CAWD Budget
2013-14
Part 2

Budget Committee (final):	April 15, 2013
Preliminary Budget Board Meeting:	April 25, 2013
Final Budget Board Meeting:	June 27, 2013

CARMEL AREA WASTEWATER DISTRICT TREATMENT PLANT
CAPITAL IMPROVEMENT PROJECTS - FY 2013/14 - FY 2017/18

	PROJECT	13/14	14/15	15/16	16/17	17/18	Unsched
1	Belt Press #2 & Polymer Delivery Rehabilitation	$500,000					
2	Rehabilitate/Replace Natural gas lines	$150,000	$100,000				
3	Replacement of Critical valves (as needed)	$100,000	$100,000	$100,000	$100,000	$100,000	
4	Building, Offices, & Locker Room Rehabilitation	$100,000	$100,000	$100,000			
5	Chemical containment area - MF/RO (*Reclamation 100%*)	$100,000					
6	Primary Clarifier Collector Unit Rebuild/Replace on Tank #2	$63,000					
7	Parking & drainage at Treatment Plant Maint Shop	$60,000					
8	Demolition of old equipment	$55,000	$50,000	$45,000	$25,000		
9	Field Instrument Study/Repair/Rplc and Modifications (*Reclamation 25%*)	$50,000	$50,000				
10	Water champ - automatic chlorine injection (*Reclamation 50%*)	$50,000					
11	Laboratory Information Management System (LIMS) (*Reclamation 50%*)	$50,000					
12	Grit Bin/Dewatering Building Drainage	$50,000					
13	Upgrade electrical service in Maint Shop	$40,000					
14	Secondary system instrumentation improvement	$40,000					
15	Preventative Maintenance Software Implementation - Consultant (*Reclamation 25%*)	$32,240					
16	Station SBS injection modification	$30,000					
17	Misc Physical Testing of Plant Structures/Equipment	$25,000	$25,000	$25,000	$25,000	$25,000	
18	Plant lighting, Camera upgrade, and perimeter fence	$25,000	25,000	25,000	25,000		
19	Road improvements	$25,000	$15,000	$15,000	$15,000	$15,000	
20	Tertiary and Waste Activated Solids Study (*Reclamation 50%*)	$25,000					
21	Secondary system dissolved oxygen study (*Reclamation 50%*)	$15,000					
22	Moisture Analyzer (*Reclamation 25%*)	$12,500					
23	Reconstruct mezzanine in Maintenance shop	$10,000	$50,000				
24	Install Grinder, Rehab Inlet Gates & Interconnect Gates in Influent Wet Well (*Reclamation 15%*)		$175,000				
25	Digester # 1 Cleaning		$168,000				
26	Reliability study of SCADA, PLC, and Communication Systems (*Reclamation 50%*)		$72,500				
27	Instrumentation upgrade SBS pumps at CDC install flow mtrs & totalizer (*Reclamation 100%*)		$40,000				
28	Total Organic Carbon Analyzer (*Reclamation 50%*)		$38,000				
29	Headworks Channel Grinder Overhaul		$35,000				
30	Rehabilitate Maintenance Shop exterior		$35,000				
31	Primary scum sump mixer w/ ultarsonic level controls		$30,000				
32	Tertiary pH Adjustment System (*Reclamation 100%*)		$30,000				
33	Upgrade Maintenance Shop lighting		$25,000	$25,000			
34	SBS Pumps at CDC install flow meters and totalizer		$25,000				
35	Pipe Storage Area		$20,000				
36	Chlorine Analyzer (DEOX 2000 - Effluent Pump Station)		$14,000				
37	Rehabilitate Treatment Plant Collections Bldg (80% Collections, 20% Treatment)		$6,000				
38	Equalization Spray System (*Reclamation 50%*)			$40,000			
39	Fuel storage tanks modifications & repairs			$35,000			
40	Effluent Pump(s) VFD			$35,000			
41	Modify storage area in Maintenance Shop			$20,000			
42	RAS Pump VFD			$15,000			
43	Demo bridge at Treatment Plant across Carmel River					$210,000	
47	Carry Forward: Digester Equipment & Installation - Resolution #12-38 dtd 12-14-12	$312,000					
48	Carry Forward: Kennedy Jenks Design Interim Digester Equipment - Resolution #13-12 dtd 3-28-13	$51,719					
49							
50							
51							
	TREATMENT & DISPOSAL TOTAL	**$1,971,459**	**$1,228,500**	**$480,000**	**$190,000**	**$350,000**	**$0**
	RECLAMATION SHARE (1)	$193,685	$164,000	$32,500	$12,500	$0	$0
	PBCSD SHARE (2)	$592,591	$354,833	$149,167	$59,167	$116,667	$0
	CAWD COST	**$1,185,183**	**$709,667**	**$298,333**	**$118,333**	**$233,333**	**$0**

(1) PBCSD to pay 1/3 of costs. (After Reclamation portion deducted, if applicable) unless otherwise noted. *Projects in italics are not funded directly by PBCSD*

Carmel Area Wastewater District
EXPLANATION/DESCRIPTION/JUSTIFICATION/COST ESTIMATES
Capital Budget - FY 2013/14 through FY 2017/18

1. Belt Press #2 & Polymer Delivery Rehabilitation (FY 13-14)

This project was originally budgeted for 12-13 and 13-14 and is being carried forward in full to 13-14. Currently Belt Press #2 is our only operating belt press – it was originally installed in 1998.

Staff first intended to refurbish but has subsequently determined that a better approach is to send the press to Ashbrook (original manufacturer) for a complete rehab and to also rehabilitate the polymer delivery system in place. Ashbrook has offered that they are able to bring this belt press back to near new condition. Staff currently lifts totes of polymer to the second level of the belt press building for injection in the process. A more efficient and safe method would be to install a pumping system on the first level along with the chemical totes. This will require a clean-up of the lower level (currently storing surplus materials) and then installation of the pumps and piping to move the polymer to the second level.

Belt Press #1 will be demolished and replaced with a newer technology as we progress through the long term capital plan to rehabilitate the facility.

Estimated cost: $500K

2. Study to Rehabilitate/Replace Natural gas lines (FY 13-14, 14-15)

Currently, a large portion of the plant (roughly 75%) is without natural gas and is unable to operate their water heater for showers or gas heaters. The current system is not passing pressure tests and has been out of service for the past year. The system is approximately 70 years old – less areas of repair. The project will include bringing a new line across the river either attached to the bridge or under the river and lines within the plant. This project will abandon the current piping system and will efficiently and effectively route new gas lines where needed.

Staff plans to examine alternatives to use of natural gas (i.e. radiant heating, methane water heater, and new microturbine technologies). The District goal to be energy self-sufficient or to generate its own power will be considered in sizing the line large enough to consider other technologies.

Estimated Cost: $150K; $100K

3. Replacement of Critical valves as needed (FY 13-14 through 17-18)

Numerous valves are inoperable throughout the plant. These funds will be utilized to rehabilitate or replace valves as we progress with projects. In many cases projects cannot proceed or will be delayed until the proper valving and bypass valving systems are in place and determined to be reliable. Staff believes the best approach to is to allocate yearly for the next five years so that the entire plant can be rehabilitated.

Estimated Cost: $100K each year

4. Building, Offices and Locker Room Rehabilitation (FY 13-14, 14-15, 15-16)

Several offices and buildings are in need are in need of repair or rehabilitation. This project will focus its attention to these following areas and will address the glaring needs of each building including but not limited to floors, paint, wall repairs, replace showers, fixtures, appliances, office equipment, desk, lighting, etc.:

- Operations locker room (men's and women's)
- Operators work area
- SCADA control center
- Operations supervisor office
- Safety officers work area
- Operators project work area
- Superintendent's trailer
- Maintenance shop offices
- Maintenance shop restrooms
- Belt press restroom

Estimated Cost: $100K per year

5. Chemical containment area, tertiary CIP cleaning (FY 13-14)(100% Reclamation)

Staff is recommending that a section of asphalt next to the northwest corner of the MF/RO facility which holds the inventory of chemicals needed for maintenance washes, CIP (clean in place), and neutralization chemicals be converted into a functional, contracted OSHA approved containment storage for chemicals.

