CAMBRIA COMMUNITY SERVICES DISTRICT

Donn Howell, Chair of the Resources & Infrastructure Committee and Cindy Steidel, Chair of the Finance Committee, hereby call a Special Joint Meeting pursuant to California Government Code Section 54956. The Special Joint Meeting will be held: **Tuesday, May 14, 2019, 2:00 PM to 5:00 PM**, **1000 Main Street, Cambria, CA 93428.** The purpose of the Special Joint Meeting is to discuss or transact the following business:

NOTICE OF SPECIAL JOINT MEETING

RESOURCES & INFRASTRUCTURE COMMITTEE
FINANCE COMMITTEE

TUESDAY, MAY 14, 2019
2:00 PM to 5:00 PM
1000 Main Street
Cambria, CA

Copies of the staff reports or other documentation relating to each item of business referred to on the agenda are on file in the Office of the District Clerk, available for public inspection during District business hours. The agenda and agenda packets are also available on the CCSD website at www.cambriacsd.org. The District Office hours are Monday - Thursday, and every other Friday from 9:00 a.m. through 4:00 p.m. Please call 805-927-6223 if you need any assistance. If requested, the agenda and supporting documents shall be made available in alternative formats to persons with a disability. The District Clerk will answer any questions regarding the agenda.

1. **CALL TO ORDER**

2. **PUBLIC COMMENT ON AGENDA ITEMS**

3. **REGULAR BUSINESS**

   A. Introductions

   B. Discussion of Objectives for Joint Meeting

   C. Discussion of Resources and Infrastructure Committee CIP Prioritization
      I. Water Systems Priorities
      II. SWF System Priorities
      III. Wastewater System Priorities
      IV. PGE Turnkey Project – see addendum 1

   D. Discussion of Approach to Budgeting CIP within the 2019/2020 Budget

   E. Discussion of 2019/2020 follow-up Actions by Each Committee
      I. Final Evaluation of PGE Turnkey Project
      II. Other Actions Relating to Capital Projects Development

4. **ADJOURN**

Water CIP - Capital Improvement Program (Revised 5/6/2019 - For Discussion Only)

		Ranking	Project Cost	10 yr Cost
	Water Distribution System Projects			
1	Pressure Zone 2 to Zone 7 transmission main replacement @ SR Creek pedestrian bridge	1	$ 120,000	$ 120,000
2	Water Meter Replacements & Upgrades	1	$ 1,050,000	$ 1,050,000
3	Annual GIS updating & upgrades	1	$ 10,000	$ 100,000
4	Piney Way erosion control inspection report and follow-up protection efforts for existing pipeline	1	$ 10,000	$ 10,000
	Priority 1 Subtotal		**$ 1,190,000**	**$ 1,280,000**
5	Subzone metering of distribution system	2	$ 150,000	$ 150,000
6	Stuart Street Tank Replacement (125K gallon welded steel tank with new foundation)	2	$ 458,000	$ 458,000
	Priority 2 Subtotal		**$ 608,000**	**$ 608,000**
7	Replacement of problematic service lines within Leimert	3	$ 130,000	$ 130,000
8	Water Master Plan Amendment (revised fire flow modeling/tank sizing check)	3	$ 35,000	$ 35,000
9	Annual Water pipelines, pumps, and PRV repairs and replacements	3	$ 50,000	$ 500,000
10	Valve Replacements	3	$ 20,000	$ 20,000
	Priority 3 Subtotal		**$ 235,000**	**$ 685,000**
11	Inspection & spot repair to water transmission main under S. Parks wetlands area; or lining of transmission main plus study & predesign	4	$ 80,000	$ 80,000
12	Pine Knolls - Iva Court zone 1 pipeline expansion	4	$ 165,000	$ 165,000
	Priority 4 Subtotal		**$ 245,000**	**$ 245,000**
	Tank & Booster Pump Station Projects			
1	SCADA System - Long-term Water Portion	1	$ 250,000	$ 250,000
2	Electrical transfer switch and conduit to well SS-3	2	$ 25,000	$ 25,000
3	San Simeon well field generator replacement	2	$ 100,000	$ 100,000
	Priority 2 Subtotal		**$ 125,000**	**$ 125,000**
4	Rodeo Grounds Pump Station Replacement (aka Zone 2 Booster pump station)	3	$ 1,016,000	$ 1,016,000
	Water conservation			
1	Database for water conservation program/tracking with parcel links & APN file conversion	1	$ 10,000	$ 10,000
	Vehicles & Trailer Mounted-Equipment			
1	Vehicle Replacement Program Reserves (Accumulate Funds)	1	$ 25,000	$ 250,000
	Overhead Projects			
1	Contingency/reserves (Accumulate Funds)	1	$ 15,000	$ 150,000
			Grand Total	**$ 4,619,000**

Priority 1 Total	$ 1,940,000
Priority 2 Total	$ 733,000
Priority 3 Total	$ 1,701,000
Priority 4 Total	$ 245,000

SWF CIP - Capital Improvement Program (Revised 4/30/2019 - For Discussion Only)

		Ranking	Project Cost	10 yr Cost
	Permitting			
1	EIR consulting (follow up agency discussions to support the SWF's Regular CDP)	1	$ 10,000	$ 10,000
2	Section 7 ESA consulting, annual AMP report, & AMP update	1	$ 100,000	$ 100,000
	Priority 1 Subtotal		**$ 110,000**	**$ 110,000**
	Interim, short-term SWF Modifications			
1	Modifications to facilitate off-hauling RO waste (secondary containment, grading, rock, purchase tanks)			
	a) Secondary Containment, Grading, Rock	1	$ 20,000	$ 20,000
	b) Tank purchase	1	$ 80,000	$ 80,000
	Priority 1 Subtotal		**$ 100,000**	**$ 100,000**
	Advanced Water Treatment Plant			
1	Miscelaneous instrumentation / monitoring upgrades	2	$ 10,000	$ 10,000
2	Filters / membrane replacements (or build reserves for future)	2		$ -
	Priority 2 Subtotal		**$ 10,000**	**$ 10,000**
	Long-Term Improvement Modifications			
1	Consutling assistance for coordination with Army Corps on WRDA grant (meetings, redefine work plan, & update scope of work)	1	$ 40,000	$ 40,000
2	Future permanent mods at SWF for trailer fill station [transfer tanks, piping, & spill contrainment/loading pad] (1,2)	2	$ 200,000	$ 200,000
3	AWTP pull-barn style covers for outdoor equipment & control panels (1,2)	2	$ 50,000	$ 50,000
	Priority 2 Subtotal		**$ 250,000**	**$ 250,000**
4	Sems, Hach WIMS, or custom programmer for logging/reporting software and tablets (yr 1 is software/programming assistance)	3	$ 25,000	$ 25,000
5	Installation of remote sensing instrumentation at SS creek (needs access agreement with State Parks)	3	$ 10,000	$ 10,000
6	Solar Array System (1,2)	3	$ 375,000	$ 375,000
	Priority 3 Subtotal		**$ 410,000**	**$ 410,000**
			Grand Total	**$ 920,000**

Priority 1 Total	$ 250,000
Priority 2 Total	$ 260,000
Priority 3 Total	$ 410,000
Priority 4 Total	-

Wastewater CIP - Capital Improvement Program (Revised 5/6/2019 - For Discussion Only)

	Wastewater Projects	Ranking	Project Cost	10-Yr Cost
	Wastewater Treatment Plant Projects in SST			
1	Electrical Upgrades (ECM 7) - Conduits between PG&E transformer and service witchboard, switchboard, connections to existing switchboard, connections to generator)	SST	$ 232,500	$ 232,500
2	Secondary Water System (3W) Improvements (ECM 10) - Submersible pumps, hydrpneumatic tank, demo, electrical/I&C	SST	$ 185,000	$ 185,000
3	Sewer Lift Stations (ECM 12) - Lift Station B1, Lift Station B4, Electrical/I&C	SST	$ 3,945,000	$ 3,945,000
4	Influent Lift Station Modifications (ECM 2) - Bypassing; VFDs; Equipment & Material Demo; Pumps, guiderails, valves, and piping installation; upper concrete wet well deck & hatches (installation); electrical/I&C; new concrete and repair coatings	SST	$ 846,250	$ 846,250
5	Modified Ludzak-Ettinger Process Upgrade (ECM 3) - MLE conversion based on Carollo 2015 Study minus VFD costs; header repair	SST	$ 853,750	$ 853,750
6	Influent Flow Equalization (ECM 1) - New or refurbished EQ tanks based on Carollo 10% design	SST	$ 1,060,000	$ 1,060,000
7	Effluent Pump Station Improvements (ECM 11) - Demo; surge tank replacement; pump replacement; install new VFDs; flowmeter; discharge manifold piping; instrumentation; replace air release valves; pipeline cleaning and flushing; electrical/I&C	SST	$ 733,750	$ 733,750
8	RAS and WAS Pumping Improvements (ECM 5) - RAS pumping system; WAS pumping system; scum pumps replacement; skimming troughs replacement; electrical/I&C	SST	$ 496,250	$ 496,250
9	SCADA System (ECM 9) - New SCADA system based on Carolla 10% Design	SST	$ 721,250	$ 721,250
10	Backup Power (ECM 8) - 365 kW NG Generator; Demo; Propane backup	SST	$ 497,500	$ 497,500
11	Blower System Improvements (ECM 4) - Replace 2 blowers; duct replacement	SST	$ 1,345,000	$ 1,345,000
12	Sludge Thickening (ECM 6) - Rehabilitate rotary drum thickener and screw press; new transfer pumps; stabilization tanks; aeration system and control valve; demo of clarifiers; rolloff area with roof; electrical/I&C	SST	$ 961,250	$ 961,250
		Subtotal	**$ 11,877,500**	**$ 11,877,500**
	Treatment Plant Projects Not in SST			
1	Clarifier Repairs (replace eastern drive unit's metalic hubs with non-corrosive hubs)	1	$ 35,000	$ 35,000
	Collection System Projects			
1	Lift Station B-2 (Wood Dr./E. Lodge Hill) new control panel at grade el.	1	$ 425,000	$ 425,000
2	Lift Station B-3 (Green St./W. Lodge Hill) new control panel	1	$ 250,000	$ 250,000
3	Lift Station 4 (DeVault Pl/Seaclift Estates) VFDs /new elect panel & 3 phase pump motors	1	$ 85,000	$ 85,000
4	Five-Year Replacement and New PCs for operators	1	$ 10,000	$ 20,000
5	Annual manhole inspections and report on needed corrections (approx. 20% of system/yr)	1	$ 40,000	$ 400,000
6	Annual Collection System Phased televising & cleaning (revised 11/20/18 reduced cost by 50% & extended number of years - SSMP has this over 10 yrs,)	1	$ 50,000	$ 500,000
7	Lift Station A (Nottingham & Leighton/Park Hill) new submsersible pumps, MCC, bypass piping	1	$ 400,000	$ 400,000
8	Lift Station A (Nottingham & Leighton/Park Hill) control panel at grade el	1	$ 90,000	$ 90,000
9	Lift Station A-1 (Sherwood & Harvey/Marine Terrace) submersible pumps, MCC, bypass piping	1	$ 265,000	$ 265,000
		Subtotal	**$ 1,615,000**	**$ 2,435,000**
1	Lift Station B improvements (SR Creek/behind Park Hill) new control panel	2	$ 75,000	$ 75,000
2	Annual manhole raising due to street overlays & roadway work/Manhole cover replacements	2	$ 10,000	$ 100,000
		Subtotal	**$ 85,000**	**$ 175,000**
1	Annual Collection System Repairs to reduce I/I & damaged pipe sections	3	$ 50,000	$ 500,000
2	Lift Station B - new wet well, submersible pumps, and valve vault (placeholder)	3	$ 300,000	$ 300,000
3	Collection System Assessment software (E.g, t4 Spatial or other)	3	$ 10,000	$ 10,000
4	Annual Collection System Assessment/engineering for repairs (extended number of years - SSMP has this occurring over 10 yrs)	3	$ 30,000	$ 300,000
5	Lift Station B-3 (Green St./W. Lodge Hill) submseribe pumps, MCC, bypass piping	3	$ 250,000	$ 250,000
6	Lift Station B - replace existing generator	3	$ 60,000	$ 60,000
		Subtotal	**$ 700,000**	**$ 1,420,000**
1	Annual SCADA System Maintenance or Upgrades - Collections System	4	$ 25,000	$ 25,000
2	Collection System smoke testing	4	$ 50,000	$ 50,000
		Subtotal	**$ 75,000**	**$ 75,000**
	Vehicles and Trailer- Mounted Equipment			
1	Pearpoint or equal TV inspection camera (removed cost from mid year total to meet reduced funding balance, 11/20/2018.)	1	$ 50,000	$ 50,000
2	Vactor truck - replace with new $430K truck that meets emssion requirements (7 yr loan @ 4.5%)	1	$ 518,000	$ 518,000
		Subtotal	**$ 568,000**	**$ 568,000**
3	Vehicle Replacement Program (Annual reserves)	3	$ 25,000	$ 250,000
4	Portable equipment replacement program - backhoes, generators and pumps (Annual reserves)	4	$ 15,000	$ 150,000
	Deferred Major Maintenance			
1	Cleaning of aeration basins (after screen installation)	1	$ 20,000	$ 20,000
2	Cleaning of pipelines from headworks to aeration tanks (after screen installation), including cleanout additions	1	$ 10,000	$ 10,000
		Subtotal	**$ 30,000**	**$ 30,000**
3	Western clarifier - Replace clarifier chain, wear shoes, skid plates, & sprockets	2	$ 40,000	$ 40,000
4	Eastern clarifer - Replace clarifier chain, wear shoes, skid plates, & sprockets	2	$ 40,000	$ 40,000

Wastewater CIP - Capital Improvement Program (Revised 5/6/2019 - For Discussion Only)

		Wastewater Projects	Ranking	Project Cost	10-Yr Cost
61	5	Repainting of WWTP	2	$ 30,000	$ 30,000
62	6	Repainting of lift station facilities	2	$ 10,000	$ 10,000
63			**Subtotal**	**$ 40,000**	**$ 40,000**
64					
65	7	Seal coat AC pavement at WWTP	4	$ 65,000	$ 65,000
66				**Grand Total**	**$ 17,120,500**

67	Priority 1 Total	$ 3,068,000
68	Priority 2 Total	$ 215,000
69	Priority 3 Total	$ 1,670,000
70	Priority 4 Total	$ 290,000
71	SST Total	$ 11,877,500

Cambria CSD

Preliminary Engineering Estimates

OPINION OF PROBABLE CONSTRUCTION COSTS

ECM 7 - WWTP Electrical Improvements

Item	Description	Quantity	Unit	Unit Price	Amount	
1	General Conditions (5%)	1	LS	$6,000	$6,000	
2	Electrical Upgrades	1	LS	$119,000	$119,000	
			Sub Total		$125,000	(1)
			Contingency	30%	$38,000	
			GC overhead, profit and risk	18%	$23,000	
			Sales Tax (based on 8.7%)		$0	(2)
			Total Construction Cost		$186,000	
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$46,500	
			Total Project Cost		$232,500	
			Annual Energy Savings			

(1) The service transformer and conductors from the transformer to CCSD's service equipment is typically furnished and installed by PG&E. Our opinion of probable construction cost for the conduits between the PG&E transformer and the service switchboard, the service switchboard itself, the connections to the existing service switchboard, and the connections to the on site generator is $125,000. This is as quoted from an electrical contractor to a general contractor.

