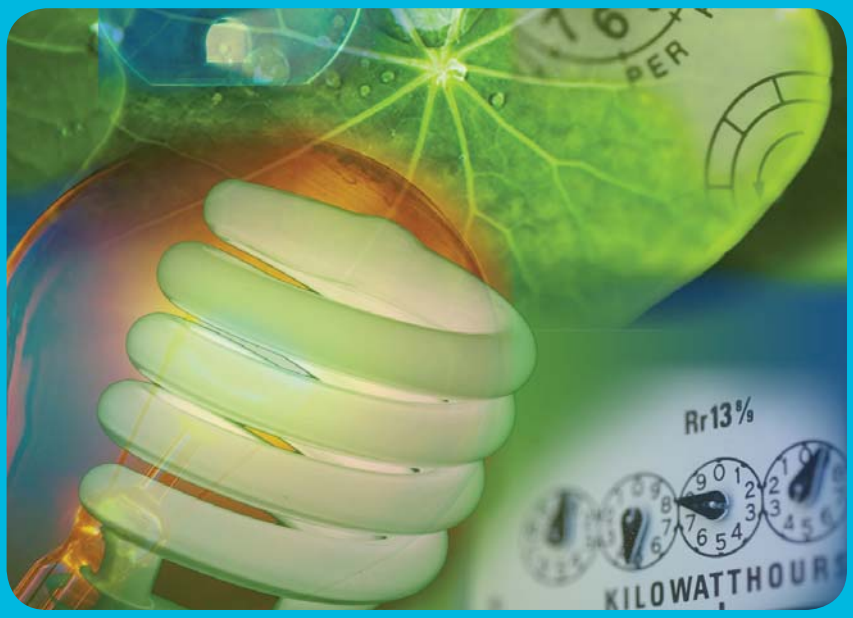

Preliminary Report

City of Placerville, California

September 2015

Johnson Controls

Table of Contents

Johnson Controls

1. Executive Summary

Like many Cities, the City of Placerville is interested in becoming better stewards of the Earth's precious resources by improving operating efficiencies and conserving water. This preliminary report is the initial step to allow the City to achieve their sustainability goals and policies. The intent of this preliminary analysis is twofold; first, to evaluate the energy and water savings potential and to lay out a roadmap for the City. Second, to illustrate a financial business case reflecting how the City can reduce energy, operating costs, recover non–revenue water, and provide efficient facilities for staff and customers by partnering with Johnson Controls. The program's success is guaranteed by Johnson Controls which drastically reduces the City's risk to save the necessary payment amount for the program.

The specific objectives were identified by the City of Placerville that they would like to have assessed by Johnson Controls are the following:

- Evaluate improving water meter reading capabilities by relying on the advanced meter infrastructure that can be used to facilitate water conservation.
- Evaluate the possibility of upgrading energy efficiency measures at the Wastewater Treatment Plant.
- Evaluate possible renewable energy such as solar and photovoltaic.

Johnson Controls began using our standardized preliminary analysis tools to identify and quantify efficiency issues related to the municipal utility usages system. We then established a general picture of whether energy infrastructure improvement upgrades will be self-funded using our financial modeling tool. Financing models have been included with the help from California financial market partners. The preliminary report summarizes the City of Placerville's current utility spend, the proposed improvement measures and projected cost and savings data. It also establishes a financial analysis of budget neutral programs while eliminating risk to the City. In addition, the City can use the savings identified through this analysis to offset the costs for investments in capital improvements and promote water and energy conservation well into the future.

The preliminary savings calculated in the business case for the improvements helps establish a framework for financing a comprehensive program. Our initial estimates indicates a potential water and energy operating savings of $693,000 annually.

The following improvements will help to achieve these savings; Street Lights, Optimized Rate Tariffs, Building interior and exterior Lighting, VOIP, Parking Garage Lights, Peak Demand Control, Automated Demand Response, Sludge Drying, Blower AND vfd, Modified Anaerobic Digester Process, Leak Detection, Pipe Replacement, Solar PV, Water Meters, Automated Meter Reading Infrastructure, Building Automation, etc.

Based on a project 25 year life-cycle benefit and a financing rate of 3.9%, the water and energy efficiency program is estimated to be $13,000,000 with a **guaranteed self-funding/financing**

term of 20 years. This option will provide an estimated $9,278,000 in excess revenue after debt service.

By leveraging CA Government Code 4217 to procure this Energy Performance Contract the City of Placerville will receive guarantee of savings that will ensure the anticipated financial performance is met. Johnson Controls would be pleased to partner with you to proceed with the remaining process steps in order to fully develop a program that meets all of your needs and requirements.

2. Background

Johnson Controls has conducted a preliminary energy use analysis of the City of Placerville facilities to identify efficiency improvements. Our goal in presenting this report is to communicate to you the opportunities that will reduce the Cities operating expenses and increase revenue with water and energy measures. Below illustrates a list areas of benefits to optimize operating cost to the City's while yielding the following benefits:

- ✓ Water and Energy Savings
- ✓ Reduce Utility and Operating Cost
- ✓ Renewable Energy
- ✓ Environmental Stewardship
- ✓ Preservation of History of Infrastructure
- ✓ Creating Economic Growth and Prosperity

This preliminary analysis report has been developed to illustrate the City existing utility costs and a brief walk-through survey of your facility. Our walk-through was conducted with various City staff members as well as conference calls with PG&E. We would like to thank the following help from these key individuals who assisted us with ideas, time and support:

Cleve Morris – City Manager
Dave Warren – Director of Finance
Mark Liebenow – Water Reclamation Facility Supervisor
John Millington - Water Reclamation Facility Operator III
Mark Ivani – Engineering Technician
Alan Hopkins – Utility Services Specialist

Estimates of the overall savings opportunity and the estimated installed cost could be fully supported by energy and operational savings which have been provided in the following sections of this report. The results of this report provide assistances to the City of Placerville's decision to move forward with a guaranteed energy savings performance contract.

Some of the recommended projects include capital renewal measures that do not yield significant energy or operational savings. While these projects are unable to fund themselves independently they have the potential to be fully funded within the program when paired with other energy saving measures. Provided herein are preliminary estimates based on information gathered in the last 65 days. Note that Johnson Controls will provide guarantee maximum process and guaranteed savings as a part of the detailed engineering study to be completed as the next phase of the performance contract.

3. Overview

The City of Placerville is located in the Sierra Nevada foothills 42 miles east of Sacramento on US Highway 50. It has an area population of about 10,000 people within the City Service areas. It was founded in 1849 during the California Gold Rush with the name of “Hangtown”, which was changed to Placerville in 1854. The entire downtown area around Main Street is considered a historic district.

- Placerville is a City with a City Council, Mayor and City Manager. The organizational structure is shown in the diagram below.

Figure 1 – Governmental Organizational Chart

The services offered by the City of Placerville are:

- Police Department aka Public Safety
- Parks and Recreation Department with 50 acres of Public Parks
- Public Pool
- City Services which include Building Department and Financial Services
- Water Distribution
- Wastewater Treatment Facility
- Maintenance of City Owned Facilities

4. Utility Summary

The City of Placerville has a total of 63 identified electrical accounts with Pacific Gas & Electric. A summary of these is shown below:

Address	Account/SAiD	Meter Number	Rate Plan	Monthly Charge	Estimated Annual Charge	Comments
3101 Center St.	1399313973	1006727899	A10SX	$3,072	$36,870	City Hall
487 Main Street	1399313002	Un-Metered	LS2-A	$687	$8,243	62 lamps@$11.059
730 Main Street	1929899351	1008822036	A10SX	$1,891	$22,695	Public Safety Building
End of Cemetary Road	2378107867	1006776100	A1X	$13	$160	Assumed Traffic Lights
Center St. & Hwy 50	9252954170	1006776183	A1X	$22	$262	Assumed Traffic Lights
Hwy 49 & Hwy 50	9794621568	1006776228	A1X	$17	$200	Assumed Traffic Lights
Canal St. & Hwy 51	1022024987	1009125420	A1X	$16	$195	Assumed Traffic Lights
3101 Center Street	1033034508	Un-Metered	LS2-A	$41	$495	9 lamps@ $4.571
3155 Clark Street	1033034703	1008776226	A1X	$21	$249	Assumed Traffic Lights
Forni @ Placerville Dr	1033034703	1007047735	A1X	$226	$2,711	Unknown
Coloma & Hwy 50	1033034952	1006494278	TC1	$46	$547	Traffic Lights
Coloma Street	1033034587	1006775960	A1X	$174	$2,090	Unknown
Canal & Hwy 50	1033034211	1009125418	A1X	$114	$1,366	Unknown
Main @ Spring St.	1033034618	1007067809	A1X	$77	$921	Unknown
Canal @ Main Street	1033034122	1006776227	A1X	$374	$4,491	Unknown
D Allen Downs Unit 3	1033034642	Un-Metered	LS1-D	$23	$279	2 lamps@ $11.614
LS/Cribbs RD	1033034128	1007049264	A1X	$20	$242	
La Vista Dr SS	1033034131	1006882157	A1X	$21	$252	Meter Charge Only
Bedford @ Main	1033034512	1006753627	A1X	$11	$126	Meter Charge Only
Center St. N/S Main	1033034242	1008838538	A6	$1,627	$19,518	Center Street Parking Garage
Pacific @ Sacramento	1033034050	1006775180	TC1	$49	$590	Unknown
Cedar Ravine @ Main	1033034055	Un-Metered	A1F	$14	$164	Unknown
W/Canal & Frwy	1033034060	Un-Metered	TC1F	$32	$381	Assumed Traffic Lights
Cedar Ravine Rd ES-S/	1033034965	1009510251	A6	$223	$2,676	Unknown
Glory @ Washington	1033034176	1009663290	A6	$71	$855	Unknown
Lumsden PK End Wilse	1033034890	1007049339	A1X	$11	$126	Unknown
Top Hill CTRY Club Dr	1033034526	1006500853	A1X	$33	$393	Unknown
N/End Morrene Dr	1033034330	1004457509	A1X	$221	$2,656	Sewer Lift Station
Pacific & Sacramento	1033034115	1006775161	TC1	$82	$982	Assumed Traffic Lights
3023 Pardi Way	1033034732	1005511318	A6	$21	$258	Unknown
3231 Big Cut	1033034598	1008838496	A6	$477	$5,728	Corporate yard
3071 Benham	1033034355	1006718121	A1X	$2,425	$29,095	Benham Pool
3071 Benham	1033034758	1006775536	A1X	$32	$389	Unknown
Madrone Ln WS	1033034383	1005835120	A1X	$198	$2,382	Sewer Lift Station
Placerville Drive	1033034150	1006775157	TC1	$58	$697	Assumed Traffic Lights

Main Street Area	1022024893	Un-Metered	LS2-A	$74	$890	8 lamps@ $9.25
360 Fair	1033034799	Un-Metered	LS1-A	$22	$258	2 lamps@ $10.74
2908 Wood St	1033034100	Un-Metered	OL1	$11	$131	
2501 Bedford	1033034782	1006775524	A1X	$41	$487	Unknown
Estey Estates	1033034767	Un-Metered	LS1-D	$35	$418	3 lamps@ $11.614
487 Main Street	1033034002	Un-Metered	LS2-A	$31	$375	4 lamps@ $7.803
487 Main Street	1033034004	Un-Metered	LS1-A	$3,870	$46,438	See "Street Lights" tab
487 Main Street	1033034008	Un-Metered	LS1-C	$46	$552	See "Street Lights" tab
487 Main Street	1033034014	Un-Metered	LS1-D	$427	$5,130	See "Street Lights" tab
487 Main Street	1033034016	Un-Metered	LS1-E	$862	$10,343	See "Street Lights" tab
487 Main Street	1033034022	Un-Metered	LS1-F	$292	$3,508	See "Street Lights" tab
487 Main Street	1033034026	Un-Metered	LS1-F	$463	$5,551	See "Street Lights" tab
487 Main Street	1033034028	Un-Metered	LS2-A	$497	$5,963	See "Street Lights" tab
487 Main Street	1033034032	Un-Metered	LS2-C	$26	$308	See "Street Lights" tab
487 Main Street	1033034555	Un-Metered	LS2-A	$8	$94	See "Street Lights" tab
487 Main Street	1033034034	Un-Metered	LS1-D	$81	$976	See "Street Lights" tab
487 Main Street	1033034038	Un-Metered	LS1-D	$93	$1,116	See "Street Lights" tab
487 Main Street	1033034044	Un-Metered	LS1-D	$35	$418	See "Street Lights" tab
487 Main Street	1033034046	Un-Metered	LS1-D	$58	$697	See "Street Lights" tab
487 Main Street	1033034052	Un-Metered	LS1-D	$93	$1,116	See "Street Lights" tab
487 Main Street	1033034693	1005433213	A6	$285	$3,420	Assumed Old City Hall
487 Main Street	1033034040	612R88	A6	$160	$1,917	Assumed Old City Ha
549 Main Street	1033034634	1009510319	A6	$871	$10,458	Town Hall
3128 Ridge Court (Pump)	1033034063	1007088438	A1X	$59	$704	Pump Station
3155 Clark Street	1033034202	5000023298	A6	$67	$806	Unknown
3155 Clark Street	1033034065	1003630156	A6	$29	$345	Unknown
2300 Coolwater Creek	4796220555	1006734002	HE19SX		$215,650	WWTP
2300 Coolwater Creek	1033034275	1009486051	E19SX		$158,731	WWTP
	Total	63 Accounts		$20,975	$626,083	

Table 1 - PG&E Bill Summary

The total cost for electrical service on an annual basis in the study period was $626,083. Of this, approximately 60% of the total is for the Wastewater Treatment Plant. Of the remaining amount of $251,702, approximately $88,000 of this, or 35%, is for street lighting. $130,000, or 52% is being spent on the nine city buildings.

While no bills were submitted for prior years, based on other Customers in the PG&E Service area, it is expected that the City can expect to see Utility Bill escalations of 3% to 5% over time based on current inflation rates.

The City of Placerville also has service with various propane suppliers, but the utility bills were not included in this analysis.

5. City Wide Measures

Street Lights

The City of Placerville has a total of 499 street lights in the city that are owned and maintained by PG&E. These are on the LS-1 Rate Plan. The City also has 151 street lights that are owned and maintained by the City that are on the LS-2 rate plan. For Details on each Rate Plan, please see Appendix B. The full list of the street light accounts is shown in the Table below.