At any given time there is approximately 2000 to 5000 gallons of chemicals in various containers (i.e. drums, totes,) on hand for use at the MF/RO facility. Quantities have to be stored on hand because of changes in operational needs and long lead times before delivery of chemicals. Chemicals have been stored on the ground with a sock barrier around the area to capture any leaking chemicals but will not contain a major spill or prevent vehicles accidentally hitting a chemical container. This risk factor is increased because of the close proximity to the facility storm drains.

Staff recommends creating a platform to hold multiple drums and totes to be accessed by forklift and able to capture a chemical spill. Numerous bollards will be inserted around the perimeter to protect the chemical holding area from traffic. Pictures below are a representation of suggested platform.

Ultra-Modular IBC Spill Pallets

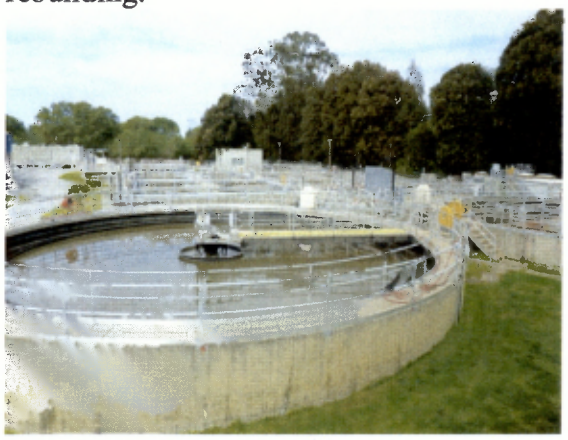
- New Ultra-Modular IBC Spill Pallets provide low cost spill containment for multiple IBC tanks. Standard offerings include: 2-tank, 3-tank, 4-tank and 5-tank indoor and outdoor models. In addition, components may be purchased separately to allow users to "build-your-own" configurations for indoor models.
- Each IBC tank sits on a heavy-duty spill pallet that offers a Uniformly Distributed Load Capacity of 9,000 lbs. Each of the low profile spill pallets has a containment capacity of 75-gallons and measures 62" x 62" x 8.75"H.

- To increase containment capacity, a 65-gallon capacity Expansion Tank is available. "Flow-through" bulkhead fittings (1.25-inch diameter) are used to connect spill pallets and Expansion Tanks together. This patented feature allows spills to be channeled throughout the containment system, thereby "borrowing" containment capacity from adjacent spill pallets and Expansion Tanks.
- Any number of the modular spill pallets can be connected together with the bulkhead fittings. Two (2) bulkhead fittings are used to connect one pallet to the next.
- Connecting an Expansion Tank to a spill pallet also requires two (2) bulkhead fittings. Bulkhead fittings are included with each 2-, 3-, 4-, or 5-tank model. Once five (5) or more spill pallets are connected together, the total containment capacity is 375 gallons minimum and does not require use of an Expansion Tank to meet the spill containment regulations.
- Optional Extender Kits (Part# 9658) provide for the addition of another compartment to Outdoor Models. (1 tank per Extender Kit).
- Ultra-Modular IBC Spill Pallets are constructed of 100% polyethylene, eliminating the potential for rust and corrosion. They offer excellent chemical resistance to a broad range of chemicals including acids, solvents and oils.

Estimated Cost: $40K

6. Primary Clarifier Collector Unit Rebuild/Replace on Tank #2 (13/14)

Both Primary Clarifiers will have logged 40 years of near continuous operation and will be in need of a complete rebuild or replacement. Staff's research indicates a rebuild would cost $65,000 which would be for parts, shipping and labor. To replace the primary clarifiers it would cost $63,000. The labor cost is less with a replacement because they would demolish the existing one. Staff recommends replacing versus rebuilding.



Estimated cost: $63,000

7. Parking and drainage at Treatment Plant Maintenance Shop (FY 13-14)

Pave the east side of the Treatment Plant Maintenance Shop for parking and add adequate drainage to prevent further damage to the retaining wall. Rust and poor drainage have damaged the retaining wall. The intention is to regrade the area rather that attempt to repair the retaining wall. The roadway into the plant must be repaired from damage due to eucalyptus tree roots and there is a minor sinkhole at the north end of the Maintenance Shop that must be repaired.

Staff advises work on this roadway now before onset of major construction for long term capital plan because vehicles will need adequate access.

Estimated Cost: $60K

8. Demolition of antiquated equipment (FY 13-14, 14-15, 15-16, 16-17)

Funds will be used for the removal or demolition of unused and unneeded equipment in several areas of the plant. Such as:

- Unusable Equipment in basement of Belt Press building
- Abandoned electrical/control panels in numerous areas of the plant
- Removal of damaged and unsafe equipment and storage tanks
- Removal of abandoned piping systems

Staff will work with contractor or vendor to determine if there is any surplus/salvage value.

Estimated Cost: $55K, $50K, $45K, $25K

9. Field instrument Study/Repair/Replacement and Modifications (FY 13-14, 14-15) (25% Reclamation)

Field instruments (e.g. flow meters, pressure regulators, level indicators, etc.) are the nerve endings of the SCADA system and are responsible for the measurements that are reported for diagnosis, evaluation, troubleshooting, process control and reporting.

Funds will be utilized to develop a TM with 10 year forecast and recommendations to integrate, improve or modify our current system along with the identification and repair of instruments in need of immediate attention (e.g. nuisance alarms should be evaluated).

Estimated Cost: $50K, $50K

10. Water Champ Modification (FY 13-14) (50% Reclamation)

Staff recommends that the primary and the secondary water champ chlorine injection system be modified. Approximately two years ago the #1 water champ used for disinfecting our secondary flow and to create mono-chloramines for the MF/RO pad had a failure during the night. The result of this failure caused a violation NPDES.

To address this, a number of changes were made to prevent this from occurring again. One of the changes was to install a second water champ chlorine injection system in the vault next to the primary system. Although this is a good redundant system it does not address the fact that it manually has to be implemented. Someone has to drive in on an emergency call-out and make necessary valve changes and power the second unit up.

Staff has determined that during the 45 minute drive to the facility the District has a potential for a violation again. We plan to cure the potential for violation and properly add the necessary solenoid valving, piping, electrical and PLC controls to resolve this issue.

Reclamation: The Water Champ serves dual purpose for injection of ammonia and chlorine. These are used to produce mono-chloramine that prevents biofouling.

Estimated Cost: $50K

11. Laboratory Information Management System (LIMS) (FY 13-14) (50% Reclamation)

A Laboratory Information Management System (LIMS) is a software based laboratory and information management system that supports lab operations by managing multiple aspects of laboratory informatics. Automating operations and integrating instruments allows operators and labs to increase capacity and sample throughput and build in regulatory compliance, while also reducing the costs associated with time spent on manual activities, such as recording data in paper notebooks or using spreadsheets to create reports.

In today's wastewater laboratories LIMS are commonplace because of the strict guidelines we are held to by the many agencies we are require to report to. A LIMS designed for wastewater and/or environmental labs can significantly enhance a lab's capability for any audit situation that requires evidence of controlled sample management, proper labeling and identification, records of all proficiency training, instrument calibration schedules and full audit traceability of all records. LIMS simplifies the audit process by enabling the lab to mine all sample-related data to give an end-to-end review. With specific functionality built into the LIMS to improve workflow and lab efficiency, reports can be automated to ensure full traceability and integrity of the lab's data.