(2) Included in item 2 above

ECM 10 - WWTP Secondary Water System Improvements

Description	Quantity	Unit	Unit Price	Amount	
General Conditions (5%)	1	LS	$3,500	$3,500	
Submersible Pumps	2	LS	$25,000	$50,000	(1)
Hydropneumatic Tank	1	LS	$20,000	$20,000	
Demolition	1	LS	$10,000	$10,000	
Electrical/I&C (24%)	1	LS	$13,200	$14,000	
		Sub Total		$98,000	
		Contingency	30%	$29,000	
		GC overhead, profit and risk	18%	$18,000	
		Sales Tax (based on 8.7%)	3.5%	$3,000	(2)
		Total Construction Cost		$148,000	
Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$37,000	
		Total Project Cost		$185,000	
		Annual Energy Savings			

(1) requires revisions to wetwell, etc

(2) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

ECM 12 - Sewer Lift Stations

Item	Description	Quantity	Unit	Unit Price	Amount
1	General Conditions (5%)	1	LS	$99,200	$99,200
5	Lift Station B1 - Full Replacement	1	LS	$700,000	$700,000
8	Lift Station B4 - Full Replacement	1	LS	$900,000	$900,000
10	Electrical/I&C (24%)	1	LS	$384,000	$384,000
			Sub Total		$2,083,000
			Contingency	30%	$625,000
			GC overhead, profit and risk	18%	$375,000
			Sales Tax (based on 8.7%)	3.5%	$73,000 (1)
			Total Construction Cost		$3,156,000
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$789,000
			Total Project Cost		$3,945,000
			Annual Energy Savings		

(1) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

ECM 2 - WWTP Influent Lift Station Modifications

Item	Description	Quantity	Unit	Unit Price	Amount
1	General Conditions (5%)	1	LS	$11,700	$11,700
2	Bypassing (3 months)	1	LS	$75,000	$75,000
3	VFDs	3	LS	$5,000	$15,000
4	Equipment and Material Demolition	1	LS	$6,000	$6,000
5	Pumps, Guiderails, Valves, and Piping Installation	3	LS	$50,000	$150,000
6	Upper Concrete Wet Well Deck & Hatches - Installation	1	LS	$40,000	$40,000
7	Electrical/I&C (24%)	1	LS	$57,240	$58,000
8	Coatings (new concrete and repair coatings)	1067	SF	$85	$91,000
			Sub Total		$447,000
			Contingency	30%	$134,000
			GC overhead, profit and risk	18%	$80,000
			Sales Tax (based on 8.7%)	3.5%	$16,000 (1)
			Total Construction Cost		$0
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$0
			Total Project Cost		$0
			Annual Energy Savings		$0

(1) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

ECM 3 - WWTP MLE Process Conversion (Diffusers and Basin Mods)

Item	Description	Quantity	Unit	Unit Price	Amount	
1	MLE Conversion (Carollo 2015 Study minus VFD costs) (1)	1	LS	$425,837	$426,000	(1)
2	Header Repair	1	LS	$25,000	$25,000	
			Sub Total		$451,000	
			Contingency	30%	$135,000	
			GC overhead, profit and risk	18%	$81,000	
			Sales Tax (based on 8.7%)	3.5%	$16,000	(2)
			Total Construction Cost		$683,000	
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$170,750	
			Total Project Cost		$853,750	(3)
			Annual Energy Savings		$0	

(1) general conditions already included

(2) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

(3) Original Cost Opinion $584,080-199,900 (Nov 2014 ENR SF CCI = 10919.84) Escalated to September 2018 CCI = 12103.8

(4) This ECM includes: diffusers, divider walls, header pipe, mixers

ECM 1 - WWTP Influent EQ

Item	Description	Quantity	Unit	Unit Price	Amount	
1	Equalization (Carollo 10% Design) (1)	1	LS	$558,212	$559,000	
			Sub Total		$559,000	
			Contingency	30%	$168,000	
			GC overhead, profit and risk	18%	$101,000	
			Sales Tax (based on 8.7%)	3.5%	$20,000	(2)
			Total Construction Cost		$848,000	
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$212,000	
			Total Project Cost		$1,060,000	
			Annual Energy COST		-$7,563	

(1) Original Cost Opinion $930,000 (Nov 2014 ENR SF CCI = 10919.84) Escalated to September 2018 CCI = 12103.

(2) Calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

(3) Includes demo of steel tanks

ECM 11 - WWTP Effluent Pump Station Improvements

Item	Description	Quantity	Unit	Unit Price	Amount
1	General Conditions (5%)	1	LS	$13,700	$13,700
2	Demolition	1	LS	$5,000	$5,000
3	Surge tank replacement	1	LS	$30,000	$30,000
4	Pump Replacement	2	EA	$50,000	$100,000
5	Install New VFDs	2	EA	$20,000	$40,000
6	Flowmeter	1	EA	$10,000	$10,000
7	Discharge manifold piping	1	EA	$50,000	$50,000
8	Instrumentation	1	EA	$15,000	$15,000
9	Replace Air Release Valves (Number to be confirmed)	3	EA	$15,000	$45,000
10	Pipeline cleaning and flushing	1	EA	$25,000	$25,000
11	Electrical/I&C (24%)	1	LS	$52,800	$53,000
			Sub Total		$387,000
			Contingency	30%	$116,000
			GC overhead, profit and risk	18%	$70,000
			Sales Tax (based on 8.7%)	3.5%	$14,000 (1)
			Total Construction Cost		$587,000
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$146,750
			Total Project Cost		$733,750
			Annual Energy Savings		

(1) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

ECM 5 - WWTP RAS/Was Pumping Improvements

Item	Description	Quantity	Unit	Unit Price	Amount
1	General Conditions (5%)	1	LS	$7,700	$7,700
2	RAS Pumping system	2	EA	$50,000	$100,000
3	WAS Pumping system	2	EA	$30,000	$60,000
4	Scum Pumps replacement	2	EA	$20,000	$40,000
5	Skimming Troughs replacement	1	LS	$30,000	$30,000
6	Electrical/I&C (24%)	1	LS	$24,000	$24,000
			Sub Total		$262,000
			Contingency	30%	$79,000
			GC overhead, profit and risk	18%	$47,000
			Sales Tax (based on 8.7%)	3.5%	$9,000 (1)
			Total Construction Cost		$397,000
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$99,250
			Total Project Cost		$496,250
			Annual Energy Savings		

(1) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

ECM 9 - SCADA System

Item	Description	Quantity	Unit	Unit Price	Amount	
1	General Conditions (5%)	1	LS	$18,135	$18,200	
2	New SCADA System (Carollo 10% Design) (1)	1	LS	$262,698	$263,000	
3	Conduit and Ductbanks	1	LS	$100,000	$100,000	(1)
			Sub Total		$381,000	
			Contingency	30%	$114,000	
			GC overhead, profit and risk	18%	$69,000	
			Sales Tax (based on 8.7%)	3.5%	$13,000	(2)
			Total Construction Cost		$577,000	
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$144,250	
			Total Project Cost		$721,250	(3)
			Annual Energy Savings			

(1) from carollo report

(2) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

(3) Original Cost Opinion $237,000 (Nov 2014 ENR SF CCI = 10919.84) Escalated to September 2018 CCI = 12103.88.

ECM 8 - WWTP Backup Power Improvements

Item	Description	Quantity	Unit	Unit Price	Amount	
1	General Conditions (5%)	1	LS	$12,500	$12,500	
2	365 kW NG Generator	1	LS	$204,400	$205,000	(1)
3	Demolition	1	LS	$25,000	$25,000	
4	Propane Backup	1	LS	$20,000	$20,000	
			Sub Total		$263,000	
			Contingency	30%	$79,000	
			GC overhead, profit and risk	18%	$47,000	
			Sales Tax (based on 8.7%)	3.5%	$9,000	(2)
			Total Construction Cost		$398,000	
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$99,500	
			Total Project Cost		$497,500	
			Annual Energy Savings			

(1) assumes $560/kW

(2) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

ECM 4 - Blower System Improvements

Item	Description	Quantity	Unit	Unit Price	Amount	
1	General Conditions (5%)	1	LS	$33,800	$33,800	
2	Blower Replacement, 2 Blowers (1)	1	LS	$625,516	$626,000	
3	Duct Replacement	1	LS	$50,000	$50,000	
			Sub Total		$710,000	
			Contingency	30%	$213,000	
			GC overhead, profit and risk	18%	$128,000	
			Sales Tax (based on 8.7%)	3.5%	$25,000	(1)
			Total Construction Cost		$1,076,000	
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$269,000	
			Total Project Cost		$1,345,000	
			Annual Energy Savings		$0	

(1) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

(2) Reference: 2015 Large Integrated Audit Final Report (KW Engineering) - $576,500 original cost opinion (SF ENR CCI Dec 2015 = 11155.41) escalated to Sept 2018 CCI = 12103.88

(3) Energy cost assumes one 125-hp blower runs 365 days per yr at $0.13/kW-hr

ECM 6 - WWTP Sludge Thickening and Dewatering Improvements

Item	Description	Quantity	Unit	Unit Price	Amount	
1	General Conditions (5%)	1	LS	$19,700	$19,700	
2	Rehabilitate Rotary Drum Thickener and Screw Press	1	LS	$50,000	$50,000	
3	New Transfer Pumps	1	LS	$50,000	$50,000	
4	Stabilization Tanks	2	LS	$94,397	$189,000	
5	Aeration System and Control Valve	1	LS	$50,000	$50,000	
6	Demo of clarifiers	1	LS	$75,000	$75,000	
7	Rolloff Area with Roof	1	LS	$50,000	$50,000	
8	Electrical/I&C (24%)	1	LS	$24,000	$24,000	
			Sub Total		$508,000	
			Contingency	30%	$152,000	
			GC overhead, profit and risk	18%	$91,000	
			Sales Tax (based on 8.7%)	3.5%	$18,000	(1)
			Total Construction Cost		$769,000	
	Internal Labor (Project Manager, Construction Manager, Design Engineering, Energy Engineer, Quality Control, & Administration)			25%	$192,250	
			Total Project Cost		$961,250	
			Annual Energy Savings (1)		$0	

(1) calculated as 8.7% applied to 40% of direct costs, or overall 3.5% of total direct costs

(2) Assumes 4 hrs/ day processing solids; 10 hp future aeration demand for stabilization of sludge; 25 hp current aeration demand (20% of 125 hp blower power)

Cambria Community Services District



Water Rate Study Tables & Charts

Revised Draft 7/5/18

BARTLE WELLS ASSOCIATES
INDEPENDENT PUBLIC FINANCE ADVISORS

Table 6
Cambria Community Services District
Water Capital Improvement Projects

5-Year CIP Average (With Inflation): $953,000
10-Year CIP Average (With Inflation): 716,000

	1 2018/19	2 2019/20	3 2020/21	4 2021/22	5 2022/23	6 2023/24	7 2024/25	8 2025/26	9 2026/27	10 2027/28	Total
Capital Improvement Projects (Jan 2018 $)											
Priority 1	234,000	239,000	294,000	214,000	214,000	214,000	-	-	-	-	1,409,000
Priority 2	220,000	272,000	746,000	546,000	554,000	96,000	96,000	96,000	96,000	96,000	2,818,000
Priority 3*	50,000	100,000	150,000	280,000	155,000	80,000	180,000	846,000	30,000	30,000	1,901,000
Priority 4	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000
Total	514,000	621,000	1,200,000	1,050,000	933,000	400,000	286,000	952,000	136,000	136,000	6,228,000
Capital Improvement Projects (With Cost Inflation)											
Cost Inflation	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	
Cost Inflator	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	1.344	
Priority 1	241,000	254,000	321,000	241,000	248,000	256,000	-	-	-	-	1,561,000
Priority 2	227,000	289,000	815,000	615,000	642,000	115,000	118,000	122,000	125,000	129,000	3,197,000
Priority 3	52,000	106,000	164,000	315,000	180,000	96,000	221,000	1,072,000	39,000	40,000	2,285,000
Priority 4	10,000	11,000	11,000	11,000	12,000	12,000	12,000	13,000	13,000	13,000	118,000
Total	530,000	660,000	1,311,000	1,182,000	1,082,000	479,000	351,000	1,207,000	177,000	182,000	7,161,000

* Potential future relining or replacement of water transmission main under S. Parks wetlands area deferred until years 6 - 8.