Address	Account/SAiD	Rate Plan	Monthly Charge	Estimated Annual Charge	Comments	Comments
487 Main Street	1399313002	LS2-A	$687	$8,243	62 lamps@$11.059	175 W Metal halide
3101 Center Street	1033034508	LS2-A	$41	$495	9 lamps@ $4.571	HPSV 120-v 70 Watt
D Allen Downs Unit 3	1033034642	LS1-D	$23	$279	2 lamps@ $11.614	HPSV 120-V 70 Watt
360 Fair	1033034799	LS1-A	$22	$258	2 lamps@ $10.74	HPSV 120-V 70 Watt
2908 Wood St	1033034100	OL1	$11	$131		
Estey Estates	1033034767	LS1-D	$35	$418	3 lamps@ $11.614	HPSV 120-V 70 Watt
487 Main Street	1033034002	LS2-A	$31	$375	4 lamps@ $7.803	LED 145 to 150 W
487 Main Street	1033034004	LS1-A	$3,870	$46,438	See "Street Lights" tab	
487 Main Street	1033034008	LS1-C	$46	$552	See "Street Lights" tab	
487 Main Street	1033034014	LS1-D	$427	$5,130	See "Street Lights" tab	
487 Main Street	1033034016	LS1-E	$862	$10,343	See "Street Lights" tab	
487 Main Street	1033034022	LS1-F	$292	$3,508	See "Street Lights" tab	
487 Main Street	1033034026	LS1-F	$463	$5,551	See "Street Lights" tab	
487 Main Street	1033034028	LS2-A	$497	$5,963	See "Street Lights" tab	
487 Main Street	1033034032	LS2-C	$26	$308	See "Street Lights" tab	
487 Main Street	1033034555	LS2-A	$8	$94	See "Street Lights" tab	
487 Main Street	1033034034	LS1-D	$81	$976	See "Street Lights" tab	
487 Main Street	1033034038	LS1-D	$93	$1,116	See "Street Lights" tab	
487 Main Street	1033034044	LS1-D	$35	$418	See "Street Lights" tab	
487 Main Street	1033034046	LS1-D	$58	$697	See "Street Lights" tab	
487 Main Street	1033034052	LS1-D	$93	$1,116	See "Street Lights" tab	
		Total	**$7,701**	**$92,409**		

Table 2 - Street Light Bill Summary

On the LS-1 rate plan, PG&E assesses a monthly charge per lamp to provide for maintenance services. These charges range, depending on the type of lamp and wattage, from $8 to $20 per lamp per month. The actual energy charge, which is $0.15045 per kWh regardless of lamp type, wattage or rate plan, is less than 50% of the actual billed amount. All of the LS-1 and LS-2 accounts are unmetered, and the charges are derived from calculated usages.

In the case of the City of Placerville, the annual LS-1 maintenance charges are estimated to be $41,099 and the energy charges are $30,249. While there is no PG&E maintenance costs for the LS-2 lamps, any maintenance costs are borne by the City Staff. Annual costs for this are not known.

Details of the costs are shown in the two tables that follow.

Most of the street lights in the City of Placerville are High Pressure Sodium Vapor (HPSV) and Metal Halide (MH). These older technology lamps and ballasts that last approximately 20,000 burn-hours, or 5 years of use, at which time they fail and need replacement.

LS-1										
Type	Nominal Wattage	Quantity	Hours per Year	Annual Consumption (kWh)	Electric charge ($/kWh)	Total Annual Electric Cost ($)	Annual Energy Charge	Annual Maintenance Charge	Estimated Energy Savings with LED	Annual PG&E Maintenance Savings
HPSV	70	425	4000	144,500	$0.1505	$56,142	$21,740	$35,004	$10,870	$30,921
HPSV	100	36	4000	16,560	$0.1505	$5,456	$2,491	$2,965	$1,246	$2,619
HPSV	150	1	4000	700	$0.1505	$188	$105	$82	$53	$73
HPSV	200	13	4000	11,700	$0.1505	$2,831	$1,760	$1,071	$880	$946
HPSV	250	22	4000	24,200	$0.1505	$5,453	$3,641	$1,812	$1,820	$1,601
HPSV	400	2	4000	3,400	$0.1505	$676	$512	$165	$256	$146
	Total	**499**		**201,060**		**$71,348**	**$30,249**	**$41,099**	**$15,125**	**$36,305**

Table 3 – Summary of LS-1 Rate Plan Costs

LS-2									
Type	Nominal Wattage	Quantity	Hours per Year	Annual Consumption (kWh)	$/kWh	Total Annual Electric Cost ($)	Annual Energy Charge	Maintenance Charge	Estimated Energy Savings with LED
HPSV	70	41	4000	13,940	$0.1505	$2,396	$2,097	$299	$1,049
HPSV	150	22	4000	15,400	$0.1505	$2,442	$2,317	$125	$1,158
HPSV	200	8	4000	7,200	$0.1505	$1,192	$1,083	$109	$542
HPSV	250	2	4000	2,200	$0.1505	$367	$331	$36	$165
HPSV	400	1	4000	1,700	$0.1505	$307	$256	$51	$128
MH	175	62	4000	49,600	$0.1505	$8,243	$7,462	$781	$5,597
LED	150	15	4000	9,000	$0.1505	$1,405	$1,354	$50	$0
	Total	**151**		**99,040**		**$16,351**	**$14,901**	**$1,450**	**$8,639**

Table 4 – Summary of LS-2 Rate Plan Costs

Many of the LS-1 roadway lights are standard “cobra-head” style fixtures. These typically use the HPSV lamps that range from 70 watts to 150 watts for roadway lights to 200 watts to 400 watts for intersection lighting. These lamps typically produce light with an orange-yellow color.

Figure 2 - “Cobra Head” Style Roadway Luminaire

Many of the LS-2 lights owned by the City have more decorative fixtures, such as shown below. These typically use the Metal Halide lamps that are 175 watts. These lamps typically produce a white light.

Figure 3 - City Owned Decorative Fixture

Electric Billings and Rate Plans

The City of Placerville has a total of 2 inactive accounts and 17 accounts on the A1X plan. According to the City, it is believed that most of the A1X accounts are for Traffic Lights. This is something that needs further investigation to confirm what each account serves. If most of the A1X accounts are for traffic lights, it would be advantageous to convert to the TC-1 rate plan, which has 20% lower rates on average.

Address	Account/SAiD	Meter Number	Rate Plan	Monthly Charge	Estimated Annual Charge	kWh	Days	Comments
Idle Accounts								
La Vista Dr SS	1033034131	1006882157	A1X	$21	$252	0	32	Meter Charge Only
Bedford @ Main	1033034512	1006753627	A1X	$11	$126	0	32	Meter Charge Only
				Total	**$378**			
Potential Rate Plan Change								
End of Cemetary Road	2378107867	1006776100	A1X	$13	$160	22	30	Assumed Traffic Lights
Center St. & Hwy 50	9252954170	1006776183	A1X	$22	$262	75	32	Assumed Traffic Lights
Hwy 49 & Hwy 50	9794621568	1006776228	A1X	$17	$200	39	32	Assumed Traffic Lights
Canal St. & Hwy 51	1022024987	1009125420	A1X	$16	$195	38	32	Assumed Traffic Lights
3155 Clark Street	1033034703	1008776226	A1X	$21	$249	67	32	Assumed Traffic Lights
Forni @ Placerville Dr	1033034703	1007047735	A1X	$226	$2,711	1,395	32	Unknown
Coloma Street	1033034587	1006775960	A1X	$174	$2,090	1,069	32	Unknown
Canal & Hwy 50	1033034211	1009125418	A1X	$114	$1,366	669	32	Unknown
Main @ Spring St.	1033034618	1007067809	A1X	$77	$921	431	32	Unknown
Canal @ Main Street	1033034122	1006776227	A1X	$374	$4,491	2,356	32	Unknown
LS/Cribbs RD	1033034128	1007049264	A1X	$20	$242	63	32	
La Vista Dr SS	1033034131	1006882157	A1X	$21	$252	0	32	Meter Charge Only
Bedford @ Main	1033034512	1006753627	A1X	$11	$126	0	32	Meter Charge Only
Lumsden PK End Wilse	1033034890	1007049339	A1X	$11	$126	0	32	Unknown
Top Hill CTRY Club Dr	1033034526	1006500853	A1X	$33	$393	74	32	Unknown
3071 Benham	1033034758	1006775536	A1X	$32	$389	141	32	Unknown
2501 Bedford	1033034782	1006775524	A1X	$41	$487	192	32	Unknown
				Total	**$14,660**			

Table 5 - Summary of A1X and In-Active PG&E Accounts

City Wide Photo-Voltaics

The City of Placerville has numerous accounts and buildings that could benefit from using locally produced electricity from a photo-voltaic array. Because all of the locations have very little available space to mount panels, the only practical way to do this would be via remote generation and "wheeling" power to each of the city meters using the PG&E transmission lines. This is a program allowed to be used by local governments and is called the RESBCT program. In this, the City is allowed to save the generation charges, but still must pay the transmission charges to PG&E.

Potential Facilities Improvement Measures (FIM's)

The prices and savings estimates given are for budgetary purposes only and are NOT intended to be Firm, Fixed, and Guaranteed Maximum Price (GMP) estimates. These estimates were arrived at using "Rules of Thumb" estimating methods and are intended only to show the relative viability of each FIM based on Simple Paybacks. The values given should be within +/-25% of the final costs, subject to Scope of Work changes arrived at in the Investment Grade Audit. More development work will be required during the Investment Grade Audit Phase to finalize Scopes of Work so firm, fixed pricing and savings can be obtained.

1. Conversion of Exterior LS-1 and LS-2 lights to LED

Figure 4 - LED Roadway Light

The City could eliminate $40,000 of annual PG&E maintenance charges by purchasing the LS-1 roadway and intersection lights back from PG&E and by retrofitting the fixtures with LED lamps. LED lamps will typically operate at half the electrical cost of the older lamps and also come with 70,000 burn-hour warranties. Based on an average use of 4,000 hours per year, this would provide 17.5 years of warranty coverage. This would translate into significant O&M savings.

It is proposed to obtain the LS-1 lights from PG&E and replace the majority of the exterior fixtures/pole heads with LED lights. The process of obtaining the lights could take 2-3 years and the price per lamp would need to be negotiated.

Cost: The estimated cost to purchase all the LS-1 lights and convert all the LS-1 and LS-2 lights to LED would be $886,000.

Benefits: It is estimated that the new LED lights will result in $23,764 in electrical charges and $36,000 in PG&E Maintenance Charges. There will be additional savings on the City owned LS-2 lights due to the greatly reduced maintenance requirements of the new LED lights. Total Annual Savings is estimated at $60,000.

Rebates: There would be rebates available from $5,000 to $10,000 depending on the program selected.

Optimize Electric Rate Tariffs

By converting the majority of the A1X rate plans to TC-1 and closing inactive accounts, the City could reduce its annual PG&E bill.

Cost: The estimated cost to make the conversion is approximately $5,000.

Benefits: It is estimated that if a full conversion is possible, there would be $3,300 in Annual Savings.

Rebates: There would be no rebates available for this action.

2. Installation of RESBCT PV for City Buildings

The City currently uses 1,200,000 kWh of electrical energy per year. It is possible to install a PV array on the hill on the north side of the Wastewater Treatment Plant which is City owned. Assuming 1,400 kWh per kW of solar production based on insonation data in the Placerville area and an 60% target yield, the new PV array would be 655 kW DC in size and would require about 1 ½ acres of space. Total annual production would be 760,000 kWh.

Cost: The estimated cost to install the PV system would be $1,900,000

Benefits: It is estimated that the PV array would offset about $95,000 of electrical cost annually.

Rebates: CSI PBI rebates are no longer available in the PG&E territory.

6. Building Measures

Operations Baseline and Overview

The City of Placerville maintains seven city buildings/areas. These locations and the associated information on each is given in the table below.

Building Name	Address	SF	Stories	Year Built	Status
Old City Hall	487 Main Street	6,450	2	1860	1/2 tenant space
Town Hall	549 Main Street	10,710	2	1931	Parks & Rec
New City Hall	3101 Center Street	10,892	4	1962	City Hall
Downtown Restroom	485 Main Street	400	1	1998	Restroom
Public Safety Building	730 Main Street	7,616	1	1978	PD
Community Aquatic Center	3071 Benham	TBD	1	2005	Pool
Corporate Yard	3231 Big Cut	TBD	1	1950	Steel Bldgs

Table 6 - Building and Facility Information

In addition to the Buildings, the City maintains a large 3 story Parking Garage that is adjacent to the New City Hall.

Building Descriptions

New City Hall

This is a 6,450 square foot, four story building that houses all of the City Administrative activities.

Figure 5 - City Hall

The building has occupancy from 7:00 AM to 6:00 PM Monday through Friday.

The building HVAC systems uses 5 roof mounted package unit heat pumps with a combined tonnage of 23 tons. These units do not have economizers, just fixed position dampers. There is no natural gas service in the City of Placerville. There is no propane service at the building. The units are all about 12 years old and in need of replacement. There is a membrane roof in place.

Figure 6 - City Hall HVAC Unit

The building HVAC controls system is an Alerton DDC system that was installed in approximately 2004. It is fully capable of regulating temperatures based on system set-points and operating schedules. There is no “Front End” in the traditional sense.

The building interior lighting uses mostly 32 watt 4 foot linear fluorescent lamps in two or three lamp fixtures or biax fixtures with electronic ballasts. There are screw-in compact fluorescent lamps in can lights. All lights are operated from wall switches. There are no occupancy sensors or daylight harvesting controls.

The building exterior lighting uses a limited amount of wall packs using high pressure sodium vapor (HPSV) lamps.

Parking Garage

The parking garage is adjacent to the New City Hall Building. It is on a separate electric meter from City Hall.

Figure 7 - Parking Garage

The parking garage is metered parking and uses an automated payment kiosk.

Figure 8 - Parking Metering and payment Station

The interior spaces in the parking garage use 100 watt induction lighting that was installed in 2009. The lights are controlled by a standard electric time clock. There is no photocell or daylighting control. Based on energy bills and observation, it appears that the system is constantly on 8,760 hours per year.

There are no electric vehicle charging stations in the garage.

Figure 9 - Parking Garage Induction Lighting

The upper deck of the parking structure uses decorative lighting poles with metal halide lamps. The lights are controlled by a standard electric time clock. There is no photocell or daylighting control. Based on energy bills and observation, it appears that the top deck lighting is only on at night.

Figure 10 - Top Level Parking Garage

Public Safety Building

This is a 7,616 square foot, single story building that houses all of the Police Department. The El Dorado County Fire Protection District uses the garage for storage of fire engines.

Figure 11 - Public safety Building

The building has constant occupancy in most areas.

The building HVAC systems uses a mix of 5 package unit heat pumps and split system heat pumps with a combined tonnage of 19 tons. These units do not have economizers, just fixed position dampers. There is no natural gas service in the City of Placerville. There is no propane service at the building. The units are all about 12 years old and all are in need of replacement.

Figure 12 - Police Department HVAC Unit

The building HVAC controls are all traditional electric thermostats.

The building interior lighting uses mostly 32 watt 4 foot linear fluorescent lamps in two or three lamp fixtures or biax fixtures with electronic ballasts. There are screw in compact fluorescent lamps in can lights. All lights are operated from wall switches. There are no occupancy sensors or daylight harvesting controls.

The building exterior lighting uses a limited amount of wall packs using high pressure sodium vapor (HPSV) lamps.

Corporate Yard/Maintenance Area

This is a multi-building site located on Big Cut Road. Most of the buildings are steel frame. There is one modular trailer used as office space.

Figure 133 - Maintenance Yard

The yard has occupancy from 7:00AM to 6:00PM Monday through Friday.