The CAWD laboratory produces an inordinate amount of data for a small plant because of our multiple permits required to produce water for public use. Our current system is antiquated, inefficient and is prone to errors. In addition to reporting capabilities, the LIMS serves as the database for the data generated by the lab. This database has the functionality to be queried and graphed unlike our current system. Having this ability serves as a tool for proper process control and troubleshooting. Our current system only offers a snapshot of the plant performance as a LIMS will offer a more historical look at the entire process.

Estimated Cost: $50K

12. <u>Grit bin/Dewatering building drainage (FY 13-14)</u>

This project will address the rehabilitation of the pad and drainage systems associated with the grit bin. It will also address an identical situation occurring at the drainage system located on the south side of the sludge dewatering building (Cake Discharge to trailer).

We currently have a 40 yard dumpster located on the east side of the Head Works structure. The dumpster sits on a concrete pad, which is situated below the Grit classifier and Rag collection screw. The concrete pad has a drainage system built into it. This drain flows into a sump located in the basement of the head works building, and is then pumped into the grit tank.

Aside from serving as the dumpster for the entire treatment facility, the dumpster's main purpose is for the collection and disposal of the material accumulated by the above mentioned processes. The dumpster is owned by Waste Management and is picked up and emptied approximately twice per month.

Necessity dictates the concrete pad and drainage system be rehabilitated. Sections of the pad itself have reached the end of its usable life and have begun to fail making moving the dumpster in order to utilize its full capacity almost impossible. In addition, de-generation of the pad causes concerns regarding its ability to support the weight of the dumpster.

A more pressing concern is the failure of the drainage system. The drain itself no longer efficiently collects the liquid that accumulates around and beneath the dumpster. This poses a number of concerns. Most pressing is the potential for odor complaints. Due to the dumpster's proximity to the Carmel Mission School and surrounding neighborhoods staff currently uses de-odorizing chemicals to contain the odors, however proper drainage could alleviate this problem and result in lowering total operating facility costs.

Estimated Cost: $50K

13. Upgrade electrical service in maintenance shop (FY 13-14)

Install a new electrical circuit in The Maintenance Shop to ease the load off of the existing 240 volt transformer and add an additional circuit to existing 480 volt transformer to supply the shop with proper power requirements. The current system has deficiencies that are tripping circuit breakers and dimming lights. Note: this work is separate from that proposed in Long Term Capital Plan "Standby & Main Power Integration".

Estimated Cost: $40K

14. Secondary system instrumentation improvement (FY 13-14)

These funds will be utilized to install suspended solids measuring systems in key locations within the secondary system. There are four aeration basins and two secondary clarifiers holding the microorganism's inventory. Optimal process control depends on knowing our suspended solids (microorganisms) inventory.

Currently staff is using lab data on a 24 hour composite sampled from the previous day inventory to make corrections in the microorganism inventory. Once a week the lab runs an inventory grab sample on the individual aeration basins. Control of inventory would benefit by placing a suspended solids probe in all basins holding the secondary system suspended solids.

Comparisons between laboratory analysis and continuous suspended solids measurement using suspended solids sensors show an exceptional correlation to mixed liquor, settled and thickened sludge. Online measurement not only saves time on manual analysis but also provides critical real time total suspended solids measurements that can be used to operate the plant more efficiently.

Operations maintains the inventory in each basin and sometimes the inventory becomes out of balance but with real-time suspended solids data loading to individual basins can be controlled accurately in real time with a suspended solids in process control system tied into the SCADA (Supervisory Control and Data Acquisition) system.

Estimated Cost: $40K

15. Preventative Maintenance Software Implementation (13-14) (25% Reclamation)

The District purchased a Computerized Maintenance Management Software package in June 2000 but has not been successful in its implementation. Staff proposes outsourcing the project for (1) development of implementation plan and timeline, and (2) data entry necessary to get program to the point of use. After implementation is complete staff envisions the need for a clerical/administrative type position at the plant to maintain and run the program. Implementation will need to run concurrently with any planned upgrade/rehab to the plant.

Estimated costs: (25% Reclamation)

Consultant $40/hr x 15.5/hrs x 52 wks	$32,240

16. SBS injection modification (FY 13-14)

These funds will be used to replace the old SBS pumps and piping. CAWD has two SBS pumps located at the chlorination/de-chlorination building for removing chlorine from the water before ocean discharge. (This is separate from SBS system used to de-chlorinate water relating to MF/RO process).

The existing pumps along with the piping are approximately 15 years old and showing signs of fatigue. This project will replace the existing pumps and controllers and connect to the instrumentation to our SCADA network.

Estimated Cost: $30K

17. Misc Physical Testing of Plant Structures/Equipment (FY 13-14 thru 17/18)

As part of efforts to improve long term Asset Management Plan we will conduct specific physical tests to further establish condition for certain key assets to refine budget estimates. Examples include: Digester concrete evaluation testing, ultrasonic thickness testing of pipes, soil corrosivity and pipeline cathodic test stations to evaluate buried process pipe corrosion in conjunction with internal inspections.

Estimated cost: $25,000

18. Plant lighting, camera system and perimeter fence Tech Memo (FY 14-15 through 16/17)

This project will focus on the future footprint that the plant will occupy and prepare a pre-design of the plant lighting system and the perimeter security fence-line.

Lighting

Because of our proximity to the Mission and other neighborhoods we must make it a priority to research the future lighting system. We will research the following topic:

- Impact on neighbors
- Energy efficient options
- Safety for nighttime Operations and Maintenance when necessary
- Landscaping
- SCADA Controls

- Perform pilot test as needed

Perimeter Fence-line

Our current wire mesh security fence-line has reached the end of its usable life and is need of replacement.

Over the past year there have been several conversations with various agencies in regards to creating a path that will encompass the perimeter of the plant.

When construction is progressing the contractors will be stowing their equipment onsite.

- This study and pre-design will research the following:
- Safety for public and employees
- Construction requirements
- Landscaping

Camera System

The current camera/DVR system is in need of repair and upgrade. Staff proposes that this work is done in conjunction with the lighting and perimeter fence upgrade.

There may be some benefit in tying the camera upgrade and fencing in with the regional trail project that may run along the side of the facility.

Potential Funding Sources

Staff will investigate potential grant funding for this project.

Estimated cost: $25K per year

19. <u>Road Improvements (FY 13-14 thru 17-18)</u>

Due to tree roots and unlevel pavement caused by tanker trucks that consistently deliver equipment/chemicals, the roads at CAWD have cracked, been uprooted, or have created pot holes and sink holes in areas throughout the plant. This allocation is to cover miscellaneous problems throughout the plant.

Estimate cost: $25K per year

20. <u>Tertiary and Waste Activated Solids Study (FY 13-14) (50% Reclamation)</u>

These funds will be utilized to create a Technical Memorandum in regards to the treatment of Tertiary and WAS to determine if there is a more efficient and/or economical way to treat them. The hope is that we can combine these flows and increase the capture rate.

Tertiary Thickener

Microfiltration solids to the tertiary thickener can be inconsistent at times and in turn decrease the efficiency with this system. Along with that is the potential of this complex system to get out of balance and have the same negative effects. A decrease in these efficiencies leads to an increased and potentially detrimental solids loading to our secondary system. This increased loading can lead to incorrect trouble shooting for process control, increased solids in the final effluent and increased solids to MF system.

How it works

The Lamella Thickener went online at CAWD in 1994. It is located at the Tertiary building on the south side of aeration basins. It consists of two solids sludge pumps, a rapid mixer, a rake drive, a flocculator, polymer blending unit for coagulation. Since 2007, its use has been modified from its original use to treat the waste flow from the microfiltration and reverse osmosis systems.

