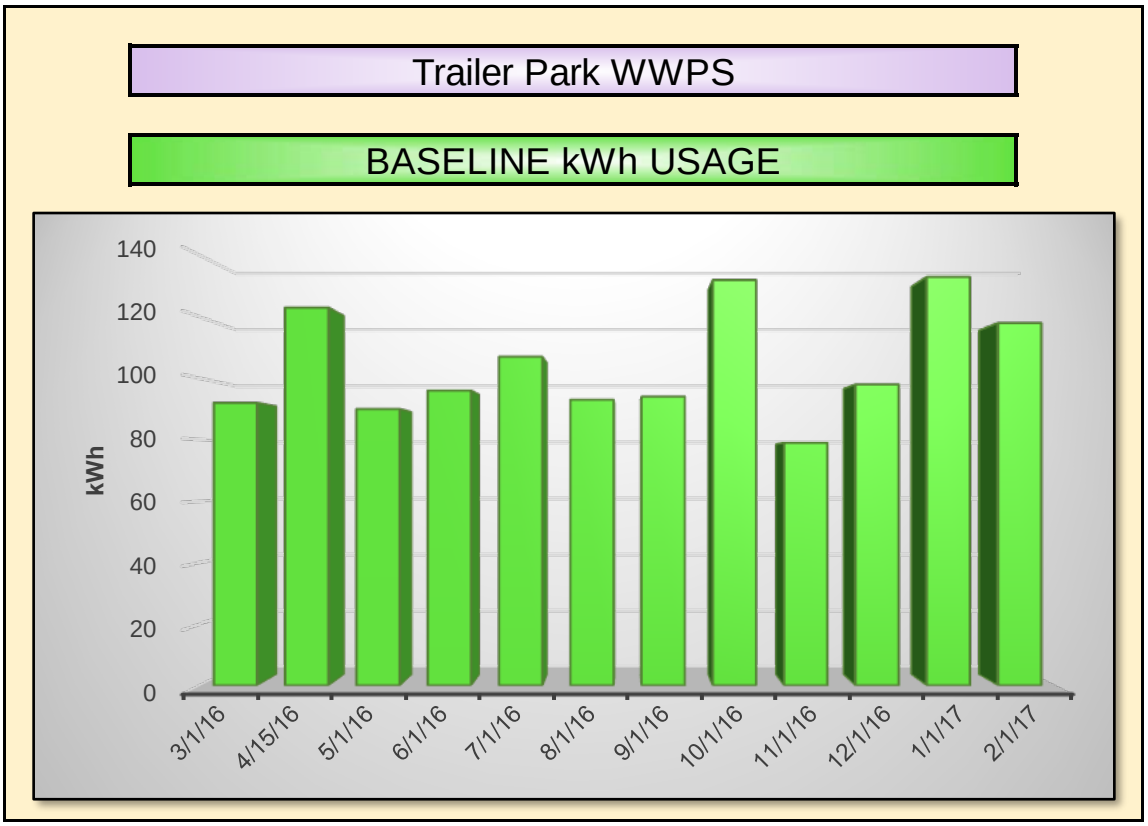
Sloping Hill WWPS

BASELINE NATURAL GAS CONSUMPTION



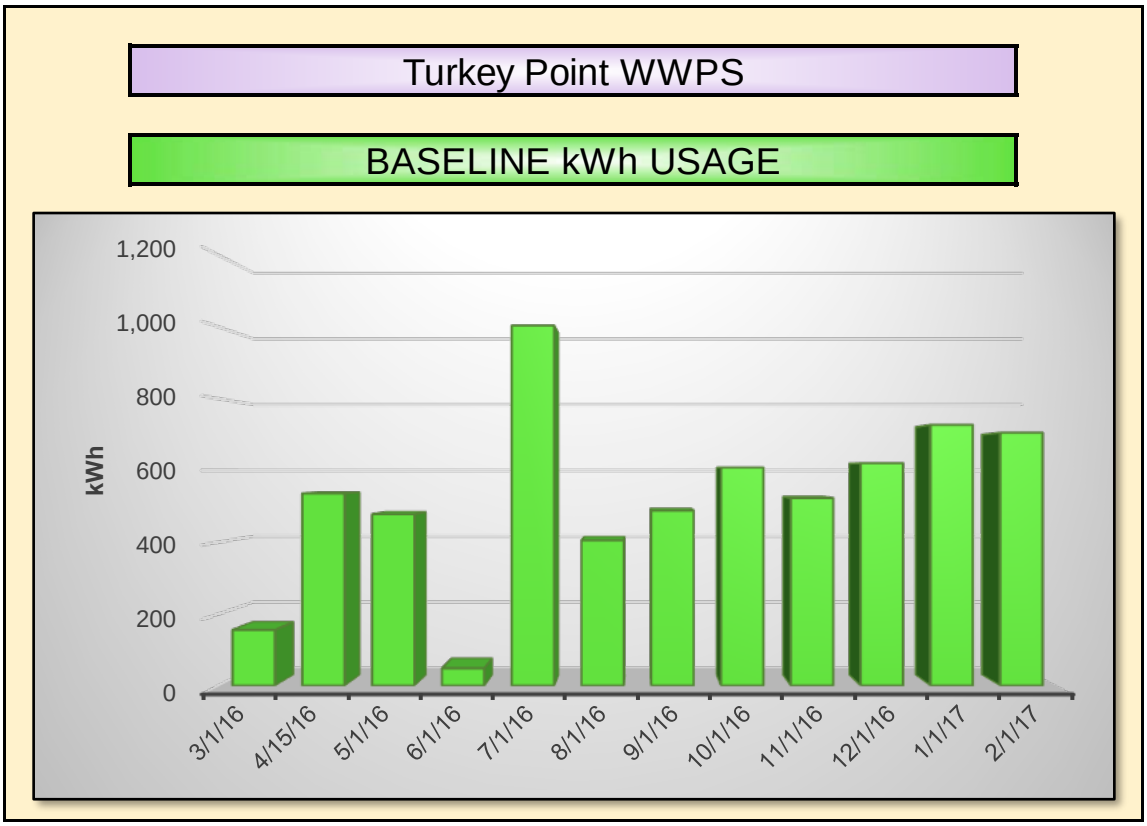
Sloping Hill WWPS					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	1	$26	$0	$26	$26.04	100,000
4/2/16	5/1/2016	1	$25	$0	$25	$25.49	100,000
5/2/16	6/1/2016	5	$27	$2	$29	$5.83	500,000
6/2/16	7/1/2016	5	$27	$2	$29	$5.83	500,000
7/2/16	8/1/2016	2	$51	$1	$52	$26.04	200,000
8/2/16	9/1/2016	1	$26	$0	$26	$26.03	100,000
9/2/16	10/1/2016	1	$27	$0	$27	$27.02	100,000
10/2/16	11/1/2016	2	$28	$1	$29	$14.48	200,000
11/2/16	12/1/2016	4	$28	$1	$30	$7.43	400,000
12/2/16	1/1/2017	1	$27	$0	$28	$27.78	100,000
1/2/17	2/1/2017	1	$27	$0	$28	$27.74	100,000
2/2/17	3/1/2017	2	$28	$1	$29	$14.48	200,000
TOTALS		26	$347	$11	$358	$13.77	2,600,000

Trailer Park WWPS



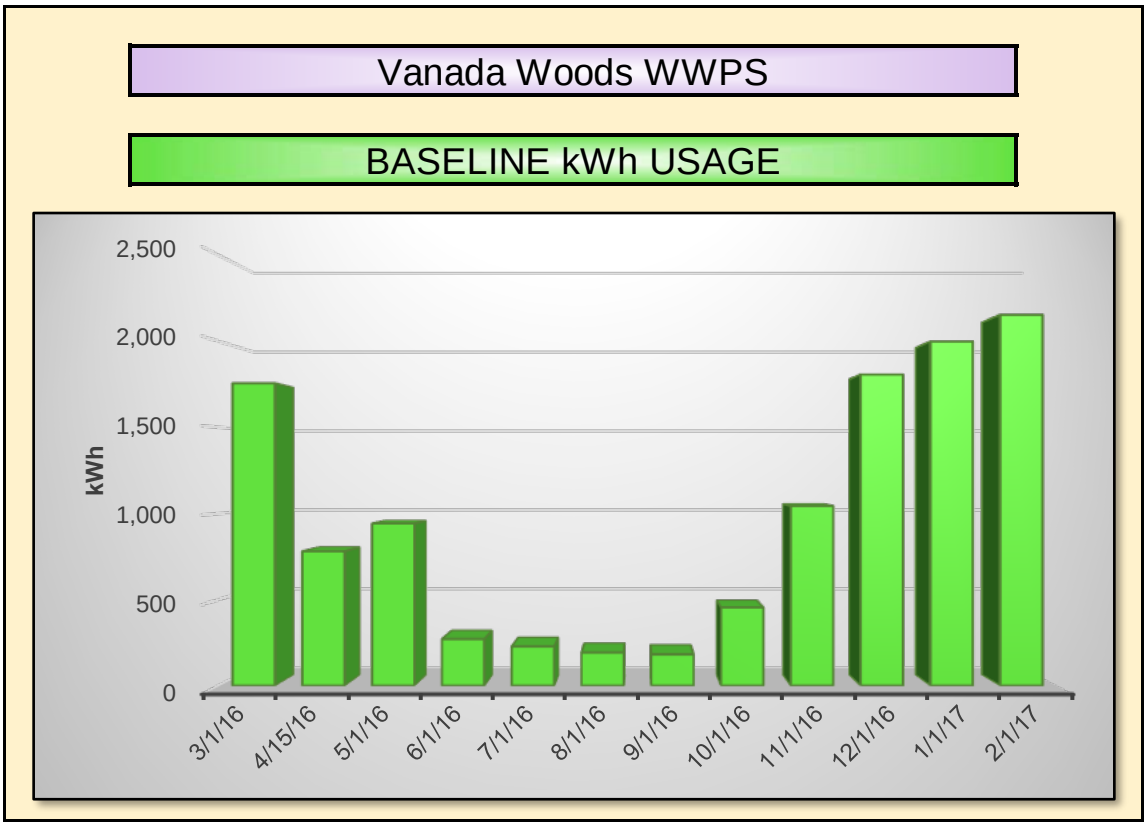
Trailer Park WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100 013 205 545			Meter #	G79624849		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	92		$8	$9		$17	$0.180	30	-	313,904
3/2/16	4/15/16	123		$11	$11		$21	$0.172	45	-	419,676
4/16/16	5/1/16	90		$8	$9		$16	$0.180	16	-	307,080
5/2/16	6/1/16	96		$9	$9		$18	$0.186	31	-	327,552
6/2/16	7/1/16	107		$10	$10		$20	$0.183	30	-	365,084
7/2/16	8/1/16	93		$8	$9		$17	$0.187	31	-	317,316
8/2/16	9/1/16	94		$8	$9		$18	$0.188	31	-	320,728
9/2/16	10/1/16	132		$12	$12		$23	$0.177	30	-	450,384
10/2/16	11/1/16	79		$7	$8		$15	$0.191	31	-	269,548
11/2/16	12/1/16	98		$9	$9		$18	$0.184	30	-	334,376
12/2/16	1/1/17	133		$12	$12		$24	$0.181	31	-	453,796
1/2/17	2/1/17	118		$11	$12		$23	$0.193	31	-	402,616
TOTALS		1,255	0	$111	$119	$0	$230	$0.183	367	-	4,282,060

Turkey Point WWPS



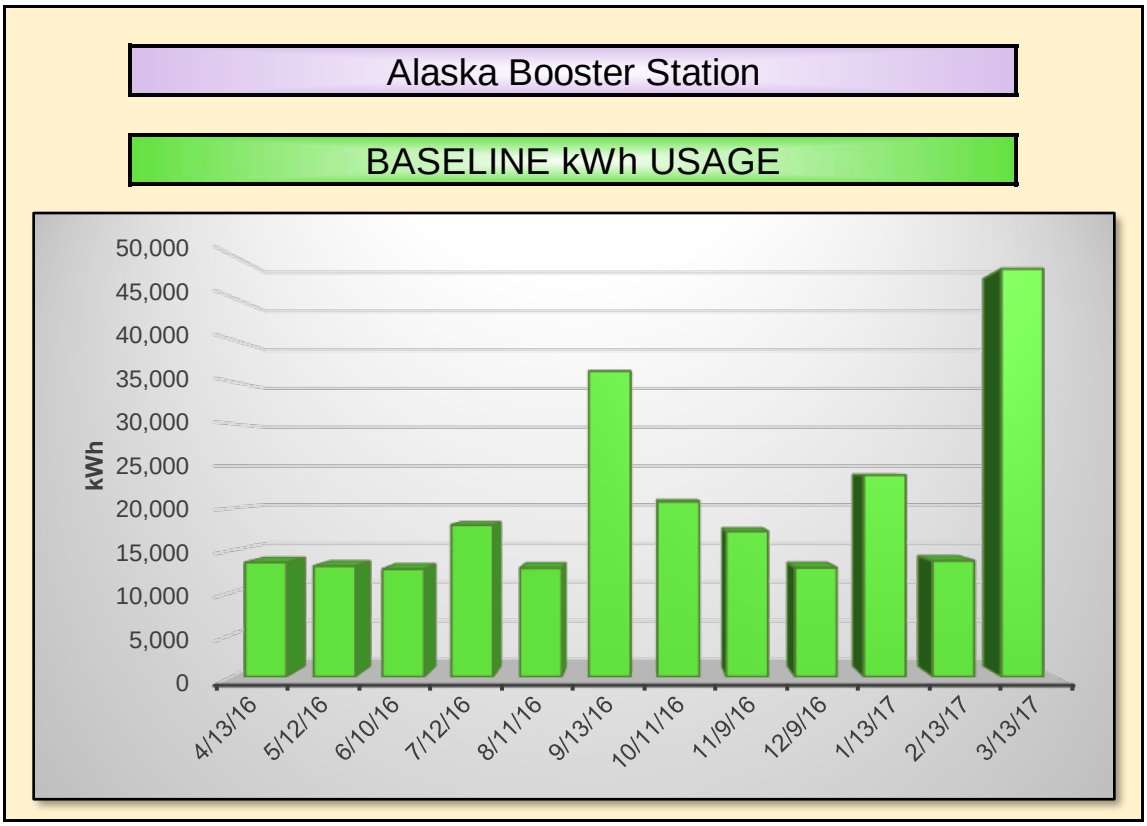
Turkey Point WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100 013 205 545			Meter #	G79624849		
Commodity:				Account #				Meter #			
Billing Period Start Date	**Actual Reading**	**Usage kWh**	**Demand kW**	**Electric Delivery Charges**	**Electric Commodity Charges**	**Electric Demand Charges**	**Total Electric Charges**	**Cost / kWh Checksum**	**Days**	**Load Factor**	**BTU**
2/1/16	3/1/16	155		$13	$13		$26	$0.167	30	-	528,860
3/2/16	4/15/16	536		$46	$37		$83	$0.155	45	-	1,828,832
4/16/16	5/1/16	478		$41	$33		$74	$0.155	16	-	1,630,936
5/2/16	6/1/16	48		$4	$6		$10	$0.216	31	-	163,776
6/2/16	7/1/16	1,004		$90	$71		$160	$0.160	30	-	3,425,648
7/2/16	8/1/16	405		$36	$30		$66	$0.164	31	-	1,381,860
8/2/16	9/1/16	488		$44	$37		$80	$0.164	31	-	1,665,056
9/2/16	10/1/16	608		$54	$43		$97	$0.160	30	-	2,074,496
10/2/16	11/1/16	523		$47	$37		$84	$0.161	31	-	1,784,476
11/2/16	12/1/16	620		$55	$44		$99	$0.160	30	-	2,115,440
12/2/16	1/1/17	727		$65	$54		$119	$0.164	31	-	2,480,524
1/2/17	2/1/17	705		$63	$57		$120	$0.170	31	-	2,405,460
TOTALS		6,297	0	$557	$462	$0	$1,019	$0.162	367	-	21,485,364

Vanada Woods WWPS



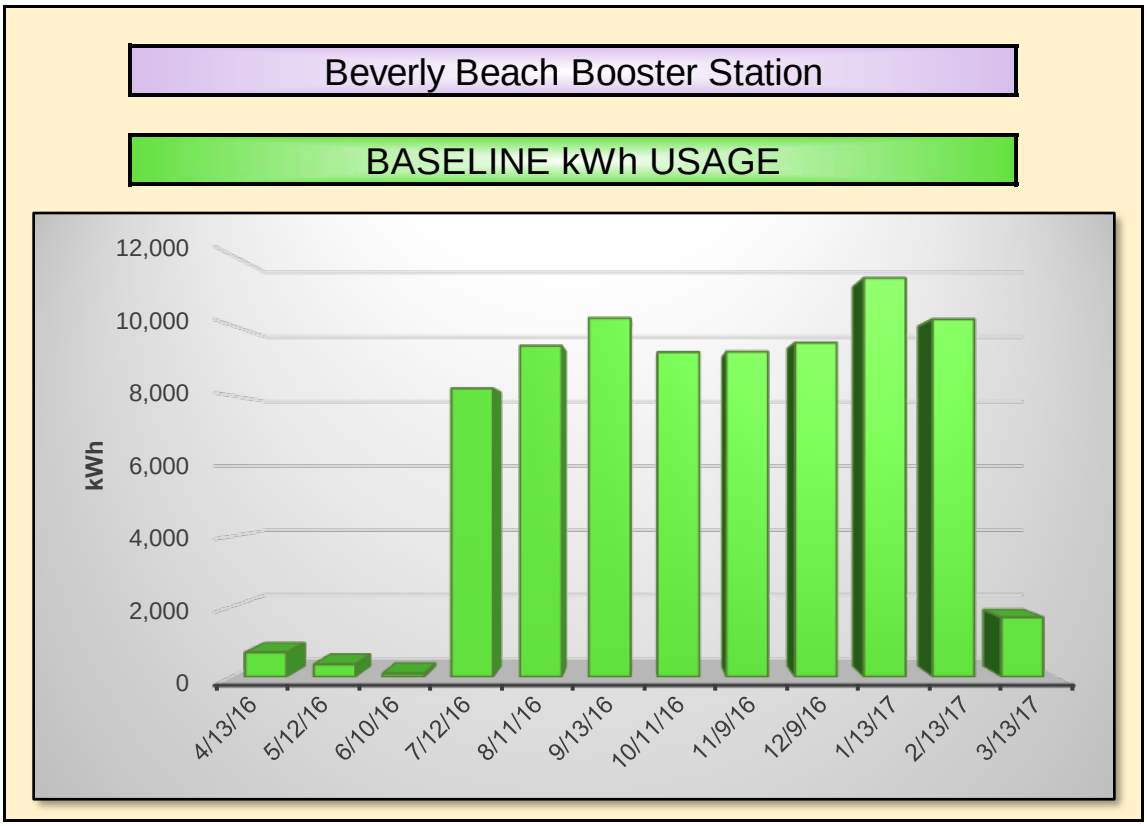
Vanada Woods WWPS								ELECTRIC METER #1			
Provider:	JCP&L			Account #	100 014 056 079			Meter #	G35545233		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
2/1/16	3/1/16	1,756		$150	$238		$388	$0.221	30	-	5,991,472
3/2/16	4/15/16	780		$67	$127		$193	$0.248	45	-	2,661,360
4/16/16	5/1/16	942		$81	$151		$231	$0.246	16	-	3,214,104
5/2/16	6/1/16	270		$24	$53		$77	$0.284	31	-	921,240
6/2/16	7/1/16	227		$20	$46		$66	$0.291	30	-	774,524
7/2/16	8/1/16	192		$17	$40		$57	$0.299	31	-	655,104
8/2/16	9/1/16	181		$16	$39		$55	$0.304	31	-	617,572
9/2/16	10/1/16	454		$41	$81		$121	$0.267	30	-	1,549,048
10/2/16	11/1/16	1,044		$93	$140		$234	$0.224	31	-	3,562,128
11/2/16	12/1/16	1,807		$161	$254		$416	$0.230	30	-	6,165,484
12/2/16	1/1/17	1,999		$178	$282		$460	$0.230	31	-	6,820,588
1/2/17	2/1/17	2,154		$192	$305		$497	$0.231	31	-	7,349,448
TOTALS		11,806	0	$1,041	$1,755	$0	$2,796	$0.237	367	-	40,282,072

Alaska Booster Station



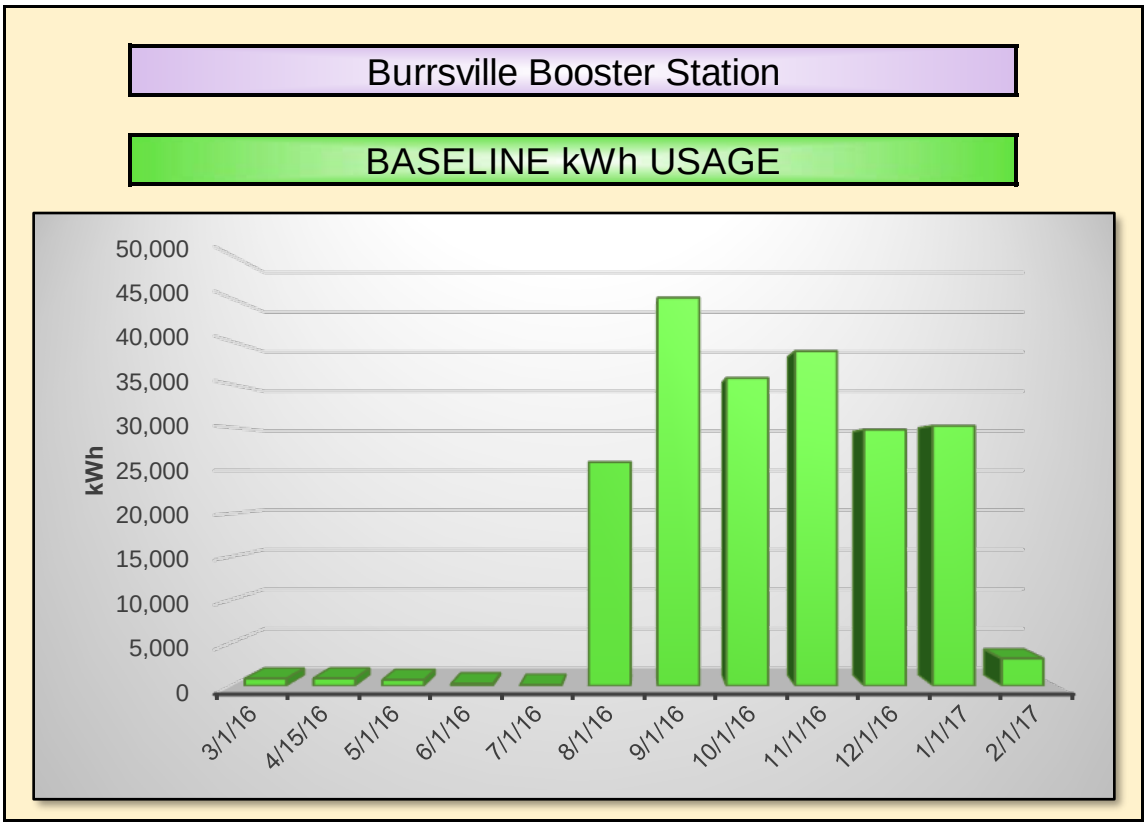
Alaska Booster Station						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100068331527			Meter #	G28658803		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	13,560		$1,161	$554		$1,715	$0.126	29	-	46,266,720
4/14/16	5/12/16	13,120		$1,123	$519		$1,642	$0.125	29	-	44,765,440
5/13/16	6/10/16	12,760		$1,092	$504		$1,597	$0.125	29	-	43,537,120
6/11/16	7/12/16	18,000		$1,606	$792		$2,399	$0.133	32	-	61,416,000
7/13/16	8/11/16	12,880		$1,149	$710		$1,859	$0.144	30	-	43,946,560
8/12/16	9/13/16	36,240		$3,234	$1,151		$4,385	$0.121	33	-	123,650,880
9/14/16	10/11/16	20,760		$1,853	$895		$2,747	$0.132	28	-	70,833,120
10/12/16	11/9/16	17,240		$1,538	$826		$2,364	$0.137	29	-	58,822,880
11/10/16	12/9/16	12,920		$1,153	$707		$1,860	$0.144	30	-	44,083,040
12/10/16	1/13/17	23,920		$2,135	$862		$2,997	$0.125	35	-	81,615,040
1/14/17	2/13/17	13,760		$1,227	$593		$1,820	$0.132	31	-	46,949,120
2/14/17	3/13/17	48,360		$4,311	$1,511		$5,822	$0.120	28	-	165,004,320
TOTALS		243,520	0	$21,582	$9,625	$0	$31,207	$0.128	363	-	830,890,240