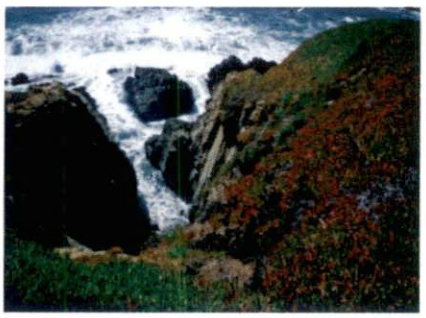
Table 8B
Cambria Community Services District
Water Financial Projections

Scenario B: Phased Approach
3-Year Phase-In to $700K Annual CIP Funding

	0 2017/18	1 2018/19	2 2019/20	3 2020/21	4 2021/22	5 2022/23
Effective Date of Rate Increases	Jan-1	Sept-1	July-1	July-1	July-1	July-1
Projected Rate Increases	4%	15%	10%	5%	4%	4%
Growth (Single Family Equivalents)		0	0	0	0	0
Change in Water Sales %		0.0%	0.0%	0.0%	0.0%	0.0%
Cost Escalation		4%	4%	4%	4%	4%
Interest Earnings Rate	1.25%	1.5%	2.0%	2.0%	2.0%	2.0%
Beginning Water Fund Reserves	$1,325,000	$1,502,000	$1,567,000	$1,606,000	$1,623,000	$1,657,000
REVENUES						
Fixed Water Service Charges	728,000	818,000	928,000	985,000	1,026,000	1,067,000
Water Quantity Charges	1,620,000	1,805,000	2,061,000	2,192,000	2,283,000	2,375,000
Subtotal	*2,348,000*	*2,623,000*	*2,989,000*	*3,177,000*	*3,309,000*	*3,442,000*
Standby Availability	178,000	178,000	178,000	178,000	178,000	178,000
Interest Income	17,000	23,000	31,000	32,000	32,000	33,000
Wait List Fees	62,000	62,000	62,000	62,000	62,000	62,000
Capacity Charges from Growth	20,000	0	0	0	0	0
Resource Conserv/Remodel Fees	70,000	70,000	70,000	70,000	70,000	70,000
Other: Acct Svcs/Admin/Late Fees	78,000	70,000	70,000	70,000	70,000	70,000
Total Revenues	2,773,000	3,026,000	3,400,000	3,589,000	3,721,000	3,855,000
EXPENSES						
Water System Operations						
Salaries & Benefits	847,000	789,000	871,000	906,000	942,000	980,000
Additional Staffing Needs	0	135,000	187,000	194,000	202,000	210,000
Maintenance & Repair	255,000	279,000	290,000	302,000	314,000	327,000
Utilities	176,000	163,000	170,000	177,000	184,000	191,000
Professional Services	101,000	95,000	99,000	103,000	107,000	111,000
Services & Supplies/Other	59,000	91,000	95,000	99,000	103,000	107,000
Government Fees & Dues	60,000	60,000	62,000	64,000	67,000	70,000
Well Site Lease	39,000	40,000	42,000	44,000	46,000	48,000
Admin Overhead	909,000	909,000	945,000	983,000	1,022,000	1,063,000
Subtotal	2,446,000	2,561,000	2,761,000	2,872,000	2,987,000	3,107,000
Capital Improvement Projects	150,000	400,000	600,000	700,000	700,000	700,000
Total Expenses	2,596,000	2,961,000	3,361,000	3,572,000	3,687,000	3,807,000
Revenues Less Expenses	177,000	65,000	39,000	17,000	34,000	48,000
Ending Fund Reserves	1,502,000	1,567,000	1,606,000	1,623,000	1,657,000	1,705,000
Fund Rsrvs as % of O&M	61%	61%	58%	57%	55%	55%

Cambria Community Services District





Sustainable Water Facility Rates Tables & Charts

Revised Draft 7/5/18

BARTLE WELLS ASSOCIATES
INDEPENDENT PUBLIC FINANCE ADVISORS

Table 3
Cambria Community Services District
SWF Capital Improvement Projects

5-Year CIP Average (With Inflation): 164,000
10-Year CIP Average (With Inflation): 333,000

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	Total
SWF Projects (Jan 2018 $)											
Priority 1	390,000	45,000	-	-	-	-	-	-	-	-	435,000
Priority 2	25,000	52,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	93,000
Priority 3	-	104,000	-	-	-	-	-	-	-	-	104,000
Potential Treatment Facilities			-	-	*150,000*	*750,000*	*1,300,000*	-	-	-	2,200,000
Total	415,000	201,000	2,000	2,000	152,000	752,000	1,302,000	2,000	2,000	2,000	2,832,000
SWF Projects (With Cost Inflation)											
Cost Inflation	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	
Cost Inflator	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	1.344	
Priority 1	402,000	48,000	-	-	-	-	-	-	-	-	450,000
Priority 2	26,000	55,000	2,000	2,000	2,000	2,000	2,000	3,000	3,000	3,000	100,000
Priority 3	-	110,000	-	-	-	-	-	-	-	-	110,000
Potential Treatment Facilities			-	-	174,000	896,000	1,599,000	-	-	-	2,669,000
Total	428,000	213,000	2,000	2,000	176,000	898,000	1,601,000	3,000	3,000	3,000	3,329,000

Table 5
Cambria Community Services District
SWF Financial Projections

Revised CIP dated 6-18-18
Assumes 2 months of SWF operation per year starting 2019/20
Current operating rate surcharges eliminated & rolled into year-round rates

	0 2017/18	1 2018/19	2 2019/20	3 2020/21	4 2021/22	5 2022/23
Effective Date of Rate Increases		Sept-1	July-1	July-1	July-1	July-1
Projected Rate Increases		16%	14%	12%	5%	5%
Growth (Single Family Equivalents)		0	0	0	0	0
Change in Water Sales %		0.0%	0.0%	0.0%	0.0%	0.0%
Cost Escalation		4%	4%	4%	4%	4%
Interest Earnings Rate	1.25%	1.5%	2.0%	2.0%	2.0%	2.0%
Beginning SWF Fund Reserves	$0	($333,000)	($351,000)	($408,000)	($438,000)	($460,000)
REVENUES						
Fixed SWF Service Charges	369,000	395,000	456,000	513,000	545,000	572,000
SWF Quantity Charges	555,000	614,000	716,000	808,000	857,000	900,000
Subtotal	924,000	1,009,000	1,172,000	1,321,000	1,402,000	1,472,000
Interest Income	0	0	0	0	0	0
Total Revenues	924,000	1,009,000	1,172,000	1,321,000	1,402,000	1,472,000
Projected $500K Interfund Loan		225,000	250,000			
EXPENSES						
SWF Base Operations						
Salaries & Benefits	130,000	196,000	204,000	212,000	220,000	229,000
Additional Staffing	0	55,000	57,000	59,000	61,000	63,000
Other Operating Expenses	395,000	130,000	135,000	140,000	146,000	152,000
Subtotal	525,000	381,000	396,000	411,000	427,000	444,000
Add'l O&M During Operations			Assumes 2 months of operation every year			
Brine Hauling & Disposal, Lab, Electricity		0	173,000	180,000	187,000	194,000
Debt Service						
2014 TBP Loan	660,000	660,000	660,000	660,000	660,000	660,000
Interfund Loan Repayment (subordinate)	0	0	0	50,000	100,000	100,000
Subtotal	660,000	660,000	660,000	710,000	760,000	760,000
Capital/Non-Operating						
Capital Improvement Projects	0	175,000	250,000	50,000	50,000	50,000
Performance Bond	72,000	36,000	-	-	-	-
Total Expenses	1,257,000	1,252,000	1,479,000	1,351,000	1,424,000	1,448,000
Revenues Less Expenses	(333,000)	(18,000)	(57,000)	(30,000)	(22,000)	24,000
Ending Fund Reserves	(333,000)	(351,000)	(408,000)	(438,000)	(460,000)	(436,000)
Fund Reserves as % of O&M+Debt	-28%	-34%	-39%	-39%	-39%	-36%
Debt Service Coverage (SWF Only)	0.60	0.95	1.18	1.38	1.48	1.56

Cambria Community Services District



Sewer Rate Study
Tables & Charts

Revised Draft 7/5/18

BARTLE WELLS ASSOCIATES
INDEPENDENT PUBLIC FINANCE ADVISORS

Table 4
Cambria Community Services District
Sewer Capital Improvement Projects

5-Year CIP Average (With Inflation): 1,543,000
10-Year CIP Average (With Inflation): 1,156,000

	1 2018/19	2 2019/20	3 2020/21	4 2021/22	5 2022/23	6 2023/24	7 2024/25	8 2025/26	9 2026/27	10 2027/28	Total
Capital Improvement Projects (Jan 2018 $)											
Priority 1	546,000	970,000	13,000	13,000	313,000	48,000	328,000	13,000	13,000	-	2,257,000
Priority 2	559,000	857,000	597,000	507,000	1,372,000	237,000	167,000	167,000	167,000	-	4,630,000
Priority 3	105,000	150,000	355,000	285,000	285,000	285,000	285,000	285,000	80,000	250,000	2,365,000
Priority 4	15,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	-	215,000
Total	1,225,000	2,002,000	990,000	830,000	1,995,000	595,000	805,000	490,000	285,000	250,000	9,467,000
Capital Improvement Projects (With Cost Inflation)											
Cost Inflation	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	
Cost Inflator	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	1.344	
Priority 1	562,000	1,029,000	14,000	15,000	363,000	57,000	403,000	16,000	17,000	-	2,476,000
Priority 2	576,000	909,000	652,000	571,000	1,591,000	283,000	205,000	212,000	218,000	-	5,217,000
Priority 3	108,000	159,000	388,000	321,000	330,000	340,000	351,000	361,000	104,000	336,000	2,798,000
Priority 4	15,000	27,000	27,000	28,000	29,000	30,000	31,000	32,000	33,000	-	252,000
Total	1,261,000	2,124,000	1,081,000	935,000	2,313,000	710,000	990,000	621,000	372,000	336,000	10,743,000

Table 5B
Cambria Community Services District
Sewer Financial Projections

Scenario B: Phased Approach
3-Year Phase-In to $800K Annual CIP Funding

	0 2017/18	1 2018/19	2 2019/20	3 2020/21	4 2021/22	5 2022/23
Effective Date of Rate Increases	Jan-1	Sept-1	July-1	July-1	July-1	July-1
Projected Rate Increases	4%	18%	15%	12%	5%	5%
Growth (Single Family Equivalents)		0	0	0	0	0
Change in Billed Use %		0.0%	0.0%	0.0%	0.0%	0.0%
Cost Escalation		4%	4%	4%	4%	4%
Interest Earnings Rate	1.25%	1.5%	2.0%	2.0%	2.0%	2.0%
Beginning Sewer Fund Reserves	$0	($25,000)	$64,000	$186,000	$174,000	$193,000
REVENUES						
Sewer Operations						
Fixed Sewer Service Charges	1,362,000	1,580,000	1,873,000	2,107,000	2,223,000	2,335,000
Sewer Quantity Charges	687,000	792,000	945,000	1,064,000	1,122,000	1,179,000
Subtotal	2,049,000	2,372,000	2,818,000	3,171,000	3,345,000	3,514,000
Standby Availability	119,000	119,000	119,000	119,000	119,000	119,000
Interest Income	0	0	1,000	4,000	3,000	4,000
Capacity Charges from Growth	20,000	0	0	0	0	0
Other	78,000	70,000	70,000	70,000	70,000	70,000
Total Revenues	2,266,000	2,561,000	3,008,000	3,364,000	3,537,000	3,707,000
EXPENSES						
Sewer System Operations						
Salaries & Benefits	730,000	783,000	814,000	847,000	881,000	916,000
Additional Staffing Needs	0	126,000	264,000	275,000	286,000	297,000
Maintenance & Repair	344,000	240,000	250,000	260,000	270,000	281,000
Utilities	251,000	216,000	225,000	234,000	243,000	253,000
Government Fees	134,000	90,000	94,000	98,000	102,000	106,000
Other Operating	91,000	96,000	100,000	104,000	108,000	112,000
Allocated Overhead	461,000	461,000	479,000	498,000	518,000	539,000
Subtotal	2,011,000	2,012,000	2,226,000	2,316,000	2,408,000	2,504,000
Debt Service						
2010 City Nat'l Bank Loan (1999 Refi)	160,000	160,000	160,000	160,000	160,000	160,000
Repay $466K Loan from General Fund	0	0	0	100,000	100,000	100,000
Subtotal	160,000	160,000	160,000	260,000	260,000	260,000
Capital Improvement Projects	120,000	300,000	500,000	800,000	850,000	900,000
Total Expenses	2,291,000	2,472,000	2,886,000	3,376,000	3,518,000	3,664,000
Revenues Less Expenses	(25,000)	89,000	122,000	(12,000)	19,000	43,000
Ending Fund Reserves	(25,000)	64,000	186,000	174,000	193,000	236,000
Fund Reserves as a % of O&M	-1%	3%	8%	8%	8%	9%
Debt Service Coverage	1.59	3.43	4.89	4.03	4.34	4.63

PRELIMINARY ENERGY ASSESSMENT

CAMBRIA COMMUNITY SERVICES DISTRICT

February 22, 2019

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1 EXECUTIVE SUMMARY

On behalf of Pacific Gas and Electric Company (PG&E), we appreciate the opportunity to assist the Cambria Community Services District (CCSD or District) in advancing its goals of delivering high quality services to CCSD residents while responsibly managing operational priorities within the Board-approved budgets. Consistent with these goals, the District has engaged PG&E's **Sustainable Solutions Turnkey (SST) Program** to identify opportunities to reduce energy use and the associated costs within its operations. Utility costs are a significant component of the District's operating budget. Utility use is distributed throughout the District's operations. However, the single largest utility consumer is the Waste Water Treatment Plant (WWTP). Combined with the associated Lift Stations, the total annual electricity cost to the District is estimated at **$194,949** – representing approximately **70% of total electric usage** and **58% of total electric cost**. As such, our initial assessment was focused on opportunities for operational improvements at the WWTP and Lift Stations.