The microfiltration and reverse osmosis (MF/RO) sends about 150,000 gallons of waste per day. It is used to capture the solids that accumulate from microfiltration monthly clean in place, daily maintenance washes, and backwash flow (every 22 minutes per cell) and the waste flow from the RO clean in place tank.

The Lamella Thickener receives about 65,000 to 80,000 gallons a day of waste from MF/RO (micro filtration and reverse osmosis), of that flow, percent solids range from 1.0 to 2.5 percent, which are pumped directly to digester No.1. The remainder of the flow goes through the emergency reject sump and is pumped back to the head of the plant. This is done because of the size of the lamella thickener. It can only handle about 90 gallons per minute before it becomes hydraulically overloaded; almost half the flow bypasses the thickener and overflows to the Headwork's. Also it should be noted that the flow may vary depending on number of MF cells and RO trains that are online.

A daily operation of this equipment is vital. When the thickener is not working adequately and the solids that come from MF/RO get placed back into the system at Headwork's and has caused the biological process to become upset and making it difficult to run the plant efficiently. Due to the thickener only being able to accommodate approximately 50% of the waste sent to it on a given day, the negative effects (decreased efficiency, increased blower costs, etc.) are ongoing.

Waste Activated Sludge

WAS solids that are discharged to the Diffused Air Flotation Thickener (DAFT) can be inconsistent at times and in turn decrease the efficiency with this system. There is a strong potential for this complex system to get out of balance and have the same negative effects. A decrease in these efficiencies leads to an increased and potentially detrimental solids loading to our secondary system. This increased loading can lead to incorrect trouble shooting for process control, increased solids in the final effluent and increased solids to MF system.

DAFT System Operation for Waste Activated Sludge

Our Dissolved Air Flotation Thickener System (DAFT) was built in the late 1980's and is located north to the equalization basin. Waste activated sludge at a rate of 325 gallon per minute (GPM) and scum from the secondary clarifiers are pumped to the DAFT continuously. The purpose of this thickener is to thicken the sludge from a .67% average solids content to a more manageable 3%+ solids content. This now decreased volume of sludge is discharged to our digester system. The dissolved air floatation thickener has four basic components:

1. Thickener tank (including the mechanism for skimming)
2. Pressurization system (including pressurization pump and air injection system)
3. Sludge and Scum pumping systems and the
4. Polymer feed system

How the DAFT works:

The rising air bubbles suspend or float solids to the tank water surface where solids are removed by a skimmer. The solids that do not float settle to the bottom where is raked to a hopper in the bottom of the tank for periodic withdrawal by the sludge or scum pump. The practice of adding polymer to the WAS flow stream is utilized to increase coagulation. Effluent from the Thickener flows through over a weir through the launder to the effluent recirculation sump, and by pipeline to the headworks grit tank. The thickened solids are skimmed to a sump where it is pumped to the primary digester.

Estimated Cost: $25K

21. Secondary system dissolved oxygen study (FY 13-14) (50% Reclamation)

Our dissolved oxygen levels within the aeration tanks are inconsistent due to several factors that will be evaluated. This project will include an evaluation of our current blower system, regulating valves, and diffusers. The goal of this study is to provide a TM that will help guide our decision-making as we move forward.

Aeration Blowers and diffusers

CAWD uses three separate processes to treat wastewater: primary treatment, secondary (biological) treatment and disinfection. The biological treatment process is called "activated sludge". Being a biological process operators are required to control the pH, ratio of microorganisms to their "food" (influent BOD) or F/M and the amount of free dissolved oxygen in the basin. D.O. is one of the primary energy sources for the microorganisms.

Dissolved oxygen is supplied to the basins through a system of diffusers mounted to the bottom of each of our three aeration basins, which in turn are fed by our Turbolex blower.

The current aeration system as a whole is significantly over sized and a significant portion of the diffusers are plugged or "blinded off". (Note: we replaced diffuser bladders that were 15+ years old from the original project and purchased spares for future failures.) This has been done in an attempt to maintain a D.O. between 1.00mg/l and 2.50 mg/l. regularly operating the system outside these parameters will have several negative effects on plant operation and chemical costs. Too low dissolved oxygen negatively affects the nitrification process by not giving the microorganisms enough oxygen to get the work done. Too high dissolved oxygen negatively affects the solids settling in the secondary clarifiers by stripping the floc and creating very poor settling that results in more solids passing through to the outfall and MF/RO. These improvements were made specifically for Reclamation.

Additionally we have encountered other issues due to the excessive size of our air supply system. One such issue has been attempting to operate the main air regulating valves located on each basin (also known as "header valves"). Since the valves were designed and built to operate at a much higher volumes of air, it has proven extremely difficult to be precise. Another issue encountered operating the valves in this manor are increased backpressure, which causes the blower to automatically shut down.

Another concern regarding our air supply system is lack of redundancy. While the old blowers (built by "Lamson") are still in place, their reliability is questionable.

Estimated Cost: $15K

22. Moisture Analyzer (FY 13-14) (25% Reclamation)

This unit is used to generate total and percent solids results.

The current method of analysis is a gravimetric process that takes 24 hours to achieve results. This involves oven drying overnight for total solids determination, followed by volatilizing in a muffle furnace to determine percent solids. The lab currently runs solids samples once per week.

A microwave or infra-red analyzer can produce the same results in a matter of minutes. These results are useful for process control in several areas of the plant and can potentially result in less solids loading to the secondary system and ultimately the MFRO system. Because we produce multiple "filtrate" side stream we should carefully monitor them for solids loadings and polymer usage where used. The RO reject is sampled for filterable effluent.

Estimated Cost: $12.5K

23. Reconstruct mezzanine in maintenance shop (FY 13-14, 14-15)

FY13-14 - Have current structure evaluated and develop a TM (Technical Memorandum) for modifications to be completed the following year.

FY14-15 - Modify the mezzanine by taking the advice of the TM (Technical Memorandum) . This area will serve as our Primary location for spare parts and inventory along with supplies used on a regular basis.

Estimated Cost: $10K, $50K

24. Install Grinder at Influent Wet Well (FY 14-15) (15% Reclamation)

These funds will be utilized for the research, engineering and installation of a grinder system that will alleviate the problems faced by staff and improve the current system.

When wastewater initially enters our facility, the first structure it enters is the "Influent Wet well". This structure is located on the north side of the influent building. The wet well itself is a sump approximately 30' long, 8' wide and 12' deep. The wastewater stays in this structure for approximately one hour depending on the influent flow rate. During this detention time the grease, rags and other constituents which readily float rise to the surface. These accumulated materials eventually form a thick "blanket" on the surface and must be manually skimmed. This process is labor intensive, involves the use of a gas detector and requires two operators. One operator remains on the deck above the wet-well and manually manipulates the wastewater level. He also raises and lowers a skimming pump so as to only collect the thick material from the surface. The second operator is required to enter the room where the wet-well is housed and uses hoses, shovels and other various tools to push the grease and other accumulated materials to the skimmer pump. This operator must have an atmosphere monitor with them due to the potential for hazardous environments caused by hydrogen sulfide or other dangerous gases. The material that is collected is pumped to digester #1 for disposal.

The influent pumps draw suction from this wet-well and are in danger of ragging that in turn decreases efficiency and can lead to pump failure. As part of the current maintenance schedule two operators are require to de-rag the influent pumps twice a week. A problem that can and is encountered with influent "garbage" is that is can be inconsistent. For instance the first storms of the year will have a "scouring" effect on the influent piping and increase the grease and rags entering the plant.