There are no HVAC systems except for the Bard unit on the trailer. The building HVAC control is a traditional electric thermostat.

The building interior lighting uses mostly 32 watt 4 foot linear fluorescent lamps in two or three lamp fixtures or with electronic ballasts. All lights are operated from wall switches. There are no occupancy sensors or daylight harvesting controls.

The building exterior lighting uses a limited amount of wall packs using high pressure sodium vapor (HPSV) lamps. There is parking throughout the facility.

Figure 4 - Exterior Fixture

Town Hall

This is a 10,710 square foot, two story building that houses the Parks and Recreation Department, the Council Chambers and various Community Rooms.

Figure 145 - Town Hall Building

The building has normal occupancy from 7:00 AM to 6:00 PM Monday through Friday. There is also occupancy at nights and on weekends in the community rooms and council chambers.

The building HVAC systems uses 3 split system heat pumps with a combined tonnage of 19 tons. There are no provisions for outside air or ventilation in the building. There is no natural gas service in the City of Placerville. There is no propane service at the building. The units are all about 12 years old and all are in need of replacement.

Figure 16 - Town Hall HVAC Units

The building HVAC controls are all traditional electric thermostats.

The building interior lighting uses mostly 32 watt 4 foot linear fluorescent lamps in two or three lamp fixtures or biax fixtures with electronic ballasts. There are screw in compact fluorescent lamps in can lights. All lights are operated from wall switches. There are no occupancy sensors or daylight harvesting controls.

The building exterior lighting uses a limited amount of wall packs using high pressure sodium vapor (HPSV) lamps. There are decorative incandescent lamps in use around the building exterior.

Figure 7 - Town Hall Parking Lot

Old City Hall

This is a 6,450 square foot, two story building with an adjacent Restroom. The building is partially leased, with half being vacant and the other half housing a realty office. This is a historic building.

Figure 158 - Old City Hall Building

The realty office has occupancy from 7:00AM to 6:00PM Monday through Friday. Half the building is unoccupied.

The building HVAC systems uses 3 split system heat pumps with a combined tonnage of 10 tons. There are no provisions for outside air or ventilation in the building. There is no natural gas service in the City of Placerville. There is no propane service at the building. The units are all about 12 years old and all are in need of replacement.

Figure 19 - HVAC Units

The building HVAC controls are all traditional electric thermostats.

The building interior lighting uses mostly 32 watt 4 foot linear fluorescent lamps in two or three lamp fixtures or biax fixtures with electronic ballasts. There are screw in compact fluorescent

lamps in can lights. All lights are operated from wall switches. There are no occupancy sensors or daylight harvesting controls.

The parking lot lighting uses decorative pole lamps using metal halide lamps. The parking lot lighting includes the area next to the County Building as well. There is also a parking lot pay station similar to the one at the City Parking Garage in use at this location.

Figure 160 - Parking Lot Lighting.

Benham Pool

This is a community facility with a large swimming pool, a kiddy pool and water slide. There are two small support buildings.

Figure 171 - Pool

The pool is open from May 1st through Mid-August, but the pool pumping and chemical equipment appears to be close to continuous operation year around. The pool is heated to 83 degrees F

when in use by propane fired boilers (3). There are pool covers present and they are supposed to be in use at night when the pool is closed.

Figure 2 - Pool Pumps

The building HVAC systems uses small split system heat pumps and propane fired space heaters. The building HVAC controls are all traditional electric thermostats.

Figure 183 - HVAC Units

The building interior lighting uses mostly 32 watt 4 foot linear fluorescent lamps in two or three lamp fixtures with electronic ballasts. There are screw in compact fluorescent lamps in can lights. All lights are operated from wall switches. There are no occupancy sensors or daylight harvesting controls.

The pool area lighting uses shoe box style pole lamps using HPS lamps. The lights are controlled by an electric time clock.

Figure 194 - Pool Deck Lighting.

Utility Services and Energy Use Analysis

Electrical Power Service

Electrical power at all locations is provided by Pacific Gas & Electric (PG&E). A summary of the annual charges is provided below. These were estimated based on one month of Utility data provided by the city.

Address	Building	Rate Plan	Estimated Annual Charge	Annual kWh
3101 Center St.	City Hall	A10SX	$36,870	167,208
730 Main Street	Public Safety Building	A10SX	$22,695	161,292
Center St. N/S Main	Center Street Parking Garage	A6	$19,518	125,088
3231 Big Cut	Corporate yard	A6	$5,728	35,544
3071 Benham	Benham Pool	A1X	$29,095	178,908
3071 Benham	Unknown	A1X	$389	1,692
487 Main Street	Old City Hall	A6	$3,420	20,604
487 Main Street	Old City Hall	A6	$1,917	11,412
549 Main Street	Town Hall	A6	$10,458	63,900
		Total	**$130,089**	**765,648**

Table 7 - City Building Electric Costs

Buildings and Rate Plans

All of the tariffs being used are on a Time-of-Use (TOU) rate plan. For the A-1 and A-6 rate plans, there are variable electrical energy costs depending on the Time-of-Use but there is no demand component. Details of the different rate plans are shown in the Table below.

Rate Schedule	Customer Charge	Season	Time-of-Use Period	Demand Charge (per kW)	Time-of-Use Period	Energy Charges (per kWh)
A1X	$0.328 per meter per day	**Summer**	Peak	None	Peak	$0.61027
			Part-Peak		Part-Peak	$0.28427
			Off-Peak		Off-Peak	$0.15690
		Winter	Part-Peak		Part-Peak	$0.17969
			Off-Peak		Off-Peak	$0.14690
A6	$0.328 per meter per day	**Summer**	Peak	None	Peak	$0.61027
			Part-Peak		Part-Peak	$0.28427
			Maximum		Off-Peak	$0.15690
		Winter	Part-Peak		Part-Peak	$0.17969
			Maximum		Off-Peak	$0.14690
A-10 Secondary	$4.59959 per meter per day	**Summer**	Peak	$14.83	Peak	$0.18183
			Part-Peak		Part-Peak	$0.17379
			Off-Peak		Off-Peak	$0.14934
		Winter	Part-Peak	$6.61	Part-Peak	$0.13047
			Off-Peak		Off-Peak	$0.10951

Table 8 - Rate Plan Summary

The TOU components change on a seasonal basis. Summer time rates are far higher than Winter Rates. The Schedule used is shown below. The Summer Season is defined as May 1st through October 31st. The Winter Season is defined as November 1st through April 30th.

Time-of-Use of Schedule		
Summer	**Time**	
Peak	1:200 to 18:00	Monday through Friday (except holidays)
Partial Peak	08:30 to 12:00	Monday through Friday (except holidays)
	18:00 to 21:30	Monday through Friday (except holidays)
Off Peak	21:30 to 08:30	Monday through Friday (except holidays)
	All Day	Saturday, Sunday and Holidays
Winter	**Time**	
Partial Peak	08:30 to 21:30	Monday through Friday (except holidays)
Off Peak	09:30 to 20:30	Monday through Friday (except holidays)
	All Day	Saturday, Sunday and Holidays

Table 9 - Time-of-Use Schedule.

Potential Facilities Improvement Measures (FIM's)

The prices and savings estimates given are for budgetary purposes only and are NOT intended to be Firm, Fixed, and Guaranteed Maximum Price (GMP) estimates. These estimates were arrived at using "Rules of Thumb" estimating methods and are intended only to show the relative viability of each FIM based on Simple Paybacks. The values given should be within +/-25% of the final costs, subject to Scope of Work changes arrived at in the Investment Grade Audit. More development work will be required during the Investment Grade Audit Phase to finalize Scopes of Work so firm, fixed pricing and savings can be obtained.

10. Installation of LED Light Tubes and LED PAR Lamps in Interior Lighting Applications

Most of the City building interior lighting uses mostly 32 watt 4 foot linear fluorescent lamps in two or three lamp fixtures or biax fixtures with electronic ballasts. There are screw in compact fluorescent lamps in can lights. All lights are operated from wall switches. There are no occupancy sensors or daylight harvesting controls. The total annual lighting electrical cost is estimated to be $44,084 per year.

It is proposed to replace the interior linear fluorescent lamps with 12 watt or 14 watt LED light tubes and replace all CF's with LED screw in lamps. There would also be a limited addition of occupancy sensors in quantities below the new Title 24 threshold limits.

Cost: The estimated cost to install the lighting retrofit would be about $75,000

Benefits: It is estimated that the new lamps would offset $25,000 of electrical cost annually.

Rebates: There would be rebates available of variable amounts of up to $20,000 depending on the program selected.

11. Installation of Exterior LED Lighting Retrofits for Parking Lot and Building Exterior Lamps

Most of the City building interior lighting uses mostly High Pressure Sodium or Metal Halide lighting systems. The total annual lighting electrical cost is estimated to be $9,500 per year.

It is proposed to replace the majority of the exterior fixtures/pole heads with LED lights.

Cost: The estimated cost to install the lighting retrofit would be about $80,000, depending on fixtures selected.

Benefits: It is estimated that the new lamps would offset $5,000 of electrical cost annually and at least $3,000 of maintenance expenses.

Rebates: There would be rebates available of variable amounts of up to $5,000 depending on the program selected.

12. Parking Garage Lighting Controls

Most of the interior parking garage lights remain continuously on. This is not necessary based required light levels.

It is proposed to install daylighting controls to turn the lights off when they are not required.

Cost: The estimated cost to install the lighting control would be about $9,000, depending on options selected.

Benefits: It is estimated that the new lamps would offset $12,000 of electrical cost annually. It would also extend the life of the existing lamps and ballasts and save maintenance expenses.

Rebates: There would be rebates available of an undetermined amount depending on the program selected.

13. Replace Package Unit Heat Pumps and Split System Units

Most of the City buildings have heat pump package units or split system units that are near the end of their useful lives and are in need of replacement. Most of these units were rated at 9.0 EER or less when installed new and operate at lower efficiencies than that today. Because they are heat pumps, the heating cycles are far more costly than those propane fired furnace units. The total annual electrical cost to operate these units is estimated to be $30,500 per year.

It is proposed to replace most of the old heat pump package units with new gas-electric units or high efficiency heat pump split systems. New propane service would be installed at the buildings were gas-electric units can be installed.

Cost: The estimated cost to install the new package units is estimated at about $290,000.

Benefits: It is estimated that the new package units would offset $12,000 of electrical cost annually and at least $2,500 of maintenance expenses. There would be an additional cost for the propane heating of about the same amount.

Rebates: There could be rebates available of variable amounts of up to $15,000 depending on the program selected.

14. Voice over IP Telephone service

Most of the City buildings still have standard telephone service via a Centrex system or on POTS lines from the phone company. The City has stated that the cost of this service is $15,000 per year

Cost: The estimated cost to install new VoIP phone lines is about $1,000 per phone. No exact counts of phones were given and no telephone bills were submitted for investigation. It is estimated there are at least 150 phone lines that this could apply to.

Benefits: It is estimated that the new VoIP phones would offset at least $10,000 annually.

Rebates: There are no rebates that would apply.

15. Installation of Covered Parking with PV on Parking Garage

The City currently uses 125,000 kWh of electrical energy per year at the Parking Garage. After the controls improvements proposed in FIM 12, this number should drop to 50,000 kWh and $7,800.

It is possible to install a PV array on top of a steel cover installed on the top level of the garage. The total area available is about 1 acre of space. Total annual production would be 40,000 kWh.

Cost: The estimated cost to install the PV system would be $318,000

Benefits: It is estimated that the PV array would offset about $6,400 of electrical cost annually.

Rebates: CSI PBI rebates are no longer available in the PG&E territory.

7. Water Services

Operations Baseline and Overview

The City of Placerville maintains its own water distribution network and sewer collection system and Wastewater Treatment Plant (WWTP). The water and wastewater services are Enterprise Funds managed entirely by the City. Dave Warren, the Director of Finance manages the financial side of the Enterprise Fund. Mark Liebenow is the Water Reclamation Facility Supervisor and Rick Ferrara is the Public Works Operations Manager who supervises the operations side of the water distribution.

Operational Metrics

The City of Placerville has approximately 2,710 active water accounts and has a tiered rate structure as shown in the Table below.

City of Placerville
Water User Rates
Effective August 16, 2014

Category/Water Use	Rates
Single-Family Residential	
Base Charge	$27.56
0 to 1,000 cubic feet	$2.94 per ccf
1,001 to 2,500 cubic feet	$3.52 per ccf
Over 2,500 cubic feet	$3.81 per ccf
Single-Family Residential (Lifeline)	
Base Charge	$20.68
0 to 1,000 cubic feet	$2.22 per ccf
1,001 to 2,500 cubic feet	$2.65 per ccf
Over 2,500 cubic feet	$2.87 per ccf
Commercial & Multi-Family	
Base Charge	$27.56
0 to 4,000 cubic feet	$2.94 per ccf
4,001 to 20,000 cubic feet	$3.52 per ccf
Over 20,000 cubic feet	$3.81 per ccf

Table 10 - Water User Rates

An AWWA Water Audit was performed to provide the City with a general view of the water system's water loss. The AWWA Water Audit v.5 is a free, nationally recognized tool and guide that helps water system managers recognize key areas of focus regarding water loss. The City provided information on water supplied, authorized consumption, system data, and cost data for performing an AWWA Water Audit. The results of that audit indicated 83 MG/Yr of non-revenue water which is approximately 19.5% by volume, with an average 3.5 percent customer metering inaccuracy.

Based on financial cost data provided, the annual cost of apparent loss was valued at $57,007 while the annual cost of real loss was valued at $63,840.

The AWWA Water Audit and performance results can be found in Appendix F- AWWA Water audit

Water Service Area

The City of Placerville provides water service to the area shown in Figure 20. There are approximately 10,000 residents and 2,710 connections in the City service area. The service area includes elementary schools, a Junior High School, a High School, and various light commercial properties. There are six City owned buildings and 50 acres of Parks in the service area. There are limited industrial sites or large commercial developments in the area. An aerial view of the service area and Distribution Map is shown in the diagrams below.

Figure 205 - Aerial View of City of Placerville and Water Service Area

Water Sources

All of the water deliveries for the City of Placerville are sourced from the El Dorado Irrigation District (EID). The City has no wells and there is no tank storage. There are 7 pressure zones within the delivery area and the City maintains pumping stations to maintain system pressures. Service elevations ranges from 2,100 feet to 2,500 feet.

Water Treatment Plant

The City of Placerville has a decommissioned Water Treatment Plant located at 3203 Pardi Way. This location also has clear wells that have been taken out of service. The City plans on demolishing the facility.

Booster Pumping Stations

There are booster pumping stations at various locations maintained by the City.

Water Mains and Distribution

Many of the water mains were built in the 1940's and 1950's. The total length of underground piping is approximately 45 miles. The main service loops are usually 14" in diameter. There is a rate study being conducted by –Bartle Wells that is expected to be delivered this fall. There are areas known to have undersized water mains.