Beverly Beach Booster Station



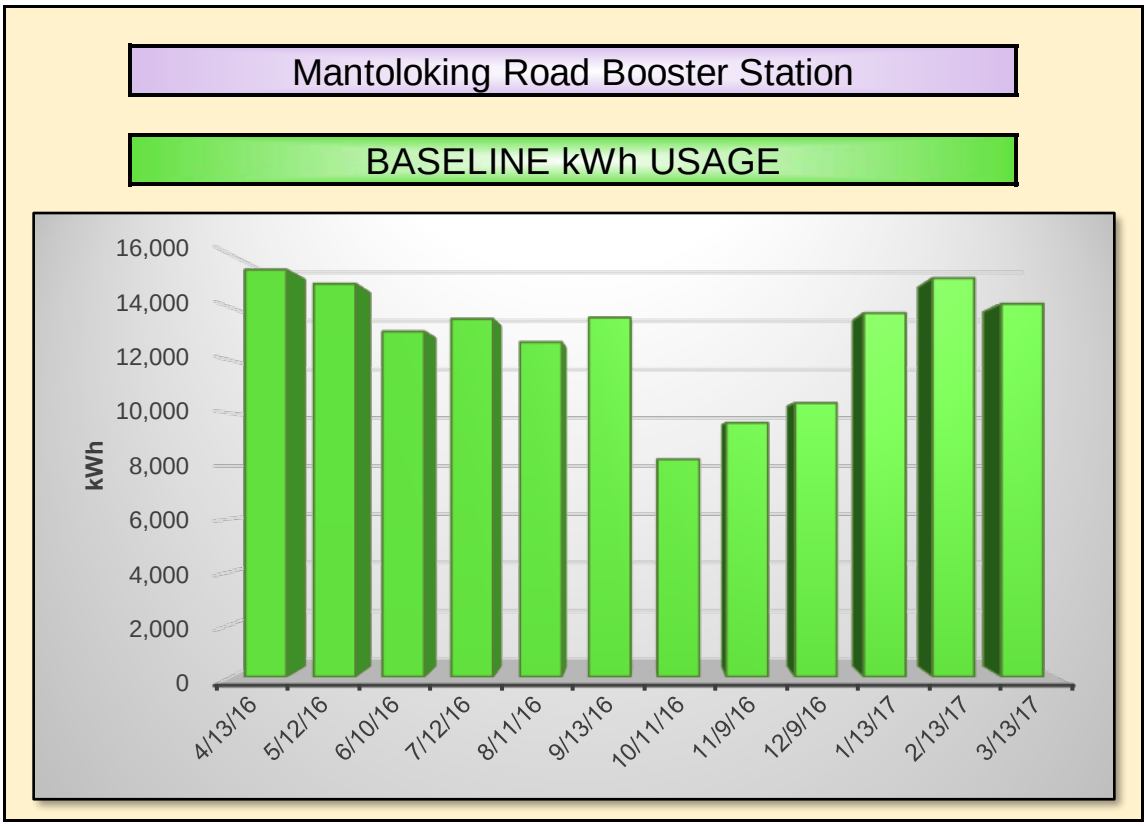
Beverly Beach Booster Station						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100013035256			Meter #	G28633972		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	698	19	$114		$51	$166	$0.237	29	5%	2,381,576
4/14/16	5/12/16	356	19	$63		$51	$115	$0.322	29	3%	1,214,672
5/13/16	6/10/16	93	18	$25		$49	$73	$0.788	29	1%	317,316
6/11/16	7/12/16	8,203	13	$942		$20	$962	$0.117	32	80%	27,988,636
7/13/16	8/11/16	9,416	13	$1,073		$20	$1,093	$0.116	30	98%	32,127,392
8/12/16	9/13/16	10,204	14	$1,170		$21	$1,191	$0.117	33	95%	34,816,048
9/14/16	10/11/16	9,236	13	$1,073		$19	$1,092	$0.118	28	103%	31,513,232
10/12/16	11/9/16	9,251	14	$1,074		$20	$1,093	$0.118	29	98%	31,564,412
11/10/16	12/9/16	9,507	16	$1,102		$34	$1,136	$0.120	30	82%	32,437,884
12/10/16	1/13/17	11,347		$0			$1,362	$0.120	35	-	38,715,964
1/14/17	2/13/17	10,174	16	$1,196		$42	$1,238	$0.122	31	84%	34,713,688
2/14/17	3/13/17	1,692	16	$244		$32	$276	$0.163	28	16%	5,773,104
TOTALS		80,177	19	$8,076	$0	$360	$9,797	$0.122	363	49%	273,563,924

Burrsville Booster Station

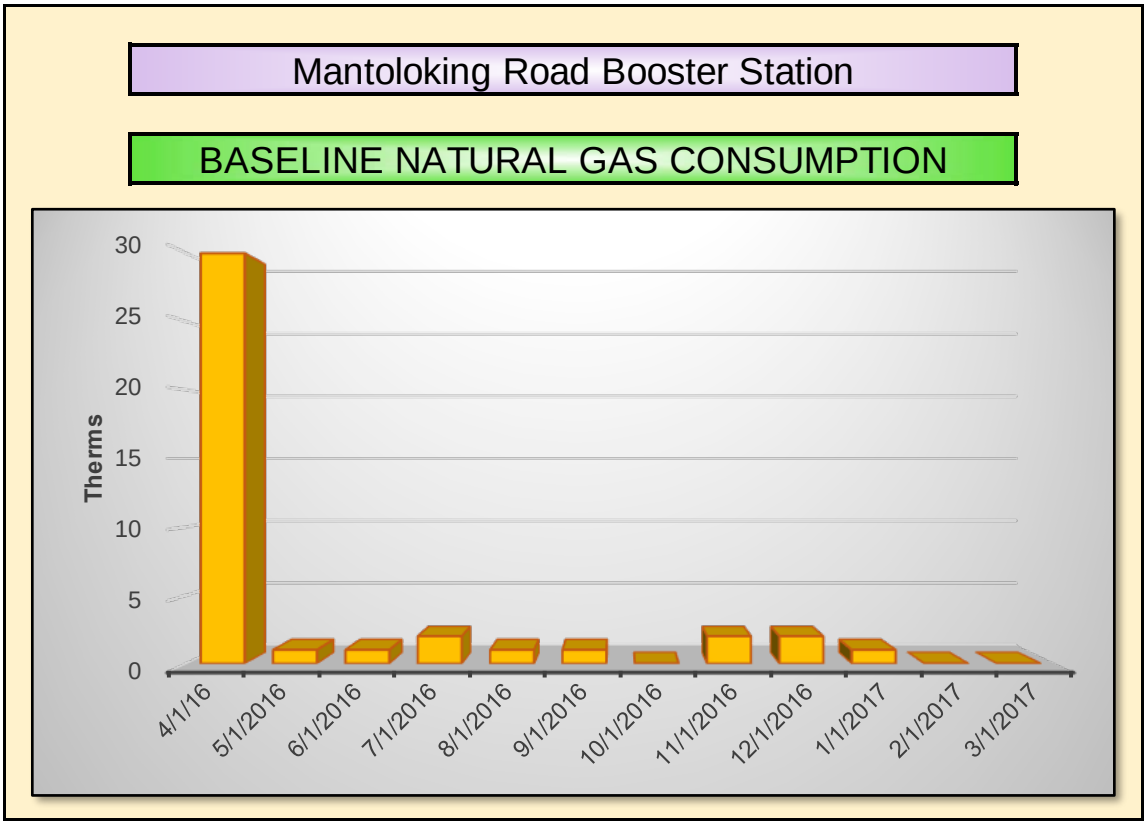


Burrsville Booster Station						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100017592385			Meter #	G35516033		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
2/1/16	3/1/16	766		$66	$212		$278	$0.363	30	-	2,613,592
3/2/16	4/15/16	780		$67	$213		$280	$0.359	45	-	2,661,360
4/16/16	5/1/16	603		$52	$202		$254	$0.421	16	-	2,057,436
5/2/16	6/1/16	168		$15	$175		$190	$1.130	31	-	573,216
6/2/16	7/1/16	0		$0	$0		$0	-	30	-	0
7/2/16	8/1/16	25,904		$2,312	$874		$3,186	$0.123	31	-	88,384,448
8/2/16	9/1/16	44,981		$4,014	$1,288		$5,302	$0.118	31	-	153,475,172
9/2/16	10/1/16	35,662		$3,182	$1,117		$4,299	$0.121	30	-	121,678,744
10/2/16	11/1/16	38,787		$3,461	$1,184		$4,645	$0.120	31	-	132,341,244
11/2/16	12/1/16	29,670		$2,648	$994		$3,642	$0.123	30	-	101,234,040
12/2/16	1/1/17	30,109		$2,685	$1,046		$3,732	$0.124	31	-	102,731,908
1/2/17	2/1/17	3,092		$276	$517		$792	$0.256	31	-	10,549,904
TOTALS		210,522	0	$18,777	$7,822	$0	$26,599	$0.126	367	-	718,301,064

Mantoloking Road Booster Station

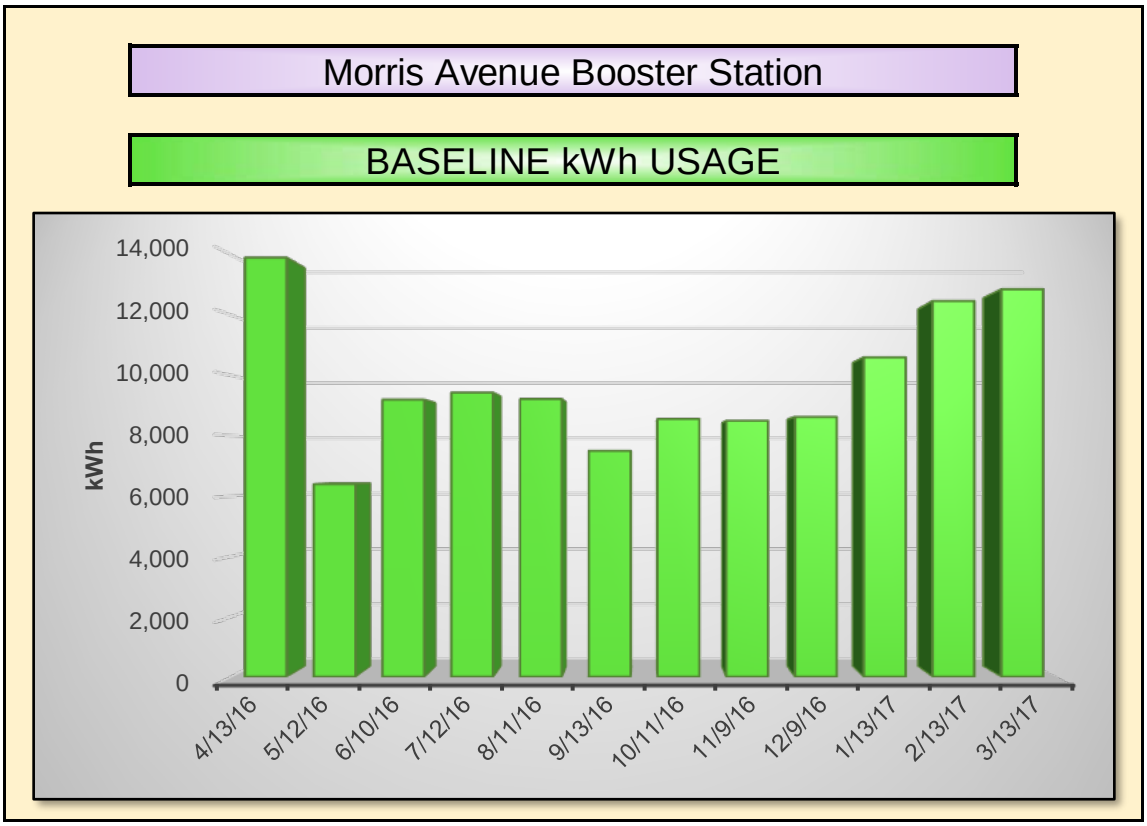


Mantoloking Road Booster Station						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 014 147 035			Meter #	G15011336		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	15,276		$1,308	$701		$2,009	$0.131	29	-	52,121,712
4/14/16	5/12/16	14,742		$1,262	$646		$1,908	$0.129	29	-	50,299,704
5/13/16	6/10/16	12,933		$1,107	$630		$1,738	$0.134	29	-	44,127,396
6/11/16	7/12/16	13,413		$1,197	$707		$1,904	$0.142	32	-	45,765,156
7/13/16	8/11/16	12,531		$1,118	$727		$1,845	$0.147	30	-	42,755,772
8/12/16	9/13/16	13,460		$1,201	$744		$1,945	$0.144	33	-	45,925,520
9/14/16	10/11/16	8,086		$722	$660		$1,382	$0.171	28	-	27,589,432
10/12/16	11/9/16	9,472		$845	$450		$1,295	$0.137	29	-	32,318,464
11/10/16	12/9/16	10,218		$912	$610		$1,522	$0.149	30	-	34,863,816
12/10/16	1/13/17	13,631		$1,216	$689		$1,906	$0.140	35	-	46,508,972
1/14/17	2/13/17	14,957		$1,334	$734		$2,068	$0.138	31	-	51,033,284
2/14/17	3/13/17	13,980		$1,246	$714		$1,960	$0.140	28	-	47,699,760
TOTALS		152,699	0	$13,468	$8,013	$0	$21,480	$0.141	363	-	521,008,988

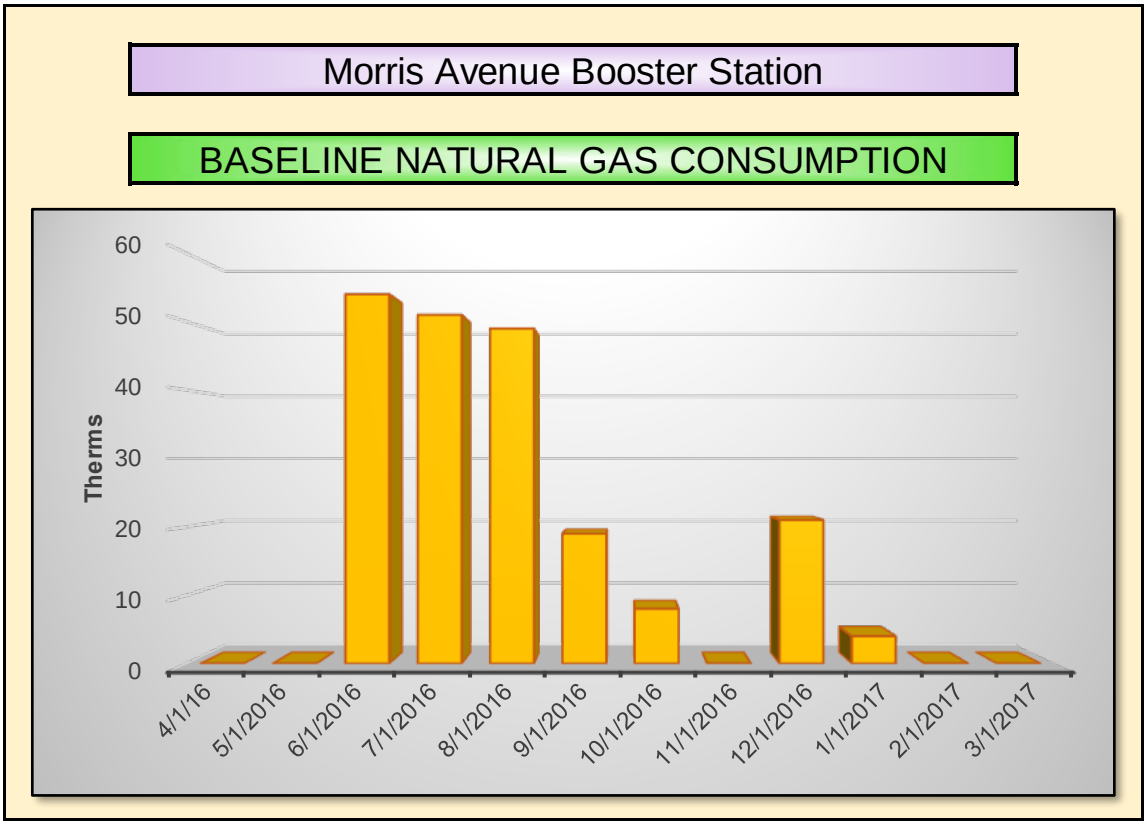


Mantoloking Road Booster Station					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	Actual Reading	Therms	Gas Delivery Charges	Gas Commodity Charges	Gas Total Charges	Cost / Unit Checksum	BTU
3/1/16	4/1/16	30	$39	$12	$51	$1.70	3,000,000
4/2/16	5/1/2016	1	$26	$0	$26	$26.04	100,000
5/2/16	6/1/2016	1	$26	$0	$26	$26.04	100,000
6/2/16	7/1/2016	2	$26	$1	$27	$13.52	200,000
7/2/16	8/1/2016	1	$26	$0	$26	$26.03	100,000
8/2/16	9/1/2016	1	$26	$0	$26	$26.03	100,000
9/2/16	10/1/2016	0	$26	$0	$26	-	0
10/2/16	11/1/2016	2	$28	$1	$29	$14.48	200,000
11/2/16	12/1/2016	2	$28	$1	$29	$14.38	200,000
12/2/16	1/1/2017	1	$27	$0	$28	$27.75	100,000
1/2/17	2/1/2017	0	$27	$0	$27	-	0
2/2/17	3/1/2017	0	$35	$2	$36	-	0
TOTALS		41	$338	$19	$357	$8.71	4,100,000

Morris Avenue Booster Station

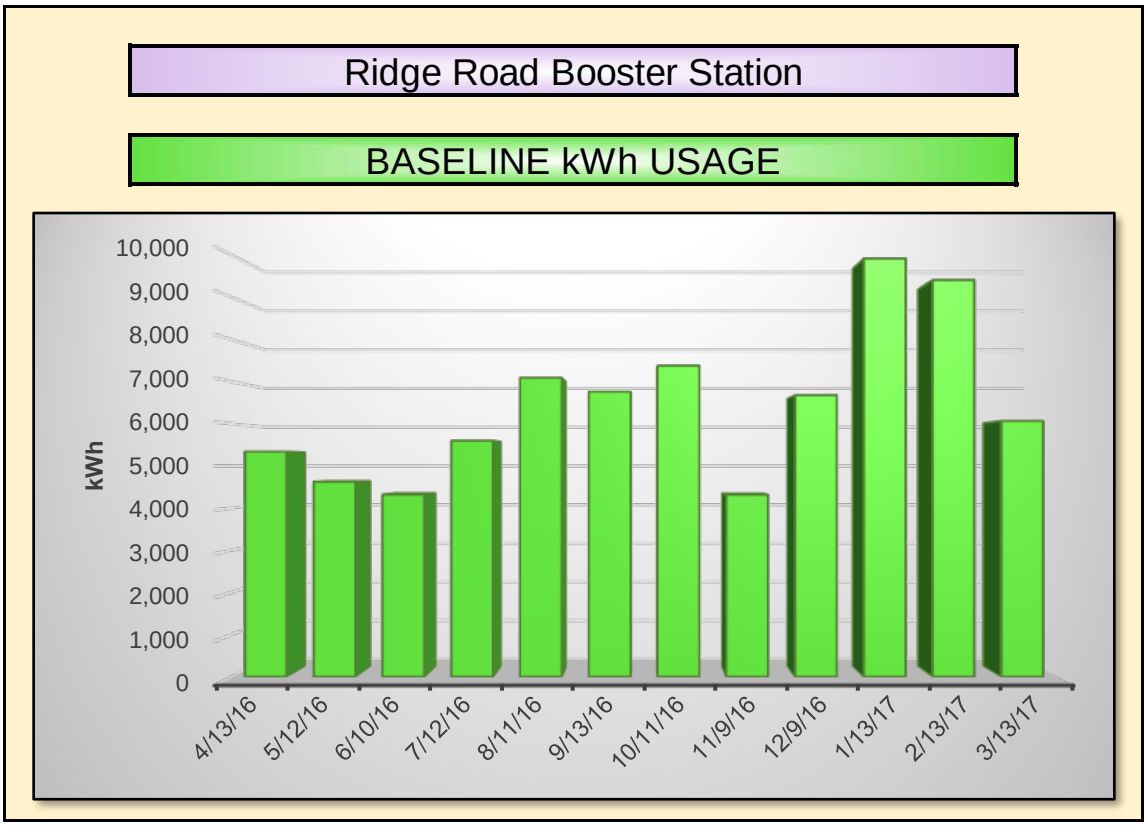


Morris Avenue Booster Station						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 015 985 219			Meter #	G35516268		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	13,912		$1,191	$732		$1,923	$0.138	29	-	47,467,744
4/14/16	5/12/16	6,395		$547	$609		$1,156	$0.181	29	-	21,819,740
5/13/16	6/10/16	9,200		$788	$559		$1,347	$0.146	29	-	31,390,400
6/11/16	7/12/16	9,433		$842	$678		$1,520	$0.161	32	-	32,185,396
7/13/16	8/11/16	9,221		$823	$683		$1,506	$0.163	30	-	31,462,052
8/12/16	9/13/16	7,501		$669	$639		$1,308	$0.174	33	-	25,593,412
9/14/16	10/11/16	8,560		$764	$680		$1,444	$0.169	28	-	29,206,720
10/12/16	11/9/16	8,500		$759	$645		$1,404	$0.165	29	-	29,002,000
11/10/16	12/9/16	8,624		$770	$660		$1,429	$0.166	30	-	29,425,088
12/10/16	1/13/17	10,605		$946	$685		$1,632	$0.154	35	-	36,184,260
1/14/17	2/13/17	12,472		$1,112	$762		$1,875	$0.150	31	-	42,554,464
2/14/17	3/13/17	12,863		$1,147	$696		$1,843	$0.143	28	-	43,888,556
TOTALS		117,286	0	$10,357	$8,028	$0	$18,385	$0.157	363	-	400,179,832

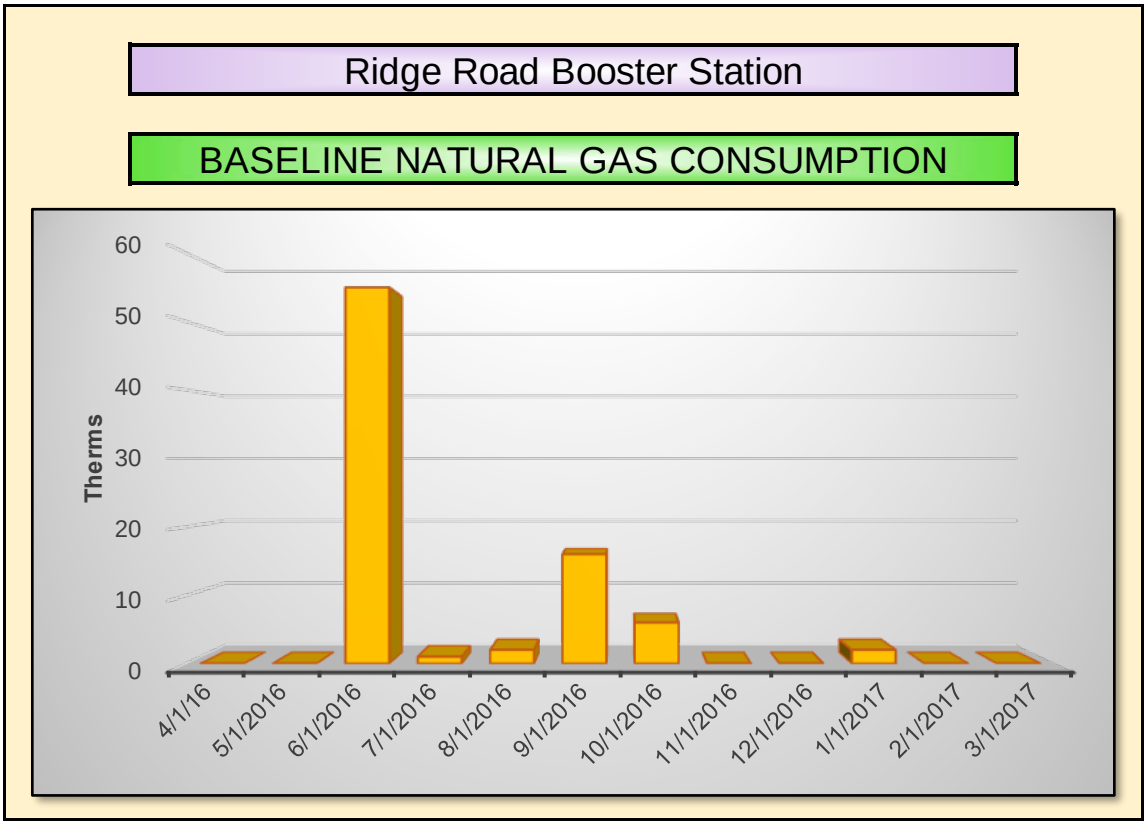


Morris Avenue Booster Station					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	0	$0	$0	$0	-	0
4/2/16	5/1/2016	0	$125	$0	$125	-	0
5/2/16	6/1/2016	54	$50	$22	$72	$1.33	5,400,000
6/2/16	7/1/2016	51	$48	$21	$70	$1.36	5,100,000
7/2/16	8/1/2016	49	$97	$20	$118	$2.40	4,900,000
8/2/16	9/1/2016	19	$34	$8	$42	$2.19	1,900,000
9/2/16	10/1/2016	8	$31	$3	$34	$4.28	800,000
10/2/16	11/1/2016	0	$21	$0	$21	-	0
11/2/16	12/1/2016	21	$42	$8	$50	$2.36	2,100,000
12/2/16	1/1/2017	4	$55	$1	$57	$14.13	400,000
1/2/17	2/1/2017	0	$27	$0	$27	-	0
2/2/17	3/1/2017	0	$35	$2	$37	-	0
TOTALS		206	$565	$86	$651	$3.16	20,600,000

Ridge Road Booster Station

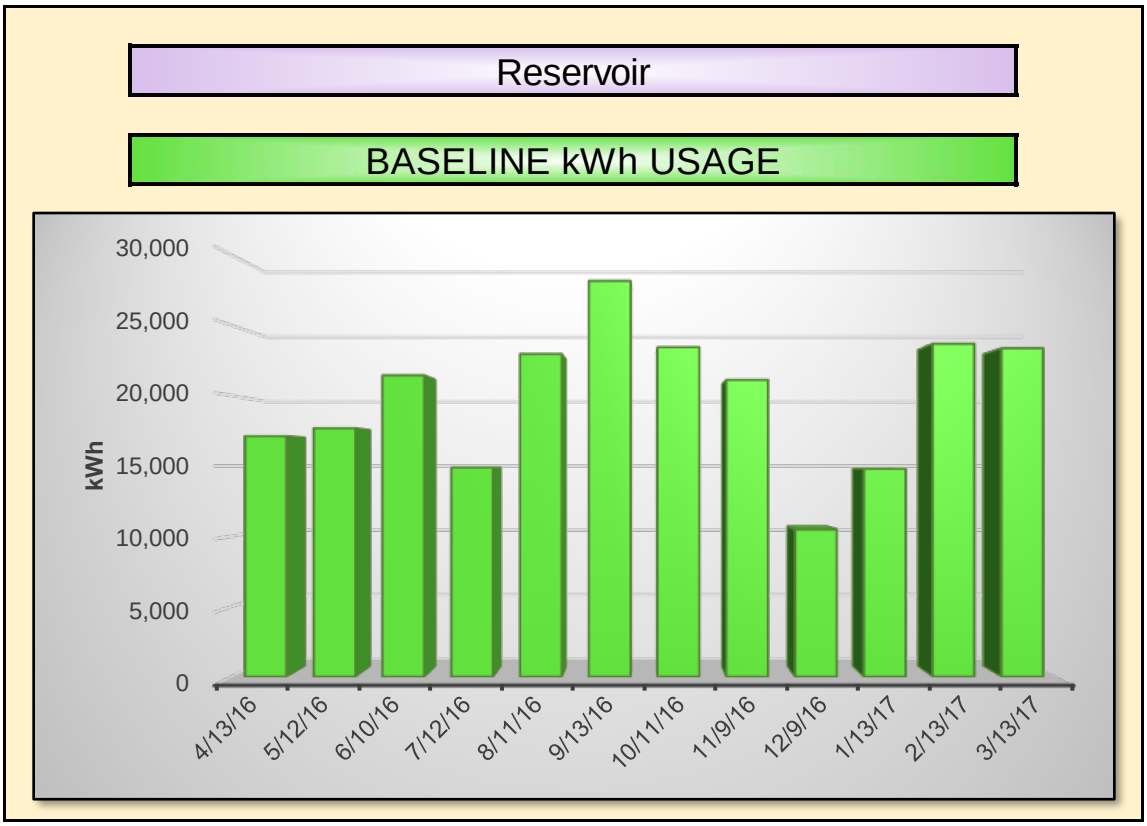


Ridge Road Booster Station						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100 016 302 133			Meter #	310325089		
Commodity:				Account #				Meter #			
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	5,339		$457	$245		$702	$0.132	29	-	18,216,668
4/14/16	5/12/16	4,624		$396	$282		$678	$0.147	29	-	15,777,088
5/13/16	6/10/16	4,321		$362	$259		$621	$0.144	29	-	14,743,252
6/11/16	7/12/16	5,597		$499	$294		$793	$0.142	32	-	19,096,964
7/13/16	8/11/16	7,088		$633	$341		$974	$0.137	30	-	24,184,256
8/12/16	9/13/16	6,760		$603	$333		$936	$0.138	33	-	23,065,120
9/14/16	10/11/16	7,374		$658	$368		$1,026	$0.139	28	-	25,160,088
10/12/16	11/9/16	4,315		$385	$252		$637	$0.148	29	-	14,722,780
11/10/16	12/9/16	6,675		$596	$366		$962	$0.144	30	-	22,775,100
12/10/16	1/13/17	9,915		$885	$348		$1,233	$0.124	35	-	33,829,980
1/14/17	2/13/17	9,403		$839	$351		$1,189	$0.126	31	-	32,083,036
2/14/17	3/13/17	6,065		$541	$298		$839	$0.138	28	-	20,693,780
TOTALS		77,476	0	$6,853	$3,736	$0	$10,589	$0.137	363	-	264,348,112