Also located in this wet well are three gates, two on the west side of the sump and one on the east, which enable staff to isolate portions of the sump as needed for maintenance, etc. While the gates are currently operational, their reliability is questionable. All three of the gates are nearing or at the end of their usable life span. The dependability of these gates is of the utmost importance due to the criticality they play in plant operation. Staff's ability to operate them to re-direct flow in emergency circumstances and the extremely dangerous circumstances that would occur as the result of any one of these gates failing while being utilized make it necessary to address them now.

Reclamation allocation 15% - use of flushing channel and washdown

Estimated Cost: $175K

25. Digester #1 Cleaning (FY 14-15)

Last cleaned/inspected in 1998. Staff contracted cleaning services for Digester #1 as part of periodic maintenance. We have carried this project forward from 2012-13 because of questions about the reliability of Digester #1. Board approved purchase of equipment to improve reliability and defer cleaning until installation of equipment. Objective is to remove inert material and high concentrations of bio-solids from digester tanks. Benefits of digester cleaning include: a) increase detention time of bio-solids tank, b) reduce fuel costs to heat solids, c) increase digestion, and d) increase life of sludge pumps.

This digester has dual mixers and has only been operating with a single mixer due to failure on the north mixer over two years ago. We have rehabilitated the failed mixer but are hesitant to reinstall until the digester has been cleaned. If we were to change the mixing dynamics in this digester at this point we risk lifting the accumulated grit and debris that has settled on the floor and potentially upsetting this digester by fouling the auxiliary equipment need to operate this digester. Because this digester receives grease it is imperative that we create and establish a healthy and well mixed digester.

The cost estimate is based upon consultations with cleaning contractors and represents the worst case scenario with respect to the amount of grit settled in the tank (which cannot be determined w/o a dewatered tank inspection).

Estimated cost: $168,000

26. Reliability study of our SCADA, PLC and Communication Systems (FY 14-15) (50% Reclamation)

These funds will be used for the following purposes:

- Complete Health Check of SCADA Systems. From Instrument input to PLC to Network to Interface.
- Development of a TM with recommendations and potential strategies for the next 10 years.

SCADA and PLC System:

Supervisory Control and Data Acquisition (SCADA) was placed in service in 1994 and has been utilized, modified, upgraded, improved and maintained ever since. SCADA is used to monitor and control several complex systems throughout the plant and collections system and also serves as our main alarm system for each plant process.

CAWD consist of two SCADA:

1. SCADA 1 is in the lead and is considered the brains of the plant
2. SCADA 2 is used for editing and as a backup.

SCADA and the PLC system is a vital part of our daily operations. It is utilized to improve plant performance and is a tool used to gather information and troubleshoot process issues. It also enables the trending of data in real time and examination of historical data. This system also collects and generates data that is reportable to our NPDES and TITLE 22 permits.

Estimated Cost: $72.5K

27. Improve instrumentation to SBS (sodium bisulfite) Pumps at CDC (FY 14-15) (100% Reclamation)

Staff is recommending that the existing SBS injection line for de-chlorination be equipped with flow meters and totalizers. In 2007 the Chlorination building was equipped with four new SBS injection systems. Those new systems were for the benefit of de-chlorinating all water relating to the MF/RO process.

There are two SBS systems in the room that were pre-existing to address all water relating to the CAWD ocean discharge. All SBS systems draw from the same SBS inventory outside the building (8000 gals.) During any period night or day water could be coming from the storage tank addressing any number of different flow streams for CAWD or MF/RO.

Right now there is no way to tell exactly how much SBS should be charged to the separate facilities because there are no meters on the separate systems. Staff believes this can be accomplished with some outside expertise in small flow chemical metering engineering injection systems contracting and installation. Staff would also like to connect this flow metering to the SCADA system.

Estimated Cost: $40K

28. Total Organic Carbon Analyzer (TOC) (FY 14-15) (50% Reclamation)

TOC analysis results can be obtained in approximately five minutes as opposed to our current analysis which takes five days for results. This would be a benefit to our process control as the food to micro-organism (F/M) ratios can be calculated in essentially real time. Also organic

content can be measured more readily and help mediate negative bio-fouling of the MFRO systems along with potential impacts on the disinfection process.

Total organic carbon is a more convenient and direct expression of total organic content than either biochemical oxygen demand (BOD) or chemical oxygen demand (COD). A repeatable empirical relationship can be established between TOC, BOD and COD

Estimated Cost: $38K

29. Headworks Channel Grinder Overhaul (FY 14-15)

Manufacture's recommendations include a total "grinder gear stack" overhaul every five years for the screenings grinder installed at the headworks in 2003.

Estimated cost: $35,000

30. Rehabilitate the Treatment Plant Maintenance Shop Exterior (FY 14-15)

The maintenance shop is a metal sided building and is in need of the typical maintenance these buildings will have. This building like many others in the plant shows signs that the challenging central coast environment will cause. This project will bring the shop to a functional and presentable state.

Estimated Cost: $35K

31. Primary scum sump mixer with ultrasonic level controls for pumping (FY 14-15)

Staff is recommending a new ultrasonic and mixing system for the primary scum sump. This would be an upgrade to the existing failed bubbler system (20+ years old) at the primary scum sump. The bubbler is in need of an upgrade to a more reliable ultrasonic system for pump down grease accumulated on the surface of the two primary clarifiers and skimmed into the grease scum sump.

One of the primary drawbacks to the system is the inability to pump the grease that is floating on the surface of the sump and therefore only what is in suspension. Staff would like to see an ultrasonic level controller installed and a mixer to keep the grease floating on the surface in solution until the pump stops.

We believe we can make this work with only in house planning, engineering and labor except for the electrical.

Estimated Cost: $30K

32. Tertiary PH adjustment system (FY 14-15) (100% Reclamation)

These funds will be utilized to purchase a new PH adjustment system for the Tertiary Facility. Currently the system in place was created in house in 1994 by operations staff to address any water which was low in PH and therefore a violation to our health department permit (Title 22).

In 1994 the PH adjustment was overlooked during the sand filtration system built by Engineering Science. In 2007 a PH system was installed in the MF/RO facility to address water leaving with a low PH. Shortly after the MF/RO system went online the PH system at MF/RO failed for a number of reasons, line plugged, pump failed, PH probe instrumentation failure, etc.

Most of these failures caused water to get to the reclaim pumps five hours downstream before it was noticed. There was no way to PH adjust the hundred thousand gallons or more of water in the channels without the use of the unit which was setup on the tertiary facility 15 years ago.

Now it is time to make this system a more viable redundant option to prevent hours of downtime without sending any water to Pebble Beach as well as to protect our Health Permit.

Staff believes this can be accomplished with little or no outside contracting except from Tesco Controls and Day Electric.

Estimated Cost: $30K

33. Upgrade Maintenance shop lighting (FY 14-15, 15-16)

Evaluate lighting requirement and repair/upgrade the current lighting system. The current lighting is not adequate and will be addressed in this project.

Estimated Cost: $25K each year

34. SBS Pumps at CDC – install flow meters and totalizer (FY 14-15)

Staff is recommending that the existing SBS injection line for de-chlorination be equipped with flow meters and totalizers. In 2007 the Chlorination building was equipped with four new SBS

injection systems. Those new systems were for the benefit of de-chlorinating all water relating to the MF/RO process.

There are two SBS systems in the room that were pre-existing to address all water relating to the CAWD ocean discharge. All SBS systems draw from the same SBS inventory outside the building (8000 gals). During any period, night or day, water could be coming from the storage tank addressing any number of different flow streams for CAWD or MF/RO.

Currently there is no way to tell exactly how much SBS should be charged to the separate facilities because there are no meters on the separate systems. Staff believes this can be accomplished with some outside expertise in small flow chemical metering engineering injection systems contracting and installation. Staff would also like to connect this flow metering to the SCADA system.