1.1 PG&E Sustainable Solutions Turnkey (SST) Program

As further detailed in Section 7 of this report, PG&E offers the SST Program to assist customers in assessing, evaluating and implementing energy-saving projects that reduce utility consumption and operating costs – all through a streamlined turnkey design-build process. The SST Program is modelled after our highly successful Utility Energy Services Contract (UESC) for Federal customers. Through a Public-Private Partnership with the United States Department of Energy (DoE), UESC authorizes both civilian and military branches of the Federal government to engage their local serving utility for the turnkey delivery of energy-related projects. Through this program, PG&E provides all of the services required to identify and implement comprehensive energy projects, including assessment, development, financial analysis, design, construction, commissioning, acceptance, training and turn-over. Since the goal of UESC projects is to reduce energy and water consumption (and the related operating cost), the capital cost of UESC projects is funded from the savings generated – either through financing, incentives, grants or a combination thereof. Since its inception over ten (10) years ago, the UESC program has delivered an impressive scorecard of results for Federal facilities across the PG&E service territory including NASA, FAA, US Army, GSA, IRS and VA.

Building on that success, PG&E's SST Program offers non-Federal customers the same ability to engage PG&E for the turnkey implementation of comprehensive efficiency and renewable energy projects across their facilities. Following the rigorous development and accounting requirements of UESC, the SST Program provides customers the same transparency, open-book cost development and warranties offered to our largest most discriminating customer.

The first step in the SST process is the **Preliminary Energy Assessment (PEA)**. The PEA analyzes energy-related activities across a customer's asset base. Leveraging that data, the PEA identifies and characterizes the cost-saving and/or revenue-generating opportunities that exist in the current operating environment. The PEA also investigates potential incentives, grants, and low-cost energy financing that may be available to reduce the capital cost of implementing these solutions. The results of the PEA, including the underlying methodology, data and conclusions, are detailed in the following report.

The development of this report required a significant amount of time and input from District staff over the course of several months. We would like to specifically acknowledge **John Allchin**, **Bob Gresens**, **Toni Artho**, **Delon Blackburn**, and **Melissa Bland** for their time and comprehensive understanding of WWTP and Lift Station operations. We have thoroughly enjoyed working with each of them and this report would not have been possible without their insightful contributions.

1.2 Report Highlights

As detailed in Section 4, the report identifies a series of opportunities for the District to reduce total operating costs by an **estimated $320,000 per year**. Additionally, the implementation of the related work would provide a foundation for achieving the following operational, regulatory and financial goals:

Increased Operational Efficiency

A streamlined and more predictable treatment process with improved controls reduces staff workload and overall operating cost.

Regulatory Resilience

Stable treatment and improved electric quality allow the plant to respond to potential future regulatory requirements (nutrient removal) while minimizing the current risk of permit violations.

Financial Flexibility

Reduced operating costs provide a basis for implementing significant capital improvements within the newly approved rate structure.

2 APPROACH TO THE PEA

2.1 Methodology

The primary purpose of the PEA is to identify financially viable energy efficiency, operations and maintenance, and infrastructure upgrade opportunities that meet the CCSD's specific goals for this project. To identify these opportunities, the SST team conducted several visits to the WWTP and Lift Stations, interviewed key personnel, reviewed utility data and available building information and reviewed prior audit reports. We leveraged this information to develop the Energy Conservation Measures (ECMs), preliminary scopes of work and budgetary financial estimates included in this report. The following sections provide an overview or our approach to developing this PEA.

2.2 PEA Process Overview

The PEA process included six primary steps:

1. **Kickoff Meeting:** Met with CCSD's key stakeholders and the SST team to review the SST program process and establish the primary goals for a SST project.
2. **Utility Analysis:** This effort provided a thorough understanding of the plant's utility consumption and costs as well as some insights into methods of operation, key trends and anomalies.
3. **Field Survey:** A brief field investigation/audit of important facilities and significant energy consuming systems.
4. **Baseline Energy & Cost Analysis:** A more detailed analysis of existing energy use and costs within facilities used for identifying potential ECM solutions and their savings.
5. **ECM Solution Development and Analysis:** Identification and development of the preliminary ECM solutions including the scope outlines, benefits and estimated turnkey implementation costs.
6. **PEA Presentation and Report:** Presentation of PEA findings and feasible SST project options to CCSD.

2.3 Facilities Included in the PEA

This PEA is primarily focused on the WWTP and the associated Lift Stations. However, we also reviewed a prior energy audit completed in 2015 in conjunction with additional information provided by CCSD to identify opportunities outside the WWTP. Should the District elect to proceed with the next phase of the SST Program, viable ECMs located across District facilities would be addressed in the Investment Grade Audit (IGA) phase.

2.3.1 Documentation Review

Our site investigation process began with obtaining readily available facility documentation such as design plans, utility data, equipment lists, and prior facility audits. Our engineering team reviewed this information in detail and utilized it in the development of this report.

2.3.2 Site Interviews

Our project team conducted multiple interviews with CCSD staff. During these interviews, our engineers and CCSD staff discussed overall plant operations, maintenance and repair, infrastructure needs, existing and/or anticipated issues and an overview of the permit/regulatory environment.

2.3.3 Energy Analysis

We derived the energy baselines from the available historic site utility data- specifically electric usage for the preceding three (3) years for all District meters and the previous twelve (12) months of 15-minute interval data for the single meter serving the WWTP. The energy use during this period formed the basis of the energy allocation analysis. An energy allocation analysis determines the estimated energy consumption for each end-use. The resulting end-use profile allows our engineers to assess where the energy is being used in the systems and to identify where the greatest opportunities for energy savings exist.

2.3.4 Energy Savings Calculations

Based on the data acquired during our investigation, the energy savings identified in this report were calculated using customized spreadsheets that use standard engineering practices and assumptions.

After we calculated the savings for each ECM, the total savings were then calibrated to ensure that no savings were “double-counted” in the analysis. All final savings by end-use were compared to total allocated end-use energy to ensure total savings fractions fall within expected ranges for the ECMs considered.

Cost savings are generally calculated using the average unit cost per utility whereby the cost of energy is calculated by dividing the total monthly cost (electricity, natural gas, etc.) by the monthly units consumed.

2.3.5 Project Costs

Preliminary engineering estimates were developed using manufacturer’s data, contractor estimates, and/or standard estimating tools. By design, these estimates are intended to be **budgetary** with an estimated accuracy of +/- 25% of the expected final turn-key implementation costs.

Should the District elect to move forward with any or all of the ECMs identified in this report, final firm fixed costs and savings numbers will be developed and presented in the Investment Grade Audit (IGA).

2.3.6 ECM Selection

The ECMs identified in this report are based on District data, interviews and our professional experience with similar work. This report is NOT intended to be an “all or nothing” project proposal. Please note that the final selection of ECMs for inclusion in any subsequent phases of the SST Program is entirely at the discretion of the District. We have presented all potential ECMs identified by PG&E during the PEA and will not proceed with any work until we consult with the District and receive specific notice to proceed.

3 UTILITY DATA ANALYSIS

This utility analysis is a fundamental element of the PEA and was utilized to gain a deeper understanding of CCSD's utility consumption and costs. The results of the analysis provide the foundation for all subsequent steps in the PEA including comparison and benchmarking of facilities, allocation of energy use and cost to systems within individual facilities, and savings calculations.

The data utilized in this analysis includes annual, monthly and 15-minute electric meter data. The District receives electric utility service for its facilities from PG&E. Gas use at the WWTP and Lift Stations (NG/Propane) is nominal and has been specifically excluded from this report.

Electrical Service

CCSD receives electric service through 44 individual PG&E accounts. Thirty-six (36) months of electrical data from June 2015 through May 2018 and the most recent twelve (12) months of 15-minute interval data was analyzed as part of this PEA.

CCSD consumes **1,715,657 kWh** of electricity annually at a cost of **$333,223** for a total blended rate of $0.194 per kWh. Table 3.1 provided a summary of the electric consumption and cost across CCSD's facilities.

Table 1: Electrical Summary by Usage Area

Facility Name	Annual Use kWh	Electric Cost $	% of Annual Electric Use	% of Annual Electric Cost
WWTP	1,106,060	$ 172,728	64.5%	51.8%
Wells	221,993	$ 61,786	12.9%	18.5%
Lift Stations	93,886	$ 22,221	5.5%	6.7%
Water Tanks	70,797	$ 16,518	4.1%	5.0%
Street Lights	38,154	$ 14,634	2.2%	4.4%
Police/Fire	35,464	$ 7,981	2.1%	2.4%
Water Yard/SWF Sprayfield	92,234	$ 24,155	5.4%	7.2%
Administration Facility	25,808	$ 5,982	1.5%	1.8%
Veteran's Building	22,857	$ 5,047	1.3%	1.5%
Other	8,404	$ 2,171	0.5%	0.7%
Total	**1,715,657**	**$ 333,223**		

This summary confirms that the **WWTP** is the single largest electric consumer in the District. Combined, the **WWTP** and **Lift Stations** account for 70% of CCSD's total annual utility costs. Water Wells, Water Tanks, and Street Lighting are the next largest users at a combined total of 28% of annual utility costs. Due to their direct relationship, the WWTP and associated Lift Stations are the subject of this report.

We also performed analysis using **Fifteen (15) Minute Interval Data** for the WWTP using a data visualization tool (DVIEW).

The following are representations of the annual and weekly demand data for the WWTP:

Figure 1: Annual Fifteen Minute Interval Demand Profile (Jul-18 through Sep-18)

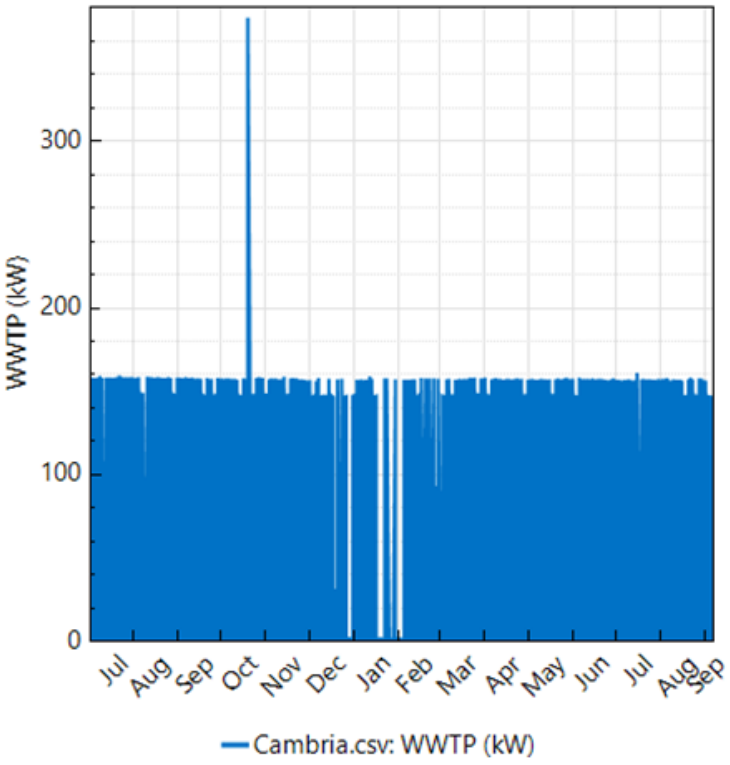


Figure 2: Fifteen Minute Interval Demand Profile (Typical Summer Month)

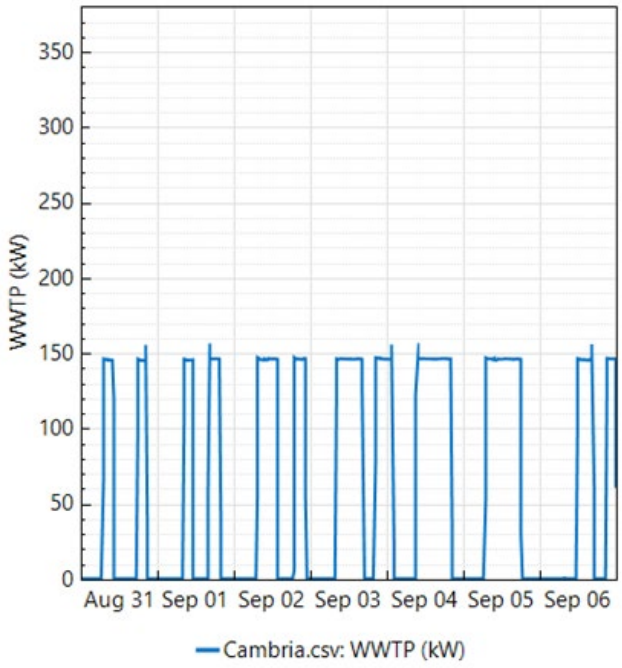
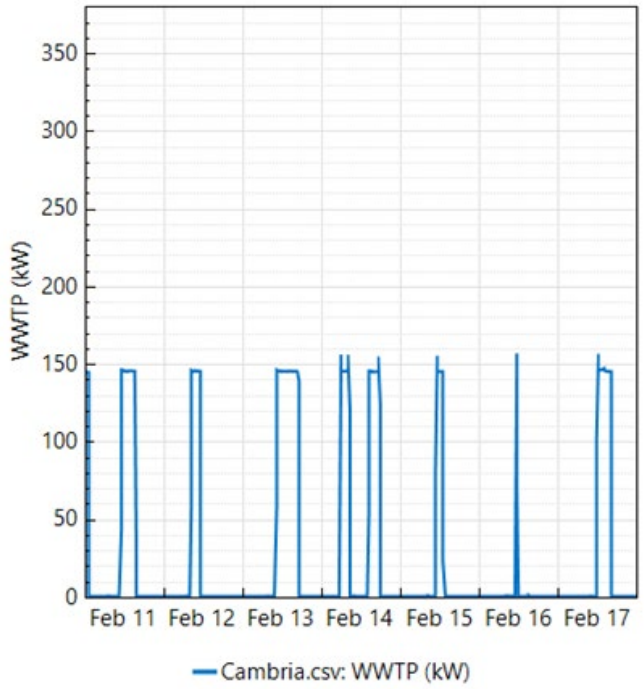


Figure 3: Fifteen Minute Interval Demand Profile (Typical Winter Month)



Our demand analysis revealed the following key observations:

- Annual & monthly profiles are extremely flat with an average peak load of approximately 160 kW
- The annual load factor for the plant is approximately 7,000 hours (summation of monthly peak demand divided by the total hours in a year)
- There are no seasonal impacts on the peak demand

Upcoming PG&E Rate Changes

All Investor Owned Utilities (IOU) in California, including PG&E, have pending rate cases filed with the California Public Utilities Commission (CPUC) that include rate modifications. The general intent of the modifications is to shift the On-Peak Time-of-Use (TOU) periods for the A-6, A-10, E-19, and E-20 tariffs to later in the day to address the large amount of solar photovoltaic (PV) power added to the grid over the last ten years.