Ridge Road Booster Station					Natural Gas Meter #1		
Provider			Account #			Meter #	
Commodity			Account #			Meter #	
Billing Period Start Date	**Actual Reading**	**Therms**	**Gas Delivery Charges**	**Gas Commodity Charges**	**Gas Total Charges**	**Cost / Unit Checksum**	**BTU**
3/1/16	4/1/16	0	$0	$0	$0	-	0
4/2/16	5/1/2016	0	$125	$0	$125	-	0
5/2/16	6/1/2016	55	$50	$23	$73	$1.33	5,500,000
6/2/16	7/1/2016	1	$26	$0	$26	$26.04	100,000
7/2/16	8/1/2016	2	$26	$1	$27	$13.54	200,000
8/2/16	9/1/2016	16	$32	$6	$38	$2.40	1,600,000
9/2/16	10/1/2016	6	$30	$2	$32	$5.32	600,000
10/2/16	11/1/2016	0	$27	$0	$27	-	0
11/2/16	12/1/2016	0	$27	$0	$27	-	0
12/2/16	1/1/2017	2	$28	$1	$29	$14.37	200,000
1/2/17	2/1/2017	0	$27	$0	$27	-	0
2/2/17	3/1/2017	0	$27	$0	$28	-	0
TOTALS		82	$424	$34	$459	$5.59	8,200,000

Reservoir



Reservoir						ELECTRIC METER #1					
Provider:	JCP&L			Account #	100053216501			Meter #	G28408051		
Commodity:				Account #				Meter #	Well #1		
Billing Period Start Date	Actual Reading	Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Total Electric Charges	Cost / kWh Checksum	Days	Load Factor	BTU
3/16/16	4/13/16	17,120		$1,495	$650		$2,146	$0.125	29	-	58,413,440
4/14/16	5/12/16	17,680		$1,513	$659		$2,173	$0.123	29	-	60,324,160
5/13/16	6/10/16	21,440		$1,835	$735		$2,571	$0.120	29	-	73,153,280
6/11/16	7/12/16	14,880		$1,328	$551		$1,879	$0.126	32	-	50,770,560
7/13/16	8/11/16	22,960		$2,049	$699		$2,748	$0.120	30	-	78,339,520
8/12/16	9/13/16	28,160		$2,513	$812		$3,325	$0.118	33	-	96,081,920
9/14/16	10/11/16	23,440		$2,092	$752		$2,844	$0.121	28	-	79,977,280
10/12/16	11/9/16	21,120		$1,885	$751		$2,635	$0.125	29	-	72,061,440
11/10/16	12/9/16	10,480		$935	$502		$1,437	$0.137	30	-	35,757,760
12/10/16	1/13/17	14,800		$1,321	$608		$1,929	$0.130	35	-	50,497,600
1/14/17	2/13/17	23,680		$2,112	$848		$2,960	$0.125	31	-	80,796,160
2/14/17	3/13/17	23,360		$2,082	$886		$2,968	$0.127	28	-	79,704,320
TOTALS		239,120	0	$21,161	$8,453	$0	$29,614	$0.124	363	-	815,877,440

Energy Savings Utility Rates

DCO Energy used the following rates to calculate the energy savings:

CALCULATED UTILITY RATES BY BUILDING					
BUILDING/FACILITY	ELECTRIC			NATURAL GAS	OTHER ENERGY #1
	$$ / kW	$$ / kWh	Blended $$ / kWh	Therms	Water & Sewer (Gal)
Main Complex	$5.45	$0.09	$0.10	$1.19	$0.0009

ENERGY SAVINGS PLAN

SECTION 3 – ENERGY CONSERVATION MEASURES

Energy Conservation Measure Listing

Below is a listing of all the Energy Conservation Measures that were evaluated for the Brick MUA ESIP Project.

ECM LISTING	
ECM 1	**LED Lighting Replacement**
ECM 2	**Energy Management System**
ECM 3	**High Efficiency Pump Motors**
ECM 4	**WSHP Replacement**
ECM 5	**Boiler Replacement**
ECM 6	**Lab Renovations**
ECM 7	**Solar PPA**

Energy Conservation Measure Breakdown by Building

The matrix below details which ECMs were applied and evaluated by building. It also indicates which ECMs were included in the project and which ECMs were not included in the project.

BRICK MUA ECM MATRIX

ECM #	ECM DESCRIPTION	Main Complex	Drum Point Road Pumping Station	Bay Harbor WWPS	Breton Road WWPS	Burnt Tavern Manor WWPS	Cape Breton WWPS	Drum Point Rd WWPS	Eagle Point WWPS	Eastern Lane WWPS	Fifth St WWPS	Greenbriar I WWPS	Greenbriar II WWPS	Island Drive WWPS	Jaywood Manor WWPS	Lanes Mill WWPS	Laurel Brook WWPS	Laurelton WWPS
1	LED Lighting Replacement	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
2	LED Lighting Replacement (Material)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
3	Energy Management System	✔																
4	High Efficiency Pump Motors	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
5	High Efficiency Pump Motors (Material)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
6	WSHP Replacement	✔																
7	Boiler Replacement	✔																
8	Lab Renovations	✔																
9	Solar PPA	✔																

BRICK MUA ECM MATRIX

ECM #	ECM DESCRIPTION	Mantoloking Road WWPS	Paramount Way WWPS	Pine Meadows WWPS	Pine View WWPS	Rivera Drive WWPS	Riverside Drive WWPS	Sea View Village WWPS	Sloping Hill WWPS	Trailer Park WWPS	Turkey Point WWPS	Vanada Woods WWPS	Alaska Booster Station	Beverly Beach Booster Station	Burrsville Booster Station	Mantoloking Road Booster Station	Morris Avenue Booster Station	Ridge Road Booster Station	Reservoir
1	LED Lighting Replacement	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
2	LED Lighting Replacement (Material)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
3	Energy Management System																		
4	High Efficiency Pump Motors	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
5	High Efficiency Pump Motors (Material)	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
6	WSHP Replacement																		
7	Boiler Replacement																		
8	Lab Renovations																		
9	Solar PPA																		✔

ECM Breakdown by Building by Cost & Savings

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Water & Sewer (Gal) COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$
1	Main Complex	LED Lighting Replacement	N	$0	$0	$0	$0
2	Main Complex	LED Lighting Replacement (Material)	Y	$92,798	$12,236	$0	$0
3	Main Complex	Energy Management System	Y	$69,197	$5,314	$0	$0
4	Main Complex	High Efficiency Pump Motors	N	$0	$0	$0	$0
5	Main Complex	High Efficiency Pump Motors (Material)	N	$0	$0	$0	$0
6	Main Complex	WSHP Replacement	Y	$535,480	$279	$0	$85,147
7	Main Complex	Boiler Replacement	Y	$289,300	$0	$1,678	$0
8	Main Complex	Lab Renovations	N	$0	$0	$0	$0
9	Main Complex	Solar PPA	N	$0	$0	$0	$0

BRICK MUA			INCLUDED IN PROJECT	ANNUAL ENERGY COST SAVINGS	ANNUAL O&M COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Main Complex	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Main Complex	LED Lighting Replacement (Material)	Y	$12,236	$12,500	$24,736	3.8
3	Main Complex	Energy Management System	Y	$5,314	$0	$5,314	13.0
4	Main Complex	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Main Complex	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
6	Main Complex	WSHP Replacement	Y	$85,427	$0	$85,427	6.3
7	Main Complex	Boiler Replacement	Y	$1,678	$0	$1,678	172.4
8	Main Complex	Lab Renovations	N	$0	$0	$0	0.0
9	Main Complex	Solar PPA	N	$0	$0	$0	0.0

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Water & Sewer (Gal) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	Water & Sewer (Gal)
1	Main Complex	LED Lighting Replacement	N	0	0	0	0
2	Main Complex	LED Lighting Replacement (Material)	Y	140,812	14	0	0
3	Main Complex	Energy Management System	Y	61,527	0	0	0
4	Main Complex	High Efficiency Pump Motors	N	0	0	0	0
5	Main Complex	High Efficiency Pump Motors (Material)	N	0	0	0	0
6	Main Complex	WSHP Replacement	Y	3,171	1	0	94,608,000
7	Main Complex	Boiler Replacement	Y	0	0	1,409	0
8	Main Complex	Lab Renovations	N	0	0	0	0
9	Main Complex	Solar PPA	N	0	0	0	0

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Drum Point Road Pumping Station	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Drum Point Road Pumping Station	LED Lighting Replacement (Material)	Y	$3,058	$49	$49	62.8
4	Drum Point Road Pumping Station	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Drum Point Road Pumping Station	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Bay Harbor WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Bay Harbor WWPS	LED Lighting Replacement (Material)	Y	$3,058	$78	$78	39.3
4	Bay Harbor WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Bay Harbor WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Breton Road WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Breton Road WWPS	LED Lighting Replacement (Material)	Y	$737	$58	$58	12.6
4	Breton Road WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Breton Road WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Burnt Tavern Manor WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Burnt Tavern Manor WWPS	LED Lighting Replacement (Material)	Y	$396	$41	$41	9.7
4	Burnt Tavern Manor WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Burnt Tavern Manor WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW
1	Drum Point Road Pumping Station	LED Lighting Replacement	N	0	0
2	Drum Point Road Pumping Station	LED Lighting Replacement (Material)	Y	339	4
4	Drum Point Road Pumping Station	High Efficiency Pump Motors	N	0	0
5	Drum Point Road Pumping Station	High Efficiency Pump Motors (Material)	N	0	0
1	Bay Harbor WWPS	LED Lighting Replacement	N	0	0
2	Bay Harbor WWPS	LED Lighting Replacement (Material)	Y	542	6
4	Bay Harbor WWPS	High Efficiency Pump Motors	N	0	0
5	Bay Harbor WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Breton Road WWPS	LED Lighting Replacement	N	0	0
2	Breton Road WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Breton Road WWPS	High Efficiency Pump Motors	N	0	0
5	Breton Road WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Burnt Tavern Manor WWPS	LED Lighting Replacement	N	0	0
2	Burnt Tavern Manor WWPS	LED Lighting Replacement (Material)	Y	203	4
4	Burnt Tavern Manor WWPS	High Efficiency Pump Motors	N	0	0
5	Burnt Tavern Manor WWPS	High Efficiency Pump Motors (Material)	N	0	0

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Cape Breton WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Cape Breton WWPS	LED Lighting Replacement (Material)	Y	$264	$49	$49	5.4
4	Cape Breton WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Cape Breton WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Drum Point Rd WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Drum Point Rd WWPS	LED Lighting Replacement (Material)	Y	$3,058	$49	$49	62.8
4	Drum Point Rd WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Drum Point Rd WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Eagle Point WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Eagle Point WWPS	LED Lighting Replacement (Material)	Y	$264	$49	$49	5.4
4	Eagle Point WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Eagle Point WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Eastern Lane WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Eastern Lane WWPS	LED Lighting Replacement (Material)	Y	$737	$58	$58	12.6
4	Eastern Lane WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Eastern Lane WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW
1	Cape Breton WWPS	LED Lighting Replacement	N	0	0
2	Cape Breton WWPS	LED Lighting Replacement (Material)	Y	339	4
4	Cape Breton WWPS	High Efficiency Pump Motors	N	0	0
5	Cape Breton WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Drum Point Rd WWPS	LED Lighting Replacement	N	0	0
2	Drum Point Rd WWPS	LED Lighting Replacement (Material)	Y	339	4
4	Drum Point Rd WWPS	High Efficiency Pump Motors	N	0	0
5	Drum Point Rd WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Eagle Point WWPS	LED Lighting Replacement	N	0	0
2	Eagle Point WWPS	LED Lighting Replacement (Material)	Y	339	4
4	Eagle Point WWPS	High Efficiency Pump Motors	N	0	0
5	Eagle Point WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Eastern Lane WWPS	LED Lighting Replacement	N	0	0
2	Eastern Lane WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Eastern Lane WWPS	High Efficiency Pump Motors	N	0	0
5	Eastern Lane WWPS	High Efficiency Pump Motors (Material)	N	0	0

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Fifth St WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Fifth St WWPS	LED Lighting Replacement (Material)	Y	$869	$58	$58	14.9
4	Fifth St WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Fifth St WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Greenbriar I WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Greenbriar I WWPS	LED Lighting Replacement (Material)	Y	$0	$0	$0	0.0
4	Greenbriar I WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Greenbriar I WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Greenbriar II WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Greenbriar II WWPS	LED Lighting Replacement (Material)	Y	$0	$0	$0	0.0
4	Greenbriar II WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Greenbriar II WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Island Drive WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Island Drive WWPS	LED Lighting Replacement (Material)	Y	$605	$49	$49	12.4
4	Island Drive WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Island Drive WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Jaywood Manor WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Jaywood Manor WWPS	LED Lighting Replacement (Material)	Y	$0	$0	$0	0.0
4	Jaywood Manor WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Jaywood Manor WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW
1	Fifth St WWPS	LED Lighting Replacement	N	0	0
2	Fifth St WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Fifth St WWPS	High Efficiency Pump Motors	N	0	0
5	Fifth St WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Greenbriar I WWPS	LED Lighting Replacement	N	0	0
2	Greenbriar I WWPS	LED Lighting Replacement (Material)	Y	0	0
4	Greenbriar I WWPS	High Efficiency Pump Motors	N	0	0
5	Greenbriar I WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Greenbriar II WWPS	LED Lighting Replacement	N	0	0
2	Greenbriar II WWPS	LED Lighting Replacement (Material)	Y	0	0
4	Greenbriar II WWPS	High Efficiency Pump Motors	N	0	0
5	Greenbriar II WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Island Drive WWPS	LED Lighting Replacement	N	0	0
2	Island Drive WWPS	LED Lighting Replacement (Material)	Y	339	4
4	Island Drive WWPS	High Efficiency Pump Motors	N	0	0
5	Island Drive WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Jaywood Manor WWPS	LED Lighting Replacement	N	0	0
2	Jaywood Manor WWPS	LED Lighting Replacement (Material)	Y	0	0
4	Jaywood Manor WWPS	High Efficiency Pump Motors	N	0	0
5	Jaywood Manor WWPS	High Efficiency Pump Motors (Material)	N	0	0

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Lanes Mill WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Lanes Mill WWPS	LED Lighting Replacement (Material)	Y	$264	$58	$58	4.5
4	Lanes Mill WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Lanes Mill WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Laurel Brook WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Laurel Brook WWPS	LED Lighting Replacement (Material)	Y	$264	$58	$58	4.5
4	Laurel Brook WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Laurel Brook WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Laurelton WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Laurelton WWPS	LED Lighting Replacement (Material)	Y	$605	$29	$29	20.7
4	Laurelton WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Laurelton WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Mantoloking Road WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Mantoloking Road WWPS	LED Lighting Replacement (Material)	Y	$264	$49	$49	5.4
4	Mantoloking Road WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Mantoloking Road WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Paramount Way WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Paramount Way WWPS	LED Lighting Replacement (Material)	Y	$0	$0	$0	0.0
4	Paramount Way WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Paramount Way WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW
1	Lanes Mill WWPS	LED Lighting Replacement	N	0	0
2	Lanes Mill WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Lanes Mill WWPS	High Efficiency Pump Motors	N	0	0
5	Lanes Mill WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Laurel Brook WWPS	LED Lighting Replacement	N	0	0
2	Laurel Brook WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Laurel Brook WWPS	High Efficiency Pump Motors	N	0	0
5	Laurel Brook WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Laurelton WWPS	LED Lighting Replacement	N	0	0
2	Laurelton WWPS	LED Lighting Replacement (Material)	Y	203	2
4	Laurelton WWPS	High Efficiency Pump Motors	N	0	0
5	Laurelton WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Mantoloking Road WWPS	LED Lighting Replacement	N	0	0
2	Mantoloking Road WWPS	LED Lighting Replacement (Material)	Y	339	4
4	Mantoloking Road WWPS	High Efficiency Pump Motors	N	0	0
5	Mantoloking Road WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Paramount Way WWPS	LED Lighting Replacement	N	0	0
2	Paramount Way WWPS	LED Lighting Replacement (Material)	Y	0	0
4	Paramount Way WWPS	High Efficiency Pump Motors	N	0	0
5	Paramount Way WWPS	High Efficiency Pump Motors (Material)	N	0	0

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Pine Meadows WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Pine Meadows WWPS	LED Lighting Replacement (Material)	Y	$1,364	$58	$58	23.4
4	Pine Meadows WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Pine Meadows WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Pine View WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Pine View WWPS	LED Lighting Replacement (Material)	Y	$1,815	$58	$58	31.1
4	Pine View WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Pine View WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Rivera Drive WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Rivera Drive WWPS	LED Lighting Replacement (Material)	Y	$792	$58	$58	13.6
4	Rivera Drive WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Rivera Drive WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Riverside Drive WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Riverside Drive WWPS	LED Lighting Replacement (Material)	Y	$1,716	$78	$78	22.0
4	Riverside Drive WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Riverside Drive WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Sea View Village WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Sea View Village WWPS	LED Lighting Replacement (Material)	Y	$264	$29	$29	9.0
4	Sea View Village WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Sea View Village WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW
1	Pine Meadows WWPS	LED Lighting Replacement	N	0	0
2	Pine Meadows WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Pine Meadows WWPS	High Efficiency Pump Motors	N	0	0
5	Pine Meadows WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Pine View WWPS	LED Lighting Replacement	N	0	0
2	Pine View WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Pine View WWPS	High Efficiency Pump Motors	N	0	0
5	Pine View WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Rivera Drive WWPS	LED Lighting Replacement	N	0	0
2	Rivera Drive WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Rivera Drive WWPS	High Efficiency Pump Motors	N	0	0
5	Rivera Drive WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Riverside Drive WWPS	LED Lighting Replacement	N	0	0
2	Riverside Drive WWPS	LED Lighting Replacement (Material)	Y	542	6
4	Riverside Drive WWPS	High Efficiency Pump Motors	N	0	0
5	Riverside Drive WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Sea View Village WWPS	LED Lighting Replacement	N	0	0
2	Sea View Village WWPS	LED Lighting Replacement (Material)	Y	203	2
4	Sea View Village WWPS	High Efficiency Pump Motors	N	0	0
5	Sea View Village WWPS	High Efficiency Pump Motors (Material)	N	0	0

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Sloping Hill WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Sloping Hill WWPS	LED Lighting Replacement (Material)	Y	$528	$58	$58	9.0
4	Sloping Hill WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Sloping Hill WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Trailer Park WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Trailer Park WWPS	LED Lighting Replacement (Material)	Y	$0	$0	$0	0.0
4	Trailer Park WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Trailer Park WWPS	High Efficiency Pump Motors (Material)	n	$0	$0	$0	0.0
1	Turkey Point WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Turkey Point WWPS	LED Lighting Replacement (Material)	Y	$66	$29	$29	2.3
4	Turkey Point WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Turkey Point WWPS	High Efficiency Pump Motors (Material)	Y	$3,128	$52	$52	60.4
1	Vanada Woods WWPS	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Vanada Woods WWPS	LED Lighting Replacement (Material)	Y	$528	$58	$58	9.0
4	Vanada Woods WWPS	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Vanada Woods WWPS	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Alaska Booster Station	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Alaska Booster Station	LED Lighting Replacement (Material)	Y	$2,321	$78	$78	29.8
4	Alaska Booster Station	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Alaska Booster Station	High Efficiency Pump Motors (Material)	Y	$32,944	$872	$872	37.8

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW
1	Sloping Hill WWPS	LED Lighting Replacement	N	0	0
2	Sloping Hill WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Sloping Hill WWPS	High Efficiency Pump Motors	N	0	0
5	Sloping Hill WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Trailer Park WWPS	LED Lighting Replacement	N	0	0
2	Trailer Park WWPS	LED Lighting Replacement (Material)	Y	0	0
4	Trailer Park WWPS	High Efficiency Pump Motors	N	0	0
5	Trailer Park WWPS	High Efficiency Pump Motors (Material)	n	0	0
1	Turkey Point WWPS	LED Lighting Replacement	N	0	0
2	Turkey Point WWPS	LED Lighting Replacement (Material)	Y	203	2
4	Turkey Point WWPS	High Efficiency Pump Motors	N	0	0
5	Turkey Point WWPS	High Efficiency Pump Motors (Material)	Y	600	0
1	Vanada Woods WWPS	LED Lighting Replacement	N	0	0
2	Vanada Woods WWPS	LED Lighting Replacement (Material)	Y	407	4
4	Vanada Woods WWPS	High Efficiency Pump Motors	N	0	0
5	Vanada Woods WWPS	High Efficiency Pump Motors (Material)	N	0	0
1	Alaska Booster Station	LED Lighting Replacement	N	0	0
2	Alaska Booster Station	LED Lighting Replacement (Material)	Y	542	6
4	Alaska Booster Station	High Efficiency Pump Motors	N	0	0
5	Alaska Booster Station	High Efficiency Pump Motors (Material)	Y	10,098	0

BRICK MUA			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	Beverly Beach Booster Station	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Beverly Beach Booster Station	LED Lighting Replacement (Material)	Y	$396	$78	$78	5.1
4	Beverly Beach Booster Station	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Beverly Beach Booster Station	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Burrsville Booster Station	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Burrsville Booster Station	LED Lighting Replacement (Material)	Y	$396	$78	$78	5.1
4	Burrsville Booster Station	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Burrsville Booster Station	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Mantoloking Road Booster Station	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Mantoloking Road Booster Station	LED Lighting Replacement (Material)	Y	$396	$78	$78	5.1
4	Mantoloking Road Booster Station	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Mantoloking Road Booster Station	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Morris Avenue Booster Station	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Morris Avenue Booster Station	LED Lighting Replacement (Material)	Y	$2,684	$78	$78	34.5
4	Morris Avenue Booster Station	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Morris Avenue Booster Station	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Ridge Road Booster Station	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Ridge Road Booster Station	LED Lighting Replacement (Material)	Y	$2,178	$78	$78	28.0
4	Ridge Road Booster Station	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	Ridge Road Booster Station	High Efficiency Pump Motors (Material)	N	$0	$0	$0	0.0
1	Reservoir	LED Lighting Replacement	N	$0	$0	$0	0.0
2	Reservoir	LED Lighting Replacement (Material)	Y	$44,924	$997	$997	45.1
9	Reservoir	Solar PPA	N	$0	$0	$0	0.0
		TOTALS		$1,097,659	$24,428	$123,753	8.9

BRICK MUA			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS
1	Beverly Beach Booster Station	LED Lighting Replacement	N	0	0	0
2	Beverly Beach Booster Station	LED Lighting Replacement (Material)	Y	542	6	0
4	Beverly Beach Booster Station	High Efficiency Pump Motors	N	0	0	0
5	Beverly Beach Booster Station	High Efficiency Pump Motors (Material)	N	0	0	0
1	Burrsville Booster Station	LED Lighting Replacement	N	0	0	0
2	Burrsville Booster Station	LED Lighting Replacement (Material)	Y	542	6	0
4	Burrsville Booster Station	High Efficiency Pump Motors	N	0	0	0
5	Burrsville Booster Station	High Efficiency Pump Motors (Material)	N	0	0	0
1	Mantoloking Road Booster Station	LED Lighting Replacement	N	0	0	0
2	Mantoloking Road Booster Station	LED Lighting Replacement (Material)	Y	542	6	0
4	Mantoloking Road Booster Station	High Efficiency Pump Motors	N	0	0	0
5	Mantoloking Road Booster Station	High Efficiency Pump Motors (Material)	N	0	0	0
1	Morris Avenue Booster Station	LED Lighting Replacement	N	0	0	0
2	Morris Avenue Booster Station	LED Lighting Replacement (Material)	Y	542	6	0
4	Morris Avenue Booster Station	High Efficiency Pump Motors	N	0	0	0
5	Morris Avenue Booster Station	High Efficiency Pump Motors (Material)	N	0	0	0
1	Ridge Road Booster Station	LED Lighting Replacement	N	0	0	0
2	Ridge Road Booster Station	LED Lighting Replacement (Material)	Y	542	6	0
4	Ridge Road Booster Station	High Efficiency Pump Motors	N	0	0	0
5	Ridge Road Booster Station	High Efficiency Pump Motors (Material)	N	0	0	0
1	Reservoir	LED Lighting Replacement	N	0	0	0
2	Reservoir	LED Lighting Replacement (Material)	Y	11,051	8	0
9	Reservoir	Solar PPA	N	0	0	0
		TOTALS		272,219	168	1,409

ECM Breakdown by Greenhouse Gas Reduction

BRICK MUA		INCLUDED IN PROJECT	Reduction of CO_2	Reduction of No_x	Reduction of SO_2	Reduction of Hg
ECM #	ENERGY CONSERVATION MEASURE	"Y" OR "N"	LBS	LBS	LBS	LBS
1	LED Lighting Replacement	N	0	0	0	0
2	LED Lighting Replacement (Material)	Y	247,940	457	1,060	0
3	Energy Management System	Y	93,521	172	400	0
4	High Efficiency Pump Motors	N	0	0	0	0
5	High Efficiency Pump Motors (Material)	Y	16,261	30	70	0
6	WSHP Replacement	Y	4,820	9	21	0
7	Boiler Replacement	Y	16,484	13	0	0
8	Lab Renovations	N	0	0	0	0
9	Solar PPA	N	0	0	0	0

Note:

- **Factors used to calculate Greenhouse Gas Reductions are as follows:**
  - ***CO2 (lbs) = (1.11*kWh Savings) + (11.7*Therm Savings)***
  - ***NOx (lbs) = (0.00095*kWh Savings) + (0.0092*Therm Savings)***
  - ***SO2 (lbs) = (0.00221*kWh Savings)***
  - ***Hg (mg) = (2.21* kWh Savings)***

ECM Breakdown by Cost & Savings

BRICK MUA		INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Water & Sewer (Gal) COST SAVINGS
ECM #	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$
1	LED Lighting Replacement	N	$0	$0	$0	$0
2	LED Lighting Replacement (Material)	Y	$167,609	$14,861	$0	$0
3	Energy Management System	Y	$69,197	$5,314	$0	$0
4	High Efficiency Pump Motors	N	$0	$0	$0	$0
5	High Efficiency Pump Motors (Material)	Y	$36,072	$924	$0	$0
6	WSHP Replacement	Y	$535,480	$279	$0	$85,147
7	Boiler Replacement	Y	$289,300	$0	$1,678	$0
8	Lab Renovations	N	$0	$0	$0	$0
9	Solar PPA	N	$0	$0	$0	$0

BRICK MUA		INCLUDED IN PROJECT	ANNUAL ENERGY COST SAVINGS	ANNUAL O&M COST SAVINGS	TOTAL ANNUAL COST SAVINGS	SIMPLE PAYBACK WITHOUT INCENTIVES
ECM #	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	YEARS
1	LED Lighting Replacement	N	$0	$0	$0	0.0
2	LED Lighting Replacement (Material)	Y	$14,861	$12,500	$27,361	6.1
3	Energy Management System	Y	$5,314	$0	$5,314	13.0
4	High Efficiency Pump Motors	N	$0	$0	$0	0.0
5	High Efficiency Pump Motors (Material)	Y	$924	$0	$924	39.0
6	WSHP Replacement	Y	$85,427	$0	$85,427	6.3
7	Boiler Replacement	Y	$1,678	$0	$1,678	172.4
8	Lab Renovations	N	$0	$0	$0	0.0
9	Solar PPA	N	$0	$0	$0	0.0

BRICK MUA		INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Water & Sewer (Gal) SAVINGS
ECM #	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	Water & Sewer (Gal)
1	LED Lighting Replacement	N	0	39	0	0
2	LED Lighting Replacement (Material)	Y	163,118	142	0	0
3	Energy Management System	Y	61,527	0	0	0
4	High Efficiency Pump Motors	N	0	0	0	0
5	High Efficiency Pump Motors (Material)	Y	10,698	0	0	0
6	WSHP Replacement	Y	3,171	1	0	94,608,000
7	Boiler Replacement	Y	0	0	1,409	0
8	Lab Renovations	N	0	0	0	0
9	Solar PPA	N	0	0	0	0

ECM Budgeting Narrative

Detailed plans, schematics and specifications for Brick MUA were not available to deliver a cost estimate for each ECM. The budgetary costs carried in the project are based on good faith estimates, contractor supplied budgets for similar ECMs on other recent projects and a database of actual installed costs for various ECMs.