Estimated cost: $40K

35. Pipe Storage Area and improvements to the South Storage shed (FY 14-15)

Install an overhang, gutters and a pipe rack on the side of the ***Treatment Plant storage building*** at the Treatment Plant. The overhang on the storage building will protect the pipe from sun damage. The gutters will help to prevent the storage building from water build up which has been causing the building to rust. The shed area needs to have debris removed and the pipe storage area needs to be paved to allow forklift access. Currently, the proposed site of the new pipe storage consists of an uneven, unpaved plot on the south side of the above mentioned storage shed. This area would need to be paved to allow forklift access.

Estimated Cost: $20K

36. Chlorine Analyzer (DEOX – Effluent Pump Station) (FY 14-15)

By 2014/2015 budget cycle, Deox #1(negative chlorine residual) at the Effluent pump station will have reached its ten year life cycle. Staff proposes to replace analyzer with the latest model available.

Estimated cost: $14,000

37. Rehabilitate the Treatment Plant Collections Building (FY 14-15) (80% Collections/20% Treatment)

Rehabilitate the ***Treatment Plant Collections building*** electrical, sand rust and paint inside and out. Transfer some of the power added from the new electrical supply being added to the Plant shop to the Plant collections building. The existing power supply in the Collections building is inadequate.

Estimated Cost: $30K

38. Equalization Spray System (FY 15-16) (50% Reclamation)

Staff is recommending that the existing Equalization Basin have installed an automatic spraying system. Every morning when the equalization pumps are down the staff is spending 30 minutes to manually hose down solids and control the EQ pump on the PLC because of solids settling during the night. This is done five days per week and excluded on Saturdays and Sundays because of reduced staffing. The equalization basins were established solely for the benefit of Reclamation.

This can be easily controlled by an automatic spray system managed by the PLC (Programmable Logic Controller). This would be contracted and installed to start whenever the EQ basin becomes empty and using the level controls and existing PLC. This would free valuable staff time to monitor more technical aspects of the process.

Estimated Cost: $40K

39. Fuel storage tanks modifications and repairs (FY 15-16)

The fuel storage gas tanks base are currently set directly on the ground leaving them exposed to the elements, causing rust. This project will encompass grading the concrete base for proper drainage and resetting both fuel tanks with the proper footings.

Estimated Cost: $35K

40. Effluent Pumps VFD

A Variable frequency drive (VFD) is an electronic controller that provides continuous control matching motor speed to the specific demands of the work being performed. In wastewater facilities the greatest energy draws comes from pumping and aeration – applications that are particularly suited to VFDs. VFD's enable the pumps to accommodate fluctuating demand, running pumps at lower speeds and drawing less energy while still meeting pumping needs. VFDs offer a "soft start" capability, gradually ramping up a motor to operating speed. This lessens mechanical and electrical stress on the motor system and can reduce maintenance and repair costs and extend motor life. The plant effluent pumps VFD drives are in need of replacement due to age.

Estimated Cost: $35K

41. Modify storage area in Maintenance shop (FY 15-16)

Construct a storage area above the office in the maintenance shop in what is now unused. Our Shop currently lacks adequate storage and utilizing spaces such as these will help.

Estimated Cost: $20K

42. RAS Pumps VFD (FY 15-16)

Replace Return Activated Sludge (RAS) Pumps VFDs. A Variable Frequency Drive is a type of adjustable-speed drive used to control motor speed and torque by varying motor frequency and voltage. VFDs provide two primary benefits: (1) energy Savings and, (2) control performance.

RAS refers to the sludge settled in the clarifier that is returned to the aeration tank. Proper management of the RAS is important to the efficiency of the activated sludge process because: (a) RAS provides a source of organisms that is returned to the activated sludge process, (b) by changing the RAS rate, we can control the concentration of organisms in the aeration tank and maintain the proper Food:Micro-organism ration for best performance, (c) the well being of the aerobic organisms deteriorate as long as they remain in the secondary clarifier. If sludge remains in the clarifier too long, the aerobic organisms will die, and (d) increasing RAS rates increases may cause overloading of the activated sludge system if not done properly.

Estimated cost: $15,000

43. Demo Bridge at Treatment Plant across Carmel River (FY 17-18)

Per Capstone Structural Engineering Report received Feb 2011:
"...we believe that the existing pipe trestle structure is not imminently subject to collapse under its own weight with empty utility pipes. Pedestrian live load should not be allowed on the structure (with the exception of one or two skilled maintenance personnel at a time) as the structure is both structurally and functionally deficient for pedestrians. The pipe trestle structure lacks a positive load path and is vulnerable to collapse under lateral loading from a significant seismic or hydraulic event."

The demolition is "Unscheduled" because (1) per Capstone, the bridge is not imminently subject to collapse, and (2) there may be an opportunity to work with other local groups to extend Carmel area walking trails from Carmel down to Big Sur by donating the bridge. The District no longer needs the bridge but believes that it is valuable because of the permitting that would be required for a new bridge. It may be possible through local transportation agency, parks, and City of Carmel to donate the bridge and fund demolition and replacement costs through grant funding.

Demolition Estimate (does not include hazardous abatement)	
Mobilization & site prep (includes vegetation removal)	$20,000
Preparations for picking	$43,000
Pick and off haul	$47,000
Pier removal	$17,000
Subtotal	$127,000
Specifications, Advertising & Bidding (Approx. 20% of construction)	$20,000 - $30,000
Environmental Evaluation/Permitting(Approx. 30% of construction)	$30,000 - $50,000
Total	$175,000 - $210,000
New Pedestrian Bridge	
Pre-Engineered Steel Pedestrian Bridge (6' wide, single span 100' long bridge to three span 272' long bridge)	$100,000 - $230,000
Design Fee (Approx. 20% of construction)	$20,000 - $46,000

Environmental Evaluation/Permitting (Approx. 30% of construction)	$30,000 - $70,000
Total	$150,000 - $350,000

Estimated cost of demolition: $210,000

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Carry Forward:

Digester Equipment & Installation (FY 2013-14) **$312,000**
Resolution #2012-38 dated 12-14-12 authorized call for bids for the purchase and installation of heat exchanger, boiler, recirculation pump and ferric chloride injection equipment in an amount not to exceed $312,000. Total equipment purchase $94,425 reported in May 2013. Purchase order issued in June 2013. Payment will likely not occur until FY 2013-14. The original resolution included funding installation – that has not yet been contracted for.

Kennedy Jenks Design Interim Digester Equipment Placement & Installation **$51,719**
Resolution #2013-12 dated March 2013 authorized agreement for development of final design documents relating to the placement and installation of the interim digester improvement equipment. Said equipment was authorized under Resolution #2012-38.