A summary of what was filed includes:

1. **The Summer Period will be defined as June 1 through September 30 (4 months).** Currently, Summer is defined as May 1 through the end of October (6 months).
2. **During the Summer Period, both weekdays and weekends will have On-Peak Periods.** Currently, Summer On-Peak applies only on weekdays.
3. **The Summer On-Peak TOU period will change to 4:00 p.m. to 9:00 p.m. (5 hours).** Currently it is from Noon to 6:00 p.m. (6 hours).
4. **The Summer Partial-Peak TOU Period will change from 2:00 p.m. to 4:00 p.m. and 9:00 p.m. to 11:00 p.m. seven days a week.** Currently it is from 8:30 a.m. to Noon and 6:00 p.m. to 9:30 p.m. weekdays only.
5. **It appears the Winter TOU time periods will not be changing with the <u>exception</u> that weekends will now have Partial-Peak rates apply from 8:30 a.m. to 9:30 p.m.** Previously, weekends were all off-peak.

If approved by the CPUC as proposed, these changes will impact the CCSD's annual energy cost. Based on currently available information, the following are our **estimates** of the <u>qualitative</u> effects to individual accounts. A thorough assessment of the new tariff(s) and the effects to District energy costs will be conducted in the Investment Grade Audit (IGA).

1. Any non-TOU accounts with a flat rate fee for energy only and no demand charges, such as the A-1 rate plan, will likely see minimal changes.
2. Individual buildings on a TOU rate plan (A-6 or E-19) will likely see reduced annual electrical costs as most of the building's energy use will be earlier in the day before the proposed On-Peak period

begins and because of minimal weekend use. While beneficial from a rate point of view, this will have a negative effect on the financial impacts for measures associated with these buildings.

3. The WWTP will likely see an increase in costs due to evening and weekend use hours.
4. Flat-rate Roadway lighting and Traffic Control Lighting should be unaffected by the proposed changes.

PG&E has both *Deemed* and *Customized* Rebate Programs in place based on the current rate plans. What effect the proposed rate plans will have on rebates is currently unknown. Any estimates made in this report are based on the existing programs. Available Utility Programs will be thoroughly assessed in the Investment Grade Audit (IGA).

4 POTENTIAL ENERGY CONSERVATION MEASURES (ECM)

4.1 Introduction

The ECMs were developed through a combination of meetings and interviews with District staff; review of recent studies and preliminary design reports; field visits; analysis of utility and benchmark data; and energy and economic analysis of potential ECM opportunities. This section presents existing conditions, identified solutions, and estimated benefits for each ECM presented in this section.

4.2 Wastewater Fund ECMs

ECM-1	Influent Flow Equalization
ECM-2	Influent Lift Station Modifications
ECM-3	Modified Ludzak-Ettinger Process Upgrade
ECM-4	Blower System Improvements
ECM-5	RAS and WAS Pumping Improvements
ECM-6	Sludge Thickening
ECM-7	Electrical Upgrades
ECM-8	Backup Power
ECM-9	SCADA System
ECM-10	Secondary Water System (3W) Improvements
ECM-11	Effluent Pump Station Improvements
ECM-12	Sewer Lift Stations

4.2.1 ECM-1: Influent Flow Equalization

Existing Conditions

The plant has a design flow of 1 Million Gallons per Day (MGD) and a peak hydraulic capacity of 2.5 MGD during storm events. Of the two existing influent equalization tanks, the oldest, bolted tank is severely corroded. The newer welded tank was recoated in the early 1990s and exhibits fewer signs of corrosion. The two tanks are no longer in service. Influent currently flows by gravity from the grit removal system directly to the aeration basins. Incoming flows can cause overflow of the grit chamber when two influent pumps operate, and it is suspected that significant debris may be reducing the capacity of the piping between the grit chamber and the activated sludge basins. During completion of this report, CCSD was completing installation of a new influent screening system upstream of the grit chamber.

Plant flow cannot be reliably managed without addition of equalization and/or improvements to the influent pump station. Management of plant flows becomes particularly important when the existing aeration basins are converted (as proposed in ECM 3 below) to accommodate reliable nitrogen removal through the Modified Ludzak-Ettinger (MLE) process. To implement the MLE process, the volume in the existing aeration basins will be reduced by approximately 16 percent to accommodate an anoxic zone at the influent end of each aeration basin. Each aeration basin will have an anoxic zone and aerated zone. The ability of the process to absorb flow variations is reduced in these smaller receiving basins. Therefore, when the plant implements the MLE process, it will become more important to manage flows to maintain process stability, particularly during wet weather flows.

Based on biological process modeling[1] completed by the District, the existing WWTP has a maximum monthly flow capacity of 0.95 MGD to meet effluent total nitrogen (TN) concentrations of less than 10 mg/L when operated in MLE configuration. This capacity corresponds to a peak hour flow of 2.08 MGD when historical flow records and peaking factors are reviewed. In order to maintain plant performance during peak hour flows, model results indicate influent to the secondary treatment process should be reduced to 1.9 MGD.

Although there is currently no permit condition for nitrogen removal, District staff noted the Regional Water Quality Control Board was recommending further limitations on nitrogen loadings at the San Simeon Creek lagoon within a draft March 2015 total maximum daily loading report. This earlier draft report had a nitrogen target level of 1.3 mg/l (Nitrogen-N) within the lagoon during the dry season to avoid bio-stimulation. Since this report, Water Board staff have indicated they were pleased with the nitrate removal observed since the CCSD began operating its interim MLE process using temporary piping and pumps. Therefore, it is anticipated that permit requirements could become more stringent in the future.

Measure Description

This ECM will include construction of new influent equalization tanks and pump station to maintain steady flow through the planned MLE process.

The existing effluent storage basins are not recommended to be utilized for influent flow equalization due to the condition of the older, bolted tank. In addition, the pump pit between the two tanks is subject to flooding from infiltration during high groundwater events.

It is estimated that a total of approximately 120,000 gallons of flow equalization would be required in two tanks. Coarse bubble aeration is recommended to reduce odors and maintain suspension of solids. For the purposes of this report, it is anticipated that the tanks would be partially buried concrete. Tank volume, construction type and configuration would be validated during the IGA.

[1] Enhanced Compliance Action Project and 10% Design- Technical Memorandum No. 1 (Carollo, 2014)

Benefits

- Reduces the risk of overflow
- Improves treatment plant efficiency, performance, and reliability
- Coordinates with influent lift station improvements to manage incoming flows and maintain biological nutrient removal (BNR) effectiveness
- Reduces burden on staff
- Addresses the hydraulic restriction between the grit removal equipment and the aeration basins

Potential ECM Savings

This ECM may increase pumping energy as it introduces additional pumping and aeration/mixing stages. Additional energy cost would be offset by avoiding potential overloading of mixed liquor suspended solids into the clarifiers from the activated sludge process and enhancements to operations, permit compliance, and staff impact.

4.2.2 ECM-2: Influent Lift Station Modifications

Existing Conditions

The WWTP influent lift station utilizes three 25 Hp constant speed suction-lift pumps to lift incoming sewage into the treatment process. The pumps operate based on wet well level. The pumps are oversized compared to current flows, since the plant was designed and constructed before water conservation became a common practice. The middle pump does not hold prime, and downstream processes can overflow when two pumps run.

Figure 4: Influent pump station

Measure Description

This ECM will include installing new higher efficiency submersible pumps with variable frequency drives (VFDs). The pumps would be sized to operate more efficiently at existing flows, while ensuring all pumps can pass a minimum 3-inch solid to prevent clogging. The influent wet well will be re-coated and new access hatches will be provided for maintenance of submersible pumps. Baffling will be considered to minimize aeration and prevent cavitation and binding. This ECM complements

influent flow equalization (ECM 1 above), but could also be implemented without construction of equalization.

Benefits

- Reduces energy usage by installing appropriately sized pumps and VFDs
- Eliminates existing priming problem in middle pump and improves pump reliability
- Improves balance of running hours between pumps to extend pump life
- Addresses needed repair/replacement project identified in Capital Improvement budget
- Extends useful life of influent wet well by repairing and replacing coatings
- Eliminates existing condition that can cause one pump to cavitate and run continuously, requiring a second pump to operate at the same time
- Can be programmed to perform self-cleaning functions within the wet well and incoming sewer

Potential ECM Savings

Controlling the pumps with a VFD would allow the pumps to operate at reduced speeds, which would decrease fluid velocity in the discharge piping and minimize friction head losses.

Retrofitting the existing influent lift station with submersible pumps on VFDs could reduce average pumping rate by approximately 30%, resulting in lower losses and more efficient pumping. However, pumps would have to operate for longer duration to pass incoming flows. Based on our calculations and assuming an Average Daily Flow (ADF) of 0.539 MGD, the average reduction in electrical consumption would be approximately 16,300 kWh/year or $2,800/year (at $0.171/kWh).

Although the electrical savings associated with this ECM are modest, the benefits to overall operations, reliability, plant efficiency, and maintenance should be carefully considered.

4.2.3 ECM 3 - Modified Ludzak-Ettinger Process Upgrade

Existing Conditions

In response to the concerns from the draft March 2015 Total Maximum Daily Load (TMDL) Report by RWQCB and underlying groundwater concerns, the CCSD completed interim measures to denitrify WWTP effluent. Water Board staff monitor the nitrogen levels on the San Simeon Creek lagoon and have noted a substantial reduction since CCSD completed its interim denitrification efforts. Therefore, although there is currently no permit condition for nitrogen removal, it is anticipated that permit requirements could become more stringent in the future. Interim MLE denitrification efforts have included temporary pumps and piping to recirculate mixed liquor to a zone near the front of the basins where aeration has been turned off in order to produce the effects of an anoxic zone. While effective, there is no baffling to isolate this zone from the aerated sections of the basins. This lack of isolation limits effectiveness and energy efficiency while increasing the amount of operator time required. Therefore, a more permanent MLE system is needed.

According to the 1993 WWTP plant specifications, fine bubble diffusers were specified. Although details were not found within District records, the retired District Engineer recalled them as being EPDM tubes (socks), which would be periodically changed as they aged. Their replacement was necessary due to the holes stretching over time and allowing for larger, less energy efficient aeration bubbles to be formed. Based on visual observation and staff input, it is suspected that the diffusers have reached the end of their useful life. It is recommended that the existing diffusers be replaced with fine pore bubble diffusers with newer materials that would not stretch and deform over time.

Additionally, the 12-inch header in the basins at the end of the influent piping was removed to reduce hydraulic restriction and accommodate gravity flow from the grit chamber, resulting in uneven flow distribution across the basin.

Measure Description

This ECM will include construction of high efficiency air diffusers, construction of basin divider wall, improvement of recirculation piping, construction of new recirculation pumps, and installation of a new flow distribution header. It is assumed that new submersible pumps would be installed for mixed liquor return, and new submersible mechanical mixers would be installed in the anoxic zones. The new mixers will be protected by the influent screen project which is currently being completed by District staff.

Additionally, non-functional skimming troughs and scum pumps will be replaced. Due to the reduction in volume of the basin resulting from the construction of baffle walls, it is anticipated that influent flow equalization will be necessary to maintain reliable nutrient removal, particularly during wet weather events. Accordingly, it is assumed that ECM 1 be completed in coordination with this ECM. During the IGA, we will evaluate whether existing structures or tanks could be repurposed as anoxic zone reactors to reduce cost for baffling the existing aeration basins.

Benefits

- Reduces energy usage by installing high efficiency diffusers for improved oxygen transfer
- Reduces volume requiring aeration by partitioning the anoxic and aerobic zones
- Provides permanent and reliable nutrient removal
- Replaces mechanical equipment which has failed and/or reached the end of its useful life
- Provides improved flow distribution
- Reduces burden on staff

Potential ECM Savings

The savings calculated for this ECM are achieved through the improved Oxygen Transfer Efficiency (OTE) of new fine pore bubble diffusers to replace the ineffective diffusers, the reduced aeration and mixing requirement through isolating the anoxic zone, and the improved flow distribution. The results of this ECM assume that ECM 4 (Blower Improvements) is also completed.