BRICK MUA		INCLUDED IN PROJECT	INSTALLED COST
ECM #	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$
1	LED Lighting Replacement	N	$0
2	LED Lighting Replacement (Material)	Y	$167,609
3	Energy Management System	Y	$69,197
4	High Efficiency Pump Motors	N	$0
5	High Efficiency Pump Motors (Material)	Y	$36,072
6	WSHP Replacement	Y	$535,480
7	Boiler Replacement	Y	$289,300
8	Lab Renovations	N	$0
9	Solar PPA	N	$0

Project Incentives Analysis

A smart start now means better performance later! Whether you're starting a project from the ground up, renovating existing space, or upgrading equipment, you have unique opportunities to upgrade the energy efficiency of the project.

New Jersey SmartStart Buildings can provide a range of support to yield substantial energy savings, both now and for the future at no cost to you. Financial incentives are available for size projects which can offset some - or maybe even all - of the added cost to purchase qualifying energy-efficient equipment.

The Brick MUA is eligible for these Smart Start Incentives. A total of $15,015 was calculated for the potential incentive per the program guidelines. To be conservative, only 60% of that total ($9,000) was carried in the Debt Service Payments in Year 1 of the project as anticipated Smart Start Payments. The incentive was calcualted using the following data per the Smart Start Program:

- $2 per MBH of Boiler Capacity ($2 * 300 MBH = $600)
- $80 per ton for WSHP ($80 * 18 Tons = $1,440)
- $ per bulb for the LED Lighting Retrofit.
    - Note: The vast majority of the lighting will be $5 per bulb

Please see the following page for the incentive calculations by building, by ECM

BRICK MUA			INCLUDED IN PROJECT	TYPE OF INCENTIVE	ESTIMATED INCENTIVE AMOUNT
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	SELECT	$$
2	Main Complex	LED Lighting Replacement (Material)	Y	NJ SmartStart	$11,395
6	Main Complex	WSHP Replacement	Y	NJ SmartStart	$1,440
7	Main Complex	Boiler Replacement	Y	NJ SmartStart	$600
2	Drum Point Road Pumping Station	LED Lighting Replacement (Material)	Y	NJ SmartStart	$150
2	Bay Harbor WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$150
2	Breton Road WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$15
2	Burnt Tavern Manor WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$20
2	Cape Breton WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$10
2	Drum Point Rd WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$150
2	Eagle Point WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$10
2	Eastern Lane WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$15
2	Fifth St WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$20
2	Greenbriar I WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$0
2	Greenbriar II WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$0
2	Island Drive WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$5
2	Jaywood Manor WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$0
2	Lanes Mill WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$15
2	Laurel Brook WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$15
2	Laurelton WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$5
2	Mantoloking Road WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$10
2	Paramount Way WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$0
2	Pine Meadows WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$35
2	Pine View WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$15
2	Rivera Drive WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$40
2	Riverside Drive WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$150
2	Sea View Village WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$10
2	Sloping Hill WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$25
2	Trailer Park WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$0
2	Turkey Point WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$5
2	Vanada Woods WWPS	LED Lighting Replacement (Material)	Y	NJ SmartStart	$25
2	Alaska Booster Station	LED Lighting Replacement (Material)	Y	NJ SmartStart	$40
2	Beverly Beach Booster Station	LED Lighting Replacement (Material)	Y	NJ SmartStart	$25
2	Burrsville Booster Station	LED Lighting Replacement (Material)	Y	NJ SmartStart	$25
2	Mantoloking Road Booster Station	LED Lighting Replacement (Material)	Y	NJ SmartStart	$25
2	Morris Avenue Booster Station	LED Lighting Replacement (Material)	Y	NJ SmartStart	$40
2	Ridge Road Booster Station	LED Lighting Replacement (Material)	Y	NJ SmartStart	$30
2	Reservoir	LED Lighting Replacement (Material)	Y	NJ SmartStart	$500

ECM 1 – Lighting Replacement (LED)

Background & Existing Conditions

Lighting retrofits can greatly reduce energy consumption and lower energy bills, while maintaining lighting levels and quality by upgrading lighting components to more efficient and advanced technologies. Upgrading technologies can also offer employees greater control over lighting, allowing for additional energy savings.

Improvements in lighting technologies have led to increased lifetimes for components that will result in fewer failures and lengthen the time between maintenance activities.

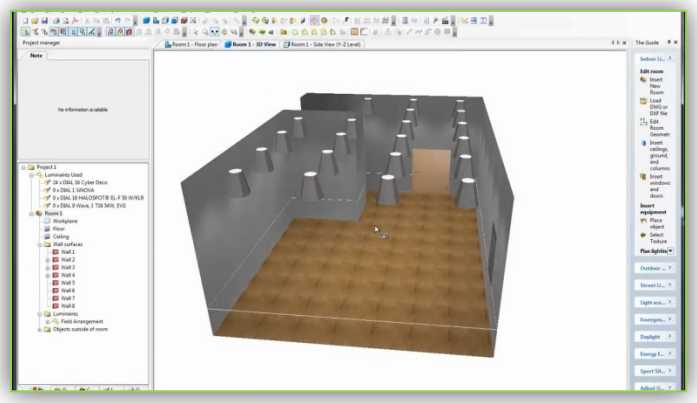
The implementation of a routine maintenance program in addition to the lighting retrofit will greatly simplify the maintenance practices and reduce the operational costs.

Several new LED lighting lamp and fixture products are now available that were not viable a few years ago. While conventional HID fixtures are controlled only by photocell and timer technologies to turn either on and off, the use of LED fixtures and digital technology allows additional trimming and the use of motion/occupancy-based controls to limit the output of exterior fixtures when sufficient natural lighting is present or for periods when the parking lots and authority grounds are unoccupied. The replacement of existing fixture heads with premium efficiency / LED-based fixtures is the basis of this listed ECM.

Lighting Level Testing and Commissioning

Assuring that the lighting levels of the interior and exterior spaces are a critical component of lighting retrofit project. Each space being retrofitted will have lighting levels measured and recorded during the design phase of the project.

The lighting system will be designed to assure that the lighting levels meet code and either meet or exceed the existing levels. Lighting measurements will be taken per IES Standards.



When the retrofit has been completed, the lighting levels in each space will be measured again to assure compliance with the system design. All documentation will be delivered to Brick MUA for approval and record.

Scope of Work *(All Demolition & Installation to be performed by Brick MUA)*

- Retrofit the existing fixtures with new LED Bulbs.
  - Disconnect power at the breaker panel for the existing fixture circuit
  - Remove and dispose of existing bulbs and ballasts in a responsible manner
  - Install new sockets (as necessary)
  - Install new bulbs
  - Test new fixture for operation and performance
  - Test existing space for proper lighting levels
  - All Retrofit Components will be UL Listed
  - Bid documents will call for UL Inspection of each retrofitted fixture

ECM Calculations

Energy Savings from the installation of new LED Lighting is based on the reduction in Electric Consumption (Watts) from the existing bulbs/fixtures to new LED bulbs/fixture and were calculated BPU protocols and estimate lighting run hours.

Performance Lighting

For new construction and entire facility rehabilitation projects, savings are calculated by comparing lighting power density of fixture being installed to the baseline power densities from ASHRAE 90.1 2007.

Lighting equipment includes fluorescent fixtures, ballasts, compact fluorescent fixtures, exit signs, LED fixtures, and metal halide lamps. The measurement of energy savings is based on algorithms with measurement of key variables (i.e., Coincidence Factor and Operating Hours) through end-use metering data accumulated from a large sample of participating facilities from 1995 through 1999.

Algorithms

Demand Savings = ΔkW X CF X (1+IF)

Energy Savings = ΔkW X EFLH X (1+IF)

$\Delta kW = (LPD_{base} - LPD_{inst}) \times SF$

Definition of Variables

ΔkW = Change in connected load from baseline to efficient lighting level.

LPD_{base} = Baseline lighting power density in Watt per square foot of space floor area, based on ASHRAE 90.1 Table 9.6.1 (Space-by-Space Method)

LPD_{inst} = Lighting power density of installed fixtures, equal to the sum of installed fixture wattage divided by floor area of the space where the fixtures are installed. Wattage of installed fixtures is based on table at http://www.sce.com/NR/rdonlyres/FC51087D-2848-42DF-A52A-BDBA1A09BF8D/0/SCE_B_StandardFixtureWatts010108.pdf.

SF = space floor area, Square Foot

CF = Coincidence Factor

EFLH = Equivalent Full Load Hours

IF = Interactive Factor

Lighting Verification Summary

Component	Type	Value	Source
ΔkW	Fixed	See Lighting Wattage Table derived from the California SPC Table: http://www.sce.com/NR/rdonlyres/FC51087D-2848-42DF-A52A-BDBA1A09BF8D/0/SCE_B_StandardFixtureWatts010108.pdf And Formula Above.	• 1 • Baseline LPD from ASHRAE 90.1-2007 Table 9.6.1 • Installed LPD, space type and floor area from customer application.
CF	Fixed	See Lighting Table by BuildingType	2
IF	Fixed	See Lighting Table by Building Type	3
EFLH	Fixed	See Lighting Table by Building Type	4

Lighting by Building Type

Building Type	EFLH	CF	IF
Education – Primary School	1,440	0.57	0.15
Education – Secondary School	2,305	0.57	0.15
Education – Community College	3,792	0.64	0.15
Education – University	3,073	0.64	0.15
Grocery	5,824	0.88	0.13
Medical – Hospital	8,736	0.72	0.18
Medical – Clinic	4,212	0.72	0.18
Lodging Hotel (Guest Rooms)	1,145	0.67	0.14
Lodging Motel	8,736	1.00	0.14
Manufacturing – Light Industrial	4,290	0.63	0.04
Office- Large	2,808	0.68	0.17
Office-Small	2,808	0.68	0.17
Restaurant – Sit-Down	4,368	0.76	0.15
Restaurant – Fast-Food	6,188	0.76	0.15
Retail – 3-Story Large	4,259	0.78	0.11
Retail – Single-Story Large	4,368	0.78	0.11
Retail – Small	4,004	0.78	0.11
Storage Conditioned	4,290	0.69	0.06
Storage Heated or Unconditioned	4,290	0.69	0.00
Warehouse	3,900	0.69	0.06
Average = Miscellaneous	4,242	0.72	0.13

LED Lighting Replacement Savings

BUILDING	SPACE	kW_{base}	LPD_{base}	kW_{inst}	LPD_{inst}	ΔkW	IF	CF	EFLH	Demand Savings (kW)	Energy Savings (kWh)
Main Complex	INTERIOR	See Lighting Audit Line-By-Line								13.6	140812
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Drum Point Road Pumping Station	INTERIOR	10	4.00	5	2.00	5.00	0.13	0.63	60	3.6	339
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Bay Harbor WWPS	INTERIOR	15	6.00	7	2.80	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Breton Road WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Burnt Tavern Manor WWPS	INTERIOR	11	73.33	5	33.33	6.00	0.13	0.63	30	4.3	203.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Cape Breton WWPS	INTERIOR	9	180.00	4	80.00	5.00	0.13	0.63	60	3.6	339
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Drum Point Rd WWPS	INTERIOR	10	4.00	5	2.00	5.00	0.13	0.63	60	3.6	339
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Eagle Point WWPS	INTERIOR	9	180.00	4	80.00	5.00	0.13	0.63	60	3.6	339
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Eastern Lane WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Fifth St WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Greenbriar I WWPS	INTERIOR		0.00		0.00	0.00	0.13	0.63	60	0.0	0
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Greenbriar II WWPS	INTERIOR		0.00		0.00	0.00	0.13	0.63	60	0.0	0
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Island Drive WWPS	INTERIOR	9	180.00	4	80.00	5.00	0.13	0.63	60	3.6	339
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Jaywood Manor WWPS	INTERIOR		0.00		0.00	0.00	0.13	0.63	60	0.0	0
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Lanes Mill WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Laurel Brook WWPS	INTERIOR	11	73.33	5	33.33	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Laurelton WWPS	INTERIOR	5	250.00	2	100.00	3.00	0.13	0.63	60	2.1	203.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Mantoloking Road WWPS	INTERIOR	10	500.00	5	250.00	5.00	0.13	0.63	60	3.6	339
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Paramount Way WWPS	INTERIOR		0.00		0.00	0.00	0.13	0.63	60	0.0	0
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Pine Meadows WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0

LED Lighting Replacement Savings

BUILDING	SPACE	kW_{base}	LPD_{base}	kW_{inst}	LPD_{inst}	ΔkW	IF	CF	EFLH	Demand Savings (kW)	Energy Savings (kWh)
Pine View WWPS	INTERIOR	11	57.29	5	26.04	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Rivera Drive WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Riverside Drive WWPS	INTERIOR	15	6.00	7	2.80	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Sea View Village WWPS	INTERIOR	5	250.00	2	100.00	3.00	0.13	0.63	60	2.1	203.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Sloping Hill WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Trailer Park WWPS	INTERIOR		0.00		0.00	0.00	0.13	0.63	60	0.0	0
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Turkey Point WWPS	INTERIOR	5	500.00	2	200.00	3.00	0.13	0.63	60	2.1	203.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Vanada Woods WWPS	INTERIOR	11	70.97	5	32.26	6.00	0.13	0.63	60	4.3	406.8
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Alaska Booster Station	INTERIOR	15	30.00	7	14.00	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Beverly Beach Booster Station	INTERIOR	15	30.00	7	14.00	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Burrsville Booster Station	INTERIOR	15	30.00	7	14.00	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Mantoloking Road Booster Station	INTERIOR	15	30.00	7	14.00	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Morris Avenue Booster Station	INTERIOR	15	30.00	7	14.00	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Ridge Road Booster Station	INTERIOR	15	30.00	7	14.00	8.00	0.13	0.63	60	5.7	542.4
	EXTERIOR		0.00		0.00	0.00				0.0	0
	SPECIAL		0.00		0.00	0.00				0.0	0
Reservoir	INTERIOR	5	4.17	2	1.67	3.00	0.13	0.63	60	2.1	203.4
	EXTERIOR	15	12.50	7	5.83	8.00	0.13	0.63	1200	5.7	10848
	SPECIAL		0.00		0.00	0.00				0.0	0

ECM 2 – Energy Management System

Background & Existing Conditions

Energy Management Systems (EMS) are systems comprised of sensors, operators, processors, and a front-end user interface that controls and monitors electrical and mechanical building systems. Such systems provide automated control and monitoring of the heating, cooling, ventilation, lighting and performance of a building or group of buildings. The energy management system will provide Brick MUA with continuous monitoring & reporting of the Electric and Gas Meters.

Having building systems monitored from a central location enables the operator to receive alerts and predict future problems or troublesome conditions. The data obtained from these can be used to produce a trend analysis and annual consumption forecasts. Advanced control strategies implemented using these systems such as time scheduling, optimum start and stop, night set-back, demand controlled ventilation, and peak demand limiting. The auditor will be able to use the EMS to diagnose current building system problems as well as tailor specific energy savings strategies that utilize the full capability of the given EMS.

The new District Wide EMS will remove existing pneumatics and, replace or integrate existing proprietary systems with new DDC Controls. Control strategies will be designed and programmed into the system to maintain building comfort while

operating the building mechanical system in the most efficient manner possible. Strategies include:

1. Occupancy Scheduling
2. Building Wide Night Set Back
3. Morning Warm Up
4. Individual Room Temperature Set Point Control
5. Supply Air Temperature Reset
6. Chilled & Heating Supply Water Temperature Resets
7. Economizer Control
8. CO2 Ventilation Control

Scope of Work – System Wide

- **Web Based, Campus Wide Energy Management System**
  - Energy Management System shall be accessible via the Internet.
  - User shall have the ability to view the system graphics, change set points, perform overrides, view schedules, change schedules, view alarms, acknowledge alarms, view trend information as well as print, save & e-mail trend information.
  - A Secure Internet Connection to the Brick MUA's Network shall be provided and managed by the Brick MUA's IT Department.
  - 3-D Graphics Package is provided for navigating the Energy Management System as well as viewing floor plans, system graphics and equipment graphics.
  - New server will be provided to host the new Web Based, District Wide Energy Management System
  - An Energy Monitoring Dashboard will be provided to display and report Gas & Electrical Consumption for each building detailed in this proposal.
  - The new Web Based, Campus Wide Energy Management System will reside on the Brick MUA Network and access to the system will be controlled by the Brick MUA.
  - All controls will be Open Protocol and all software will be open source. All configuration software and programming tools will be free and the property of the Brick MUA.
  - The Brick MUA Facilities Staff and IT Staff will receive full training on the operation of the system.
  - If the condition of the existing units/systems do not allow for EMS retrofit, DCO will review each instance with the EMS Contractor and the district to determine the appropriate course of action to gain control of the unit/system.

Scope of Work – Administration Building

- **WSHP Loop Control**
  - Boiler Start/Stop
  - Boiler Status
  - Boiler Alarms
  - Variable Volume Pump Control
  - Supply & Return Water Temperature Sensors
  - Flow Meters
  - OA Temperature Sensors
- **(14) WSHPs**
  - Integrate factory provide Open Protocol Interface
  - Wall Mounted Temp/Humidity Sensors
  - Interconnection wiring between isolation valve and compressor contact

ECM Calculations

Energy Savings from the installation of an upgraded Energy Management System at the Administration Building were calculated per 2020 BPU protocols and are shown below.

Algorithms

Cooling Energy Savings (kWh/yr) = $(((T_c * (H+5) + S_c * (168 - (H+5)))/168) - T_c) * (P_c * Cap_{hp} * 12 * EFLH_c/EER_{hp})$

Heating Energy Savings (kWh/yr) = $(T_h - ((T_h * (H+5) + S_h * (168 - (H+5)))/168)) * (P_h * Cap_{hp} * 12 * EFLH_h/EER_{hp})$

Heating Energy Savings (Therms/yr) = $(T_h - ((T_h * (H+5) + S_h * (168 - (H+5)))/168) * (P_h * Cap_h * EFLH_h/AFUE_h/100{,}000)$

Definition of Variables

T_h = Heating Season Facility Temp. (°F)
T_c = Cooling Season Facility Temp. (°F)
S_h = Heating Season Setback Temp. (°F)
S_c = Cooling Season Setup Temp. (°F)
H = Weekly Occupied Hours
Cap_{hp} = Connected load capacity of heat pump/AC (Tons) – Provided on Application.
Cap_h = Connected heating load capacity (Btu/hr) – Provided on Application.
$EFLH_c$ = Equivalent full load cooling hours
$EFLH_h$ = Equivalent full load heating hours
P_h = Heating season percent savings per degree setback
P_c = Cooling season percent savings per degree setup
$AFUE_h$ = Heating equipment efficiency – Provided on Application.
EER_{hp} = Heat pump/AC equipment efficiency – Provided on Application

Summary of Inputs

Occupancy Controlled Thermostats

Component	Type	Value	Source
T_h	Variable		Application
T_c	Variable		Application
S_h	Fixed	T_h-5°	
S_c	Fixed	T_c+5°	
H	Variable		Application; Default of 84 hrs/week
Cap_{hp}	Variable		Application
Cap_h	Variable		Application
$EFLH_{c,h}$	Variable	See Table Below	1
P_h	Fixed	3%	2
P_c	Fixed	6%	2
$AFUE_h$	Variable		Application
EER_{hp}	Variable		Application

EFLH Table

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Assembly	603	669
Auto repair	1910	426
Dormitory	465	800
Hospital	3366	1424
Light industrial	714	549
Lodging – Hotel	1077	2918
Lodging – Motel	619	1233
Office – large	2034	720
Office – small	431	955
Other	681	736
Religious worship	722	279
Restaurant – fast food	813	645
Restaurant – full service	821	574

Occupancy Controlled Thermostat Savings Calculation	
Th	70
Tc	72
Sh	65
Sc	77
H	84
EFLHc	431
EFLHh	955
Ph	0.03
Pc	0.06
AFUEh	0.87
EERhp	9

EMS Savings			
BUILDING	**SQFT**	**CAPhp**	**Total Electric Savings (kWh)**
Main Complex	64,894	24	61,527

ECM 3 – High Efficiency Pump Motor Replacement

Background & Existing Conditions

Premium efficiency electric motors will help optimize fan and pump efficiency, reduce electrical power consumption and improve system reliability. These motors are designed to run cooler, last longer, and require less maintenance than the existing standard efficiency motors. Premium efficiency motors can be as high as 95% efficient (as opposed to standard efficiency motors of 78% to 88%) and are capable of operating at varying speeds allowing Variable Frequency Drive (VFD) installations where applicable.

ECM Calculations

Energy Savings from the installation of higher efficiency Pump Motors were calculated per BPU protocols and are shown below. Please see page 63-70 for which buildings are receiving new pump motors.

Motors

For premium efficiency motors 1-200 HP.

Algorithms

From application form calculate ΔkW where:

$$\Delta kW = 0.746 * HP * IF_{VFD} * (1/\eta_{base} - 1/\eta_{prem})$$

Demand Savings = (ΔkW) X CF

Energy Savings = (ΔkW)*HRS * LF

Definition of Variables

ΔkW = kW Savings at full load

HP = Rated horsepower of qualifying motor, from nameplate/manufacturer specs.

LF = Load Factor, percent of full load at typical operating condition

IF_{VFD} = VFD Interaction Factor, 1.0 without VFD, 0.9 with VFD

η_{base} = Efficiency of the baseline motor

η_{prem} = Efficiency of the energy-efficient motor

HRS = Annual operating hours

CF = Coincidence Factor

Motors

Component	Type	Value	Source
HP	Variable	Nameplate/Manufacturer Spec. Sheet	Application
LF	Fixed	0.75	1
hp_{base}	Fixed	EPACT Baseline Efficiency Table	EPACT Directory
hp_{prem}	Variable	Nameplate/Manufacturer Spec. Sheet	Application
IF_{VFD}	Fixed	1.0 or 0.9	3
Efficiency - η_{ee}	Variable	Nameplate/Manufacturer Spec. Sheet	Application
CF	Fixed	0.74	1
HRS	Fixed	Annual Operating Hours Table	1

EPAct Baseline Motor Efficiency Table

Motor	1200 RPM (6 pole)		1800 RPM (4 pole)		3600 RPM (2 pole)	
Horsepower	ODP	TEFC	ODP	TEFC	ODP	TEFC
1	0.8	0.8	0.825	0.825	na	0.755
1.5	0.84	0.855	0.84	0.84	0.825	0.825
2	0.855	0.865	0.84	0.84	0.84	0.84
3	0.865	0.875	0.865	0.875	0.84	0.855
5	0.875	0.875	0.875	0.875	0.855	0.875
7.5	0.885	0.895	0.885	0.895	0.875	0.885
10	0.9002	0.895	0.895	0.895	0.885	0.895
15	0.902	0.902	0.91	0.91	0.895	0.902
20	0.91	0.902	0.91	0.91	0.902	0.902
25	0.917	0.917	0.917	0.924	0.91	0.91
30	0.924	0.917	0.924	0.924	0.91	0.91
40	0.93	0.93	0.93	0.93	0.917	0.917
50	0.93	0.93	0.93	0.93	0.924	0.924
60	0.936	0.936	0.936	0.936	0.93	0.93
75	0.936	0.936	0.941	0.941	0.93	0.93
100	0.941	0.941	0.941	0.945	0.93	0.936
125	0.941	0.941	0.945	0.945	0.936	0.945
150	0.945	0.95	0.95	0.95	0.936	0.945
200	0.945	0.95	0.95	0.95	0.945	0.95

*Note: For the Direct Install Program, different baseline efficiency values are used.