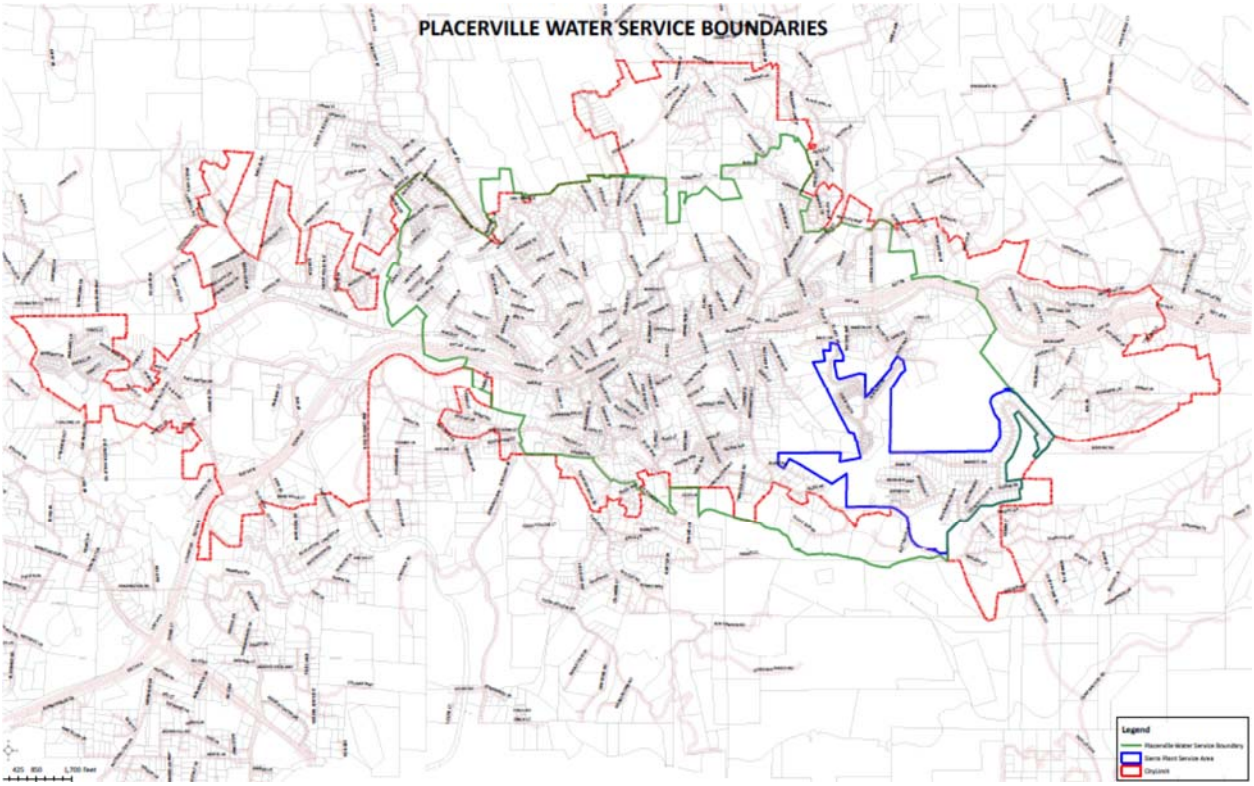

Figure 216 - City of Placerville Water Service Area

There is a mix of piping in the system. There is some steel piping in the system but it is being replaced. There is some "Orangeburg" piping which is in the process of being replaced by HDPE. The City has an aggressive replacement plan underway with $500,000 in the 2015 Capital Improvement Plan (CIP) being allocated to piping replacement. In addition, 1,700 feet of 12" mains and laterals on Main Street have been replaced in the last year. The City also has a

$950,000 grant that will be applied to replacement work starting in July. Measure H also contributes $500,000 per year for line replacement.

There is no leak detection system in place, The City has experienced major water loss in the past due to line breaks, the Pardi leak being an example. Some leaks are not readily apparent due to soil conditions. Most leaks are caused by bad welds and tree roots. The City estimates that it is losing 63.840 million gallons per year valued at $63,840 in Real Water Losses.

Water Meters

All water meters are manually read by 1.25 full time equivalent (FTE) meter readers. Readings are taken monthly and all customers are metered. There is an additional cost to the City for truck charges, maintenance and other associated activities over and above the salary cost of the meter readers. The City of Placerville does not currently have any AMI/AMR metering in place, but is interested in making the conversion. The City has a “Navaline” Billing system in place that is managed by Kelly Segura.

The residential meters range in size from 1/2-inch x 5/8 to ¾-inch x 5/8. Most are about 10 to 15 years old. There are an estimated 300 commercial meters in place that go up to 4” in size.

Control Systems

There are no SCADA controls at the pumping stations. The City is interested in expanding the SCADA to these sites. There is no communications infrastructure in place using radio carriers (900MHz, 2.8GHx or 5.6GHz) but the City is interested in evaluating options.

Operations and Maintenance (O&M)

The City of Placerville performs some of its maintenance activities in house. Larger work, such as main line replacement, is subcontracted out. The maintenance yard is located at 3231 Big Cut Road.

The shop has the ability to do fleet vehicle maintenance and has a mechanical and electrical shop. The City has a staff of 1.25 full time equivalent personnel dedicated to the water system meter reading.

Figure 22 - City Yard Maintenance Facility

Utility Services and Energy Use Analysis

Electrical Power Service

Electrical power to all the pumping booster stations is provided by Pacific Gas & Electric (PG&E). There is not enough information on the pumping stations to do an electrical use analysis at this time.

Potential Facilities Improvement Measures (FIM's)

The prices and savings estimates given are for budgetary purposes only and are NOT intended to be Firm, Fixed, and Guaranteed Maximum Price (GMP) estimates. These estimates were arrived at using "Rules of Thumb" estimating methods and are intended only to show the relative viability of each FIM based on Simple Paybacks. The values given should be within +/-25% of the final costs, subject to Scope of Work changes arrived at in the Investment Grade Audit. More development work will be required during the Investment Grade Audit Phase to finalize Scopes of Work so firm, fixed pricing and savings can be obtained.

20. Water Meters and AMRAMI

The existing 2710 water meters are being manually read by 1.25 full time equivalent meter readers. In addition to the time spent gathering meter readings, there is a cost to the City for vehicles, vehicle maintenance, fuel, insurance, etc. to perform this function. Additional time is being spent by office staff compiling the collected information into customer invoices. The City uses Sungard "NaviLine" financial software for its utility billing processing.

The existing meters are old and have reading inaccuracies that often times favor the end user. Replacement of older water meters, right sizing and right typing of intermediate meters, and an upgrade to either an Automated Meter Reading (AMR) or an Advanced Metering Infrastructure (AMI) system would increase overall meter and system accuracies resulting in reduced non-revenue water losses that occur each month.

Cost: The estimated cost to replace, right size and type and install 2,710 AMI water meters is $2,423,000.

Benefits: If the City of Placerville were to add an AMI system, it is estimated that they would be able to reassign 0.60 full time equivalent meter readers and save additional O&M expenses. Billing processes would also be simplified and accelerated. There would be a total labor cost savings of approximately **$37,500** per year plus **$15,000** per year in O&M expenses such as fuel and vehicle expense. As the result of improved meter accuracy, recovery of non-revenue water would be generated. This amount is estimated at **$48,456** per year. If the City also uses a volumetric basis for their sewer rate based on water consumption, additional revenue would also be generated.

Total savings are estimated at $**100,956** per year.

Rebates: None

21. Leak Repairs

The City has budgeted $500,000 for line replacement/leak repairs in the 2016 Capital Improvement Plan. This money comes from the Measure H Fund. It is proposed to include this activity within the Project Scope.

Cost: The estimated cost to perform the line replacement/repairs would be $500,000

Benefits: This would allow the money in the Capital Plan to be re-allocated to other needs within the City.

Savings: No additional savings is claimed as part of this measure, although line leakage would be reduced. The estimated savings are included in FIM 22 “Leak Detection”.

Rebates: None

22. Leak Detection

The City relies on call-ins and field observations to determine if there are leaks in the piping system. The City has experienced several major and long-lasting leaks in the past, such as the Pardi Way leak. Some leaks are not readily apparent due to soil conditions. The AWWA Water Audit performed estimates that the City is losing 63,840 million gallons per year valued at $63,840 in Real Water Losses. There currently is no leak detection system in place to give the City early warning.

Cost: The estimated cost to install a leak detection system is **$380,060. Some of this cost could be offset by Grants or Measure B funds.**

Savings: The AWWA Water Audit estimates that annual Real Water Losses are valued at $63,840. Installation of a Leak Detection System would reduce the amount of water losses by at least half, or save **$31,920** annually.

Rebates: None

8. Wastewater Treatment Plant

Operations Baseline and Overview

The Hangtown Creek Water Reclamation Facility, aka Wastewater Treatment Plant (WWTP) is owned and operated the by the City of Placerville. The WWTP is located at 2300 Coolwater Creek Road, which is about four miles west of Placerville. The WWTP sits on approximately a 15 acre site north of Coolwater Creek. The City also owns an approximate 5 acre parcel of land directly north of the plant that is currently undeveloped.

Figure 23 - Aerial View of Wastewater Treatment Plant

The WWTP has a 3,391 accounts and approximately a 2,900 customer Equivalent Development Unit (EDU) base of operations. The service area includes most of the City. It should be noted that the service boundaries for the sewer system are not the same as for water service. In the cases where only sewer service is provided, the EID provides the City with billing information.

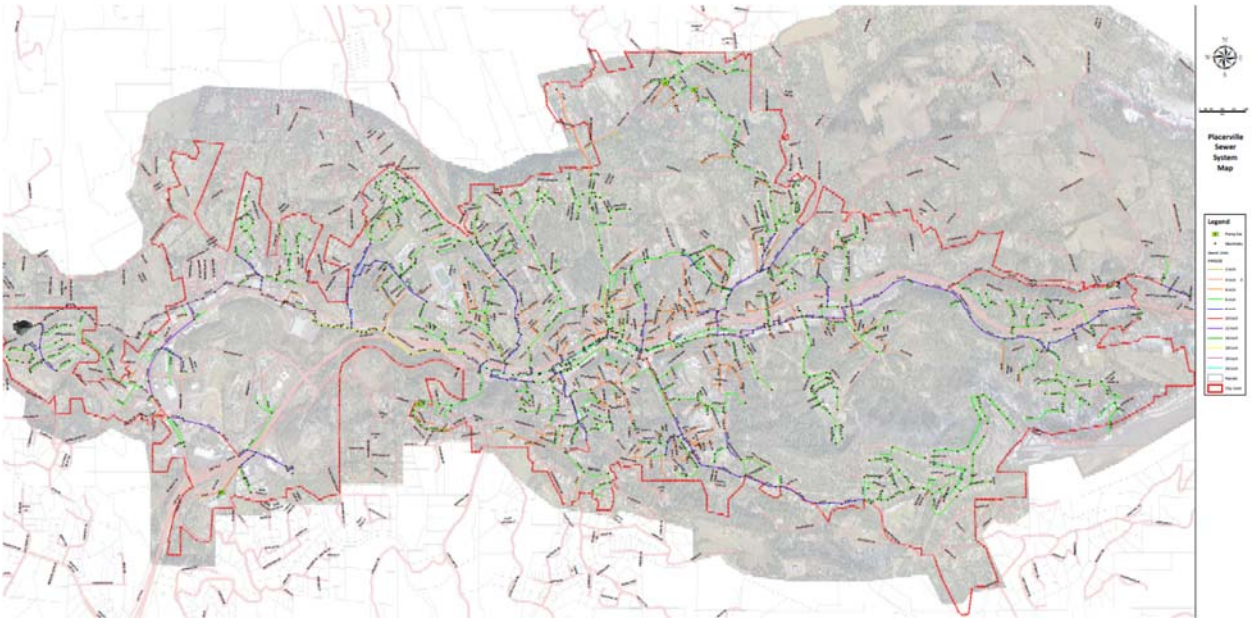

Figure 24 - Wastewater Treatment Plant Service Area

Most of the service base is residential, with some schools and limited light commercial. There are no industrial sites or large commercial developments in service area.

There are additional residences in the service are that are on septic systems. By code, many of these should be on the sewer system based on their proximity to a sewer line (within 100 feet. It is expected over time that these will be added to the collection system.

The wastewater plant diurnal flow ranged from 0.3 MGD to 1.6 MGD for the week of 3-24-15 to 3-31-15. The daily flow profiles are shown in the chart below. The City is under a Cease and Desist order for excessively high Zinc levels that must be corrected by 2017.

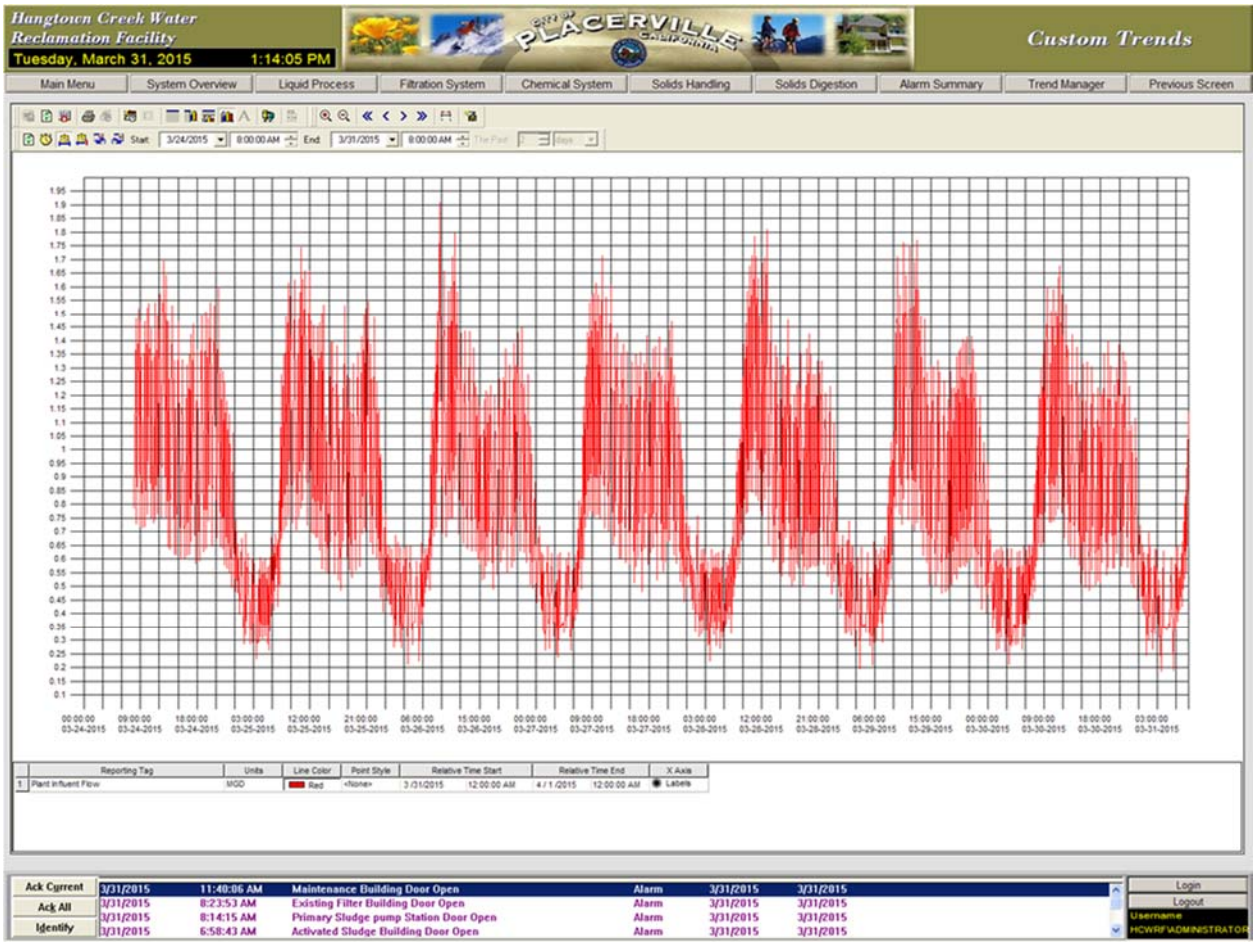

Figure 25 - Wastewater Treatment Plant Weekly Influent Profile

The Wastewater Treatment Plant and Water Services are part of a City Enterprise Fund. The median cost of services for a single-family residential account is $189.70 on a bi-monthly basis with the Lifeline median cost being $138.51. The rate structure is shown in the Table below.