Isolating the anoxic zone reduces the volume in the basin requiring mixing by aeration. Installing new diffusers will also improve overall efficiency since some of the existing diffusers have obviously failed and require replacement. It is estimated that this ECM would reduce energy demand by approximately 8,200 kWh/year.

4.2.4 ECM 4 – Blower System Improvements

Existing Conditions

A plant wide air system conveys air to the activated sludge basins and sludge holding tanks from three 125 Hp multistage centrifugal blowers[2]. Blowers are manually operated by District staff and are not controlled by dissolved oxygen (DO) or other parameters in the activated sludge basins. DO control is not used because the existing centrifugal blowers are prone to surging if the air output rates are reduced too much. Therefore, in order to reduce air flow through the submerged diffusers, the plant currently partially closes (throttles) blower inlet valves. Despite throttling inlet air flow, the DO level in the aeration basins can still be higher than target concentration of 2.0 mg/L. The blowers were installed as part of the 1993 upgrades and newer technologies have since evolved, which are more energy efficient and more readily operated under variable speeds. The existing blowers are also at the end of their useful life. Additionally, holes in the existing blower ducts release warm air into the motor control center (MCC), reducing air delivery to the basins, and increasing cooling requirements into the MCC room.

Figure 6: Existing blowers

Table 2: Aeration Blowers

Blower	Manufacturer and Model No.	Blower Type	Qty	Control	Blower Motor (hp)	Status
Main Blowers	Hoffman 38407A1	Centrifugal	1 (active) 2 (standby)	1-VFD 1-Soft Start 1-None	125	1 On
Pony Blower	Hoffman 4208A	Centrifugal	1	None	100	Off

[2] A fourth blower rated at 100 Hp is in place and was used for mixing the influent EQ basing (no longer in use). This blower does not have adequate capacity for other uses and is not utilized for any processes.

Measure Description

This ECM will include construction of two new blowers, aeration piping modifications, duct repair, variable frequency drives, and dissolved oxygen control systems to improve efficiency and effectiveness. DO control will allow the blowers to run only at the required rate, reducing electrical usage and avoiding over-aeration.

Benefits

- Reduces energy usage by installing high efficiency blowers, variable speed drives, mass air flow meters, and automated controls
- Reduces over-aerating by introducing DO control
- Replaces mechanical equipment which has failed and/or reached the end of its useful life
- Reduces air conditioning loads by eliminating hot air entry into conditioned space
- Reduces burden on staff

Potential ECM Savings

The savings associated with this ECM assumes that ECM 3 has already been completed. Blower power requirements were calculated assuming an OTE of 20%. The majority of savings associated with this ECM are anticipated as a result of improved blower efficiency, providing the ability to reduce aeration during low demand periods, and reducing over-aerating by utilizing DO control. Under 2017-2018 operating conditions, blower power consumption for both aeration and mixing demand was estimated to be approximately 87 kW. Power requirement after this ECM is implemented is estimated at 32 kW, and is based on the minimum air flow required for mixing, which exceeds the air flow required to meet BOD.[3]

The savings associated with this ECM are anticipated to be approximately 781kWh/yr. At an average utility rate of $.171/kWh, annual savings of approximately $133,000 are anticipated.

4.2.5 ECM 5 - RAS and WAS Pumping Improvements

Existing Conditions

The two return activated sludge (RAS) pumps each run continuously at 200 gpm and 20 Hz. They are oversized for current flows and as a result are operating at a very low efficiency (inefficient area of pump curve). Two separate waste activated sludge (WAS) pumps are installed and it would be preferable for WAS flows to be delivered through valve(s) on the RAS piping, thereby eliminating two pumps. Skimming troughs and scum pumps are not functioning.

[3] The air volume required to meet BOD is estimated at 360 cfm, the air volume required for mixing is 1,000 cfm. This mixing requirement only includes the aerated portion of two MLE reactors, not the anoxic zones. Additional aeration demands for mixing for other uses (influent equalization, sludge stabilization, etc.) are included in other ECMs

Figure 7: RAS/WAS Piping

Figure 8: Tipping trough

Measure Description

The existing RAS and WAS pumps were initially installed as part of the 1993 improvements, along with the ability to independently control both systems. However, that feature was never utilized, and the system may no longer have this capability. Scum troughs and scum pumps have failed and must be replaced. This ECM will include construction of a new RAS and WAS pumping systems, manual scum tipping troughs, and scum pumps. Separate WAS and RAS control systems, similar to those in the 1993 improvements, will either be returned to service or will be newly installed to allow independent control of each system.

Benefits

- Reduces the amount of equipment to operate and maintain
- Reduces energy usage by installing high efficiency pumps with more refined flow ranges
- Replaces mechanical equipment which has failed and/or reached the end of its useful life
- Reduces burden on staff

4.2.6 ECM 6 - Sludge Thickening

Existing Conditions

Operators pump WAS and sludge from the secondary clarifiers to the sludge holding tank (unused clarifiers) overnight. One sludge tank holding cell is continuously aerated to meet San Luis Obispo County Air Pollution Control District (APCD) odor-mitigation requirements, and sludge from the second cell is transferred to another basin prior to being delivered to the screw press. Holes in cell partition walls allow sludge to leak into adjacent cell. Supernatant is pumped to another cell and some flow is returned to the headworks every other day. The screw press receives approximately 2% solids and operates five days per week, nine hours per day. The sludge storage tanks (repurposed steel clarifiers) have exceeded their useful life. Holes and structural failures are apparent in walls separating sludge storage cells. Due to continuous aeration, the sludge does not thicken readily and requires multiple pumping operations to process solids and ultimately convey them to the screw press.

Figure 10: Sludge thickener and screw press

Figure 11: Sludge thickener

The existing mechanical thickener is offline. Attempts were made to adjust polymer and improve performance, but the thickener was ultimately bypassed due to reliability issues. The screw press is oversized and has been modified to utilize approximately 50% of its overall capacity.

Measure Description

This ECM will include demolition of the two existing (unused) secondary clarifiers, construction of two new 70,000-gallon bolted steel aerated sludge stabilization tanks, rehabilitation of the sludge thickening system, and improvements to the screw press. During the IGA, further evaluation of this ECM will be conducted to determine the most cost-effective method for biosolids handling – either a biosolids handling and storage area to manage dewatered solids or direct discharge to roll-off containers.

Benefits

- Reduces energy usage by installing more efficient pump transfer and sludge aeration systems
- Replaces mechanical equipment which has failed and/or reached the end of its useful life
- Improves solids dewatering and reduces hauling costs
- Reduces burden on staff

4.2.7 ECM 7 – Electrical Upgrades

Existing Conditions

The District has experienced disruptions in the quality of electrical service, resulting in failure of critical plant electrical infrastructure. The existing PG&E service transformer is a live-front unit that provides a 480V, three-phase, three-wire ungrounded service to the CCSD service switchboard, which is also rated

480V, three-phase, three-wire. The service switchboard includes an automatic transfer switch for connection of an existing 350kW on-site standby generator.

Measure Description

PG&E may replace the existing live-front transformers with dead-front transformers due to safety considerations. If this transformer replacement occurs, a new 1200A, 480Y/277V, three-phase, four-wire service switchboard will be required. The current electrical code requires the service overcurrent protection to include ground-fault protection.

A new service switchboard would be constructed between the new PG&E dead-front transformer and the existing CCSD service switchboard. This will allow the existing switchboard with its overcurrent devices to remain unchanged. The new service switchboard will include an integral automatic transfer switch that will be connected to the standby generator. A power conditioning and monitoring unit will also be installed.

Benefits

- Provides code- and PGE- compliant solution for upgrade to grounded PGE transformer (PGE pays for transformer)
- Improved voltage stability compared to current ungrounded system
- Potentially improved protection against damage to electrical systems from transients
- Avoids need for plant-wide rewiring

4.2.8 ECM 8 - Backup Power

Existing Conditions

The existing 365 kW diesel backup generator was installed in 1976 and has reached the end of its useful life. The San Luis Obispo County Air Pollution Control District (APCD) limits use of the generator to emergency conditions and a small number of hours annually for maintenance. Currently, District staff can only view generator status via the SCADA system. It is preferred to have remote control of the generator via SCADA.

Measure Description

This ECM will include installation of a new natural gas-fired generator with propane backup. For this ECM it is assumed that the new generator will have a capacity of 365 kW, but the final size may be revised based on final load calculations.

Figure 12: Emergency generator

Benefits

- Improves treatment plant reliability during power outages
- Reduces burden on staff to maintain the existing generator
- Replaces critical infrastructure before it fails
- Eliminates regulatory restrictions on operations
- Reduces ongoing permitting costs and activities

4.2.9 ECM 9 - SCADA System

Existing Conditions

The WWTP has a limited SCADA system that provides monitoring and some manual operator control. The SCADA system has very little automatic functionality.

The SCADA system hardware consists of an OPTO-22 based platform. The operator workstation is located in the Maintenance Building. The WWTP utilizes an auto-dialer to alert staff in the event of a plant alarm. The auto-dialer is configured to send an alarm which is broken into 12 categories. The WWTP staff has to investigate the causes of the alarm once they reach the WWTP.

Measure Description

This ECM will include a new plant SCADA system for remote control, monitoring, and automation of processes. It is assumed the system would consist of new PLC with cabinet/HMI, new software server with redundant server, historian, and a new rack server with three workstations.

Other alternatives, such as expanding the existing Opto-22 system, will be evaluated during the IGA to determine the most cost-effective method for delivering enhanced SCADA control.

Benefits

- Reduces burden on staff
- Reduces energy usage through automation and optimization of treatment process
- Improves security and plant resilience
- Upgrades existing outdated infrastructure

4.2.10 ECM 10 – Secondary Water System (3W) Improvements

Existing Conditions

The existing secondary or plant water (3W) pumps (15 hp each) have reached the end of their useful life. The existing system pumps run at a constant speed while a pressure relief valve (PRV) maintains a set pressure in the plant system and discharges water back to the influent wet well where it is re-pumped by the system.

Figure 13: Secondary water pump station

The existing system was based on a design that simplified operation but was not energy efficient. For example, when the system over-pressurizes non-potable water it returns it to the wet well through a pressure relief valve, only to be pumped again. Additionally, the secondary water system runs continuously.

Measure Description

We recommend a more efficient system that utilizes submersible pumps, VFDs and/or a hydro pneumatic tank to optimize pump performance. This retrofit will also include the installation of new instrumentation and controls to better manage system pressures and reduce operating costs. In addition, the existing bag filtration system will be evaluated to consider a more efficient self-cleaning filtration systems.

Benefits

- Reduces energy usage by eliminated release of pressurized water back to the wet well
- Reduces energy usage by coordinating pump operating point with plant demand
- Replaces mechanical equipment which has reached the end of its useful life
- Reduces burden on staff

4.2.11 ECM 11 - Effluent Pump Station Improvements

Existing Conditions

The existing 40 Hp VFD-controlled effluent pumps do not reliably deliver flow at their rated capacities and have unmatched output. A surge tank was installed but it is no longer connected to the system. A PLC is

programmed to modulate based on wet well level, but control of the pumps is difficult, resulting in unstable pump operations.

The condition of the effluent line is not known, although cleaning is expected to improve pump performance and predictability. Air release valves (ARVs) along the 2.5-mile-long discharge system have reached the end of their useful life. It is believed that non-functional ARVs and sediment buildup in the pipeline may contribute to reduced capacity of the discharge system.

Figure 14: Effluent pump station

It is also assumed that restrictions in the discharge manifold impact pump operations.

Measure Description

This ECM will include replacement of the effluent pumps, rehabilitation of level control, reconfiguration and replacement of the discharge manifold system, cleaning of the effluent line, and evaluation or replacement of air release valves along the 2.5-mile long discharge alignment. This effort will also consider using the concrete-lined ponds as buffer storage to allow pumping only during non-peak electric periods. Replacement of the surge tank to protect the discharge piping will be evaluated.

Benefits

- Reduces energy usage by effectively controlling pump output
- Improves resiliency for critical plant infrastructure
- Upgrades existing infrastructure
- Reduces burden on staff

4.2.12 ECM 12 – Sewer Lift Stations

Existing Conditions

The District maintains and operates ten (10) sewer lift stations to convey sewage to the wastewater plant. Most of the District's lift stations have a "dry well/wet well" configuration featuring two pumps for lead/lag operation. Lift Station A is a triplex dry well/ wet well lift station (only two pumps installed) and features a below grade vault housing a 55-kW diesel generator. Lift Stations 4 & 8 consist only of a wet well with two submersible pumps. Maintenance or repair at the majority of the lift stations requires work to be conducted in a "confined space" as defined and regulated by the Division of Occupational Safety and Health (Cal/OSHA).

The District sewer collection system was constructed in the mid-1970s. Few improvements have been made since original construction. Due to water conservation measures implemented in recent years, a common issue at District lift stations is oversized pumps. Oversized pumps consume more energy due to

high velocities and associated high friction losses. Additionally, oversized pumps cycle more frequently both shortening pump life and unnecessarily increasing electrical use.

The District's Capital Improvement plans include raising electrical panels above grade as a first phase, then converting dry/wet pit lift stations to submersible lift stations.