CARMEL AREA WASTEWATER DISTRICT TREATMENT PLANT
LONG TERM CAPITAL PROJECTS - FY 2013/14 - 25/26

	PROJECT	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26
1	Studies	$88,000	$88,000				$100,000				$100,000			
2	Influent Conveyance & Screening		$77,000		$347,000	$347,000								
3	Influent Manhole Replace/Retrofit				$36,000	$162,000	$162,000							
4	Standby Blower Replacement	$70,000	$313,000	$313,000										
5	Standby & Main Power Integration	$296,000	$1,332,000	$1,332,000										
6	Hypo/SBS (*Reclamation 25%*)	$136,000	$612,000	$612,000										
7	Effluent Building			$174,000	$785,000	$785,000								
8	#3 Water System Improvements	$150,000	$256,000											
9	Portable RAS Pumping	$250,000												
10	Dewatering	$291,000	$791,000											
11	Interim Digester Improvements	$891,000												
12	Aeration Valve/Gate & Instrument Rehab					$41,000	$367,000							
13	RAS Building Rehab			$122,000				$1,098,000						
14	Primary Clarifier Rehab								$266,000	$1,293,000				
15	Secondary Clarifier Rehab								$242,000	$1,079,000				
16	Digester Firm Capacity Improvements	$197,000	$197,000	$1,733,000	$1,733,000									
17	#1 Water Improvements	$132,000	$132,000											
18	Storm Water Improvements	$350,000	$350,000											
19	Demo Project										$400,000			
20	Headworks											$675,000		
21	50% Recl Thickener (*Reclamation 50%*)	$1,000,000	$1,000,000											
22	Chlorine Contact (*Reclamation 25%*)										$1,511,000			
23	Ops Building Improvements												$599,000	
24	Misc Yard Piping Rehab	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000	$89,000
25	To Be Determined													$1,000,000
	TREATMENT & DISPOSAL TOTAL	**$3,940,000**	**$5,237,000**	**$4,375,000**	**$2,990,000**	**$1,424,000**	**$718,000**	**$1,187,000**	**$597,000**	**$2,461,000**	**$2,100,000**	**$764,000**	**$688,000**	**$1,089,000**
	RECLAMATION SHARE (1)	$534,000	$653,000	$153,000	$0	$0	$0	$0	$0	$0	$377,750	$0	$0	$0
	PBCSD SHARE	$1,135,333	$1,528,000	$1,407,333	$996,667	$474,667	$239,333	$395,667	$199,000	$820,333	$574,083	$254,667	$229,333	$363,000
	CAWD COST	**$2,270,667**	**$3,056,000**	**$2,814,667**	**$1,993,333**	**$949,333**	**$478,667**	**$791,333**	**$398,000**	**$1,640,667**	**$1,148,167**	**$509,333**	**$458,667**	**$726,000**

(1) PBCSD to pay 1/3 of costs. (After Reclamation portion deducted, if applicable) unless otherwise noted. *Projects in italics are not funded directly by PBCSD*

Carmel Area Wastewater District
EXPLANATIONS/DESCRIPTIONS/JUSTIFICATION/COST ESTIMATES
Long Term Capital Plan – Treatment Facility

1. **Studies (FY 2013/14 & 2014/15)**

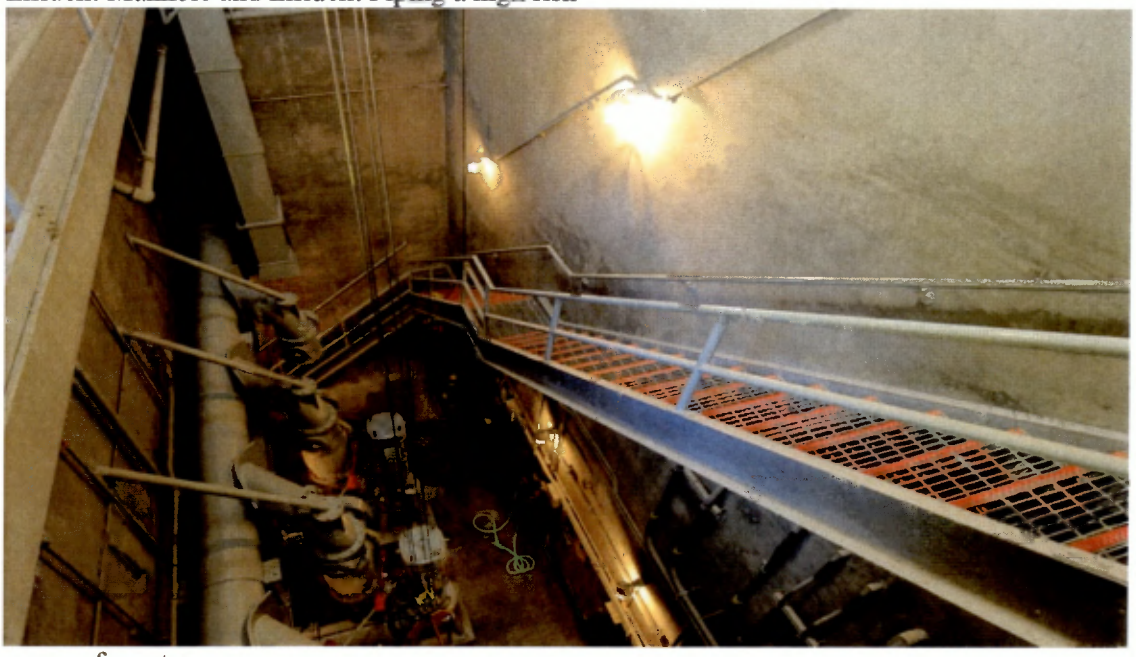
Description: Planned Engineering Studies as follows:

- Influent Conveyance and Pre-Screening Pre-Design Report
- Septic Receiving Facility Study
- Flooding/Storm Water Reliability Improvements Study
- Power Feeders, Standby Power and Automatic Transfer Switch Systems Integration Study

Budget Amount: $88K each year

2. **Influent Conveyance & Screening (FY 2014/15, 2016/17 – 2018/19)**

Description: Improve hydraulic capacity of the influent manhole. The Influent system conveys up to 10 MGD flows during wet weather and would be subject to significant untreated wastewater spills if a failure of the conveyance system was to occur. Hydraulic concerns related to the Influent Manhole capacity coupled with unknown corrosion of influent piping systems makes the Influent Manhole and Influent Piping a high risk



group of assets.

Function: The Influent Pumps transfer variable influent flow from the Influent wet well to the Influent Manhole which is at a higher elevation to allow gravity flow through the primary and secondary treatment processes. The influent wet well provides removal of grease and settling of heavy objects before the influent pumps and provides storage volume to keep influent pumps from cycling on and off.

Failure Modes Addressed:

1. At higher influent flows the water level in the Influent Manhole nearly overflows the structure because of backup of gravity flow
2. The condition inside buried and exposed influent piping is unknown and therefore piping should be inspected and an allowance budgeted for improvements to piping to mitigate against possible corrosion related failure of influent pump piping.
3. The condition inside the Influent Wet Well is unknown and therefore needs to be inspected and an allowance budgeted for rehabilitation of the wet well or slide gates.

Budget Amount: $77K; $347K & $347K

3. Influent Manhole Replace/Retrofit (FY 2016/17 – 2018/19)

Description: Improve condition of the Influent Manhole Sluice Gates and inspect/rehabilitate buried influent piping. The Influent Piping and valves in the Influent Building may also need to be upgraded at the same time to improve condition upstream of the influent manhole. The Influent Building needs repairs to the roof and influent wet well equipment and lighting.

Function: The Influent Pumps transfer variable influent flow from the Influent wet well to the Influent Manhole which is at a higher elevation to allow gravity flow through the primary and secondary treatment processes. The influent wet well provides removal of grease and settling of heavy objects before the influent pumps and provides storage volume to keep influent pumps from cycling on and off.

Failure Modes Addressed:

1. At higher influent flows the water level in the Influent Manhole nearly overflows the structure because of backup of gravity flow
2. The condition inside buried and exposed influent piping is unknown and therefore piping should be inspected and an allowance budgeted for improvements to piping to mitigate against possible corrosion related failure of influent pump piping.
3. The condition inside the Influent Wet Well is unknown and therefore needs to be inspected and an allowance budgeted for rehabilitation of the wet well or slide gates.

Budget Amount: $36K; $162K & $162K

4. Standby Blower replacement (FY 2013/14 -02015/16)

Description: Replace existing standby blower with a properly sized blower to provide a backup blower for the only reliable blower. Include energy saving modifications to the existing blowers such as inlet throttling or variable speed drives if financially efficient (i.e. acceptable payback on energy savings investment). Other improvements to the air piping and upgrades to blower electrical systems may be included in the project.

Currently we operate one centrifugal blower that is in use 24 hours a day 7 days a week. This blower supplies the oxygen needed for the microorganisms in the aeration basins to survive. This blower was installed in 1998 when it was determined that the existing blower installed in 1994 was oversized and energy cost was excessive. The two existing blowers from 1994 are not dependable and are in need of costly repairs to refurbish to give us a redundant/backup system.