Code	Sewer Rates	Base Charge-First 750 cf	Per 100 cf Over Base	Bi-Monthly Discount - Measure H
	Consumption Based - Per 100 Cubic Feet (ccf)			
	Residential:			
R	Single Family	$162.11	$7.51	($15.00)
RL	Lifeline	$121.58	$5.63	($15.00)
AP	Apartment Units - B&B's	$145.91	$7.51	($45.00)
	Non-Residential:			
RS	Retail Stores and Offices	$143.98	$15.07	($55.00)
SS	Service Stations	$171.50	$18.11	($50.00)
MH	Motel-Hotel Rooms (w/o kitchen)	$171.01	$12.81	($110.00)
RT	Restaurants	$327.40	$18.61	($130.00)
FF	Fast Food Service (w/o disposal/dishwasher)	$281.58	$15.27	($130.00)
CS	Coffee Shops/Bakeries	$212.78	$15.18	($92.50)
LM	Laundromats/Laundry	$137.14	$15.35	($155.00)
HP	Hospitals	$158.15	$16.64	($945.00)
RH	Resthomes	$152.22	$16.13	($235.00)
MK	Markets	$178.12	$18.61	($530.00)
CH	Churches	$128.56	$13.09	($50.00)
CW	Car Wash	$121.64	$12.98	($175.00)
BR	Bars	$185.18	$15.89	($90.00)
MO	Mortuaries	$208.85	$24.33	($285.00)
HL	Halls	$128.60	$10.71	($25.00)
FI	Fire Station	$151.87	$15.81	($50.00)
FG	Fair Grounds	$163.59	$17.53	($110.00)
	Consumption Based - Per Unit			
MT	Movie Theater (per seat)	n/a	$0.87	($115.00)
SC	Schools (per student)	n/a	$8.30	($95.00)

Table 11 - Sewer Rate Structure

Plant operations consist of eight personnel working on the day shift only Monday through Friday from 7:00 AM through 3:30 PM. The plant is supervised by Mark Liebenow. There are five Operators as well as a Lab Director and a Maintenance Mechanic.

The wastewater facility achieves a tertiary level of treatment with Biological Nutrient Removal (BNR) technology. The plant was rebuilt and greatly expanded in 2009 by Owen Engineering and Management Consultants and has a rated capacity of 5 million gallons per day (MGD). Current diurnal average daily flow ranges from 1.7 MGD to 0.3MMGPD, with the overall average daily flow being about 1.0 MGD, or 20% of the rated design capacity.

Total O&M annual budgetary costs for the plant is $2,274,646. Known elements of the budget can be broken down into the following categories

- Personnel: $994,491
- Materials & Supplies: 328,500
- Contract Services: 674,400
- Overhead: 215,000
- Other Expenses 56,700

- Capital Outlay: 5,555

The overall treatment process can be characterized be the following sequence of operations taken from the SCADA System:

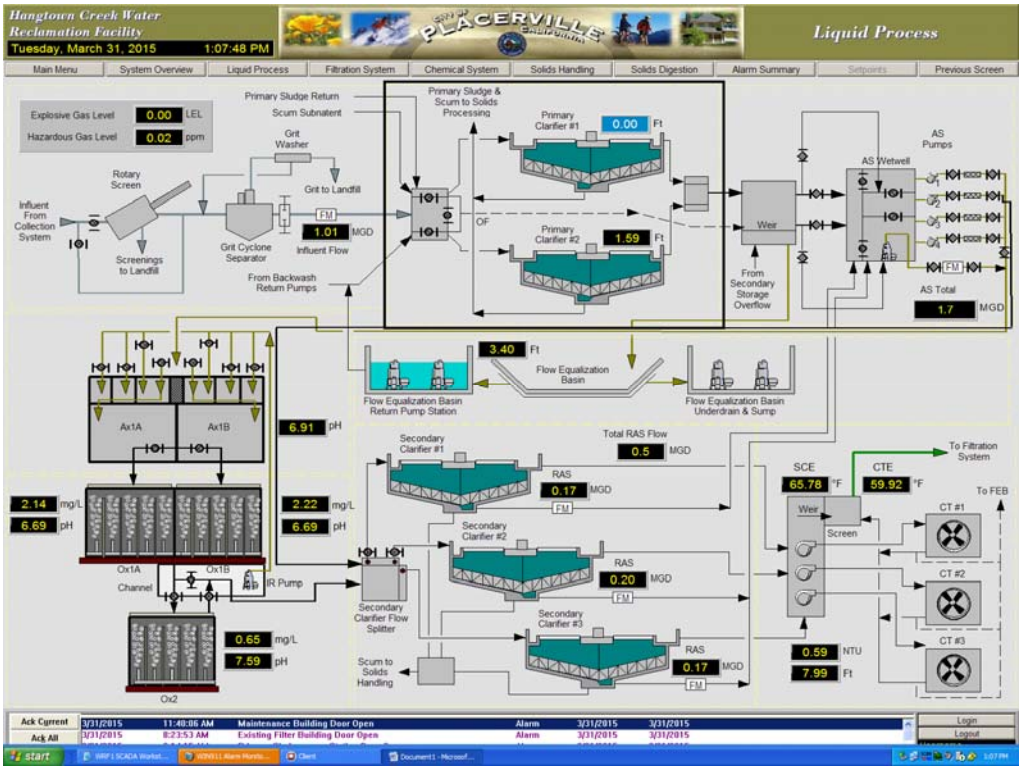

Figure 26 - Process Flow Diagrams - Liquid Process

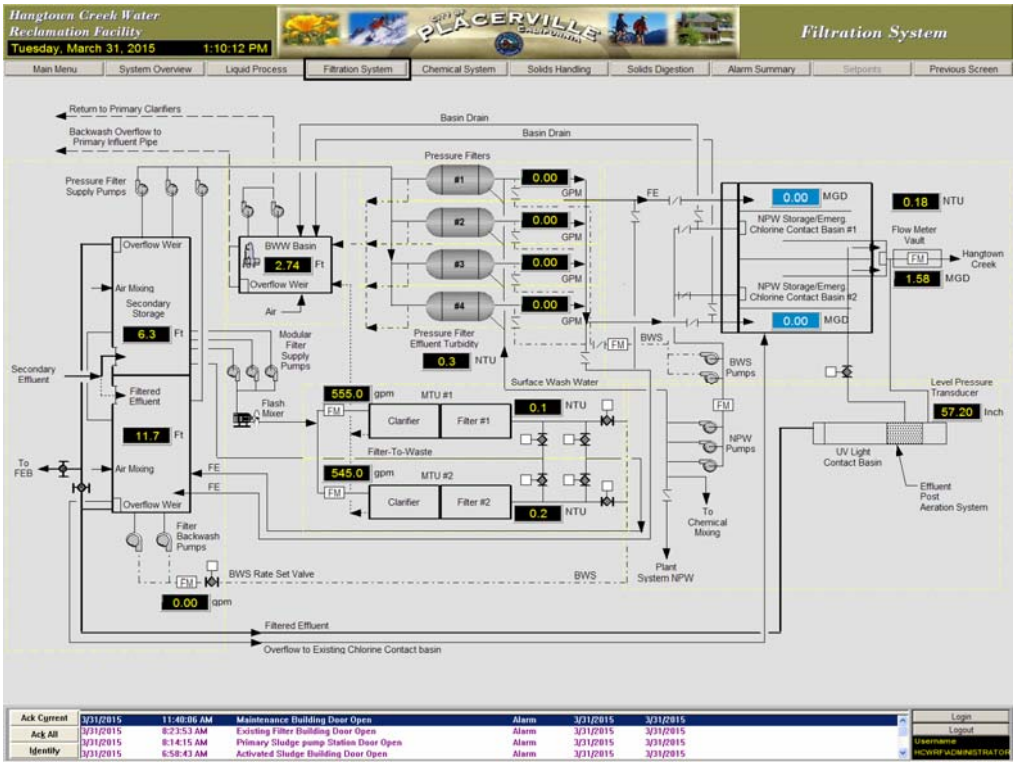

Figure 27 - Process Flow Diagrams - Filtration System

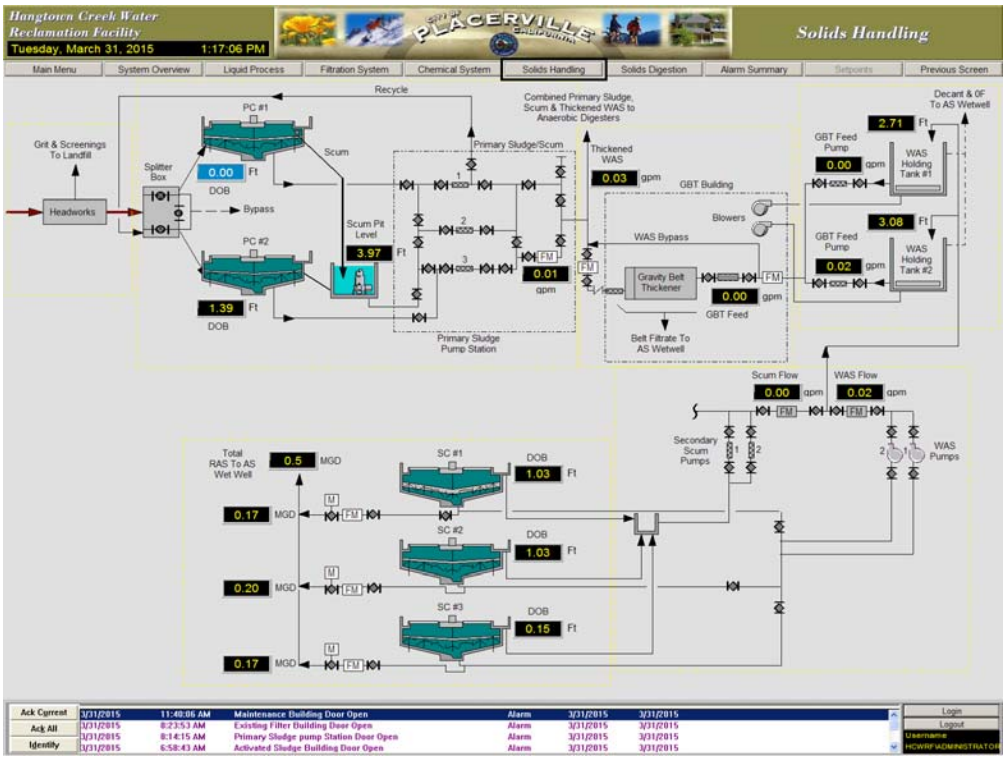

Figure 28 - Process Flow Diagrams - Solids Handling

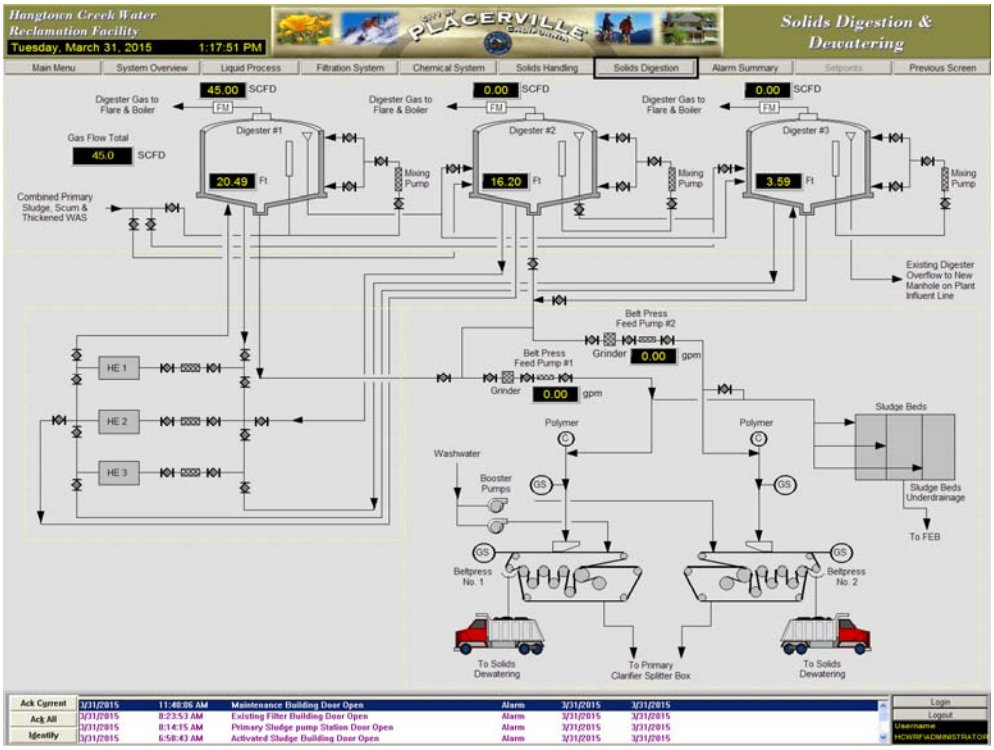

Figure 29 - Process Flow Diagrams - Solid Digestion & Dewatering

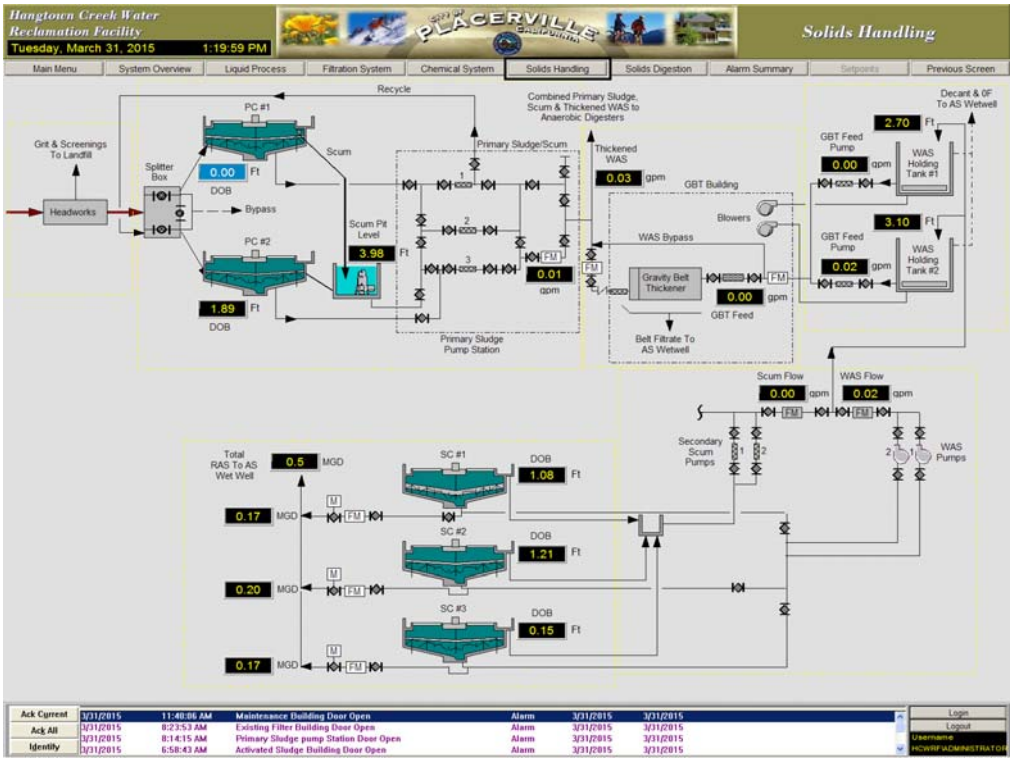

Figure 30 - Process Flow Diagrams - Solids Handling

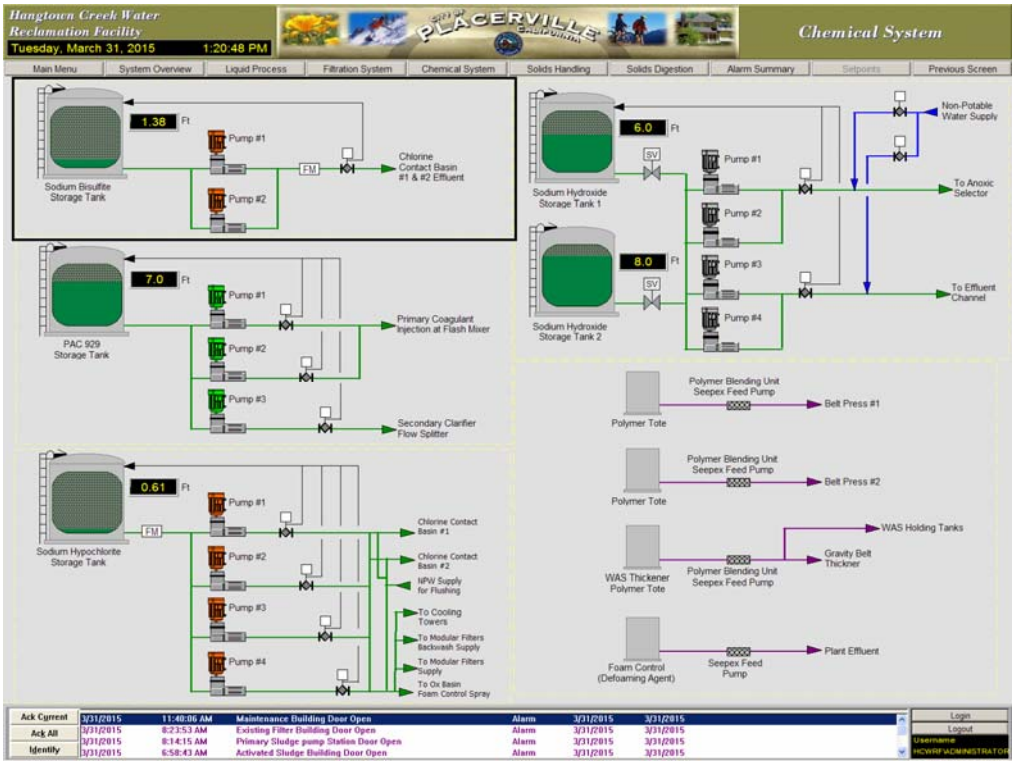

Figure 31 - Process Flow Diagrams - Chemical System

After screening, de-gritting and primary clarification, secondary treatment consists of activated sludge with fine bubble aeration. There is one 100 HP blower and three 75 HP multistage compound blowers in place. These use inlet guide vanes and there are no VFD's on the blowers. Because of their sizing, during low flow conditions, the blowers introduce excess oxygen into the process which results in over-aeration. This results in increased electrical costs.

Some of the internal recirculation pumps are also oversized relative to low flow needs. As a result, during low flow conditions, excessive internal recycling occurs in the process which is unnecessary.

Tertiary treatment consists of ultraviolet disinfection (UV) and filtration. Three cooling towers are used to cool the water to approximately 68 °F to 72 °F before it is released into Coolwater Creek.

It should be noted that the cooling towers cannot cool the treated effluent sufficiently to meet permit requirements on many occasions. This causes the towers to operate at full speed most of the time, which is wasteful of energy.

The facility contains an NPDES permit for effluent discharge into Cool water creek. There is no re-use of the discharged treated effluent for irrigation or other purposes.

Solids treatment consists of thickening, digestion and dewatering prior to being hauled off site for beneficial use. Solids digestion is performed anaerobically. One of the byproducts of the anaerobic digestion process is the production of methane gas. Currently, only about 25% of the

methane gas is being used for process heating purposes by using a conventional boiler to heat water for the process. The remaining gas with a heating content of 8,000 MMBTU is being flared.

Digested Solids are dewatered with a belt filter press which achieves about 14% solids. The plant produces about 30 tons of sludge per week which is trucked by Synargo West to be used as Class B fill at local farms at a cost of $20 per ton.

The plant is operating at a reasonably low hydraulic and biological capacity. During peak flows, it is only operating at 30% of its design capacity. During minimum flow conditions, it operates at less than 10% of design capacity. The low flow conditions make it difficult for the plant operators to be able to control the processes due to the oversizing of equipment and the relatively few Variable Frequency Drives (VFD's) in place. This contributes to high electrical and chemical costs due to oversized equipment. With improvements this situation could be better optimized for the current operation.

Control Systems

The WWTP has a full complement of SCADA controls.

Utility Services and Energy Use Analysis

Electrical Power Service

Electrical power is provided by Pacific Gas & Electric (PG&E). The main electrical service enters the site at two locations and with the 12kV feeds terminating in PG&E transformers. The secondary side of the transformers provides 460 VAC electrical service to the Plant. The site has two electrical meters.

The WWTP also has two backup diesel generators. The details of the generator permit regarding operating hour maximums were not given. It is run periodically for maintenance verification purposes.

Utility Meters and Rate Plan

The WWTP site is on two different rate plans.

Meter 1 is on the PG&E E19SX rate plan and has a SAiD Account Number of 1033034275. The Meter Number is 1009486051. Meter 2 is on the PG&E HE19SX rate plan and has a SAiD Account Number of 4796220555. The Meter Number is 1006734002. Both meter addresses are at 2300 Coolwater Creek Road.

The (H) E19SX tariff is a Time-of-Use (TOU) rate plan. The rate plan is based on variable cost electrical energy consumption charges based on the time of day that the electricity is used. There are Demand Charges. Components of the rate plan as shown in the Table below.

Rate Schedule	Customer Charge	Season	Time-of-Use Period	Demand Charge (per kW)	Time-of-Use Period	Energy Charges (per kWh)
(H)E 19 S	$19.71 per meter per day	**Summer**	Peak	$19.03	Peak	$0.16533
			Part-Peak	$4.42	Part-Peak	$0.11193
			Maximum	$13.67	Off-Peak	$0.07697
		Winter	Part-Peak	$0.24	Part-Peak	$0.10485
			Maximum	$13.67	Off-Peak	$0.08097

Table 12 - (H) E19SX Rate Plan Summary

The TOU components change on a seasonal basis. Summer time rates are far higher than Winter Rates. The Schedule used is shown below. The Summer Season is defined as May 1st through October 31st. The Winter Season is defined as November 1st through April 30th.

Time-of-Use of Schedule		
Summer	**Time**	
Peak	1:200 to 18:00	Monday through Friday (except holidays)
Partial Peak	08:30 to 12:00	Monday through Friday (except holidays)
	18:00 to 21:30	Monday through Friday (except holidays)
Off Peak	21:30 to 08:30	Monday through Friday (except holidays)
	All Day	Saturday, Sunday and Holidays
Winter	**Time**	
Partial Peak	08:30 to 21:30	Monday through Friday (except holidays)
Off Peak	09:30 to 20:30	Monday through Friday (except holidays)
	All Day	Saturday, Sunday and Holidays

Table 13 - Time-of-Use Schedule.

Electrical Usage Patterns

Based on one year of electrical bill analysis through the end of February of 2015, the total electrical consumption is 2,492,072 kWh per year with a cost of $374,212 in the last twelve months. The blended electrical cost for this location is $0.150 per kWh.

Electrical energy consumption, expressed in kWh, shows a relatively flat profile on a month to month basis with a slight elevation in the summer months. The graph below shows monthly electrical consumption averages around 200,000 kWh per month. The blended electrical cost has extreme seasonal variation due to the summer and winter unit energy cost differences and unit demand charge differences in the E19 tariff.

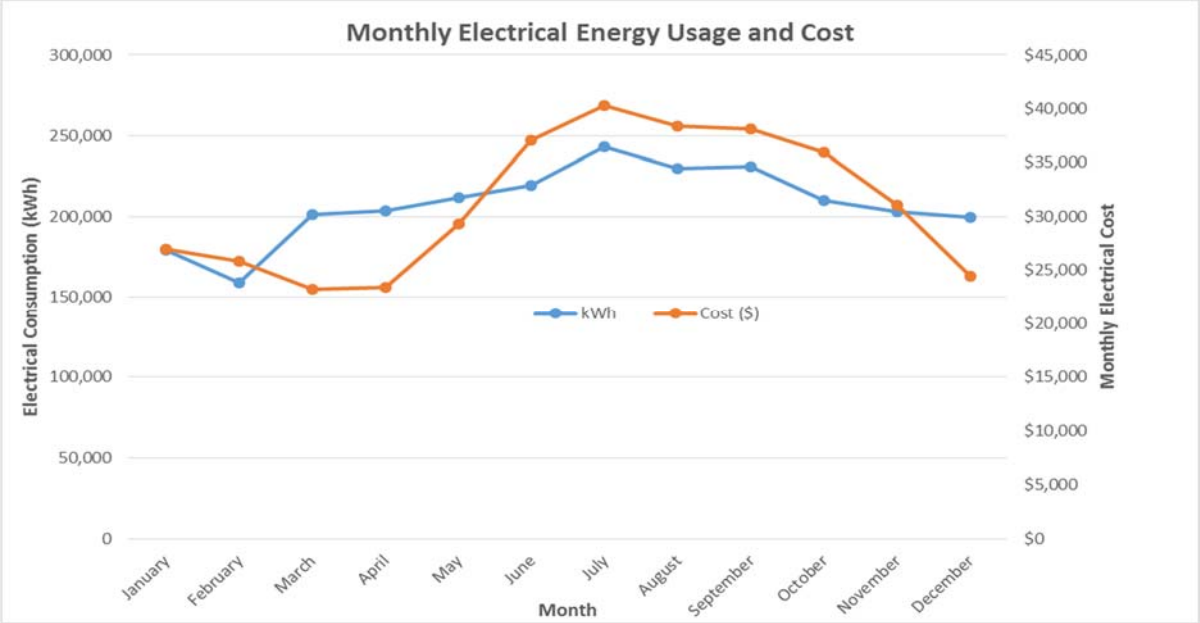

Figure 32 - Electrical Consumption and Cost by Month

According to PG&E, there is no information available for 15 minute interval demand data. This will need to be investigated more fully during the Detail Development phase.

Potential Facilities Improvement Measures (FIM's)

The prices and savings estimates given are for budgetary purposes only and are NOT intended to be Firm, Fixed, and Guaranteed Maximum Price (GMP) estimates. These estimates were arrived at using "Rules of Thumb" estimating methods and are intended only to show the relative viability of each FIM based on Simple Paybacks. The values given should be within +/-25% of the final costs, subject to Scope of Work changes arrived at in the Investment Grade Audit. More development work will be required during the Investment Grade Audit Phase to finalize Scopes of Work so firm, fixed pricing and savings can be obtained.

30. Installation of PV on Hill North of WWTP

The WWTP currently uses 2,492,072 kWh of electrical energy per year. It is possible to install a PV array on the hill on the north side of the plant which is City owned. Assuming 1,400 kWh per kW of solar production based on insolation data in the Placerville area and an 80% target yield, the new PV array would be 1.7 MW DC in size and would require about 3 ½ acres of space. Total annual production would be 1,994,687 kWh.

Cost: The estimated cost to install the PV system would be $5,200,000

Benefits: It is estimated that the PV array would offset about $300,000 of electrical cost annually.

Rebates: CSI PBI rebates are no longer available in the PG&E territory.

31. Optimize the Anaerobic Digesters

Currently both primary and secondary digestion is done in the #1 Digester. The #2 Digester is used as an overflow. It is recommended to make the #1 digester a batch operation and use the #2 digester as a decanter for sludge removal. This would reduce power consumption, stabilize their process and reduce chemical costs.

Cost: It is estimated that the new pumps and VFD's would cost approximately $140,000

Benefits: It is estimated that there would be an annual savings of $20,000 in energy, $5,000 in sludge removal costs and $2,000 in chemical savings

Rebates: Depending on the program and the eligibility level, the City of Placerville would be eligible for $14,000 in Rebates

32. Smaller Blower Motor with VFD Control

There are currently three 75 HP multi-stage blowers and one 100 HP blower using inlet guide vane controls in place. During low flow conditions, the blowers overproduce and introduce excess DO into the aeration tanks. When the WWTP operates at less than 10% of capacity at low influent flow conditions and because of the lack of low speed control on the blowers, more air is introduced to the process than is optimum. This provides more air than what is biologically required, which makes it more costly overall to operate.

It is recommended to replace one of the 75 HP blowers with a 50 HP turbo-blower with VFD control. This would allow the plant to deliver the correct amount of air to maintain Dissolved Oxygen (DO) levels at target levels at low flow conditions and to trim levels at higher flow conditions.

Cost: The estimated cost of installing a 50 HP blower and VFD is about $194,000**.**

Benefits: The estimated annual electrical energy savings is $32,000

Rebates: Depending on the program and the eligibility level, the City of Placerville may be eligible for $30,000 to $15,000 of Rebates

33. Installation of Sludge Dryer

The WWTP currently hauls 30 tons of digested solids at 14% solids to landfill each week. This is the limit of what the current equipment (belt filter press) can dewater the sludge to. The hauling costs are given as $20 per ton.