Table 3: Sewer Lift Station Pumps

Lift Station No.	Manufacturer and Model No.	Pump Type	Qty	Pump Motor (hp)
A	Crown PO6LB-12F	Suction Lift	2	7.5
A1	Ebara Self-Priming	Suction Lift	2	10
B	Ebara Self-Priming	Suction Lift	2	25
B1	Crown PO4LB	Suction Lift	2	5
B2	Crown PO4LB-8D	Suction Lift	2	15
B3	Crown PO4LC	Suction Lift	2	10
B4	Allis Chalmers 400 SER	Suction Lift	2	40
9	Ebara C-EFQT6A	Suction Lift	2	10
4	Paco/58-47001-QDN	Submersible	2	1.5
8	Paco/58-47001-QDN	Submersible	2	1.5

Figure 15: Lift station B1

Figure 16: Lift station B4

Measure Description

Based on operating data from 11/1/2016 – 11/30/2018, pumps at District lift stations operate more than 20,600 hours per year. In addition to the benefits associated with retrofitting with premium efficiency motors and more appropriately sized pumps, the District will benefit from converting from obsolete dry-well lift station configurations which are inefficient, require significant ongoing maintenance, and are a safety hazard for District personnel.

Eight lift stations (A1, B, B1-B4, 3, 9) are in need of total replacement with submersible pumping systems to eliminate confined space entry requirements. LS4 and LS8 are already fitted with submersible pumps and are not recommended for rehabilitation at this time. It is anticipated that replacement of eight District lift stations will be a multi-year effort, requiring significant District resources to complete.

It is recommended that two lift stations be selected for replacement under the SST program. Based on field reconnaissance and discussions with District staff, it is recommended that Lift Stations B1 and B4 be replaced under this program.

	Hp	Notes
Lift Station B1 - Full Replacement	5	
Lift Station B4 - Full Replacement	40	Oversized
Not Recommended:		
Lift Station A - Pump replacement	7.5	LS A - Assumes replace with higher efficiency pumps and motors. Too close to coast for major improvements
Lift Station A1 - Full Replacement	10	LS A-1 pumps subsequently replaced with Ebara Self Primer pumps during ~ 2014
Lift Station B - Full Replacement	25	LS B pumps subsequently replaced with Ebara Self Primer pumps during ~ 2014
Lift Station B2 - Full Replacement	15	
Lift Station B3 - Full Replacement	10	
Lift Station 9 - Full Replacement	10	
LS4	1.5	submersible
LS8	1.5	3-phase submersible pumps. VFDs were added to provide 3-phase power to pumps.
LS9	5	suction lift, no dry pit, very small site next to road. changed approx 3 different times during its history.

Benefits

- Reduces energy usage by replacing inefficient pumps and matching pump capacity and flow
- Eliminates confined-space safety hazards
- Reduces (SSO) risk and Improves resiliency for critical infrastructure
- Upgrades aging infrastructure

5 PRELIMINARY FINANCIAL SUMMARY

From the list of potential measures evaluated in this PEA, the SST team believes that implementing a comprehensive project would enable CCSD to realize much needed infrastructure improvements while generating approximately $380,00/year in energy and operational savings. Table 5.1 provides a summary of all of the ECMs identified during this PEA. As part of the IGA, the SST would work closely with CCSD define each solution and to identify the specific ECM's that the district would like to move into the construction phase.

It is important to recognize that the estimated savings, implementation costs, and other inputs used in the financial analysis are preliminary and will be refined in the Investment Grade Audit (IGA).

Table 4: Preliminary Financial Summary

ECM ID	Description	Facility ID	Facility ID Level 2	Utility Savings	Avoided Cost & O&M Savings ($)	Total Savings ($)	Implementation Costs ($)	Notes
				Total Utility($)				
1	Influent Flow Equalization	WWTP	Equalization Basins (New)	(7,563)	15,900	8,337	1,060,000	Add equalization basins to maintain steady flow through activated sludge system. Consider conversion of existing (unused) clarifier(s) to anoxic basins, or possibly equalization basins.
2	Influent Lift Station Modifications	WWTP	Influent Lift Station	2,790	12,694	15,484	846,250	New submersible recirc pumps with VFDs. Replace or rehab pipe between the grit tank and aeration system. replace caps on header pipes so influent is delivered through diffusers.
3	Modified Ludzak-Ettinger Process Upgrade	WWTP	Aeration Basins	1,405	12,806	14,212	853,750	Add baffles and replace temporary internal recycle system with permanent recycle system. Replace existing diffusers and mechanical equipment that has exceeded design life. This is also necessary to meet effluent requirements.
4	Blower System Improvements	WWTP	Blower Room and Aeration Basins	133,468	20,175	153,643	1,345,000	DO control of diffusers and duct repair. Consider blower replacement
5	RAS and WAS Pumping Improvements	WWTP	Aeration Basins		7,444	7,444	496,250	Pumps are past their design life. Replace RAS pumps with new pumps & VFDs operating closer to design conditions. Add control valve on RAS lines, or dedicated WAS pumps, to control RAS feed rates without additional pumping. RAS pumps appear to be sized too large for current flows. Repair skimming troughs and scum pumps
6	Sludge Thickening	WWTP	Solids Processing Area	968	14,419	15,387	961,250	Sludge basins have exceeded design life. Replace basins with new aerobic digester. Reduce screw press operating hours. Repair/revise thickener. Repair/revise screw press. Optimize thickening procedures.
7	Electrical Upgrades	WWTP	Control and Generator Building	-	3,488	3,488	232,500	Replace transformer. Provide new switchboard and GFI. Replace or relocate 480V MCCs in conference area
8	Backup Power	WWTP	Control and Generator Building	-	7,463	7,463	497,500	Replace old generator with new generator (natural gas with propane backup)
9	SCADA System	WWTP	Communications Systems	5,500	10,819	16,319	721,250	Install plant SCADA system for remote control, monitoring, and automation of processes Opto-22 based controls do not allow remote control or process optimization
10	Secondary Water System (3W) Improvements	WWTP	3W Station	-	2,775	2,775	185,000	Replace existing Cla-Val pressure relief valve with hydropneumatic tank and pressure settings. Install new submersible pumps.
11	Effluent Pump Station Improvements	WWTP	Effluent	4,200	11,006	15,206	733,750	Repair surge tank. Install vfds. Clean effluent line, evaluate/replace ARVs
12	Sewer Lift Stations	Collection	Lift Stations	2,100	59,175	61,275	3,945,000	Replace B1 and B4
					-	-		
Total				**142,869**	**178,163**	**321,031**	**11,877,500**	

5.1 Financing Options

PG&E does not provide financing directly for projects executed through the SST Program. Rather, we work with an experienced group of financiers to support our customer's project financing needs. We have accessed these resources to develop a preliminary projection of funding cost and structure that reflects current market conditions. It is important to note that PG&E does not make any money from the financing of projects. We facilitate the acquisition of project financing purely to assist our customers.

In addition to traditional financing vehicles, CCSD would also qualify for low cost energy financing. The California Energy Commission (CEC) offers loans which are issued at a 1% interest rate for qualifying projects. Similarly, California Investor-Owned Utilities (IOUs) offer 0% interest On-Bill Financing (OBF). Both PG&E and Southern California Gas offer OBF loans. The State Revolving Fund (SRF) and USDA also offer long-term and low interest infrastructure loans. During the IGA, PG&E would work with the District to identify and secure project funding from the available source, or combination of sources, that best meet the according to District's needs and timing.

5.2 Rebates, Grants and Rate Plans

There are multiple opportunities for rebates, grants, and specialized electrical rate plans to be applied to the proposed measures. Availability of funds for qualifying District projects would be fully assessed in the Investment Grade Audit (IGA) to

6 NEXT STEPS

The Preliminary Energy Assessment (PEA) is the first step in PG&E's comprehensive approach to energy projects through the Sustainable Solutions Turnkey (SST) Program. The goals of the PEA are to characterize the customer's existing energy and facility conditions and to identify opportunities for the customer to improve those conditions to save energy and reduce operating costs.

Following review of the PEA Report, the next step in the SST Process is for the customer to select candidate Energy Conservations Measures (ECMs) for further investigation in the Investment Grade Audit (IGA). The IGA provides detailed evaluation of the candidate ECMs including real-time data collection, energy validation, engineering, final construction costing, and provides the customer with a firm, not-to-exceed, fixed cost for turn-key implementation.

Furthermore, the IGA serves three (3) primary objectives:

For the Customer: The IGA clearly defines the proposed technical solutions, the expected construction schedule and the associated cost for each ECM and the overall project. The IGA identifies the extent of the customer's project risk and characterizes suitable methods for risk mitigation. The IGA confirms the expected savings and financial performance of the project as well as the associated sources of funding/financing. And, finally, the IGA provides the customer with a firm fixed "not to exceed" cost proposal for turnkey implementation.

For PG&E: The IGA validates the technical feasibility of all ECMs, ensures project constructability, characterizes PG&E risk and finalizes all costs required to deliver a successful turn-key project to the customer. It is on the basis of the IGA that PG&E can provide a firm fixed "not to exceed" turn-key proposal for project implementation.

For Financiers: Generally, potential financiers (and/or funding programs) require an IGA as a condition of underwriting and funding energy projects. Financiers share the customer's and PG&E's interest in the technical and financially viability of a project – both at completion and through the life of the financing period. The IGA provides financiers with a full description of the project, with a particular focus on the project's ability to deliver savings and/or revenue through the term of the financing period.

The next step for the CCSD is to decide which ECMs, if any, should be further investigated in an IGA. Armed with the District's selection, the SST Team will promptly prepare and submit an IGA proposal for District consideration.

A sample schedule is outlined below.

- 95% complete PEA for District Staff review: **January 14, 2019**
- Final 100% PEA report to be delivered to the District: **February 8, 1019**
- Draft IGA Proposal to District: **February 20, 2019**
- PG&E to deliver final IGA proposal to District: **Five (5) business days from selection**
- Outline of Board Presentation: **TBD**
- Board Packet and Resolution submitted two weeks in advance of Board Meeting: **TBD**
- Public Posting two weeks prior: **TBD**
- Target Board Meeting: **TBD**.

7 SST PROGRAM OVERVIEW

For over 40 years, PG&E and our fellow California utilities have been recognized leaders in the advancement of energy efficiency programs and technologies. In collaboration with the California Public Utilities Commission (CPUC) and the Governor's office, California utilities have been able to maintain pre-1980's per capita energy consumption in the face of unprecedented population and economic growth. More recently, we have risen to the challenge of increasing generation from renewable sources in our energy portfolio. As a result of this historic collaboration, PG&E customers enjoy one of the cleanest energy supplies in the country.

While we are proud of our collective successes, the State, PG&E and our customers are facing a new set of challenges arising from the interrelated effects of Climate Change, severe drought and worldwide goals to reduce the carbon impact of everything we do. Addressing these most pressing challenges in a timely and viable way calls for creative thinking and an innovative response.

PG&E's Utility Energy Services Contract (UESC) is a prime example of doing things differently through collaboration and creativity. Through a Public-Private Partnership with the United States Department of Energy (DoE), UESC authorizes both civilian and military branches of the Federal government to engage their local serving utility for the turnkey delivery of energy-related projects. Through this program, PG&E provides all of the services required to identify and complete comprehensive energy projects, including assessment, development, financial analysis, design, construction, commissioning and acceptance/turn-over. Since the goal of these projects is to reduce energy and water consumption (and the related operating cost), the capital cost of UESC projects is funded from the savings generated – either through financing, incentives, grants or a combination thereof. PG&E provides end-to-end implementation including all elements of assessment, development, design and construction for projects. Since its inception, the UESC program

PG&E's Unique Qualifications

- **PROVEN TRACK RECORD.** PG&E has successfully administered, developed, and executed hundreds of millions of dollars' worth of energy efficiency projects.
- **LOCAL PRESENCE & LONG-TERM PARTNER.** With over 150 years' experience serving Northern and Central California, PG&E has extensive local resources that will support the project's development, implementation, engineering, and service requirements
- **VENDOR NEUTRAL.** PG&E does not make or sell equipment. Our solution and project development are guided exclusively by the unique needs of each individual customer.
- **ROBUST INTERNAL TECHNICAL RESOURCES.** 100% of our energy engineering and project management is delivered in-house by our experienced staff and qualified strategic partners.

has delivered an impressive scorecard of results for Federal facilities across our service territory including NASA, FAA, US Army, GSA, IRS and VA.

Building on the success of the Federal UESC program, PG&E developed the Sustainable Solution Turnkey (SST) Program to offer non-Federal customers the same ability to engage PG&E for the implementation of comprehensive efficiency and renewable energy projects across their facilities. Modeled on the rigorous development and accounting requirements of UESC, the SST Program provides customers the same transparency, open-book cost development and warranties offered to our largest most discriminating customer.

PG&E strongly encourages customers to take a comprehensive and strategic approach to energy planning, sustainability initiatives and related project implementation. The SST Program defines and supports a process that considers a design-build approach, takes advantage of streamlined procurement through California Government Code Section 4217 and properly prioritizes and bundles deep energy-saving retrofits, with renewable generation to achieve overall energy, sustainability, operational and financial goals.

Importantly, the SST methodology, described below, is designed to support the customer's decision-making process and is comprised of several steps to ensure that projects meets the customer's unique priorities and needs.

1) **Preliminary Energy Assessment (PEA):** Establish customer goals and objectives. Identify opportunities and project viability through data analysis, interviews and benchmarking. Determine key opportunities based on customer goals and define the associated technical and financial components:
    a) Advance customer's sustainability & climate action goals
    b) Assess current baseline and opportunities for improvement
    c) Reduce utility and operating costs
    d) Address aging building systems or facility infrastructure
    e) Demonstrate a potential project size that fits the SST program
    f) Determine potential Green House Gas (GHG) savings and environmental impact
    g) Produce recurring annual savings to support financing
2) **Investment Grade Audit (IGA)**: Finalize technical solution and financial details
    a) Detailed Audit
    b) Engineering and Economic Analysis

c) Project Pricing and Financing Plan

d) Monitoring and Verification Plan

e) Equipment specification and subcontractor bid packages

f) IGA Report Preparation

g) Firm, fixed “not to exceed” construction cost/project proposal

3) **Implementation:** Deliver turnkey design/build construction of project, start-up and testing and final commissioning.