NEMA Premium Motor Efficiency Table

Motor	1200 RPM (6 pole)		1800 RPM (4 pole)		3600 RPM (2 pole)	
Horsepower	ODP	TEFC	ODP	TEFC	ODP	TEFC
1	0.825	0.825	0.855	0.855	0.77	0.77
1.5	0.865	0.875	0.865	0.865	0.84	0.84
2	0.875	0.885	0.865	0.865	0.855	0.855
3	0.885	0.895	0.895	0.895	0.855	0.865
5	0.895	0.895	0.895	0.895	0.865	0.885
7.5	0.902	0.91	0.91	0.917	0.885	0.895
10	0.917	0.91	0.917	0.917	0.895	0.902
15	0.917	0.917	0.93	0.924	0.902	0.91
20	0.924	0.917	0.93	0.93	0.91	0.91
25	0.93	0.93	0.936	0.936	0.917	0.917
30	0.936	0.93	0.941	0.936	0.917	0.917
40	0.941	0.941	0.941	0.941	0.924	0.924
50	0.941	0.941	0.945	0.945	0.93	0.93
60	0.945	0.945	0.95	0.95	0.936	0.936
75	0.945	0.945	0.95	0.954	0.936	0.936
100	0.95	0.95	0.954	0.954	0.936	0.941
100	0.95	0.95	0.954	0.954	0.941	0.95
150	0.954	0.958	0.958	0.958	0.941	0.95
200	0.954	0.958	0.958	0.962	0.95	0.954

Annual Operating Hours Table

Motor Horsepower	Operating Hours, HRS
1 to 5 HP	2,745
6 to 20 HP	3,391
21 to 50 HP	4,067
51 to 100 HP	5,329
101 to 200 HP	5,200

High Efficiency Pump Savings

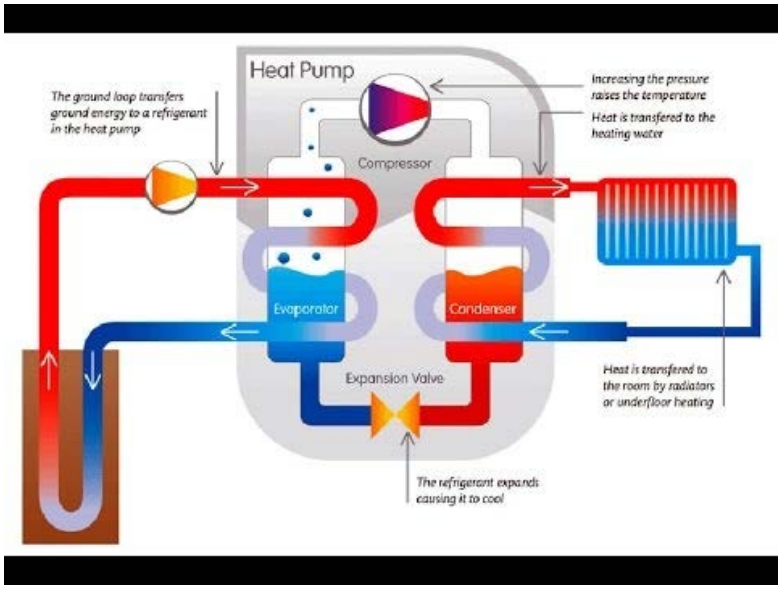
BUILDING	UNIT/FAN TAG	MOTOR HP	EXISTING MOTOR EFFICIENCY (Nbase)	REPLACEMENT MOTOR EFFICIENCY (Nprem)	LF	CF	IFvfd	HRS	ΔkW	DEMAND SAVINGS (Kw)	ELECTRIC SAVINGS (kWh)
Main Complex	Reservoir Fill	400	0.95	0.958	0.75	0.74	1.0	4200	2.62	2	8,262
	Reservoir Fill	400	0.95	0.958	0.75	0.74	1.0	4200	2.62	2	8,262
	Well 9	100	0.945	0.954	0.75	0.74	1.0	4200	0.74	1	2,346
	Well 11	250	0.95	0.958	0.75	0.74	1.0	4200	1.64	1	5,164
	Well 12	250	0.95	0.958	0.75	0.74	1.0	4200	1.64	1	5,164
	Well 15A	350	0.95	0.958	0.75	0.74	1.0	4200	2.30	2	7,230
	Intake River	325	0.95	0.958	0.75	0.74	1.0	4200	2.13	2	6,713
	Intake River	325	0.95	0.958	0.75	0.74	1.0	4200	2.13	2	6,713
	Intake River	325	0.95	0.958	0.75	0.74	1.0	4200	2.13	2	6,713
	Intake River	325	0.95	0.958	0.75	0.74	1.0	4200	2.13	2	6,713
	Finish Water Pump House	200	0.95	0.958	0.75	0.74	1.0	4200	1.31	1	4,131
	Finish Water Pump House	200	0.95	0.958	0.75	0.74	1.0	4200	1.31	1	4,131
	Finish Water Pump House	200	0.95	0.958	0.75	0.74	1.0	4200	1.31	1	4,131
	Finish Water Pump House	200	0.95	0.958	0.75	0.74	1.0	4200	1.31	1	4,131
602 Drum Point Road Pumping Station	P-1	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-2	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-3	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
Bay Harbor WWPS	P-1	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-2	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-3	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
Breton Road WWPS	P-1	7.5	0.885	0.91	0.75	0.74	1.0	4200	0.17	0	547
	P-2	7.5	0.885	0.91	0.75	0.74	1.0	4200	0.17	0	547
					0.75	0.74	1.0	4200	0.00	0	0
Burnt Tavern Manor WWPS	P-1	7.5	0.885	0.91	0.75	0.74	1.0	4200	0.17	0	547
	P-2	7.5	0.885	0.91	0.75	0.74	1.0	4200	0.17	0	547
					0.75	0.74	1.0	4200	0.00	0	0
Cape Breton WWPS	P-1	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
	P-2	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
					0.75	0.74	1.0	4200	0.00	0	0
Drum Point Rd WWPS	P-1	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-2	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-3	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
Eagle Point WWPS	P-1	2	0.84	0.865	0.75	0.74	1.0	4200	0.05	0	162
	P-2	2	0.84	0.865	0.75	0.74	1.0	4200	0.05	0	162
					0.75	0.74	1.0	4200	0.00	0	0
Eastern Lane WWPS	P-1	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
	P-2	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
					0.75	0.74	1.0	4200	0.00	0	0
Fifth St WWPS	P-1	11	0.895	0.917	0.75	0.74	1.0	4200	0.22	0	693
	P-2	11	0.895	0.917	0.75	0.74	1.0	4200	0.22	0	693
					0.75	0.74	1.0	4200	0.00	0	0
Greenbriar I WWPS	P-1	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
	P-2	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
					0.75	0.74	1.0	4200	0.00	0	0
Greenbriar II WWPS	P-1	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
	P-2	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
					0.75	0.74	1.0	4200	0.00	0	0
Island Drive WWPS	P-1	2	0.84	0.865	0.75	0.74	1.0	4200	0.05	0	162
	P-2	2	0.84	0.865	0.75	0.74	1.0	4200	0.05	0	162
					0.75	0.74	1.0	4200	0.00	0	0
Jaywood Manor WWPS	P-1	3.5	0.865	0.895	0.75	0.74	1.0	4200	0.10	0	319
	P-2	3.5	0.865	0.895	0.75	0.74	1.0	4200	0.10	0	319
					0.75	0.74	1.0	4200	0.00	0	0
Lanes Mill WWPS	P-1	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-2	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
					0.75	0.74	1.0	4200	0.00	0	0
Laurel Brook WWPS	P-1	30	0.924	0.941	0.75	0.74	1.0	4200	0.44	0	1,378
	P-2	30	0.924	0.941	0.75	0.74	1.0	4200	0.44	0	1,378
					0.75	0.74	1.0	4200	0.00	0	0
Laurelton WWPS	P-1	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
	P-2	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
					0.75	0.74	1.0	4200	0.00	0	0

High Efficiency Pump Savings											
BUILDING	UNIT/FAN TAG	MOTOR HP	EXISTING MOTOR EFFICIENCY (Nbase)	REPLACEMENT MOTOR EFFICIENCY (Nprem)	LF	CF	IFvfd	HRS	ΔkW	DEMAND SAVINGS (Kw)	ELECTRIC SAVINGS (kWh)
Mantoloking Road WWPS	P-1	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
	P-2	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
					0.75	0.74	1.0	4200	0.00	0	0
Paramount Way WWPS	P-1	11	0.895	0.917	0.75	0.74	1.0	4200	0.22	0	693
	P-2	11	0.895	0.917	0.75	0.74	1.0	4200	0.22	0	693
					0.75	0.74	1.0	4200	0.00	0	0
Pine Meadows WWPS	P-1	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
	P-2	15	0.91	0.93	0.75	0.74	1.0	4200	0.26	0	833
					0.75	0.74	1.0	4200	0.00	0	0
Pine View WWPS	P-1	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
	P-2	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
					0.75	0.74	1.0	4200	0.00	0	0
Rivera Drive WWPS	P-1	7.5	0.885	0.91	0.75	0.74	1.0	4200	0.17	0	547
	P-2	7.5	0.885	0.91	0.75	0.74	1.0	4200	0.17	0	547
					0.75	0.74	1.0	4200	0.00	0	0
Riverside Drive WWPS	P-1	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
	P-2	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
	P-3	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
Sea View Village WWPS	P-1	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
	P-2	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
					0.75	0.74	1.0	4200	0.00	0	0
Sloping Hill WWPS	P-1	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
	P-2	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
					0.75	0.74	1.0	4200	0.00	0	0
Trailer Park WWPS	P-1	1	0.825	0.855	0.75	0.74	1.0	4200	0.03	0	100
	P-2	1	0.825	0.855	0.75	0.74	1.0	4200	0.03	0	100
					0.75	0.74	1.0	4200	0.00	0	0
Turkey Point WWPS	P-1	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
	P-2	5	0.875	0.895	0.75	0.74	1.0	4200	0.10	0	300
					0.75	0.74	1.0	4200	0.00	0	0
Vanada Woods WWPS	P-1	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
	P-2	3	0.865	0.895	0.75	0.74	1.0	4200	0.09	0	273
					0.75	0.74	1.0	4200	0.00	0	0
Alaska Booster Station	P-1	25	0.917	0.936	0.75	0.74	1.0	4200	0.41	0	1,300
	P-2	125	0.945	0.954	0.75	0.74	1.0	4200	0.93	1	2,932
	P-3	125	0.945	0.954	0.75	0.74	1.0	4200	0.93	1	2,932
	P-4	125	0.945	0.954	0.75	0.74	1.0	4200	0.93	1	2,932
Beverly Beach Booster Station	P-1	20	0.91	0.93	0.75	0.74	1.0	4200	0.35	0	1,111
	P-2	20	0.91	0.93	0.75	0.74	1.0	4200	0.35	0	1,111
					0.75	0.74	1.0	4200	0.00	0	0
Burrsville Booster Station	P-1	40	0.93	0.941	0.75	0.74	1.0	4200	0.38	0	1,181
	P-2	40	0.93	0.941	0.75	0.74	1.0	4200	0.38	0	1,181
					0.75	0.74	1.0	4200	0.00	0	0
Mantoloking Road Booster Station	P-1	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
	P-2	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
					0.75	0.74	1.0	4200	0.00	0	0
Morris Avenue Booster Station	P-1	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
	P-2	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
					0.75	0.74	1.0	4200	0.00	0	0
Ridge Road Booster Station	P-1	50	0.93	0.945	0.75	0.74	1.0	4200	0.64	0	2,005
	P-2	10	0.895	0.917	0.75	0.74	1.0	4200	0.20	0	630
	P-3	10	0.895	0.917	0.75	0.74	1.0	4200	0.20	0	630

ECM 4 – WSHP Replacement

Background & Existing Conditions

A water source heat pump operates much like a traditional air source heat pump except that it extracts and dissipates heat by way of water instead of air. This is certainly not a type of home comfort system that will be available to anyone, but if you live in an area close to a well, lake or other natural water source, it may be an option worth considering.



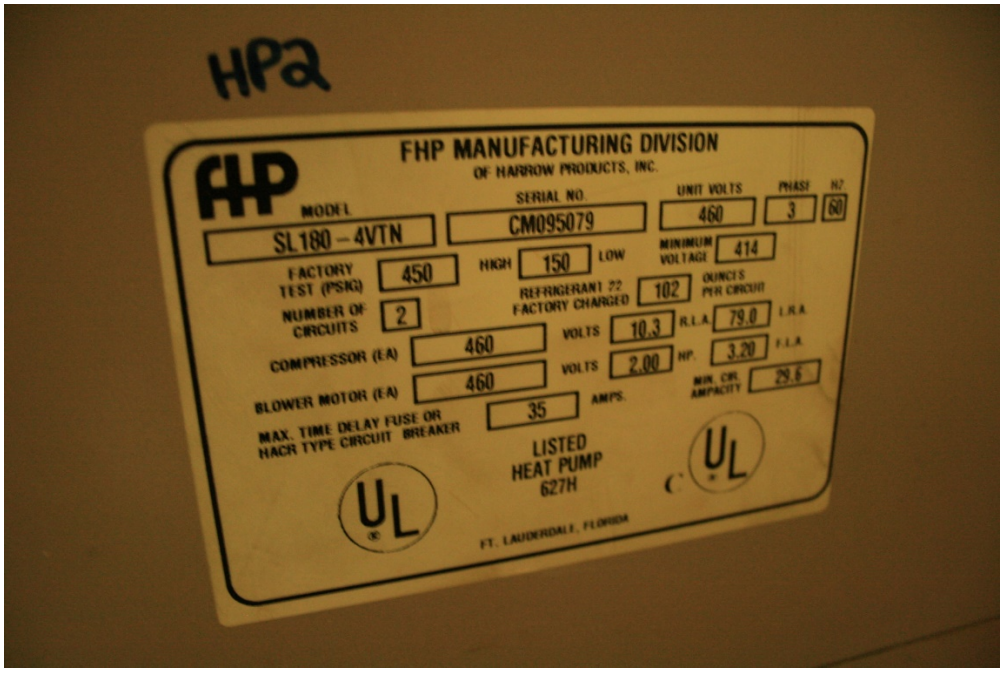
All types of heat pumps can provide excellent year round temperature control by pumping heat in during the winter months and removing it during the summer. The main difference between the types of heat pumps is where they get the heat or dispose of it.

Traditional air source heat pumps get their heat from the air outside, as even relatively cold air actually contains a substantial amount of heat. They use this heat to keep your facility warm in the winter, but as the outside temperatures go down below freezing, these heat pumps can become less and less effective.

Water source heat pumps, on the other hand, work on basically the same principle as air source heat pumps, but they extract heat from a body of water rather than the air. Traditional WSHP systems use cooling towers, boiler, and/or ground source loops as the source of water. Brick MUA uses the water from its process to deliver/extract heat from the heat pumps. Brick MUA has an extraordinarily efficient source of water to utilize as a heat sink that does not require the maintaining of large pieces of equipment such as cooling towers.

While the utilization of the process water is a highly effective and efficient system, the water source heat pump units are original to the system and are approaching the end of their useful life. Replacing these units with new, high efficiency units with modern refrigerants will provide energy savings and incentives for Brick MUA in the Administration Building. New units would also deliver the latest techniologies that were not available when the original units were installed. Those technologies include:

- Variable Speed Fan Control
- Variable Speed Compressors



Existing water source heat pumps at the Administration Building are original and were installed . This is a once through system with the water for WSHP loop coming directly from the main plant where the boilers are used to temper the water according to need.

Scope of Work

Replace existing (14) WSHPs at the Administration Building New units will have centrally located, variable speed compressors with refrigerant piping to each terminal unit.

In lieu of installing a new cooling tower, a cost $200,000 has been carried in the ECM estimate for the drilling of a new well which will be dedicated for the WSHP Loop.

ECM Calculations

Energy Savings from the installation of higher efficiency water source heat pumps was calculated per BPU protocols and are shown below.

Heat Pump Algorithms:

Cooling Energy Savings (kWh/yr) = N * Tons * 12 kBtuh/Ton * (1/EERb-1/EERq) * EFLHc
Heating Energy Savings (Btu/yr) = N * Tons * 12 kBtuh/Ton * ((1/ (COPb * 3.412))-(1/ (COPq * 3.412)) * EFLHh

Where c is for cooling and h is for heating.

Definition of Variables

N = Number of units
Tons = Rated cooling capacity of unit.This value comes from ARI/AHRI or AHAM rating or manufacturer data.
EERb = Energy Efficiency Ratio of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER should be used in place of EER.
COPb = Coefficient of Performance of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.
EERq = Energy Efficiency Ratio of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 (5.4 tons) BtuH, SEER should be used in place of EER.
COPq = Coefficient of Performance of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 BtuH (5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.
CF = Coincidence Factor – This value represents the percentage of the total load which is on during electric system's Peak Window. This value is based on existing measured usage and determined as the average number of operating hours during the peak window period.
EFLHc or h = Equivalent Full Load Hours – This represents a measure of energy use by season during the on-peak and off-peak periods.

Summary of Inputs

HVAC and Heat Pumps

Component	Type	Value	Source
Tons	Variable	Rated Capacity, Tons	Application
EER_b	Variable	See Table below	1
EER_q	Variable	ARI/AHRI or AHAM Values	Application
CF	Fixed	50%	2
$EFLH_{(c \text{ or } h)}$	Variable	See Tables below	3

Equipment Type	Baseline = ASHRAE Std. 90.1 – 2013
Water Source Heat Pumps (water to air, water loop) <=1.4 tons >1.4 to 5.4 tons >5.4 to 11.25 tons	12.2 EER, 4.3 heating COP 13.0 EER, 4.3 heating COP 13.0 EER, 4.3 heating COP
Ground Water Source Heat Pumps <=11.25 tons	18.0 EER, 3.7 heating COP
Ground Source Heat Pumps (brine to air, ground loop) <=11.25 tons	14.1 EER, 3.2 heating COP

WSHP Replacement Savings						
BUILDING	QUANTITY	TONS	EERb	EERq	COPb	COPq
Main Complex	7	1.5	13	16.4	4.3	5.3
	4	1	12.2	16	4.3	5.3
	3	0.5	12.2	16	4.3	5.3

WSHP Replacement Savings							
BUILDING	CF	EFLHc	EFLHh	Demand Savings (kW)	Cooling Energy Savings (kWh)	Heating Energy Savings (kWh)	Energy Savings (kWh)
Main Complex	50%	955	431	1.00	1,919	698	2,617
	50%	955	431	0.47	892	266	403
	50%	955	431	0.18	335	100	151

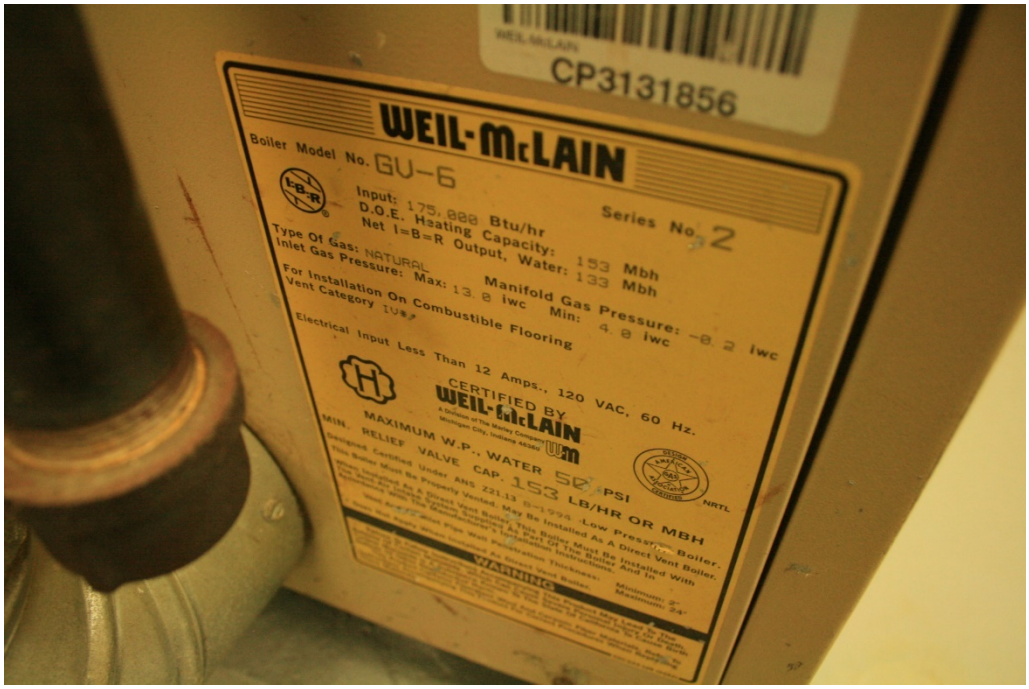
ECM Water Savings

The WSHP Loop is served by treated plat water. Per Brick MA, there are 94,608,000 gallons of water circulated through the WSHP Loop annually. This water is treated but not sold by Brick MUA. By isolating the WSHP Loop from the plant, Brick MUA will save on the cost of water treatment at a cost of $0.0009 cents per gallon for an annual water treatment savings of ***$85,147.*** The rate of $0.0009 cents per gallon was provided by Brick MUA based on their current water treatment costs.

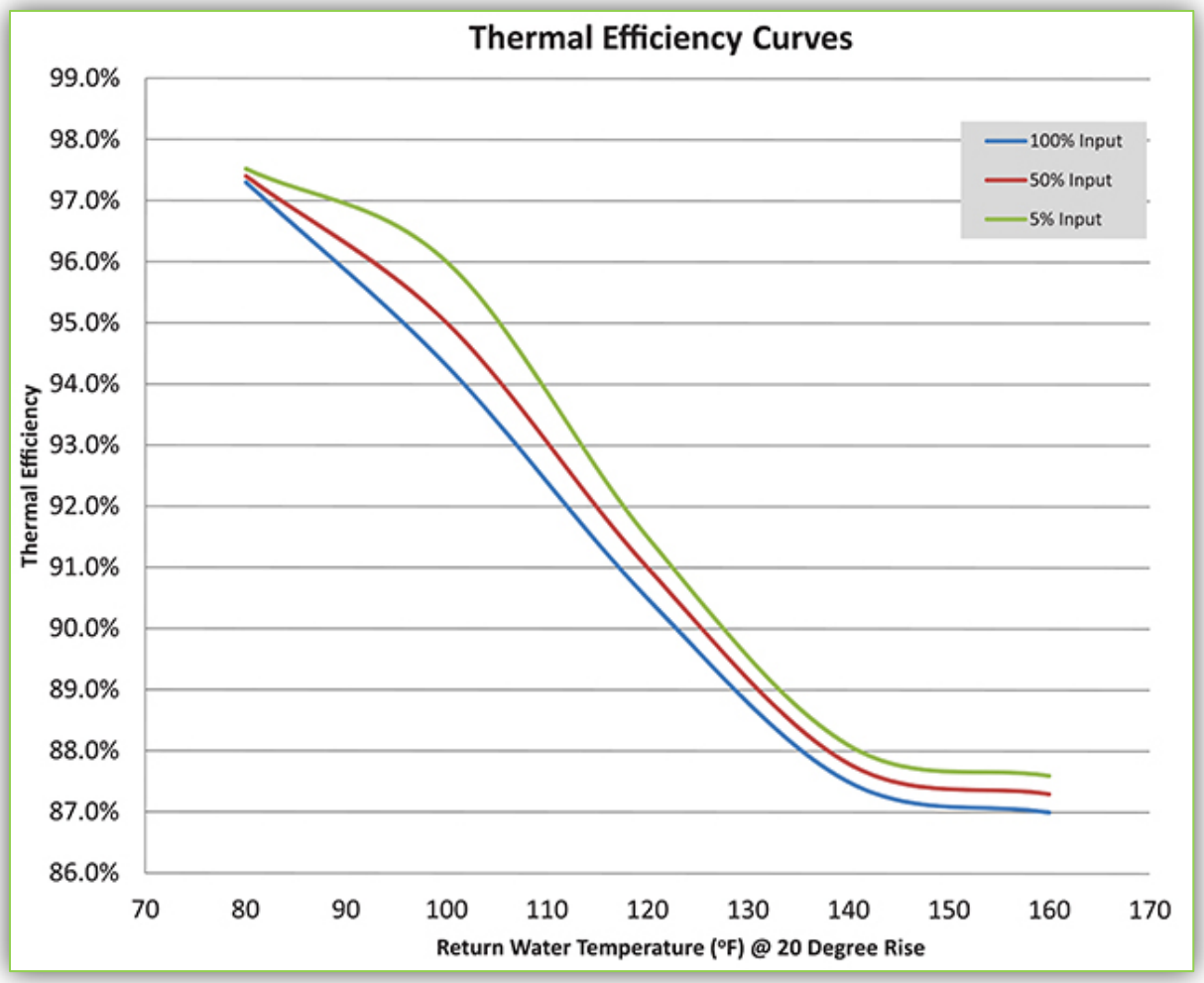
ECM 4 – Boiler Replacement

Background & Existing Conditions

The Administration Building has existing boiler systems that would benefit from the increased efficiency of new Condensing Boilers.



Older boiler systems have efficiencies in the range of 56%–75%. A condensing boiler hot water heating system can achieve efficiencies as high as 97%, converting nearly all of the fuel to useful heat. A new high-efficiency heating system will reduce natural gas consumption and pollution.



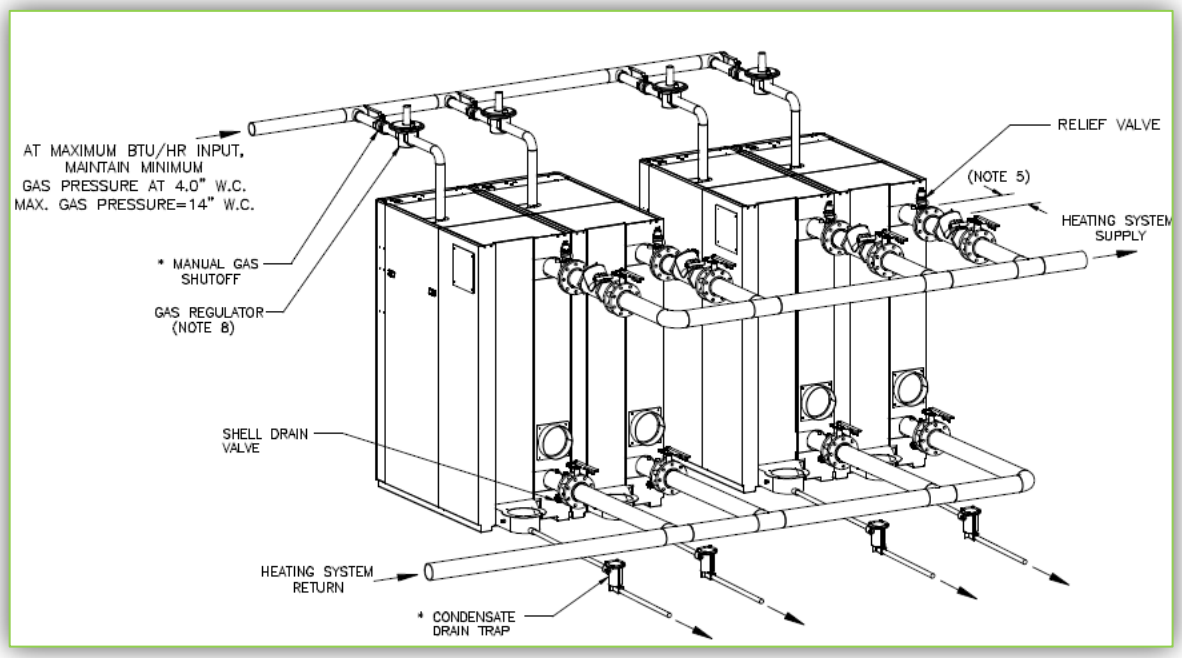
Scope of Work

Replace the existing boilers with condensing boilers capable of efficiencies upwards of 97%. The piping arrangement of the boilers will be Variable Primary with a variable frequency drive to modulate the hot water flow throughout the building.