It is proposed that a sludge drier be installed to dry the sludge to close to a bone dry condition before hauling. The source of fuel for the oven would be the flare gas that is currently being burned off.

Cost: The estimated cost of installing a drying oven is about $350,000

Benefits: It is estimated that there would be an annual reduction of 1,560 tons in hauling weights for an approximately savings of $31,000 annually.

Rebates: There would be no rebates available for this measure

34. Automated Demand Response (ADR) Participation

There is a large equalization basin that is available to handle overflows if any energy event is called. Using the basin as overflow during an event could result in substantial payments based on participation in an ADR program. It is possible for the WWTP to participate in an ADR program based on the Rate Plan and the Peak Demand amounts shown on both of the meters. It is proposed to participate and reduce load by up to 50kW per meter by programming the SCADA system to respond in a predetermined manner if an event is called. Details will need to be confirmed during the Detail Development study.

It should be noted that the WWTP has participated in ADR programs in the past, but the cost of the resultant overtime outweighed the benefit received. There would need to be changes made to the SCADA system to automate more functions for this to be viable.

Cost: $0

Benefits: It is estimated participation in the ADR program at 200kW would result in a savings of approximately $3,000 annually.

Rebates: None

35. Peak Demand Limiting

The WWTP has electrical demand spikes based on operating patterns. The WWTP has over 600 kW of peak demand on the two meters. Currently, 15 minute interval data is not available. The timing of many of the plant processes which are high energy users, such as filter backwashes, are discretionary. It is recommended that the Demand be monitored and capped by the SCADA system to minimize monthly demand charges. It is proposed that the operating sequences do demand clamping and temporarily operate at a lower speeds cap to reduce monthly demand charges. This is especially critical in the summer.

The SCADA system is fully capable of monitoring and controlling these demand spikes based on changes to the Sequence of Operation by monitoring the drive kW point.

Cost: The WWTP would add kW meter points and make programming changes to the SCADA system. Estimated cost is about $30,000

Benefits: It is estimated that a monthly demand reduction of 50 kW in the summer and winter months would yield approximately $9,000 of savings in demand charges annually.

Rebates: A rebate of $150 per kWh per month would apply for peak demand limiting. This would apply in the summer months and would result in an annual payment worth $7,500 based on a 50 kW reduction.

36. Modify Effluent Permit and Reduce Cooling Costs

The effluent water exit temperatures to the creek are specified in the Permit to be as low 58 degrees Fahrenheit. Three Cooling Towers with 20 HP motors are being used to try to cool the effluent to the required temperatures, but the equipment is not capable of consistently doing this based on the design and the ambient wet bulb temperatures. The cooling towers are being run near full capacity in an attempt to do this, but this only ends up wasting energy in the process. It is recommended that a permit change be applied for and, if allowed, the cooling tower speeds could be reduced as a result.

Cost: The cost of changing the permit and making control changes.

Benefits: It is estimated that a monthly demand reduction of 50 kW in the summer months would yield approximately $28,000 of savings annually.

Rebates: A rebate of $150 per kWh per month would apply for peak demand limiting. This would apply in the summer months and would result in an annual payment worth $90,000 based on a 100 kW reduction.

9. Grant and Rebate Incentive Programs

Prop-1 Water Programs

On November 4, 2014 Proposition 1 was approved for $7.5 billion general obligation bond measure that will fund investments in water projects and programs as part of a statewide comprehensive water plan. Bond funds will be distributed through a competitive grant process overseen by multiple State Agencies, such as the California State Water Resources Control Board, California Water Commission, and Department of Water Resources.

The passage of Prop. 1 has opened up a great opportunity for local governments to address energy efficiency and water infrastructure priorities. Johnson Controls, Inc. will provide a turn-key approach to help the City of Placerville apply for and access grant dollars to support their water efficiency projects.

The amount of funding available needs to be confirmed with the State Agencies. The funds are available on conservation measures such as water systems, water storage, or irrigation system improvements in public areas, buildings and parks. Additional information will be provided during the detailed study.

PG&E Programs

1. Peak Demand Limiting – PG&E will pay $150/kW per month for reductions in peak demand. This would be based on the average of the peak demand loads on the monthly bill based on the last twelve months.

2. Automated Demand Response - PG&E offers incentives through 3rd party providers for participation in the Automated Demand Response (ADR) program. There must be a control system capable of responding to an event signal. Participation in the ADR program will result in payments of $15 per kW per month for the summer peak season. Payments are based on the amount of participation and block size committed to. Participation is on an Event basis, with an average of about six events being called each year.

3. There are options for Express and Deemed Rebates through PG&E's 3rd party rebates provider in the area, the Sierra Nevada energy watch. In general, the rebates average $0.11 per kWh.

4. There are special rebates available to Cities that need to be investigated with PG&E. These can range from $0.12 to $0.18 per kWh, dependent on participation level.

10. Preliminary Financial Analysis

The prices and savings estimates given in the Table below are for budgetary purposes only and are NOT intended to be Firm, Fixed, and Guaranteed Maximum Price (GMP) estimates. These estimates were arrived at using “Rules of Thumb” estimating methods and are intended only to show the relative viability of each FIM based on Simple Paybacks. The values given should be within +/-25% of the final costs, subject to Scope of Work changes arrived at in the Investment Grade Audit. More development work will be required during the Investment Grade Audit Phase to finalize Scopes of Work so firm, fixed pricing and savings can be obtained.

FIM Number	FIM Description	Estimated Annual Savings	Annual O&M Savings/Cost	Asset Useful Life	Rough Order Magnitude Cost	Rebates	Simple Payback
City Wide Improvement Measures							
1	Purchase LS-1 Streetlights from PG&E and Retrofit with LED	23,764	36,305	18	886,809	8,914	14.6
2	Optimize Electric Rate Tariffs	3,310	-	15	5,370	-	1.6
3	RESBCT Photovoltaics	95,164	-	25	1,929,053	-	20.3
4	Convert City Fleet to Propane						
5	Photovoltaics for Irrigation systems						
	Subtotal	**$ 122,238**	**$ 36,305**		**$ 2,821,232**	**$ 8,914**	**17.7**
Building Improvement Measures							
10	Interior Lighting Retrofit	25,583	-	14	74,669	20,162	2.1
11	Exterior Lighting Retrofit	5,711	3,000	18	82,596	4,666	8.9
12	Parking Garage Lights	11,704	-	15	8,745	-	0.7
13	Replace Package Unit Heat Pumps	12,388	500	15	289,086	14,205	21.3
14	Replace Standard Telephone Service with VoIP	10,050	-	10	151,426	-	15.1
15	Parking Garage Covered Parking and PV	6,410	-	25	279,985	-	43.7
16	Intelligent Parking Meters						
17	Re-Air Balance Building						
18	Upgrade Building Controls						
19	Pool Pump Controls						
20	Interior Lighting Controls						
	Subtotal	**$ 71,847**	**$ 3,500**		**$ 886,507**	**$ 39,032**	**11.2**
Water Improvement Measures							
20	AMI Meter Installation	48,456	52,500	20	2,423,625	-	24.0
21	Pipe Replacement/Leak repairs/replace CIP expenditure				500,000	-	
22	Leak Detection	31,920	-	15	380,060	-	11.9
	Subtotal	**$ 80,376**	**$ 52,500**		**$ 3,303,685**	**$ -**	**24.9**
WWTP Improvement Measures							
30	Photovoltaic Array	299,505	-	25	5,222,318	-	17.4
31	Modify Anaerobic Digestion Process	19,245	7,000	20	140,650	14,434	4.8
32	Add smaller blower and install VFD on blower	32,850	-	20	194,000	19,710	5.1
33	Installation of Sludge Drying Oven	26,676	(2,000)	15	329,850	-	13.4
34	ADR	3,000	-	20	3,325	-	1.1
35	Peak Demand Limiting	9,810	-	20	30,325	7,500	2.3
36	Modify Permit, Reduce cooling costs	28,032	-	20	87,450	-	3.1
37	Power factor correction						
38	Jockey Pump for Non-Potable water						
39	Chem Feed management at Headwork						
40	UV Lamp Management						
41	Repair underground air leak						
	Subtotal	**$ 419,118**	**$ 5,000**		**$ 6,007,918**	**$ 41,644**	**15.7**
	Total	**$ 693,579**	**$ 97,305**		**$ 13,019,343**	**$ 89,590**	**16.3**

Primary Measures (Water Meter, PV & Solar, Lighting, HVAC)
Measures found during the initial site visit and recommended for further investigation during the detailed phase of the design

Table 14 - Financial Summary

Financial Analysis

Based on information provided to Johnson Controls from the City of Placerville we have provided a sample Business Case Analysis to illustrate what the initial level of savings/cost avoidance would support. Inputs used in the analysis are described in the following paragraph. A full engineering study is necessary to determine actual guaranteed savings figures which will also deliver a guaranteed maximum cost for a turn-key project.

- Average annual utility escalation rate is 4%
- Average annual water rate increase of 1%
- Operational Savings Percentage annual increase of 3%
- Measurement and Verification annual percentage increase of 3%
- Average Inaccuracy of Water Meters assumed is 4.5% based on AWWA Water Audit for City of Placerville
- City of Placerville's single-family residential water base charge is $27.56, and its commodity charge is $2.94 per ccf water volume billing charge per bi-monthly billing cycle.
- Any applicable rebates and grants are estimates and subsequently not guaranteed.

Based on the preliminary analysis and list of measures identified and validated with the City of Placerville staff, a turn-key solution with Johnson Controls for an energy performance contract is estimated to cost $13,000,000.

As the state of California financial rules have changed with regards to financing projects Johnson Controls has requested preliminary financing alternatives related to detailed information relating to debit services.

Although Johnson Controls is not a financial advisor, we have a structured finance group that explains financing options to our customers. The team is able to respond to the special characteristics of each project in order to identify customized financing options for our customers. It is important to note that Johnson Controls does not make any money on financing. We arrange financing purely to assist our customers. The Johnson Controls structured finance team wants to match the right financing structure with what is best for the customer and most appropriate for the project and City. Johnson Controls has a relationship with over 30 lenders and investors partners in California. Holman Capital Corporation and Wulff, Hansen & Company are two of firms who assisted with the financial analysis below.

All options below are sized to include the cost of the project plus all of the estimated costs of the financing. They are based on current interest rates available in the market place during the period between June 1 and June 24, 2015. The Costs of the financing are representative of similar financings issued during the same period. Both the interest rates and costs of financing are not guaranteed and would be determined closer to the time of issuance of the financing.

1. Table 16 illustrates a 15 year Private Placement (Bank Financing) in the amount of $13,024,343. The lower amount reflects the lower issuance costs that are needed in a private placement vs a public offering. This option will provide an estimated $11,782,002 in excess revenue after debt service over 25 year life-cycle benefit and a financing rate of approximately 3.9%.

2. Table 15 illustrates a 20 year Private Placement (Bank Financing) in the amount of $13,024,343. This amount reflects the lower issuance costs that are needed in a private placement vs a public offering. This option will provide an estimated $9,278,033 in excess revenue after debt service over 25 year life-cycle benefit and a financing rate of approximately 4.1%

3. Table 18 illustrates a 20 year Bond(s) (Public Offering) in the amount of $13,470,912. This option will provide an estimated $8,742.403 in excess revenue after debt service and an overall estimated interest rate of approximately 3.70%. The yearly excess revenues are lower in the early years than the 20 year option but higher in the later years.
4. Table 19 illustrates a 25 year Bond(s) (Public Offering) in the amount of $13,471,648. This option will provide an estimated $4,697,442 in excess revenue after debt service and an overall estimated interest rate of approximately 4.20%. The yearly excess revenues are lower in the early years than the 20 year option but higher in the later years

Following Table 15 – Financial Summary Options, provides a more complete analysis on each of the options in more detail relating to revenues, debt service and excess revenues.

City of Placerville
2015 Financing Project
AVAILABLE REVENUE COMPARISON TABLE
Prepared for Johnson Controls, Inc. by Wulff, Hansen & Co. and Holman Capital Corp.
All figures are estimates and subject to change with capital markets
5/6/2015

Year	25 Year Public Offering	20 Year Public Offering	15 Year Private Placement	20 Year Private Placement
Installation	-	-	-	-
1	179,227	27,213	(205,702)	52,121
2	183,699	25,332	(213,403)	54,074
3	188,241	26,624	(216,461)	52,069
4	189,708	25,141	(216,844)	52,618
5	188,847	24,079	(214,506)	50,769
6	187,852	23,284	(212,201)	53,939
7	189,597	25,630	(215,955)	50,435
8	189,264	24,047	(216,788)	54,754
9	187,005	26,288	(214,647)	51,778
10	188,124	27,406	(214,479)	51,904
11	188,469	23,501	(215,284)	50,981
12	189,143	24,728	(212,417)	54,128
13	188,922	26,237	(215,808)	50,987
14	187,690	27,430	(215,090)	51,970
15	190,804	23,684	(215,196)	52,144
16	188,456	25,581	1,249,096	51,754
17	185,920	27,858	1,299,060	51,045
18	188,533	25,860	1,351,023	50,268
19	186,449	25,139	1,405,064	54,674
20	190,216	26,066	1,461,266	54,346
21	190,467	1,519,717	1,519,717	1,519,717
22	187,005	1,580,505	1,580,505	1,580,505
23	186,726	1,643,726	1,643,726	1,643,726
24	189,975	1,709,475	1,709,475	1,709,475
25	187,104	1,777,854	1,777,854	1,777,854
	$ 4,697,442	**$ 8,742,403**	**$ 11,782,002**	**$ 9,278,033**
NPV	**$ 2,965,214**	**$ 4,001,415**	**$ 5,549,967**	**$ 4,493,486**

Table 15 - Financial Summary Options

City of Placerville
2015 Financing Project
5/6/2015
Prepared for Johnson Controls, Inc. by Holman Capital Corporation
All figures are estimates and subject to change with capital markets