4) **Acceptance, Turnover and Closeout:** O&M manuals, training, incentive/rebate procurement and Measurement & Verification (M&V).

8 APPENDIX A - LIST OF ACRONYMS

Acronym	Definition
ADF	Average Daily Flow
APCD	Air Pollution Control District
BNR	Biological Nutrient Removal
BOD	Biological Oxygen Demand
CCSD	Cambria Community Services District
CEC	California Energy Commission
CPUC	California Public Utilities Commission
DO	Dissolved Oxygen
ECM	Energy Conservation Measure
GHG	Green House Gas
GPM	Gallons per minute
IGA	Investment Grade Audit
IOU	Investor Owned Utility
kW	Kilowatt
kWh	Kilowatt Hour
M&V	Measurement and Verification
MCC	Motor Control Center
MG	Million gallons
mg/l	Milligrams per liter
MGD	Million gallons per day
MLE	Modified Ludzak-Ettinger
MW	Megawatt
O&M	Operations and Maintenance
OBF	On-Bill Financing
PEA	Preliminary Energy Assessment
PG&E	Pacific Gas and Electric

Acronym	Definition
PV	Photovoltaic
RAS	Return Activated Sludge
SCADA	Supervisory Control and Data Acquisition
SST	Sustainable Solution Turnkey
SWF	Sustainable Water Facility
TMDL	Total Maximum Daily Load
TOU	Time-of-Use
VFD	Variable Frequency Drive
WAS	Waste Activated Sludge
WWTP	Waste Water Treatment Plant

Pacific Gas and Electric Company
Turnkey Energy Solutions
245 Market Street, Mail Code N10D
San Francisco, CA 94105

February 25, 2019

Mr. John Allchin
Wastewater Systems Supervisor
CAMBRIA COMMUNITY SERVICES DISTRICT
5500 Heath Lane
Cambria CA 93428

RE: Investment Grade Audit Proposal – CCSD Waste Water Treatment Plant

John:

First, thank you for all of the time and work invested by the members of the Cambria Community Services District (CCSD) team. This collective input has been instrumental in the successful completion of our efforts to date. It has been a pleasure working with each of the team members on this exciting opportunity.

On behalf of PG&E, I am pleased to provide the following proposal for the next step in our Sustainable Solutions Turnkey (SST) Program – the **Investment Grade Audit (IGA)**. As we have previously discussed, the IGA is a detailed validation of the Energy Conservation Measures (ECMs) outlined in our Preliminary Energy Assessment, including the following highlights:

- **Technical validation** of the ECMs including up to 30% design and specification documents
- **Collaborative engagement** with District staff on solution development, design & equipment selection
- **Financial analysis** to confirm savings, funding sources and available grants or incentives
- **Firm fixed-cost implementation proposal** of the mutually developed ECMs

Please review the information provided below. Do not hesitate to reach out if you have any questions or needs for additional information.

Thank you again for the opportunity to be of service to CCSD. We look forward to working with the extended team to deliver a successful project.

Respectfully submitted,

PACIFIC GAS AND ELECTRIC COMPANY

Brent

Brent R. Patera
Senior Business Development Manager
Turnkey Energy Solutions

C: Bob Gresens
Monique Madrid
Paavo Ogren

Pacific Gas and Electric Company®

February 25, 2019

Cambria Community Services District
5500 Heath Lane
Cambria CA 93428
Attn: John Allchin

The SST Program has been developed to assist customers in completing comprehensive energy and infrastructure projects which enhance facility performance while reducing the associated operating cost and environmental footprint – delivered through a single end-to-end turnkey process. This means that customers can complete significant facility improvement projects with a minimum of impact on their internal resources.

The program offers the Cambria Community Services District all of the services required to complete a successful project that would otherwise have to be procured by the District on a piecemeal basis:

- Integrated development, engineering and installation services
- Project, construction and safety management
- Equipment, material and contractor procurement
- Commissioning, start-up testing, documentation and operator training
- Funding procurement, including available grants and low-interest financing

As the next step in the process, the PG&E Sustainable Solutions Turnkey (SST) Program is pleased to provide the following proposal for the Investment Grade Audit (IGA).

Proposal for Investment Grade Audit

This proposal includes all costs for professional consulting and engineering services required to complete the Scope of Work defined below.

ENERGY CONSERVATION MEASURES (ECMs)
PG&E and the SST team will evaluate the twelve (12) Energy Conservation Measures (ECMs) shown in Table 1 below. These ECMs are described in the 100% Preliminary Energy Assessment (PEA) Report titled: “Preliminary Energy Assessment Report for Cambria Community Services District” submitted on February 22, 2019.

Table 1: Recommended ECMs

ID	ECM Description	Site	Process Area
1	Influent Flow Equalization	WWTP	Equalization Basins (New)
2	Influent Lift Station Modifications	WWTP	Influent Lift Station
3	Modified Ludzak-Ettinger Process Upgrade	WWTP	Aeration Basins

4	Blower System Improvements	WWTP	Blower Room and Aeration Basins
5	RAS and WAS Pumping Improvements	WWTP	Aeration Basins
6	Sludge Thickening	WWTP	Solids Processing Area
7	Electrical Upgrades	WWTP	Control and Generator Building
8	Backup Power	WWTP	Control and Generator Building
9	SCADA System	WWTP	Communications Systems
10	Secondary Water System (3W) Improvements	WWTP	3W Station
11	Effluent Pump Station Improvements	WWTP	Effluent
12	Sewer Lift Stations	Collection	Lift Stations

IGA ACTIVITIES AND DELIVERABLES (GENERAL)
The Investment Grade Audit will consist of the following activities that are integral to all Energy Conservation Measures (ECMs):

- Conduct IGA Kickoff Meeting with CCSD to discuss project goals, scopes, process, access requirements, communication protocol, Utility Tariffs and schedule.
- Acquire updated utility information for Electric, Water and Natural Gas for Utility Analysis.
- Acquire additional, detailed, ECM-specific information from the District as listed by ECM below.
- Conduct additional staff interviews and site audits to enhance and verify information collected in the Preliminary Energy Assessment (PEA) and to establish utility baselines for each measure.
- Perform all necessary work to develop firm fixed implementation pricing for each ECM including:
    - Scopes of Work (SOW)
    - Up to 30% (estimated) mechanical, electrical, structural, & instrumental / controls design
    - Contractor packages, site walks and selection,
    - Detailed analysis of utility and other operational cost savings, installation cost, and constructability.
    - Specific work required at the ECM level is detailed in the respective sections below.

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- Conduct Workshop Meetings with District staff to discuss the findings and recommendations developed during the IGA. The meetings will be organized as follows:
  - Kick-Off Meeting
  - Utility Baseline Review
  - Energy Conservation Measures
    - 50% Development Review
    - 90% Development Review
  - Construction/Financing Workshop

- Upon conclusion of the IGA, a **Final Report** will be issued which will include:
  - Executive Summary
  - Detailed Utility Analysis
  - Detailed Development of Recommended Energy Conservation Measures
  - Firm Fixed Implementation Proposal
  - All supporting design information including basis of design documentation, design drawings, subcontractor & material quotes.
  - Design Completion (up to 30%) and Construction Schedule
  - PG&E Electric Service Upgrade Plan
  - Financial Analysis that includes Cost Benefit Analysis and Firm-Fixed Project Cost Estimates
  - Funding Options and Recommendations, Including Applicable Grants, Low-Interest Loans, Rebates and Incentives

IGA ACTIVITIES AND DELIVERABLES (ECM-SPECIFIC)

1. **ECM-1 Influent Flow Equalization**

- Assess condition of existing welded equalization tank
- Review plant flow records and confirm size of equalization tank(s)
- Develop hydraulic profile from lift station through new screen, grit removal, and proposed equalization tanks
- Develop cost comparison of rehabilitating existing welded tank with new liner or new coating; constructing two new concrete tanks; and constructing two new glass-coated bolted steel tanks
- Develop preliminary size and description of major equipment items, including blowers and enclosure, transfer pumps, coarse bubble diffusers, valves, process instrumentation, and piping

2. **ECM-2 Influent Lift Station Modifications**

- Review plant flow records and confirm design criteria for new pumps
- Develop system curve for influent lift station
- Evaluate potential wet well improvements including baffling to improve flow distribution
- Review and confirm options for pump type with District staff
- Confirm number and flow range of pumps over a range of motor speeds
- Develop preliminary size and description of major equipment items, including new pumps, process instrumentation including flow meter(s), and piping

3. **ECM-3 Modified Ludzak-Ettinger Process Upgrade**

- Review plant flow and water quality records and confirm design criteria

- Confirm proposed anoxic and aerobic basin size and configuration from prior studies
- Determine recirculation and waste activated sludge flows and aeration requirements under a range of operating conditions
- Develop preliminary piping and mechanical plan for review by District staff
- Develop preliminary size and description of major equipment items, including new anoxic mixer(s), diffusers, valves, process instrumentation, and piping

4. **ECM 4 – Blower System Improvements**

- Determine range of air requirements under various influent loading conditions based on analysis in ECM 3
- Develop description of process instrumentation (including air flow meters and dissolved oxygen probes)
- Evaluate options for upgrading / retrofitting blower system
- Develop scopes of work and preliminary design for recommended upgrades/retrofit
- Develop new sequences of operation to optimize system operation

5. **ECM-5 RAS and WAS Pumping Improvements**

- Perform assessment of visible surfaces within scum pit and RAS wet well
- Develop description of RAS pumps, WAS control valve, flow meters, process instrumentation, piping, valves, scum troughs, and scum pumps

6. **ECM-6 Sludge Thickening Improvements**

- Review plant sludge quality and flow records
- Assess capacity, condition and improvement options for existing thickener and screw press
- Confirm size of proposed glass-coated bolted steel sludge storage tank(s)
- Develop preliminary layout of biosolids handling area
- Develop preliminary layout of roll-off area
- Prepare lifecycle cost comparison of (1) onsite sludge storage and (2) roll-off storage with more frequent disposal
- Review and confirm preferred alternative with District staff

7. **ECM-7, -8 Electrical Upgrades and Backup Power**

- Evaluate and develop retrofit solution for power requirements (hp and voltage) for new motors and loads in proposed ECMs
- Size and specify replacement solution for standby generator and transfer switch

8. **ECM-9 SCADA System**

- Develop preliminary process and instrumentation diagrams for coordination with SCADA design
- Develop scope of work for all necessary SCADA upgrades

9. **ECM-10 Secondary Water System (3W) Improvements**

- Review condition of existing wet well, pumps, and exposed piping
- Determine design criteria (flow and pressure) for 3W system
- Evaluate cost/benefits of variable frequency drives compared to hydro pneumatic storage

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- Review and confirm solution with District staff
- Recommend improvements to existing system or replacement with new pumps and valves
- Develop scopes of work for new pumps, valves, and appurtenances

10. **ECM-11 Effluent Pump Station Improvements**

- Field review effluent pipeline alignment, air release valves, and other appurtenances
- Confirm design criteria (flow and head requirements) for effluent pumps
- Determine if constant speed or variable speed pumping should be implemented
- Perform preliminary surge analysis on effluent pump and force main system
- Develop recommendations for cleaning pipeline, including provisions for a "pigging" station
- Determine repair and rehabilitation recommendations for existing coatings and equipment
- Develop scopes of work for new pumps, valves, instrumentation, and appurtenances

11. **ECM-12 Sewer Lift Stations (B1 and B4)**

- Develop design flows for each lift station based on available plant records, review of upstream land uses, and estimated peaking factors
- Confirm design criteria (flow and head requirements) for submersible pumps at each station
- Confirm size (depth and operating ranges) for wet well
- Evaluate dimensions and visible condition of existing wet well to determine if it can be used or a new wet well should be constructed
- Develop preliminary layout of B1 and B4 for review by District staff
- Develop description of new pumps, valves, access hatches, instrumentation, and appurtenances

COST AND PAYMENT TERMS

The total cost for the work described herein is **$542,000.00**. Mobilization in the amount of $160,000 is due at the time of contract execution. The balance of the cost shall be due and payable under the following options:

1) In the event the District elects to proceed with completion of the project, the remaining balance of the IGA cost will be carried into the construction contract.

2) In the event the District elects NOT to proceed with completion of the project, the remaining balance will be due and payable upon receipt of the Final IGA Report or no later than 220 days after IGA contract execution.

ASSUMPTIONS AND CLARIFICATIONS

The following assumptions and clarifications apply to the scope and costs presented in this proposal.

- PG&E assumes that specified facility data/information will be made available in a timely fashion including utility bills, facility construction drawings, equipment data, and operations and maintenance data.
- PG&E will require close coordination with the District facility staff and other District personnel in order to successfully complete the IGA.

- The District will arrange and provide access for PG&E and consulting personnel to all facility areas and equipment as needed to complete the work.
- PG&E assumes that appropriate personnel will be available during the site visits and meetings, and will also be available by email and telephone for follow-up consultations.
- Any additional work requested by the District will be priced based on the agreed to SOW.
- District will provide available data and conduct additional analyses (including flow monitoring, pressure monitoring/recording, laboratory analyses, and other tests) if required for development and/or design. PG&E to provide testing protocols for use in collecting this data.
- PG&E has the right to rely on record drawings provided by the District in developing preliminary plans under the IGA
- PG&E has the right to rely on prior studies provided by the District in determining design criteria and developing preliminary plans

SCHEDULE

PG&E is prepared to begin work on the IGA immediately upon being provided a Notice to Proceed (NTP) from the District. Upon receipt of the NTP we will provide a schedule for the IGA work and arrange the kick-off meeting. Excluding review and/or administrative time required by the District, the estimated duration of the IGA is six (6) months from the date of NTP.