- Demolish Existing Boiler Plant
  - Disconnect power at the Boiler
  - Disconnect Natural Gas service at the Boiler
  - Disconnect existing Hot Water Piping
  - Remove existing and responsibly dispose of pumps
  - Remove existing and responsibly dispose of boilers
  - Note:
    - All demolished equipment will become the property of the demolition contractor.

- Furnish and Install new Condensing Boilers
- Furnish and install new concrete housekeeping pads for Boilers
- Install new piping in a Variable/Primary configuration

- Install new pipe, valves, & fittings
- Install insulation on new piping
- Install necessary sensor, wells, and flow meters as required for complete system. Sensors, wells, and flow meters will be provided by the EMS Contractor.
- Install new flue, venting to the side of the building
- Re-use existing louvers and combustion air system and connect to the new boilers.
- Install new VFD System Pumps
- Reconnect existing hot water piping to the new Boiler Plant.
- Installation check, start-up, performance test, & functional testing on the new heating hot water system.
- Note:
    - Cost of new DDC Controls for the Boiler Plant is carried in ECM #2.



ECM Calculations

Energy Savings from the installation of higher efficiency Condensing Boilers were calculated per BPU protocols and are shown below.

$$\text{Gas Savings (Therms)} = \frac{OF \times ((CAPY_{Bi} \times EFF_Q) - (CAPY_{Qi} \times EFF_B \times ICF)) \times HDD_{mod} \times 24}{\Delta T \times HC_{fuel} \times EFF_B \times ICF \times EFF_Q}$$

Definition of Variables

OF = Oversize factor of standard boiler or furnace (OF=0.8)

$CAPY_{Bi}$ = Total input capacity of the baseline furnace, boiler or heater in Btu/hour

$CAPY_{Qi}$ = Total input capacity of the qualifying furnace, boiler or heater in Btu/hour

HDD_{mod} = HDD by zone and building type

24 = Hours/Day

ΔT = design temperature difference

HC_{fuel} = Conversion from Btu to therms of gas or gallons of oil or propane (100,000 btu/therm; 138,700 btu/gal of #2 oil; 92,000 btu/gal of propane)

EFF_Q = Efficiency of qualifying heater(s) (AFUE %)

EFF_B = Efficiency of baseline heaters (AFUE %)

ICF = Infrared Compensation Factor (ICF = 0.8 for IR Heaters, 1.0 for furnaces/boilers)[2]

Adjusted Heating Degree Days by Building Type

Building Type	Heating Energy Density (kBtu/sf)	Degree Day Adjustment Factor	Atlantic City (HDD)	Newark (HDD)	Philadelphia (HDD)	Monticello (HDD)
Education	29.5	0.55	2792	2783	2655	3886
Food Sales	35.6	0.66	3369	3359	3204	4689
Food Service	39.0	0.73	3691	3680	3510	5137
Health Care	53.6	1.00	5073	5057	4824	7060
Lodging	15.0	0.28	1420	1415	1350	1976
Retail	29.3	0.55	2773	2764	2637	3859
Office	28.1	0.52	2660	2651	2529	3701
Public Assembly	33.8	0.63	3199	3189	3042	4452
Public Order/Safety	24.1	0.45	2281	2274	2169	3174
Religious Worship	29.1	0.54	2754	2745	2619	3833
Service	47.8	0.89	4524	4510	4302	6296
Warehouse/Storage	20.2	0.38	1912	1906	1818	2661

Boiler Replacement Savings

BUILDING	Baseline Plant Rated Input MBH	Estimated Existing Efficiency (EFFb)	Qualifying Boiler Plant Capacity (CAPYqi)	Qualifying Boiler Efficiency (EFFq)	Adjusted Heating Degree Days (HDDmod)	Delta T
Main Complex	300,000	0.75	300,000	0.87	2,660	20

Boiler Replacement Savings

BUILDING	Conversion of BTU to therms (Hcfuel)	OF	Infrared Compensation Factor (ICF)	Calculated Annual Fuel Savings (Th)
Main Complex	100,000	0.8	1.0	1,409

ECM 6 – Lab Renovations

Background & Existing Conditions

Lab renovations were reviewed but were declined to be included in the ESIP project. There is not scope, budget or savings associated with this ECM.

ECM 7 – Solar PPA

Background & Existing Conditions

Solar PPA was reviewed but were declined to be included in the ESIP project.

A Solar Power Purchase Agreement (SPPA) is a financial arrangement in which a third-party developer owns, operates, and maintains the photovoltaic (PV) system, and a host customer agrees to site the system on its roof or elsewhere on its property and purchases the system's electric output from the solar services provider for a predetermined period. This financial arrangement allows the host customer to receive stable, and sometimes lower cost electricity, while the solar services provider or another party acquires valuable financial benefits such as tax credits and income generated from the sale of electricity to the host customer.

With this business model, the host customer buys the services produced by the PV system rather than the PV system itself. This framework is referred to as the "solar services" model, and the developers who offer SPPAs are known as solar services providers. SPPA arrangements enable the host customer to avoid many of the traditional barriers to adoption for organizations looking to install solar systems: high up-front capital costs; system performance risk; and complex design and permitting processes. In addition, SPPA arrangements can be cash flow positive for the host customer from the day the system is commissioned.

- No upfront capital cost.
- Predictable energy pricing.
- No system performance or operating risk.
- Projects can be cash flow positive from day one.
- Visibly demonstrable environmental commitment.
- Potential reduction in carbon footprint

Scope of Work

- Installation of the Solar PV System shall be in accordance with NFPA 70. NEC 2011. ARTICLE 690.Solar Photovoltaic (PV) Systems. (SEE APPENDIX D).
- The following is the potential layout of the Solar Arrays for each Building.
- PPA Firm will receive any incentives available
- PPA Firm will be responsible for any structural changes necessary to install roof panels

ECM Calculations

The energy savings from this ECM is result in the reduced electrical cost from the PPA for the kWh generated by the Solar Panels. A comparison was done to assure that the generated kWh did not exceed the post-project estimated energy consumption. In cases where the generated kWh exceeded the post-project electrical consumption, the generation numbers were adjusted so as to not exceed the anticipated electrical consumption of the building.

Solar PPA - Rates & Savings						
BUILDING	MOUNTING CATEGORY	kWh GENERATED	$$/kWh RATES		SAVINGS	TOTAL SAVINGS
			UTILITY	SOLAR PPA		
Main Complex	Ground		$0.099	$0.000	$0	**$22,331**
	Roof	662,759	$0.099	$0.065	$22,331	
	Carport		$0.099	$0.000	$0	
Reservoir	Roof		$0.099	$0.000	$0	**$4,028**
	Ground	119560	$0.099	$0.065	$4,028	
	Canopy		$0.099	$0.000	$0	

ENERGY SAVINGS PLAN

SECTION 4 – FINANCIAL ANALYSIS

FORM VI

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: DCO Energy

Note: Respondents must use the following assumptions in all financial calculations:

(a) The cost of all types of energy should be assumed to inflate at **2.4% gas, 2.2% electric per year and**

1. Term of Agreement: 15 years
2. Construction Period [2] (months): 12 Months
3. Cash Flow Analysis Format:

Project Cost (1):	**$1,566,311**
3rd Party Costs	**$20,000**
Total Project:	**$1,586,311**

Interest Rate to be Used for Proposal Purposes: **2.90%**

Year	Annual Energy Savings	Annual Operational Savings	Energy Rebates/Incentives	Total Annual Savings	Annual Project Costs	Board Costs	Net Cash-Flow to Client	Cumulative Cash Flow
Installation	$ 41,117			$ 41,117	$ (33,557)	$ -	$ 7,560	$ 7,560
Year 1	$ 108,203	$ 12,500	$ 9,009	$ 129,712	$ (128,712)		$ 1,000	$ 8,560
Year 2	$ 110,757	$ 12,500		$ 123,257	$ (122,257)		$ 1,000	$ 9,560
Year 3	$ 113,372	$ 12,500		$ 125,872	$ (124,872)		$ 1,000	$ 10,560
Year 4	$ 116,048	$ 12,500		$ 128,548	$ (127,548)		$ 1,000	$ 11,560
Year 5	$ 118,787	$ 12,500		$ 131,287	$ (130,287)		$ 1,000	$ 12,560
Year 6	$ 121,592			$ 121,592	$ (120,592)		$ 1,000	$ 13,560
Year 7	$ 124,462			$ 124,462	$ (123,462)		$ 1,000	$ 14,560
Year 8	$ 127,401			$ 127,401	$ (126,401)		$ 1,000	$ 15,560
Year 9	$ 130,408			$ 130,408	$ (129,408)		$ 1,000	$ 16,560
Year 10	$ 133,487			$ 133,487	$ (132,487)		$ 1,000	$ 17,560
Year 11	$ 136,639			$ 136,639	$ (135,639)		$ 1,000	$ 18,560
Year 12	$ 139,865			$ 139,865	$ (138,865)		$ 1,000	$ 19,560
Year 13	$ 143,168			$ 143,168	$ (142,168)		$ 1,000	$ 20,560
Year 14	$ 146,548			$ 146,548	$ (145,548)		$ 1,000	$ 21,560
Year 15	$ 150,009			$ 150,009	$ (149,009)		$ 1,000	$ 22,560
Totals	$ 1,920,746	$ 62,500	$ 9,009	$ 2,033,372	$ (2,010,812)	$ -	$ 22,560	

NOTES:

(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"

(2) No payments are made by the Board during the construction period.

(3) Installation Year payment is Interest Payment

Utility Inflation Worksheet					
Year	Electric	Gas	Solar PPA	Water	Total
2	$21,848.22	$1,718.22	$0.00	$87,190.73	$110,757.18
3	$22,328.88	$1,759.46	$0.00	$89,283.31	$113,371.65
4	$22,820.12	$1,801.68	$0.00	$91,426.11	$116,047.91
5	$23,322.16	$1,844.92	$0.00	$93,620.34	$118,787.42
6	$23,835.25	$1,889.20	$0.00	$95,867.22	$121,591.68
7	$24,359.62	$1,934.54	$0.00	$98,168.04	$124,462.21
8	$24,895.54	$1,980.97	$0.00	$100,524.07	$127,400.58
9	$25,443.24	$2,028.52	$0.00	$102,936.65	$130,408.40
10	$26,002.99	$2,077.20	$0.00	$105,407.13	$133,487.32
11	$26,575.06	$2,127.05	$0.00	$107,936.90	$136,639.01
12	$27,159.71	$2,178.10	$0.00	$110,527.38	$139,865.19
13	$27,757.22	$2,230.38	$0.00	$113,180.04	$143,167.64
14	$28,367.88	$2,283.91	$0.00	$115,896.36	$146,548.15
15	$28,991.97	$2,338.72	$0.00	$118,677.88	$150,008.57

Alternate Analysis

The electrical costs savings from a Solar PPA was not included in the project. However, should the Solar PPA be pursued and accepted, it would provide $26,359 in additional annual savings. An alternate financial analysis has been provided below showing the addition of the Solar PPA savings. Should the Solar PPA be pursued, an additional $275,000 in projects can be included in the ESIP project.

FORM VI

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: DCO Energy

Note: Respondents must use the following assumptions in all financial calculations:

(a) The cost of all types of energy should be assumed to inflate at **2.4% gas, 2.2% electric per year and**

1. Term of Agreement: 15 years
2. Construction Period [(2)] (months): 12 Months
3. Cash Flow Analysis Format:

Project Cost (1):	**$1,908,733**
3rd Party Costs	**$20,000**
Total Project:	**$1,928,733**

Interest Rate to be Used for Proposal Purposes: **2.90%**

Year	Annual Energy Savings	Annual Operational Savings	Energy Rebates/Incentives	Total Annual Savings	Annual Project Costs	Board Costs	Net Cash-Flow to Client	Cumulative Cash Flow
Installation	$ 51,134			$ 51,134	$ (5,210)	$ -	$ 45,924	$ 45,924
Year 1	$ 134,562	$ 12,500	$ 9,009	$ 156,071	$ (155,071)		$ 1,000	$ 46,924
Year 2	$ 137,696	$ 12,788		$ 150,484	$ (149,484)		$ 1,000	$ 47,924
Year 3	$ 140,903	$ 13,082		$ 153,985	$ (152,985)		$ 1,000	$ 48,924
Year 4	$ 144,185	$ 13,382		$ 157,568	$ (156,568)		$ 1,000	$ 49,924
Year 5	$ 147,544	$ 13,690		$ 161,234	$ (160,234)		$ 1,000	$ 50,924
Year 6	$ 150,981			$ 150,981	$ (149,981)		$ 1,000	$ 51,924
Year 7	$ 154,498			$ 154,498	$ (153,498)		$ 1,000	$ 52,924
Year 8	$ 158,097			$ 158,097	$ (157,097)		$ 1,000	$ 53,924
Year 9	$ 161,780			$ 161,780	$ (160,780)		$ 1,000	$ 54,924
Year 10	$ 165,549			$ 165,549	$ (164,549)		$ 1,000	$ 55,924
Year 11	$ 169,406			$ 169,406	$ (168,406)		$ 1,000	$ 56,924
Year 12	$ 173,353			$ 173,353	$ (172,353)		$ 1,000	$ 57,924
Year 13	$ 177,392			$ 177,392	$ (176,392)		$ 1,000	$ 58,924
Year 14	$ 181,526			$ 181,526	$ (180,526)		$ 1,000	$ 59,924
Year 15	$ 185,756			$ 185,756	$ (184,756)		$ 1,000	$ 60,924
Totals	$ 2,383,228	$ 65,442	$ 9,009	$ 2,508,812	$ (2,447,888)	$ -	$ 60,924	

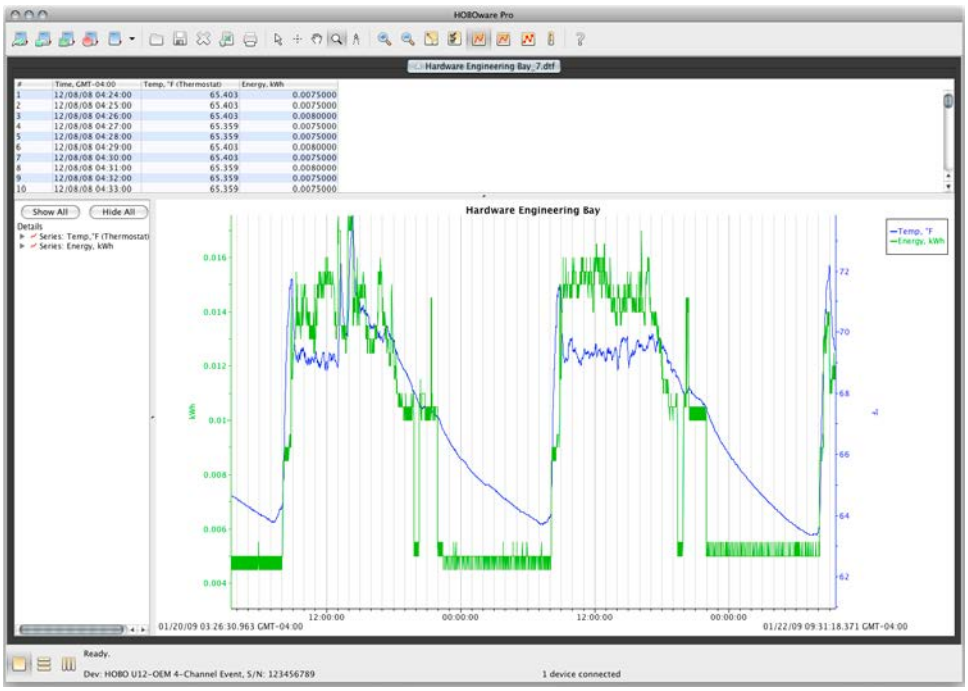
ENERGY SAVINGS PLAN

SECTION 5 – DATA LOGGER ANALYSIS

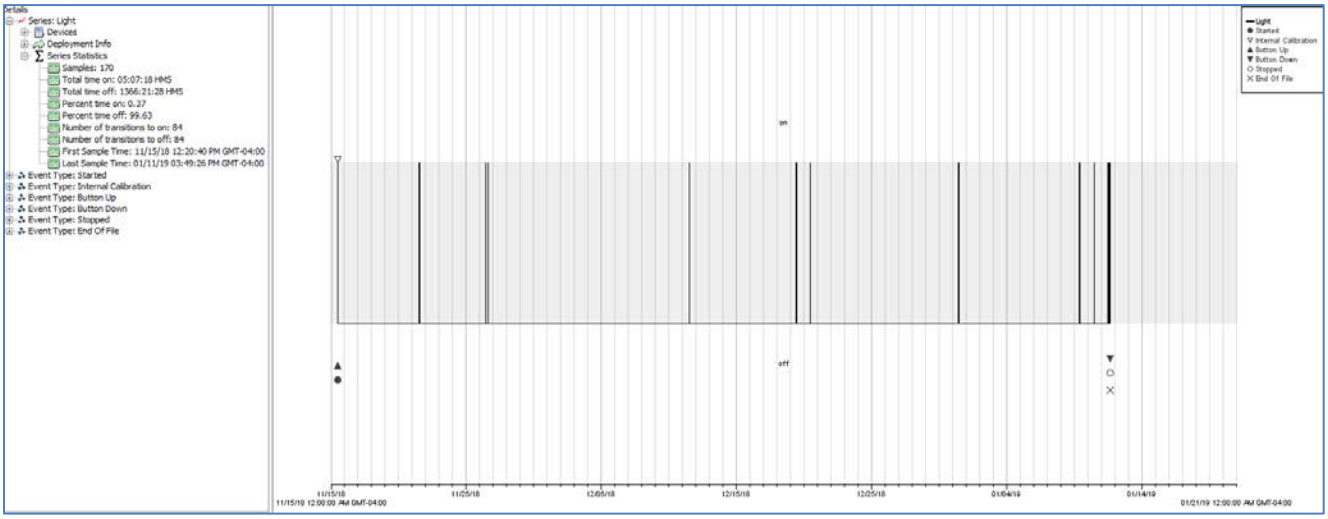
Background & Existing Conditions

Data loggers were deployed at (3) Pumping Stations. In each facility a lighting logger and temperature/humidity logger was place to take readings for 8 weeks to track actual, not estimated building performance. Loggers took measurements every 15 minutes of temperature, humidity, & lighting on-off hours.

As opposed to a typical office building or schools, it was critical to understand the actual lighting run hours at the pumping stations. Run hours is perhaps the most important variable needed to accurately compute lighting savings and measuring the lighting run hours at the WWPS was necessary to deliver the accuracy needed in the savings calculations. It was also important to measure the space temperature & humidity data to analyze the effects of local heating systems at the pumping station to understand if there any issues/opportunities at these facilities.

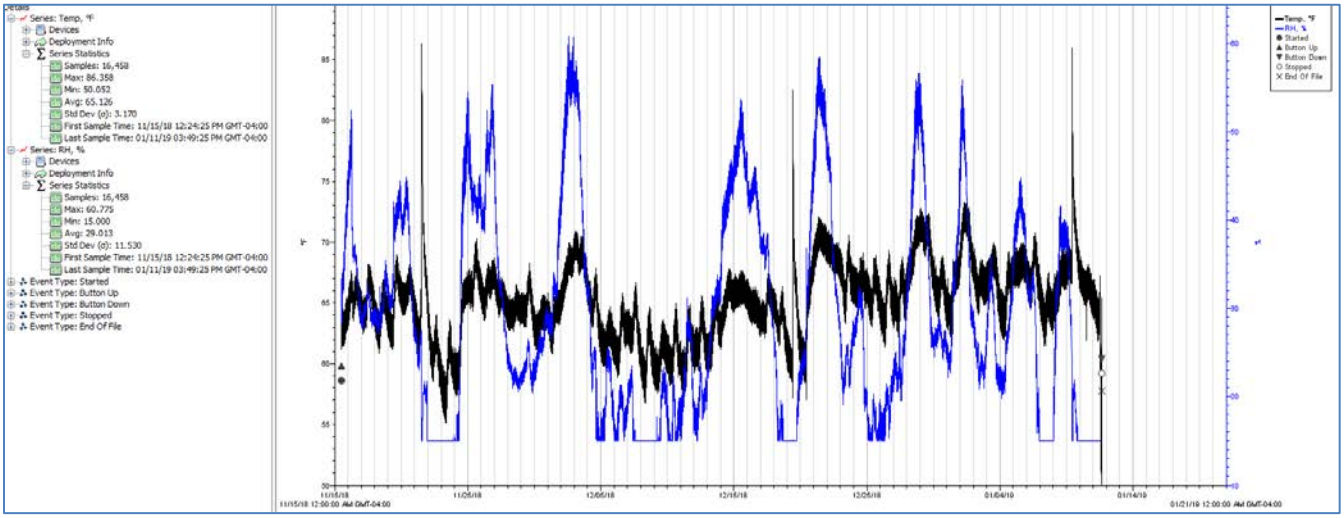


Burnt Tavern Mill WWPS



Analysis

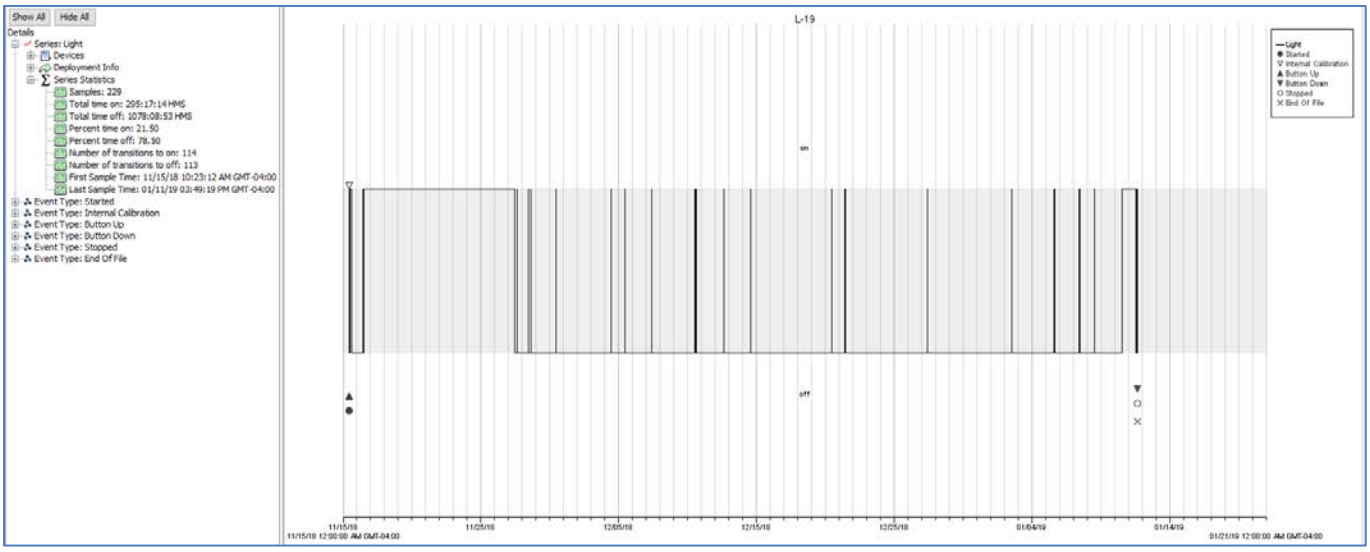
- Data logger was installed from November 15, 2018 to January 11, 2019.
- Data logger recorded a total run time for the lighting of 5 hours, 7 min
- Lighting was recorded “Off” 99.63% of the time
- Total annual run hours for the lighting can be estimated to be approximately 30 hours
- Brick MUA Staff does an excellent job turning the lights off following any visit to the WWPS



Analysis

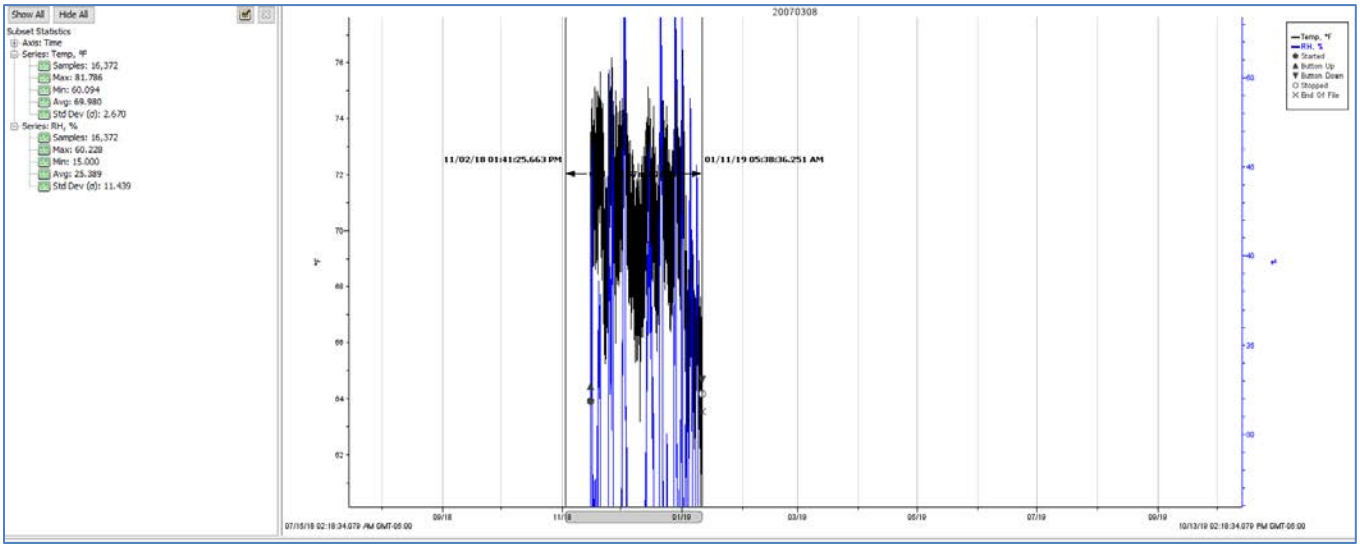
- Data logger was installed from November 15, 2018 to January 11, 2019.
- The average temperature in the facility was 65 degrees F
- The high temperature recorded was 86 Degrees F
- The low temperature recorded was 50 degrees F
- The average humidity level in the facility was 29 % RH
- The high humidity level recorded was 60 % RH
- The low humidity level recorded was 15 % RH
- The only source of heating is a small electric unit heater. It is likely that the local thermostat is set for 50 degrees to prevent freezing. This seems appropriate for the facility and temperatures do not approach any levels that would cause concern for freezing conditions.