15-Year Private Placement Scenario

Issue Amount: $13,024,343

	Revenue				Expenses							
Year	Annual Energy Savings	O&M	PG&E Rebates	**Total Revenues**	M&V Performance Reporting (JCI Guarantee)	O&M Services	**Total Expenses**	**Net Annual Cash Flow**	**Debt Service**	**Available Revenues**	**Present Value to 06/15/2015 @ 3.000102%**
Installation	-	-	-	-	-	-	-	-	-	-	
1	693,579	97,305	89,590	**880,474**	75,000	-	75,000	805,474	1,011,177	(205,702)	(199,899)
2	721,322	100,225	-	**821,547**	77,250	-	77,250	744,297	957,700	(213,403)	(201,298)
3	750,175	103,231	-	**853,406**	79,568	-	79,568	773,839	990,300	(216,461)	(198,192)
4	780,182	106,328	-	**886,510**	81,955	-	81,955	804,556	1,021,400	(216,844)	(192,717)
5	811,389	109,518	-	**920,907**	84,413	-	84,413	836,494	1,051,000	(214,506)	(185,046)
6	843,845	-	-	**843,845**	86,946	-	86,946	756,899	969,100	(212,201)	(177,687)
7	877,599	-	-	**877,599**	89,554	-	89,554	788,045	1,004,000	(215,955)	(175,525)
8	912,702	-	-	**912,702**	92,241	-	92,241	820,462	1,037,250	(216,788)	(171,032)
9	949,211	-	-	**949,211**	95,008	-	95,008	854,203	1,068,850	(214,647)	(164,375)
10	987,179	-	-	**987,179**	97,858	-	97,858	889,321	1,103,800	(214,479)	(159,427)
11	1,026,666	-	-	**1,026,666**	-	-	-	1,026,666	1,241,950	(215,284)	(155,330)
12	1,067,733	-	-	**1,067,733**	-	-	-	1,067,733	1,280,150	(212,417)	(148,766)
13	1,110,442	-	-	**1,110,442**	-	-	-	1,110,442	1,326,250	(215,808)	(146,706)
14	1,154,860	-	-	**1,154,860**	-	-	-	1,154,860	1,369,950	(215,090)	(141,928)
15	1,201,054	-	-	**1,201,054**	-	-	-	1,201,054	1,416,250	(215,196)	(137,832)
16	1,249,096	-	-	**1,249,096**	-	-	-	1,249,096	-	1,249,096	776,566
17	1,299,060	-	-	**1,299,060**	-	-	-	1,299,060	-	1,299,060	783,934
18	1,351,023	-	-	**1,351,023**	-	-	-	1,351,023	-	1,351,023	791,371
19	1,405,064	-	-	**1,405,064**	-	-	-	1,405,064	-	1,405,064	798,879
20	1,461,266	-	-	**1,461,266**	-	-	-	1,461,266	-	1,461,266	806,458
21	1,519,717	-	-	**1,519,717**	-	-	-	1,519,717	-	1,519,717	814,109
22	1,580,505	-	-	**1,580,505**	-	-	-	1,580,505	-	1,580,505	821,833
23	1,643,726	-	-	**1,643,726**	-	-	-	1,643,726	-	1,643,726	829,630
24	1,709,475	-	-	**1,709,475**	-	-	-	1,709,475	-	1,709,475	837,501
25	1,777,854	-	-	**1,777,854**	-	-	-	1,777,854	-	1,777,854	845,446
	$ 28,884,722	**$ 516,608**	**$ 89,590**	**$ 29,490,920**	**$ 859,791**	**$ -**	**$ 859,791**	**$ 28,631,129**	**$ 16,849,127**	**$ 11,782,002**	**$ 5,549,967**

Table 16 - 15 Year Private Placement Scenario

City of Placerville
2015 Financing Project
5/6/2015
Prepared for Johnson Controls, Inc. by Holman Capital Corporation
All figures are estimates and subject to change with capital markets

20-Year Private Placement Scenario

Issue Amount: $13,024,343

	Revenue				Expenses						
Year	Annual Energy Savings	O&M	PG&E Rebates	**Total Revenues**	M&V Performance Reporting (JCI Guarantee)	O&M Services	**Total Expenses**	**Net Annual Cash Flow**	**Debt Service**	**Available Revenues**	**Present Value to 06/15/2015 @ 3.450101%**
Installation	-	-	-	-	-	-	-	-	-	-	-
1	693,579	97,305	89,590	**880,474**	75,000	-	75,000	805,474	753,353	52,121	50,435
2	721,322	100,225	-	**821,547**	77,250	-	77,250	744,297	690,223	54,074	50,566
3	750,175	103,231	-	**853,406**	79,568	-	79,568	773,839	721,770	52,069	47,053
4	780,182	106,328	-	**886,510**	81,955	-	81,955	804,556	751,938	52,618	45,950
5	811,389	109,518	-	**920,907**	84,413	-	84,413	836,494	785,725	50,769	42,845
6	843,845	-	-	**843,845**	86,946	-	86,946	756,899	702,960	53,939	43,989
7	877,599	-	-	**877,599**	89,554	-	89,554	788,045	737,610	50,435	39,748
8	912,702	-	-	**912,702**	92,241	-	92,241	820,462	765,708	54,754	41,701
9	949,211	-	-	**949,211**	95,008	-	95,008	854,203	802,425	51,778	38,108
10	987,179	-	-	**987,179**	97,858	-	97,858	889,321	837,418	51,904	36,916
11	1,026,666	-	-	**1,026,666**	-	-	-	1,026,666	975,685	50,981	35,041
12	1,067,733	-	-	**1,067,733**	-	-	-	1,067,733	1,013,605	54,128	35,952
13	1,110,442	-	-	**1,110,442**	-	-	-	1,110,442	1,059,455	50,987	32,727
14	1,154,860	-	-	**1,154,860**	-	-	-	1,154,860	1,102,890	51,970	32,236
15	1,201,054	-	-	**1,201,054**	-	-	-	1,201,054	1,148,910	52,144	31,257
16	1,249,096	-	-	**1,249,096**	-	-	-	1,249,096	1,197,343	51,754	29,980
17	1,299,060	-	-	**1,299,060**	-	-	-	1,299,060	1,248,015	51,045	28,575
18	1,351,023	-	-	**1,351,023**	-	-	-	1,351,023	1,300,755	50,268	27,193
19	1,405,064	-	-	**1,405,064**	-	-	-	1,405,064	1,350,390	54,674	28,582
20	1,461,266	-	-	**1,461,266**	-	-	-	1,461,266	1,406,920	54,346	27,455
21	1,519,717	-	-	**1,519,717**	-	-	-	1,519,717	-	1,519,717	741,939
22	1,580,505	-	-	**1,580,505**	-	-	-	1,580,505	-	1,580,505	745,668
23	1,643,726	-	-	**1,643,726**	-	-	-	1,643,726	-	1,643,726	749,416
24	1,709,475	-	-	**1,709,475**	-	-	-	1,709,475	-	1,709,475	753,183
25	1,777,854	-	-	**1,777,854**	-	-	-	1,777,854	-	1,777,854	756,969
	$ 28,884,722	**$ 516,608**	**$ 89,590**	**$ 29,490,920**	**$ 859,791**	**$ -**	**$ 859,791**	**$ 28,631,129**	**$ 19,353,096**	**$ 9,278,033**	**$ 4,493,486**

Table 17 - 20 Year Private Placement Scenario

City of Placerville
2015 Financing Project
5/6/2015
Prepared for Johnson Controls, Inc. by Wulff, Hansen & Co.
All figures are estimates and subject to change with capital markets

20-Year Public Offering Bonds Scenario
Total Funds Required: $13,470,912
Issue Amount: $12,820,000

	Revenue				Expenses						
Year	Annual Energy Savings	O&M	PG&E Rebates	**Total Revenues**	M&V Performance Reporting (JCI Guarantee)	O&M Services	**Total Expenses**	**Net Annual Cash Flow**	**Debt Service**	**Available Revenues**	**Present Value to 06/15/2015 @ 3.576735%**
Installation	-	-	-	-	-	-	-	-	-	-	-
1	693,579	97,305	89,590	**880,474**	75,000	-	75,000	805,474	778,261	27,213	26,302
2	721,322	100,225	-	**821,547**	77,250	-	77,250	744,297	718,965	25,332	23,630
3	750,175	103,231	-	**853,406**	79,568	-	79,568	773,839	747,215	26,624	23,971
4	780,182	106,328	-	**886,510**	81,955	-	81,955	804,556	779,415	25,141	21,847
5	811,389	109,518	-	**920,907**	84,413	-	84,413	836,494	812,415	24,079	20,196
6	843,845	-	-	**843,845**	86,946	-	86,946	756,899	733,615	23,284	18,849
7	877,599	-	-	**877,599**	89,554	-	89,554	788,045	762,415	25,630	20,025
8	912,702	-	-	**912,702**	92,241	-	92,241	820,462	796,415	24,047	18,134
9	949,211	-	-	**949,211**	95,008	-	95,008	854,203	827,915	26,288	19,133
10	987,179	-	-	**987,179**	97,858	-	97,858	889,321	861,915	27,406	19,252
11	1,026,666	-	-	**1,026,666**	-	-	-	1,026,666	1,003,165	23,501	15,934
12	1,067,733	-	-	**1,067,733**	-	-	-	1,067,733	1,043,005	24,728	16,182
13	1,110,442	-	-	**1,110,442**	-	-	-	1,110,442	1,084,205	26,237	16,572
14	1,154,860	-	-	**1,154,860**	-	-	-	1,154,860	1,127,430	27,430	16,721
15	1,201,054	-	-	**1,201,054**	-	-	-	1,201,054	1,177,370	23,684	13,935
16	1,249,096	-	-	**1,249,096**	-	-	-	1,249,096	1,223,515	25,581	14,527
17	1,299,060	-	-	**1,299,060**	-	-	-	1,299,060	1,271,203	27,858	15,269
18	1,351,023	-	-	**1,351,023**	-	-	-	1,351,023	1,325,163	25,860	13,680
19	1,405,064	-	-	**1,405,064**	-	-	-	1,405,064	1,379,925	25,139	12,835
20	1,461,266	-	-	**1,461,266**	-	-	-	1,461,266	1,435,200	26,066	12,845
21	1,519,717	-	-	**1,519,717**	-	-	-	1,519,717	-	1,519,717	722,835
22	1,580,505	-	-	**1,580,505**	-	-	-	1,580,505	-	1,580,505	725,565
23	1,643,726	-	-	**1,643,726**	-	-	-	1,643,726	-	1,643,726	728,305
24	1,709,475	-	-	**1,709,475**	-	-	-	1,709,475	-	1,709,475	731,055
25	1,777,854	-	-	**1,777,854**	-	-	-	1,777,854	-	1,777,854	733,816
	$ 28,884,722	**$ 516,608**	**$ 89,590**	**$ 29,490,920**	**$ 859,791**	**$ -**	**$ 859,791**	**$ 28,631,129**	**$ 19,888,726**	**$ 8,742,403**	**$ 4,001,415**

Table 18 - 20 Year Public Offering Bonds Scenario

City of Placerville
2015 Financing Project
5/6/2015
Prepared for Johnson Controls, Inc. by Wulff, Hansen & Co.
All figures are estimates and subject to change with capital markets

25-Year Public Offering Bonds Scenario
Total Funds Required: $13,471,648
Issue Amount: 12,810,000

	Revenue				Expenses						
Year	Annual Energy Savings	O&M	PG&E Rebates	**Total Revenues**	M&V Performance Reporting (JCI Guarantee)	O&M Services	**Total Expenses**	**Net Annual Cash Flow**	**Debt Service**	**Available Revenues**	**Present Value to 06/15/2015 @ 3.869226%**
Installation	-	-	-	-	-	-	-	-	-	-	-
1	693,579	97,305	89,590	880,474	75,000	-	75,000	805,474	626,247	179,227	172,746
2	721,322	100,225	-	821,547	77,250	-	77,250	744,297	560,598	183,699	170,399
3	750,175	103,231	-	853,406	79,568	-	79,568	773,839	585,598	188,241	168,047
4	780,182	106,328	-	886,510	81,955	-	81,955	804,556	614,848	189,708	162,990
5	811,389	109,518	-	920,907	84,413	-	84,413	836,494	647,648	188,847	156,149
6	843,845	-	-	843,845	86,946	-	86,946	756,899	569,048	187,852	149,487
7	877,599	-	-	877,599	89,554	-	89,554	788,045	598,448	189,597	145,203
8	912,702	-	-	912,702	92,241	-	92,241	820,462	631,198	189,264	139,498
9	949,211	-	-	949,211	95,008	-	95,008	854,203	667,198	187,005	132,651
10	987,179	-	-	987,179	97,858	-	97,858	889,321	701,198	188,124	128,427
11	1,026,666	-	-	1,026,666	-	-	-	1,026,666	838,198	188,469	123,825
12	1,067,733	-	-	1,067,733	-	-	-	1,067,733	878,590	189,143	119,596
13	1,110,442	-	-	1,110,442	-	-	-	1,110,442	921,520	188,922	114,965
14	1,154,860	-	-	1,154,860	-	-	-	1,154,860	967,170	187,690	109,921
15	1,201,054	-	-	1,201,054	-	-	-	1,201,054	1,010,250	190,804	107,544
16	1,249,096	-	-	1,249,096	-	-	-	1,249,096	1,060,640	188,456	102,227
17	1,299,060	-	-	1,299,060	-	-	-	1,299,060	1,113,140	185,920	97,059
18	1,351,023	-	-	1,351,023	-	-	-	1,351,023	1,162,490	188,533	94,723
19	1,405,064	-	-	1,405,064	-	-	-	1,405,064	1,218,615	186,449	90,153
20	1,461,266	-	-	1,461,266	-	-	-	1,461,266	1,271,050	190,216	88,517
21	1,519,717	-	-	1,519,717	-	-	-	1,519,717	1,329,250	190,467	85,301
22	1,580,505	-	-	1,580,505	-	-	-	1,580,505	1,393,500	187,005	80,602
23	1,643,726	-	-	1,643,726	-	-	-	1,643,726	1,457,000	186,726	77,456
24	1,709,475	-	-	1,709,475	-	-	-	1,709,475	1,519,500	189,975	75,841
25	1,777,854	-	-	1,777,854	-	-	-	1,777,854	1,590,750	187,104	71,886
	$ 28,884,722	**$ 516,608**	**$ 89,590**	**$ 29,490,920**	**$ 859,791**	**$ -**	**$ 859,791**	**$ 28,631,129**	**$ 23,933,687**	**$ 4,697,442**	**$ 2,965,214**

Table 19 - 25 Year Public Offering Bonds Scenario

11. Next Steps

City of Placerville has clearly demonstrated a commitment to its employees and citizens to operate in the most efficient and safe manner while providing the many services that constituent's value and rely upon. While the City of Placerville has already started to identify steps and take action to reduce energy consumption in facilities, there are many opportunities remaining to reduce energy consumption, reduce operation and maintenance costs, and improve public perception through a guaranteed energy savings performance contract with Johnson Controls.

We believe we have identified significant opportunities for the City to increase operational efficiency, reduce overall costs, and improve the City's facility infrastructure. We would be pleased to proceed with you through the remaining process steps in order to fully develop a program that meets all of your needs and requirements.

Johnson Controls will provide the City of Placerville a Notice to Proceed with Step-2 of the Project Development Agreement to proceed with the next step of the process. The Notice to Proceed – Design and Cost Analysis, enables Johnson Controls to deploy the resources necessary to proceed with a comprehensive analysis of your facilities and operations, so that we may develop a final project proposal and Contract Documentation.

In summary, the Notice to Proceed states that:

1. If the project meets or exceeds your financial criteria then the City agrees to proceed with the work.

2. If the project meets or exceeds your financial criteria, but the City chooses not to proceed, then the City agrees to pay Johnson Controls a specific amount for work performed in the Notice to Proceed in the Agreement.

3. If the project cannot meet the City's financial criteria, then the City pays nothing for the Detailed Design and Cost Analysis and will have no further obligation to Johnson Controls.

We thank you for allowing us the opportunity to learn more about your facilities and look forward to a long and successful partnership in improving the facilities and operations for the City of Placerville.