Lanes Mill WWPS



Analysis

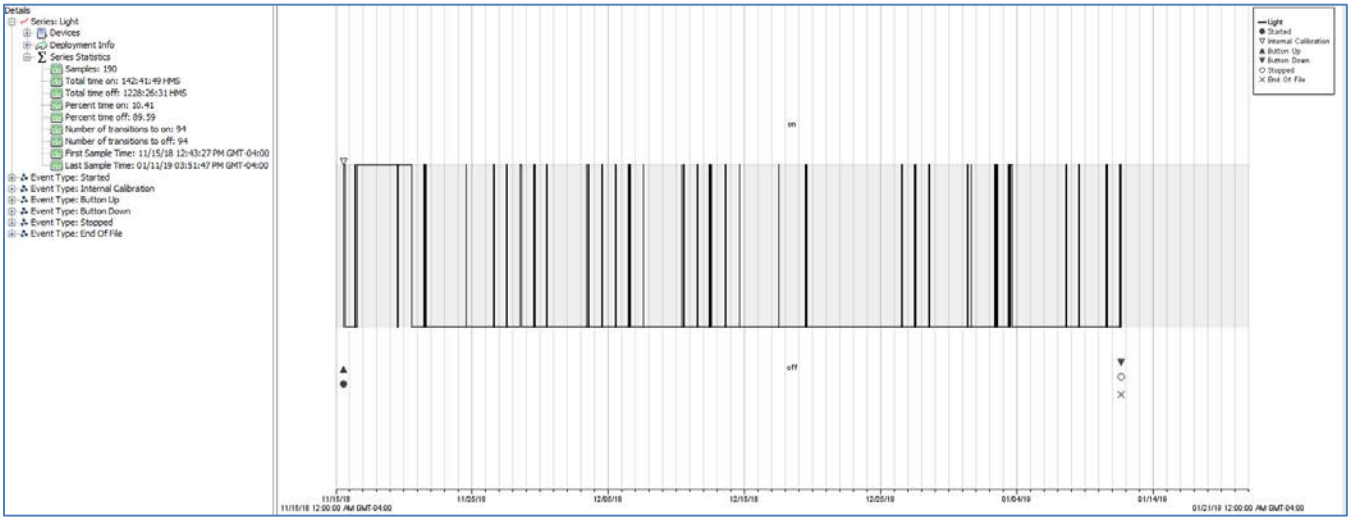
- Data logger was installed from November 15, 2018 to January 11, 2019.
- Data logger recorded a total run time for the lighting of 295 hours, 17 min
- Lighting was recorded “Off” 78.5% of the time
- The increased number of run hours versus other WWPS is due to a period of time from November 16th to November 28th when the lighting remained on for 280 hours.
- When the above anomaly is removed from the analysis, it is reasonable to determine that the annual lighting run hours would be similar to that of Burnt Mill WWPS. However, as it appears that the lighting at Lanes Mill WWPS is turned on twice as much as Burnt Mill (20 “On/Off” events versus 9 “On/Off” events). Therefore a total annual lighting run hours of 60 hours can be assumed.



Analysis

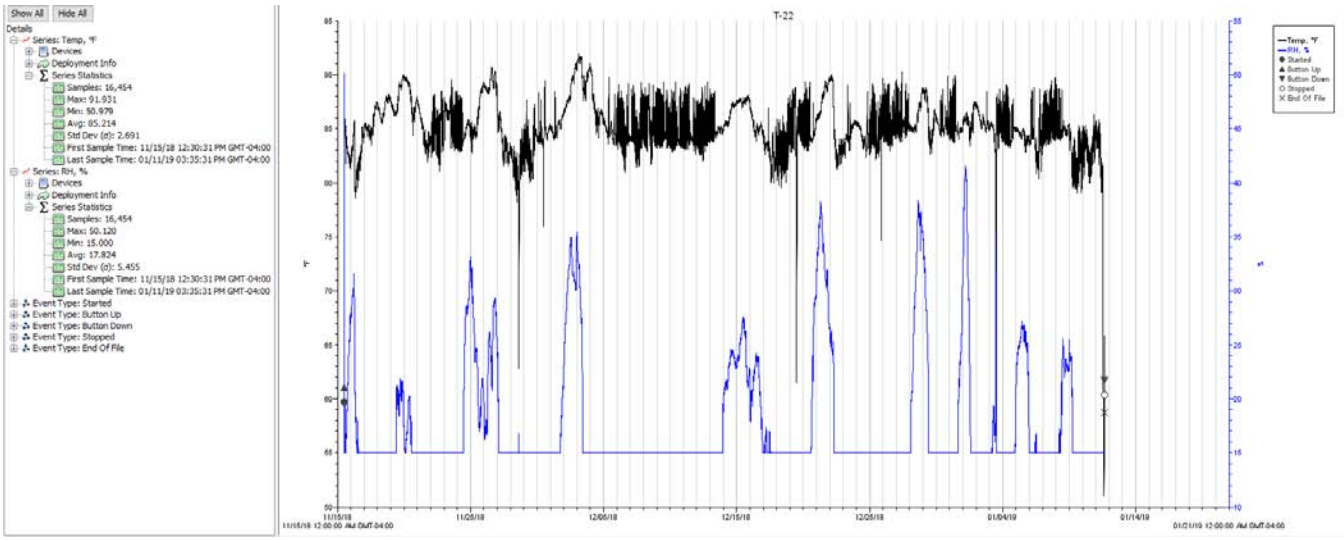
- Data logger was installed from November 15, 2018 to January 11, 2019.
- The average temperature in the facility was 69 degrees F
- The high temperature recorded was 81 Degrees F
- The low temperature recorded was 60 degrees F
- The average humidity level in the facility was 25 % RH
- The high humidity level recorded was 60 % RH
- The low humidity level recorded was 15 % RH
- The only source of heating is a small electric unit heater. It is likely that the local thermostat is set for 60 degrees to prevent freezing. This seems appropriate for the facility and temperatures do not approach any levels that would cause concern for freezing conditions.

Riverside Drive WWPS



Analysis

- Data logger was installed from November 15, 2018 to January 11, 2019.
- Data logger recorded a total run time for the lighting of 142 hours, 7 min
- Lighting was recorded “Off” 89.63% of the time
- It appears as if Riverside Drive is visited by Brink MUA Staff more frequently than Burnt Mill WWPS or Lanes Mill WWPS (94 “On/Off”).
- Total annual run hours for the lighting can be estimated to be approximately 852 hours
- Brick MUA Staff does an excellent job turning the lights off following any visit to the WWPS



Analysis

- Data logger was installed from November 15, 2018 to January 11, 2019.
- The average temperature in the facility was 85 degrees F
- The high temperature recorded was 91 Degrees F
- The low temperature recorded was 50 degrees F
- The average humidity level in the facility was 17 % RH
- The high humidity level recorded was 50 % RH
- The low humidity level recorded was 15 % RH
- There are 2 sources of heating at Riverside Drive, a small electric unit heater and a Ventrol H&V Unit with a 40 kW Electric Heater on the roof.
- While the temperature levels do fall on a couple of occasions, the space temperature stays above 80 degrees > 90% of the time. This is possibly due to overheating by the Ventrol unit. It is recommended that Brick MUA determine the appropriate temperature setpoint for the facility and adjust the thermostat setpoints accordingly.

ENERGY SAVINGS PLAN

SECTION 6 – RISK, DESIGN, & COMPLIANCE

ASSESSMENT OF RISKS, DESIGN & COMPLIANCE ISSUES

Moving from a conceptual design to engineered documents DCO has identified areas of the project that could change during the detailed design. The table below represents potential conceptual areas of concern that will need to be investigated further with a corresponding party responsible for the compliance of each item.

Issue	Category	Responsible Party
Alteration of expected Maintenance and Operational Savings	Risk	Brick MUA
Disposition of Abandoned Equipment (Steam Piping, Condensate Piping, Oil Tanks, etc.)	Risk	Brick MUA
New Natural Gas Distribution	Risk	Brick MUA
Integrity of re-used Infrastructure	Risk	Brick MUA
Life Safety System Coordination	Risk	Brick MUA
Coordination with Brick MUA Information Technology Department	Risk	Brick MUA
Ventilation Compliance With Code	Compliance	Consulting Engineer
Temperature, Humidity and Air Change Compliance with Code	Compliance	Consulting Engineer
Boiler Capacity And Turndown	Design	Consulting Engineer
Natural Gas Regulator Compliance with Code	Compliance	Consulting Engineer
Undocumented Underground Utilities	Risk	Consulting Engineer

Issue	Category	Responsible Party
Code Compliance of Existing Electrical Infrastructure	Compliance	Consulting Engineer
Lighting Levels	Compliance	Consulting Engineer
Design Light Consortium rating for bulbs	Compliance	Consulting Engineer
Underwriters Laboratory Testing for retrofitted LED Lighting Systems	Compliance	Consulting Engineer
Lighting Retrofits within hard ceilings for fixtures and occupancy sensors	Risk	Consulting Engineer
Street/Parking Lot Pole Structural Integrity	Risk	Consulting Engineer
Unrealized Energy Savings 1. Energy Modeling 2. Performance Monitoring 3. Capacity Of Equipment 4. Efficiency Of Equipment 5. Run Hours Of Equipment	Risk	DCO/ Consulting Engineer 1. DCO 2. DCO 3. Consulting Engineer / Basis of Design Vendor 4. Consulting Engineer / Basis of Design Vendor 5. Brick MUA
Existing Plumbing Infrastructure With New Low Flow Devices	Design	Consulting Engineer
Adaptation To New RTUs (Curb, Electric, Ductwork, Condensate)	Design	Consulting Engineer / Basis Of Design Manufacture
Structural Loads For Rooftop Equipment Replacement	Design	Consulting Engineer
Transformer Loading	Risk	Consulting Engineer
Site Work For Equipment	Design	Consulting Engineer

Issue	Category	Responsible Party
Condition Of Roof Under Units	Risk	Consulting Engineer
Adequate Crane Lifts & Clearances	Design	Consulting Engineer / Rigger
Physical Space Constraints And Clearance For Equipment Replacement	Design	Consulting Engineer
Refrigerant Reclaim / Refrigerant Disposal	Compliance	Contractor
Existing Tie In Locations	Design	Consulting Engineer
Schedule Oversight	Risk	DCO Energy
Impact Of Boiler Flue	Design	Consulting Engineer
Impact Of Space Usage During Construction	Risk	Consulting Engineer & Brick MUA
Scope changes relating to requests by Authorities Having Jurisdiction.	Risk	Brick MUA (via contingency)
Department of Environmental Protection Permitting	Risk	Consulting Engineer
Modifications of Energy Saving Control Sequences and Setpoints impacting Energy Savings and Incentives	Risk	Brick MUA
Post Construction Calibration of Sensors, Meters, & Safety Devices	Risk	Brick MUA
Adequate time and access for bidding contractor site surveys	Risk	Brick MUA
Utility Interconnection approval for the CHP Unit	Risk	Brick MUA

MEASUREMENT & VERIFICATION (M&V) PLAN

Our approach to M&V of energy savings aligns with the International Performance Measurement & Verification Protocol. More detailed information may be found at www.ipmvp.org. It's most cost-effective to perform M&V using the least costly option that still adequately documents system performance and permits analysis of savings. This approach lowers the total cost of the program leaving more dollars available to perform more facility improvements. Depending upon which ECMs are implemented by Brick MUA, the M&V plan proposed by DCO would incorporate one or more of the following options which outlines the four most common approaches for M&V:

Option A – Retrofit Isolation with Key Parameter Measurement	This option is based on a combination of measured and estimated factors when variations in factors are not expected. Measurements are spot or short-term and are taken at the component or system level, both in the baseline and post-installation cases. Measurements should include the key performance parameter(s) which define the energy use of the ECM. Estimated factors are supported by historical or manufacturer's data. Savings are determined by means of engineering calculations of baseline and post-installation energy use based on measured and estimated values.	Direct measurements and estimated values, engineering calculations and/or component or system models often developed through regression analysis. Adjustments to models are not typically required.
Option B – Retrofit Isolation with Parameter Measurement	This option is based on periodic or continuous measurements of energy use taken at the component or system level when variations in factors are expected. Energy or proxies of energy use are measured continuously. Periodic spot or short-term measurements may suffice when variations in factors are not expected. Savings are determined form analysis of baseline and reporting period energy use of proxies of energy use.	Direct measurements, engineering calculations, and/or component or system models often developed through regression analysis. Adjustments to models may be required.
Option C – Utility Data Analysis	This option is based on long-term, continuous, whole-building utility meter, facility level, or sub-meter energy (or water) data. Savings are determined from analysis of baseline and reporting period energy data. Typically, regression analysis is conducted to correlate with and adjust energy use to independent variables such as weather, but simple comparisons may also be used.	Based on regression analysis of utility meter data to account for factors that drive energy use. Adjustments to models are typically required.
Option D – Calibrated Computer Simulation Option D – Calibrated	Computer simulation software is used to model energy performance of a whole-facility (or sub-facility). Models must be calibrated with actual hourly or monthly billing data from the facility. Implementation of simulation modeling requires engineering expertise. Inputs to the model include facility characteristics; performance specifications of new and existing equipment or systems; engineering estimates, spot-, short-term, or long-term measurements of system components; and long-	Based on computer simulation model calibrated with whole-building or end-use metered data or both. Adjustments to models are required.

Computer Simulation (continued)	term whole-building utility meter data. After the model has been calibrated, savings are determined by comparing a simulation of the baseline with either a simulation of the performance period or actual utility data	

Each of the options can be used for a wide array of energy efficiency upgrades and each has different costs and complexities associated with it. When selecting an M&V approach, the following general rule of thumb can be applied:

OPTION A

- When magnitude of savings is low for the entire project or a portion of the project
- The risk for not achieving savings is low

OPTION B

- For simple equipment replacement projects
- When energy savings values per individual measure are desired
- When interactive effects are to be ignored or are estimated using estimating methods that do not involve long term measurements
- When sub-meters already exist that record the energy use of subsystems under consideration

OPTION C

- For complex equipment replacement and controls projects
- When predicted energy savings are in excess of 10 to 20 percent as compared with the record energy use
- When energy savings per individual measure are not desired
- When interactive effects are to be included
- When the independent variables that affect energy use are complex and excessively difficult or expensive

OPTION D

- When new construction projects are involved
- When energy savings values per measure are desired
- When Option C tools cannot cost effectively evaluate particular measures or their interactions with the building when complex baseline adjustments are anticipated

DCO will perform measurement and verification of the energy units savings at the conclusion of each month in the first year of the energy units guarantee. After the first year, M&V will be performed and presented within 30 days of year end. Brick MUA will

work with DCO to provide necessary information and provide access to any buildings to allow DCO to properly verify and measure energy savings. DCO's energy guarantee will be based on units of energy saved as determined from the baseline provide in the RFP, or adjusted baseline if original baseline is determined by both parties to be inaccurate.

Adjustments to the baseline and associated savings will be taken for weather, hours of operation, building usage, utility rates increases, code or statute changes, requirements listed in Table 1, and any other actions that adversely affect the savings beyond the control of DCO. Any savings discrepancies will be resolved to the satisfaction of both the Brick MUA and DCO in a timely manner.

MAINTENANCE PLAN

Owner Tasks and Responsibilities:

As a general statement, Brick MUA or its 3rd party service providers shall be responsible for providing ongoing maintenance through the duration of the M&V period. Maser Consulting will review operational procedures and schedules associated with such things as the building automation/control upgrades as well as the manufacturers' published requirements for all installed equipment be it: quarterly, semi-annually or annually. In most cases, Brick MUA is already aware of or self-implementing similar maintenance practices on campus or has contracted a 3rd party for such services. Failure to properly maintain the equipment may cause energy savings goals to fall short.

Specific Areas of Consideration:

In order to sustain energy savings Brick MUA's Staff will be required to implement new maintenance tasks and even modify existing policies and practices. Outlined are two examples of specific instances.

Example 1. Advanced Building Operations Programming:

Brick MUA will be given specific training on the changes and advancements in the environmental operations and energy savings strategies. Brick MUA will be responsible for following the agreed upon guidelines associated with programmed schedules and any use of override functions.

Example 2. Verification of Proper Operations: Mechanical Equipment

Brick MUA will be required to assure that proper mechanical maintenance continues to be implemented on its mechanical equipment. Example: outside air dampers will require proper operation with the appropriate seals in order to maintain ECM(s) such as demand ventilation. Maser Consulting will periodically spot check system operations to verify the Owner or its 3rd party representative is implementing proper maintenance. Any deficiencies that may be identified will be brought to Brick MUA's attention for correction.

ENERGY SAVINGS PLAN

SECTION 7 – OPERATION & MAINTENANCE

It is critical to the success of achieving continued energy savings that Brick MUA develop and implement an Operation and Maintenance Plan. In this section are some recommendations for maintenance tasks for various pieces of equipment and systems to assist Brick MUA and/or 3rd party maintenance contractors.

COMPREHENESIVE ANNUAL INSPECTION (AHU)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. **General Assembly**
   a) Inspect the unit for cleanliness.
   b) Inspect the fan wheel and shaft for wear and clearance.
   c) Check the sheaves and pulleys for wear and alignment.
   d) Check the belts for tension, wear, cracks, and glazing.
   e) Verify tight bolts, set screws, and locking collars.
   f) Check dampers for wear, security and linkage adjustment.
   g) Verify clean condensate pan.
   h) Verify proper operation of the condensate drain.
   i) Verify clean air filters.
   j) Verify clean coils.
   k) Verify proper operation of the spray pump, if applicable.
   l) Verify smooth fan operation.
   m) Log operating conditions after system has stabilized.
   n) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

4. **Lubrication**
   a) Lubricate the fan shaft bearings, if applicable.
   b) Lubricate the motor bearings, if applicable.

5. **Controls and Safeties**
   a) Test the operation of the low temperature safety device, if applicable.
   b) Test the operation of the high static pressure safety device, if applicable.
   c) Test the operation of the low static pressure safety device, if applicable.
   d) Check the thermal cutout on electric heaters, if applicable.
   e) Check the step controller, if applicable.
   f) Check and record supply air and control air pressure, if applicable.
   g) Verify the operation of the control system and dampers while the fan is operating.
6. **Motor and Starter**
   a) Clean the starter and cabinet.
   b) Inspect the wiring and connections for tightness and signs of overheating and discoloration. This includes wiring to the electric heat, if applicable.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Meg the motor and record readings.

HEATING INSPECTION (AHU)

1. **Gas Heat Option**
   a) Visually inspect the heat exchanger.
   b) Inspect the combustion air blower fan, and clean, if required.
   c) Lubricate the combustion air blower fan motor, if applicable.
   d) Verify the operation of the combustion air flow-proving device.
   e) Test the operation of the high gas pressure safety device, if applicable. Calibrate, if necessary.
   f) Test the operation of the low gas pressure safety device, if applicable. Calibrate, if necessary.
   g) Verify the operation of the flame detection device.
   h) Test the operation of the high temperature limit switch.
   i) Verify the integrity of the flue system.
   j) Verify the operation of the operating controls.
   k) Verify the burner sequence of operation.
   l) Verify proper gas pressure to the unit and/or at the manifold, if applicable.
   m) Perform combustion test. Make adjustments as necessary.
2. **Electric Heat Option**
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   b) Check and calibrate operating and safety controls, if applicable.
   c) Verify the operation of the heating elements.
   d) Check voltage and amperage and compare readings with the watt rating on the heater.

3. **Hot Water / Steam Heat Option**
   a) Inspect control valves and traps.
   b) Check and calibrate all operating and safety controls.
   c) Verify the operation of the heating coils.

d) Verify the operation of the unit low temperature safety device.

SCHEDULED RUNNING INSPECTION (AHU)

1. Check the general condition of the fan.
2. Verify smooth fan operation.
3. Check and record supply and control air pressure, if applicable.
4. Verify the operation of the control system.
5. Log the operating conditions after the system has stabilized.
6. Review operating procedures with operating personnel.
7. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

OIL SAMPLE/SPECTROGRAPHIC ANALYSIS

1. Pull oil sample for spectrographic analysis

REFRIGERANT SAMPLE/ANALYSIS

1. Pull refrigerant sample for spectrographic analysis for contaminants (oil, water, and acid), using approved containers

ANNUAL MAINTENANCE (BOILERS)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. **General Assembly**
   a) Secure and drain the boiler.
   b) Open the fire and water side for cleaning and inspection.
   c) Check heating surfaces and water side for corrosion, pitting, scale, blisters, bulges, and soot.
   d) Inspect refractory.
   e) Clean fire inspection glass.
   f) Check blow-down valve packing, and lubricate.
   g) Check and test boiler blow-down valve.
   h) Perform hydrostatic test, if required.

   i) Verify proper operation of the level float.
   j) GAS TRAIN BURNER ASSEMBLY
      1. Check the gas train isolation valves for leaks.
      2. Check the gas supply piping for leaks.

3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot igniter assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating and discoloration.

k) Clean burner fan wheel and air dampers. Check fan for vibration.
l) Verify tightness on linkage set screws.
m) Check gas valves for leakage (where test cocks are provided).
n) Verify proper operation of the feed water pump.
o) Verify proper operation of the feed water treating equipment.

4. Controls and Safeties

a) Disassemble and inspect low water cutoff safety device.
b) Reassemble boiler low water cutoff safety device with new gaskets.
c) Clean contacts in program timer, if applicable.
d) Check the operation of the low water cutoff safety device and feed controls.
e) Verify the setting and test the operation of the operating and limit controls.
f) Verify the operation of the water level control.

STARTIP/CHECKOUT PROCEDURE (BOILERS)

1. Verify proper water level in the boiler
2. Test the safety/relief valve after startup (full pressure test).
3. Clean or replace fuel filters.
4. Clean fuel nozzles.
5. Inspect clean, and functionally test the flame scanner and flame safeguard relay.
6. Clean and adjust the ignition electrode.

7. Replace the vacuum tube in the flame safeguard control, if applicable.
8. Perform pilot turn down test.
9. Verify proper steam pressure.
10. Perform combustion test and adjust the burner for maximum efficiency.
11. Test the following items:

a) Firing rate
b) Fuel/air ratio
c) CO2
d) CO
e) NOX
f) Perform smoke test.

12. Review operating procedures
13. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

MID-SEASON RUNNING INSPECTION (BOILERS)

1. Check the general condition of the unit.
2. Inspect the burner.
3. Adjust the burner controls to obtain proper combustion.
4. Check the operation of the pressure relief valve.
5. Check the operation of the low water cutoff and feed controls.
6. Check the setting and test the operation of the operating and limit controls.
7. Check the operation of the modulating motor.
8. Lift the safety/relief valves with at least 70% of rated pressure.
9. Blow down and try gauge cocks to confirm glass water level.
10. Check and test boiler blow down valve.
11. Log operating conditions after the system has stabilized.
12. Review operating procedures
13. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

SEASONAL SHUT-DOWN PROCEDURE (BOILERS)

1. Shut down boiler at boiler controls.
2. Shut off fuel lines at main valves.
3. Review operating procedures
4. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

STARTUP/CHECKOUT PROCEDURE (COOLING TOWER)

1. Fill the basin and verify the float level.
2. Verify the operation of the basin heaters
3. Verify the operation, setpoint, and sensitivity of the basin heater temperature control device.

4. Start the condenser water pumps.
5. Verify the balance of the return water through the distribution boxes.
6. Verify proper operation of the bypass valve(s), if applicable.
7. Operate fan and verify smooth operation.
8. Log operation after system has stabilized.
9. Review operating procedures
10. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

COMPRESNESIVE ANNUAL INSPECTION (COOLING TOWER)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) STRUCTURE
      1. Disassemble all screens and access panels for inspection.
      2. Inspect the conditions of the slats, if applicable.
      3. Inspect the condition of the tower fill.
      4. Inspect the condition of the support structure.
      5. Inspect the condition of the basins (upper and lower) and/or spray nozzles.
      6. Verify clean basins and strainer(s).
      7. Verify the condition and operation of the basin fill valve system.
   b) MECHANICAL
      4. Inspect belts for wear, cracks, and glazing.
      5. Verify correct belt tension. Adjust the tension as necessary.
      6. Inspect sheaves and pulleys for wear, condition, and alignment.
      7. Inspect fan shaft and bearings for condition.
      8. Inspect fan assembly for condition, security, and clearances. (e.g. blade tip clearance).
4. Lubrication System
   a) Lubricate motor bearings.
   b) Lubricate fan shaft bearings.

5. Motor And Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactor(s) for free and smooth operation.
   e) Meg the motor(s) and record readings.

f) Check disconnect terminal block for wear, tightness and signs of overheating and discoloration.
g) Check the condition and operation of the basin heater contactor(s).

SHUT-DOWN PROCEDURE (COOLING TOWER)

1. Check the general condition of the tower.
2. Turn off electrical power to basin heaters, tower fans, and pipe heaters as necessary.
3. Drain tower and condenser water piping.
4. Review operating procedures
5. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

GAS TRAIN (BURNERS)

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided

OIL TRAIN (BURNERS)

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.

6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided).

DUAL FUEL TRAIN (BURNERS)

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.

15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided)

MAINTENANCE INSPECTION (ENERGY MANAGEMENT SYSTEMS)

1. Review reports for operational problems and trends.
2. Make a back-up copy of the BAS program.

3. Check for loose or damaged parts or wiring.
4. Check for any accumulation of dirt or moisture. Clean if required.
5. Verify proper electrical grounding.
6. Verify control panel power supplies for proper output voltages.
7. Inspect interconnecting cables and electrical connections.
8. Verify that manual override switches are in the desired positions.
9. Check the operation of all binary and analog outputs, if applicable.
10. Calibrate control devices, if applicable.
11. Verify the correct time and date.
12. Check and update the holiday schedules and daylight savings time.
13. Via terminal mode, view the event log and input/output points for any unusual status or override conditions.
14. Clean the external surfaces of the panel enclosure.
15. Review operating program and parameters.
16. Check cable connections for security.
17. Review operating procedures
18. Provide a written report of completed work, and indicate any uncorrected deficiencies detected.

MAINTENANCE INSPECTION (CONTROL PANELS)

1. Control Panel

a) Verify secure connections on all internal wiring, LAN, and communication links.
b) Check for loose or damaged parts or wiring.
c) Check for any accumulation of dirt or moisture. Clean if required.
d) Remove excessive dust from heat sink surfaces
e) Verify proper system electrical grounding.
f) Verify proper output voltages on control panel power supplies.
g) Check LED Indications to verify proper operation
h) Verify LAN communications
i) Verify that cards are seated and secured.

j) Check wiring trunks and check for possible Error Code Indications
k) Check voltage level of
l) Verify the proper operation of critical control processes and points associated with this unit an make adjustments if necessary.
m) Check Volatile memory available
n) Cheek Non volatile memory available
o) Check Processor idle time
p) Clean external surfaces of the panel enclosure.
q) Check modem operation, if applicable.

r) View the event log and input/output points for any unusual status or override conditions.
s) Verify correct time and date.
t) Check and update holiday schedules, if applicable, and daylight savings time.
u) Review operating procedures with operating personnel.
v) Provide a written report of completed work, and indicate any uncorrected deficiencies detected.

MAINTENANCE INSPECTION (EMS - SEQUENCE OF OPERATIONS)

Central Plant

In order to assure effective environmental conditioning while minimizing the cost to operate the equipment, technicians will review operating sequences and practices for the chiller plant. An initial survey of current equipment operating parameters will be conducted within the first 60 days of the contract term during cooling season. This survey will include:

1. Chiller(s) operation
2. Cooling tower(s) operation
3. Pump(s) operation
4. Economizer operation (where applicable)
5. Environmental safety

A detailed report of findings and recommendations for changes, if any, will be made. Agreed upon operational changes which require only adjustment of controls or programming will be made during regularly scheduled maintenance visits as part of this agreement at no additional cost. Any recommended alterations that require addition of devices or equipment will be accompanied by a guaranteed cost proposal reflecting the applicable discounts determined by this agreement.

Building Systems

In order to assure effective environmental conditioning while minimizing the cost to operate the equipment, technicians will review operating sequences and practices for covered airside systems. An initial survey of current systems operating parameters will be conducted within the first 60 days of the contract term, except seasonally operated systems, which will be surveyed during the appropriate operating season. This survey will include:

1. Time schedule(s)
2. Reset schedule(s)
3. Economizer changeover (where applicable)

4. Setpoints
5. Energy Management routines

A detailed report of findings and recommendations for changes, if any, will be made. Agreed upon operational changes which require only adjustment of controls or programming will be made during regularly scheduled maintenance visits as part of this agreement at no additional cost. Any recommended alterations that require addition of devices or equipment will be accompanied by a guaranteed cost proposal reflecting the applicable discounts determined by this agreement.

MAINTENANCE PROCEDURE

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. **General Assembly**
   a) Check the general condition of the unit.
   b) Verify tightness of the fan, fan guards, louvers, etc.
   c) Verify clean burner assembly.
   d) Check sheaves and pulleys for wear and alignment, if applicable.
   e) Check belts for tension, wear, cracks, and/or glazing.
4. **Lubrication**
   a) Lubricate the fan motor, if applicable.
   b) Lubricate the fan bearings as necessary.
5. **Controls and Safeties**
   a) Verify proper operation of the temperature control device.
   b) Verify proper operation of the high temperature control device.
   c) Verify proper operation of the fan switch.
   d) Verify proper operation of the pilot safety device, if applicable.

6. **Electrical**
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
7. **Startup and Checkout**
   a) Start the unit.
   b) Verify proper combustion air to the burner.
   c) Verify proper gas pressure to the burner.
   d) Check the flame for proper combustion.

COMPREHENSIVE ANNUAL INSPECTION (FANS)

1. Record and report abnormal conditions, measurements taken, etc.

2. Review logs for operational problems and trends.
3. **General Assembly**
   a) Disassemble all screens and panels necessary to gain access to the fan mechanism.
   b) Disassemble the control mechanism (AVPB only).
   c) Clean all accessible rotor components to include control pitch mechanism (AVPB only).
   d) Inspect blades for wear.
   e) Inspect blade arms for wear (AVPB only).
   f) Check blade tip clearance.
   g) Check for oil leak on the blade bearing housing (AVPB only).
   h) Clean motor and fan housing.
   i) Reassemble all removed screens and plates.
4. **Lubrication**
   a) Lubricate the motor bearings.
   b) Lubricate the shaft bearings (AVPA only).
5. **Controls and Safeties**
   a) Test the operation of the high static safety device. Calibrate and record setting.
   b) Test the operation of the low static safety device. Calibrate and record setting.
   c) Test the operation of the vibration safety device. Calibrate and record setting.
   d) Verify the operation of the phase monitor, if applicable.
   e) Inspect pneumatic and electrical controls for condition and calibration.
   f) Verify proper operation.
6. **Motor and Starter**
   a) Clean the starter and cabinet.
   b) Clean the disconnect switch and cabinet at the fan, if applicable.
   c) Inspect the wiring and connections for tightness and signs of overheating and discoloration.
   d) Check the condition of the contacts for wear and pitting.
   e) Check the contactors for free and smooth operation.
   f) Meg the motor and record readings.

7. **Startup / Checkout Procedure**
   a) Start the fan.
   b) Verify the operation of the starter.
   c) Check and record supply and control air pressure.
   d) Verify the operation of the control system while the fan is operating.
   e) Log the operating conditions after the system has stabilized.
   f) Review operating procedures with operating personnel.
   g) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

SCHEDULED RUNNING INSPECTION (FANS)

1. Check the general operation of the fan.
2. Check and record supply and control air pressure.
3. Verify the operation of the control system.
4. Log the operating conditions after the system has stabilized.
5. Review operating procedures with operating personnel.
6. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

COMPREHENSIVE ANNUAL INSPECTION (FANS)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. **General Assembly**
   a) Verify tight bolts, set screws, and locking collars.
   b) Inspect sheaves and pulleys for wear and alignment.
   c) Inspect belts for tension, wear, cracks, and glazing.
   d) Inspect dampers for wear, security, and clearances, if applicable.
   e) Verify clean air filters.
   f) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. **Lubrication**
   a) Lubricate fan bearings.
   b) Lubricate motor bearings, if applicable.
5. **Controls and Safeties**
   a) Verify the operation of the control system while the fan is operating.
   b) Verify the setting of the low temperature safety device, if applicable.
   c) Verify the operation of the pre-heat control device, if applicable.
   d) Verify the operation of the cooling control device, if applicable.
   e) Verify the operation of the re-heat control device, if applicable.
   f) Verify the operation of the humidity control device, if applicable.
6. **Motor and Starter**
   a) Clean the starter and cabinet.
   b) Inspect the wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Meg the motor and record readings.
   f) Check volts and amps of the motor.

LUBRICATE/GREASE BEARINGS

1. Lubricate and/or grease bearings according to manufacturer's specifications

MEG MOTOR

1. Check the integrity of the insulation on the motor windings and the motor leads, using a megohm meter.

MAINTENANCE PROCEDURE (COILS)

1. Record and report abnormal conditions.
2. Visually inspect the coil for leaks.
3. Inspect the coil for cleanliness.

ANNUAL INSPECTION (PUMP)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Check motor shaft and pump shaft for alignment, if applicable.
   b) Inspect the coupling for wear.
   c) Verify that the shaft guard is in place and tight, if applicable.
   d) Verify water flow through the pump.

   e) Check for leaks on the mechanical pump seals, if applicable.
   f) Verify proper drip rate on the pump seal packing, if applicable.
   g) Verify smooth operation of the pump.

   h) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. Lubrication
   a) Lubricate the motor bearings as necessary.
   b) Lubricate the pump bearings as necessary.
5. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Meg the motor.
   d) Verify tight connections on the motor terminals.
   e) Check the condition of the contacts for wear and pitting, if applicable.
   f) Check the contactors for free and smooth operation.
   g) Verify proper volts and amps.

PUMP RUN INSPECTION (PUMP)

1. Verify smooth operation of the pump.
2. Check for leaks on the mechanical pump seals, if applicable.
3. Verify proper drip rate on the pump seal packing, if applicable.
4. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

MECHANICAL STARTERS WITH ELECTRONIC CONTROLS

1. Clean the starter and cabinet.
2. Inspect wiring and connections for tightness and signs of overheating and discoloration.
3. Check condition of the contacts for wear and pitting.
4. Check contactors for free and smooth operation.
5. Check the mechanical linkages for wear, security, and clearances.
6. Verify the overload settings.

COMPREHENSIVE ANNUAL MAINTENANCE (VFD STARTERS)

1. Clean the starter and cabinet.
2. Inspect wiring and connections for tightness and signs of overheating and discoloration.
3. Check the tightness of the motor terminal connections.
4. Verify the operation of the cooling loop.

5. Verify proper operation of the frequency drive.

COMPREHENSIVE ANNUAL MAINTENANCE (RTU)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. **General Assembly**
   a) Inspect for leaks and report results.
   b) Calculate refrigerant loss rate and report to the customer.
   c) Repair minor leaks as required (e.g. valve packing, flare nuts).
   d) Visually inspect condenser tubes for cleanliness.
4. **Controls and Safeties**
   a) Inspect the control panel for cleanliness.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.

c) Verify the working condition of all indicator/alarm lights, if applicable.
d) Test the low water temperature control device. Calibrate and record setting.
e) Test the low evaporator pressure safety device. Calibrate and record setting.
f) Test the oil pressure safety device. Calibrate and record setting, if applicable.
g) Check programmed parameters of RCM control, if applicable.

5. **Lubrication System**
   a) Check oil level in the compressor.
   b) Test oil for acid content and discoloration. Make recommendations to the customer based on the results of the test.
   c) Verify the operation of the oil heater. Measure amps and compare reading with the watt rating of the heater.
6. **Motor and Starter**
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Check the tightness of the motor terminal connections.
   f) Meg the motor and record readings.
   g) Verify the operation of the electrical interlocks.
   h) Measure voltage and record. Voltage should be nominal voltage ± 10%.

COMPREHENSIVE MAINTANENCE INSPECTION (RTU HEATING CYCLE)

1. Perform heating inspection/maintenance applicable to the unit (steam/hot water, gas, electric).
2. Verify smooth operation of the fans.
3. Check the belts for tension, wear, cracks, and glazing.
4. Verify clean air filters.
5. **Gas Heat Option**
   a) Visually inspect the heat exchanger.
   b) Inspect the combustion air blower fan, and clean, if required.
   c) Lubricate the combustion air blower fan motor, if applicable.
   d) Verify the operation of the combustion air flow-proving device.

e) Test the operation of the high gas pressure safety device, if applicable. Calibrate, if necessary.
f) Test the operation of the low gas pressure safety device, if applicable. Calibrate, if necessary.
g) Verify the operation of the flame detection device.
h) Test the operation of the high temperature limit switch. i.. Verify the integrity of the flue system.
i) Verify the operation of the operating controls.
j) Verify the burner sequence of operation.
k) Verify proper gas pressure to the unit and/or at the manifold, if applicable.
l) Perform combustion test. Make adjustments as necessary.

6. **Electric Heat Option**
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   b) Check and calibrate operating and safety controls, if applicable. c. Verify the operation of the heating elements. d. Check voltage and amperage and compare readings with the watt rating on the heater.
7. **Hot Water / Steam Heat Option**
   a) Inspect control valves and traps.
   b) Check and calibrate all operating and safety controls.
   c) Verify the operation of the heating coils.
   d) Verify the operation of the unit low temperature safety device.

MID-SEASON COOLING INSPECTION (RTU)

1. Check the general condition of the unit.
2. Log the operating condition after system has stabilized.
3. Verify the operation of the control circuits.
4. Analyze the recorded data. Compare the data to the original design conditions.
5. Review operating procedures with operating personnel.
6. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

COMPREHENSIVE MAINTANENCE INSPECTION (RTU - COOLING CYCLE)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. **General Assembly**
   a) Inspect for leaks and report results.
   b) Calculate refrigerant loss rate and report to the customer.

c) Repair minor leaks as required (e.g. valve packing, flare nuts).
d) Check pulleys and sheaves for wear and alignment.
e) Check belts for tension, wear, cracks, and glazing.
f) Verify clean evaporator coil, blower wheel, and condensate pan.
g) Verify clean air filters.
h) Verify proper operation of the condensate drain.
i) Verify proper operation of the dampers and/or inlet guide vanes, if applicable.

4. Controls and Safeties

a) Inspect the control panel for cleanliness.
b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
c) Verify the working condition of all indicator/alarm lights, if applicable.
d) Test the low evaporator pressure safety device. Calibrate and record setting, if applicable.
e) Test the high condenser pressure safety device. Calibrate and record setting, applicable.
f) Test the oil pressure safety device, if applicable. Calibrate and record setting.
g) Test the high static pressure safety device, if applicable. Calibrate and record setting.
h) Verify the operation of the static pressure control device, if applicable.

5. Lubrication

a) Verify the operation of the oil heater, if applicable.
b) Lubricate the fan bearings as required.
c) Lubricate the fan motor bearings as required.
d) Lubricate the damper bearings, if applicable.

6. Motor and Starter

a) Clean the starter and cabinet.

b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
c) Check the condition of the contacts for wear and pitting.
d) Check the contactors for free and smooth operation.

7. Startup /Checkout Procedure

a) Verify the operation of the oil heater.
b) Verify full water system, including the cooling tower and the condenser.
c) Verify clean cooling tower and strainers.
d) Test all flow-proving devices on the condenser water circuit.
e) Start the condenser water pump and the cooling tower fan(s).
f) Verify flow rate through the condenser.
g) Start the unit.
h) Verify smooth operation of the compressor(s) and fan(s).
i) Check the setpoint and sensitivity of the temperature control device.
j) Verify the operation of the condenser water temperature control device.
k) Verify clean condenser using pressure and temperature.

l) Check operation and setup of the Unit Control Module.
m) Check the superheat and subcooling on the refrigeration circuit(s).
n) Log the operating conditions after the system has stabilized.
o) Review operating procedures with operating personnel.
p) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

ENERGY SAVINGS PLAN

APPENDICIES

APPENDIX LIST	
APPENDIX A	Construction Contingency Allowance
APPENDIX B	Design Bid Build Procedures
APPENDIX C	Operations & Maintenance Savings
APPENDIX D	Project Changes in Financing
APPENDIX E	Incentives In Debt Service
APPENDIX F	Operating Conditions
APPENDIX G	Facility Descriptions

ENERGY SAVINGS PLAN

APPENDIX A

CONSTRUCTION CONTINGENCY ALLOWANCE

APPENDIX A – CONSTRUCTION CONTIGNENCY ALLOWANCE

Experience shows that during the construction phase there are four major categories of potential change of scope issues that benefit from having an appropriate Construction Contingency Allowance (CCA).

- Unknown conditions
- Building inspector's modifications
- Project owner requested changes
- Design clarifications or modifications

Unknown Conditions

Renovations to older facilities have greater potential for revealing unknown. Missing or inaccurate Blueprints, deviations from the original blue prints by the original builder and unknown or undocumented modifications during the life of the facility.

Areas such as behind a wall/roof/equipment or under the slab can bring unforeseen conditions which can delay the new construction and change the anticipated scope of the work. This is why it is advisable to dedicate a CCA that is higher than that for new construction.

Building Inspection Modifications

A plan review for the local building jurisdiction reviews the construction documents prior to issuing a building permit. However, there remains the likelihood that the building inspector will request modifications to the plans based upon experience and their interpretation of the applicable building code.

While we can ask for code review and documentation if you hope to get a Certificate of Occupancy under a tight schedule from this same inspector requested modifications will need to be implemented as successfully appeals take time.

Whether it is adding an extra exit sign, smoke detector or fire extinguisher, or whether it is something more significant, it will may more work from the contractor, thus added expense. The CCA is intended to be the source of funds necessary for these requested modifications.

Project Owner Requested Changes

It is nearly impossible to express your every desire during the design phase. You will always see something during construction that you would like to change.

There is nothing necessarily wrong with that.

The CCA is intended to be the source of funds necessary for these requested changes.

Design Clarifications or Modifications

No designer has ever developed the perfect set of construction documents.

There are always items that can be detailed better or more clearly. The design intent should be adequately reflected in the drawings and specifications so that the contractor can bid and build the ECM to meet the design intent.

However, there will be times during construction when the builder will not be readily able to identify the exact intent of particular details or systems. At that time the builder will submit a Request For Information (RFI) to the designer for clarification or more information. The designer will issue clarifications or directives so that the builder can continue to meet the design intent.

On occasion, the RFI will reveal that something more than was shown in the construction documents is necessary to fulfill the design intent. The clarification or modification may impact the scope of the work to a degree that additional construction costs become necessary.

As long as the design omission is not negligent, the CCA is intended to be the source of funds necessary for these design clarifications or modifications.

Contingency Method

Detailed plans, schematics and specifications for Brick MUA were not available to deliver a cost estimate for each ECM. The budgetary costs carried in the project are based on good faith estimates, contractor supplied budgets for similar ECMs on other recent projects and a database of actual installed costs for various ECMs.

a. Contingency Amount (10% of Hard Costs)
b. Project total construction contingency allowance amount is 15% of estimated hard costs and is agreed upon.

ENERGY SAVINGS PLAN

APPENDIX B

DESIGN BID BUILD

APPENDIX B – DESIGN BID BUILD PROCEDURES

Design–bid–build (or **design/bid/build**, and abbreviated **D–B–B** or **D/B/B** accordingly), also known as **Design–tender** (or "design/tender") **traditional method** or **hard bid** is the method of delivery for this project.

Design–bid–build is the traditional method for project delivery and differs in several substantial aspects from design–build.

There are three main sequential phases to the design–bid–build delivery method:

- The design phase
- The bidding (or tender) phase
- The construction phase

Design Phase

In this phase Maser Consulting will design and produce bid documents, including construction drawings and technical specifications, on which various contractors will in turn bid to construct the project.

The Energy Savings Plan (ESP) is intended to document owner's project requirements and provide a conceptual and/or schematic design and good faith estimates.

With the ESP Maser Consulting will bring in other design professionals including mechanical, electrical, and plumbing engineers (MEP engineers), a fire protection engineer, structural engineer, sometimes a civil engineer and a landscape architect to help complete the construction drawings and technical specifications.

The design document should reflect the intent of the energy savings plan for scope, price, savings, operations & maintenance savings, incentive and schedule.

The finished bid documents are coordinated by Maser Consulting and owner for issuance to contractors during the bid phase.

Bid (or tender) phase

Bidding is according to NJ Public Bid Law and is "open", in which any qualified bidder may participate.

The various contractors bidding obtain bid documents, and then put them out to multiple subcontractors for bids on sub-components of the project.

Questions may arise during the bid period, and Maser Consulting will issue clarifications or corrections to the bid documents in the form of addenda.

From these elements, the contractor compiles a complete bid for submission by the established closing date and time bid date.

Bids are be based on a base bid lump sum plus alternates, bid requirements and alternates are elucidated within the bid documents.

Once bids are received, Maser Consulting reviews the bids, seeks any clarifications required of the bidders, investigates contractor qualifications, ensures all documentation is in order (including bonding if required), and advises the owner as to the ranking of the bids.

If the bids fall in a range acceptable to the owner, the project is awarded to the contractor with the lowest reasonable bid.

In the event that all of the bids do not satisfy the needs of the owner the following options become available to Maser Consulting:

- Re-bid the construction of the project on a future when monies become available and/or construction costs go down.
- Revise the design of that ECM (at no cost to the client) so as to make the project smaller, or reduce features or elements of the project to bring the cost down. The revised bid documents can then be issued again for bid.
    - DCO Energy will provide guidance on energy savings, operation and maintenance savings and incentives to ensure the project is self-funding.
- Revise the design of future ECM(s) (at no cost to the client) so as to make the project smaller, or reduce features or elements of the project to bring the cost down. The current bid package can then be contracted
    - DCO Energy will provide guidance on energy savings, operation and maintenance savings and incentives to ensure the project is self-funding.

Construction phase

Once the construction of the project has been awarded to the contractor, the bid documents (e.g., approved construction drawings and technical specifications) may not be altered.

The necessary permits (for example, a building permit) must be achieved from all jurisdictional authorities in order for the construction process to begin.

Should design changes be necessary during construction, whether initiated by the contractor, owner, or as discovered by the architect, Maser Consulting will issue sketches or written clarifications and handle the project through allowance (See Appendix A).

The contractor may be required to document "as built" conditions to the owner.

Bidding Method

1. To achieve energy savings and fund debt service payments as rapidly as possible the bid packages will be bid in the follow order:
    a. Lighting Material
    b. Administration Building Mechanical

2. Bids in group 1 (Green) are within 15% of budget value they will be awarded.
3. Bids in group 2 (Yellow) may value engineered from the project to meet budget
    a. Maser will provide the impact of ECMs value engineered:
        i. Energy Savings
        ii. Operations and Maintenance Savings
        iii. Incentive
4. Bids in group 3 (Red) may be value engineered **or removed** from the project to meet budget
    a. Maser will provide the impact of ECMs value engineered or removed:
        i. Energy Savings
        ii. Operations and Maintenance Savings
        iii. Incentive
5. As per ESIP law, fees will be applied to the ECM hard cost.
    a. Maser will receive no compensation for bids that are under budget
    b. Maser will receive no penalty for bids that are over budget
6. If the budget overruns make savings unachievable at the current budget Maser will provide additional ECMs above the budget to meet the required energy savings

ENERGY SAVINGS PLAN

APPENDIX C

OPERATIONS AND MAINTENANCE SAVINGS

APPENDIX C – OPERATION & MAINTENANCE SAVINGS

Operations and Maintenance and other non-energy-related cost savings are allowable in NJ ESIPs, and are defined as reduction in expenses (other than energy cost savings) related to energy and water consuming equipment:

Energy-related cost savings can result from avoided expenditures for operations, maintenance, equipment repair, or equipment replacement due to the ESIP project.

Sources of O&M savings include:

- Termination of service personnel
- Lower maintenance service contract costs
- Decrease in repair costs
    - Avoided repair and replacement costs as a result of replacing old and unreliable equipment
    - Material savings due to new equipment warranties
    - Material savings due to the longer life items not needing replacement
        - In particular reduction in florescent bulbs due to LED

Termination of service personnel

As a result of the ESIP, a number of the client's maintenance staff members may no longer be required. If there will be a reduction in the government's maintenance staff, O&M savings can be claimed.

A problem could arise if the maintenance staff is not reduced. Then it would be necessary to determine what new O&M responsibilities the facility has taken on, or savings should not be claimed. For example, it could be that a new building was constructed. During the performance period, it is important to establish that any increased maintenance was not due to the equipment installed under the ESIP

Lower maintenance service contract costs

Prior to the implementation of the ESIP mechanical and electrical equipment was maintained by a third party under a maintenance contract. The ESPC replaces the aging equipment with newer, more efficient equipment, which can reduce the service costs to the client.

Decrease in repair costs

The client is responsible for maintenance both before and after the equipment installation. Although there is no reduction in staff for which to claim labor savings, there will be cost savings on replacement materials.

Material-related savings frequently result from lighting and lighting controls projects.

For this project, lighting maintenance savings will result from the following:

1. Reduced material requirements (e.g., lamps)
2. Reduced operating time — Control measures increase equipment life by reducing the burn time of lamps and ballasts

3. Warranty-related savings — newly installed lamps, and fixtures come with a manufacturer warranty of 10 years.

O&M Savings

Project total O&M savings to fund debt service amount $12,500 and these savings need to begin to accrue no later than 2020.

ENERGY SAVINGS PLAN

APPENDIX D

PROJECT CHANGES IN FINANCING

APPENDIX D – PROJECT CHANGES IN FINANCING

The Energy savings plan has been approved using:

Interest rate of: 2.9
Term: ..... 15 Years
Construction Term ..... 1 Year
Construction Interest Only Payment of $41,117

During financing, Maser will provide assistance but does not guarantee the timing of savings or incentives.

While beneficial to the client financing changes are the responsibility of the client, bond counsel and/or financial advisor. Maser represents in no way advice on these financial items

Financial items may include but are not limited to:

- Timing of payments
- Splitting payments into bi-annual, tri-annual, etc.
- Coordination with the client's fiscal year
- Local finance board material, forms and presentations
- Multiple tiered interest rates

ENERGY SAVINGS PLAN

APPENDIX E

INCENTIVES IN DEBT SERVICE

APPENDIX E – INCENTIVES IN DEBT SERVICE

The Energy savings plan has been approved using $9,000 of incentive(s) to fund debt service. Please see Section 3 for details of Smart Start Incentive Calculations.

No implied and/or written guarantee are being made with respective to the receipt of incentives. All incentives estimates carry inherent risks that may jeopardize the receipt of them. Therefore, the client acknowledges and accepts that any project proposed should not rely on the receipt of incentives as a reason to implement it.

ENERGY SAVINGS PLAN

APPENDIX F

OPERATING CONDITIONS

APPENDIX F – OPERATING CONDITIONS

The Energy savings plan has been approved using the following operating conditions for energy savings calculations.

- **Space Temperatures**
  - Space temperature will be maintained at the following set points:
    - Heating season – occupied:
      - Classrooms, Auditoriums, IT spaces and Offices [72 º F]
      - Mechanical/Electrical [85 º F]
      - Shower Rooms [72 º F]
      - Gymnasiums [68 º F]
    - Heating season – unoccupied:
      - All spaces [55 º F]
    - Cooling Season - occupied:
      - Classrooms, Auditoriums, IT spaces and Offices [72 º F]
      - Mechanical/Electrical [85 º F]
      - Shower Rooms [74 º F]
      - Halls & Stairs [76 º F]
      - Gymnasiums [74 º F]
    - Cooling season – unoccupied:
      - All spaces [85 º F]
  - **Thermostats**
    - Thermostats will be programmed to operate as per the above guidelines.
      - Halls & Stairs [68 º F]

Room Type/Description	Holidays	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Academic	Unocc	8am-4pm	8am-4pm	8am-4pm	8am-4pm	8am-4pm	Unocc	Unocc
Office / Admin	Unocc	8am-4pm	8am-4pm	8am-4pm	8am-4pm	8am-4pm	Unocc	Unocc
Student Housing	Unocc	Occ	Occ	Occ	Occ	Occ	Occ	Occ
Sports Related	Unocc	8am-9pm	8am-9pm	8am-9pm	8am-9pm	8am-9pm	12pm-10pm	12pm-10pm
Auditoriums	Unocc	8am-9pm	8am-9pm	8am-9pm	8am-9pm	8am-9pm	12pm-10pm	12pm-10pm
Shops	Unocc	8am-6pm	8am-6pm	8am-6pm	8am-6pm	8am-6pm	Unocc	Unocc
MEP Storage	Unocc	7am-7pm	7am-7pm	7am-7pm	7am-7pm	7am-7pm	Unocc	Unocc

Lighting Run Hours

Building Type	Equivalent Full Load Runtime hours/year, NJ Protocols
Education – Primary School	1,440
Education – Secondary School	2,305
Education – Community College	3,792
Education – University	3,073
Education – Other School	2,305
Grocery	5,824
Lodging Hotel (Guest Rooms)	1,145
Lodging Motel	8,736
Manufacturing – Light Industrial	4,290
Medical – Hospital	8,736
Medical – Clinic	4,212
Office- Large	2,808
Office-Small	2,808
Residential – Common Area	7,665
Residential – Tenant Area & Related	See below
Restaurant – Sit-Down	4,368
Restaurant – Fast-Food	6,188
Retail – 3-Story Large	4,259
Retail – Single-Story Large	4,368
Retail – Small	4,004
Storage Conditioned	4,290
Storage Heated or Unconditioned	4,290
Warehouse	3,900
Average = Miscellaneous	4,242

The Energy savings plan has been approved using the above referenced operating conditions for energy savings calculations. Any deviations to these conditions will require a remodeling of the savings and or baseline.

ENERGY SAVINGS PLAN

APPENDIX G

FACILITY DESCRIPTIONS