Function: The blowers provide air to the aeration basins to maintain sufficient dissolved oxygen levels.

Failure Modes Addressed:

1. The existing standby blowers have bent drive shafts and vibrate excessively when operated. The standby blowers with bent shafts are the only backups to a single reliable blower.
2. Redundancy/reliability of the blower system. Dissolved oxygen in the aeration basins is critical for reducing BOD in the treatment process. Currently there is only one reliable blower. For a critical system such as the blowers there should be a redundant blower.
3. The blowers use the most energy of any other process in the treatment plant. Investments in more energy efficient controls could reduce the overall life cycle cost of the blower system.

Budget Amount: $70K; $313K & $313K

5. <u>Standby & Main Power Integration (FY 2013/14 -2015/16)</u>

Description: Upgrade switchgear and main power feeders. Relocated updated electrical equipment to optimize space in the Operations Building and to make space in the electrical room for a future SCADA control and monitoring station.

Function: The main power feed into the plant provides electricity for plant operations.

Failure Modes Addressed:

1. Lack of integration of electrical systems makes it difficult to maintain reliability of electrical systems
2. The main power feed equipment is approximately 40 years old.

Budget Amount: $296K; $1,332K & $1,332K

6. Hypochlorite/SBS Improvements (FY 2013/14 – 2015/16) (25% Reclamation)

Description: Convert the existing chlorine gas disinfection system to a bulk 12.5% liquid sodium hypochlorite disinfection system. A new tank storage double containment pad would be built with multiple polyethylene storage tanks to store sodium hypochlorite chemical. Chemical feed pumps would be located on the double containment pad and would pump sodium hypochlorite upstream of the chlorine contact channels for disinfection. A feed would also be provided for disinfection of the recycled water upstream of the recycled water chlorine contact channels.

Construct an additional sodium bisulfite (SBS) storage tank to provide a redundant SBS storage tank to increase reliability of the dechlorination system.

Function: The level of service of the chlorination and dechlorination chemical systems is to dose and disperse chlorine upstream of the chlorine contact channel and does SBS downstream of the chlorine contact channel.

Failure Modes Addressed:

1. The existing chlorine gas cylinder room is used for both storage of standby chlorine gas cylinders and for use of cylinders. Because the chlorine gas cylinder room is used for storage of cylinders a chlorine scrubber is required per California Fire Code (CFC) Section 3704.2.2.7 Exception 2. The gas storage room is currently not equipped with a scrubber.

2. There have been minor valve failures in the chlorine gas system in the past which calls for upgrades and rehabilitation of the existing gas feed system piping.

Budget Amount: $136K; $612K & $612K

7. Effluent Building (FY 2015/16 – 2017/18)

Description: Rehabilitate the existing effluent pump system with new properly sized effluent pumps and upgrade aging electrical systems in the effluent building. Other miscellaneous building improvements including roof repairs and rehabilitating the existing standby 3W pumps.

Function: The effluent pumping system is to pump treated effluent out the outfall.

Failure Modes Addressed:

1. The existing high flow pumps are at the end of the average useful life for pumps and there have been vibration issues encountered which could lead to accelerated pump failure.
2. The existing low flow pump that is used primarily to pump reverse osmosis concentrate water has a 58% wire to water efficiency as compared to a more efficient pump that could have 76% wire to water efficiency.
3. Roof leaks could lead to water damage and short circuit in the electrical gears, which could lead to a complete failure of the pump station.
4. Obsolescence of electrical gear reduces the availability of spare parts which makes maintaining the equipment difficult.
5. Electrical gear in the effluent building has not been verified to meet arc flash safety requirements.

Budget Amount: $174K; $785K & $785K

8. #3 Water System Improvements (FY 2013/14, 2014/15)

Description: Construction of replacement equipment to replace the existing 30 year old #3 Water System hydropneumatic tank which is beyond its useful life. Replacement of #3 strainer and replacement of electrical controls and instrumentation systems.

The #3 water system is the in-house recycled water supply. It was placed into service in the late 1980's and is located at the Chlor/De-chlor building (CDC). It consists of three vertical turbine pumps that pull from Chlorine contact channel #2.

#3 water is pumped through 6" steel pipe through a motorized strainer and is discharged to a pressurized hydro-pneumatic tank. This system has lacked the proper attention and is now restricting flow to the hydro-pneumatic tank and the strainer has failed and been out of service for several years. In addition to issues with the strainers and potentially the pressurized water tank, there are five critical gate valves associated with this system that are in need of attention.

The tank is glass lined and has a 5,000 gallon capacity with a sight gauge and level probe electrodes that control the #3 water pumps through SCADA. This tank acts as a large shock absorber for the system. There are two air compressors that supply the air to the tank to keep it in balance. This portion of the system is critical as it serves as a buffer to the downstream piping and equipment and protects the pumping system if maintained correctly. The #3 water provides cooling to a number of key assets throughout the facility such as:

- Influent Pumps (packing)
- Effluent Pumps (packing)

- ❖ Emergency Generator (Cooling system)
- ❖ Waste Activated Sludge Pumps (packing)
- ❖ Return Activated Sludge Pumps (packing)

The system also supplies cooling and injector water for chlorination system for microfiltration and reverse osmosis system. This injector system is also one of three ways to chlorinate the secondary effluent. This water is also used to flush lines and hose tanks throughout the plant.

As spray water here are two examples:

- ❖ Utilized at the aeration basins as spray water to control foam
- ❖ The Belt Press is equipped with spray-bars designed to wash the belts as they move through a wash-box. We utilize approximately 3,000 gallons per hour of $3 water to keep this essential process in service. Without the ability to keep the belts clean with high pressure water we would lose the ability to dewater sludge as the belts become blinded with solids and polymer.

Function: Supply reclaimed water throughout the WWTP for pump seal water, spray-water for secondary clarifier scum collection, belt filter press spray water, and various wash-down and flushing uses.

Failure Modes Addressed: The existing #3 Water System has reached the end of its useful life and major components such as the hydropneumatic tank could fail resulting in a loss of service, the highest consequences of failure could be related to loss of process pump seal water.

Budget Amount: $150K & $256K

9. <u>Portable RAS Pumping (FY 2013/14)</u>

Description: Purchase portable pumps to provide an independent emergency backup pump system for RAS/WAS pumping. Mechanical improvements include installing permanent connections for portable pumps to the RAS wet well for emergency RAS/WAS pumping in the event of a failure of the RAS pumps, piping or valves.

Function: Pump activated sludge collected in the Secondary Clarifiers to the Anoxic Selector (upstream of aeration basins). Pump waste activated sludge to the thickener. Pump Secondary Clarifier Scum to RAS or WAS stream.

Failure Modes Addressed:

1. Existing electrical wiring has been severely compromised due to corrosion. Electrical equipment (wiring, breakers, MCC, etc.) are 40 years old which is beyond the average useful life of electrical equipment.
2. Existing mechanical (valves and piping) equipment is aged and will need to be rehabilitated or replaced.
3. Safety. In addition to the condition and age of electrical equipment, electrical equipment in RAS Pump Building is in close quarters to working areas which increases hazards if work needs to be done to repair electrical equipment in the event of an electrical failure.
4. Sludge wasting pumps to replace the current practice of flow control valves may improve efficiency of the sludge process by reducing loading on solids treatment equipment.

Budget Amount: $250K

10. Dewatering (FY 2013/14 & 2014/15)

Description: Construction of a backup dewatering skid adjacent to the existing belt filter press (BFP). Requires demolition of the current non-operational BFP which is located too close to the current operating BFP such that certain maintenance tasks could not be completed (i.e. removing rollers). Recommended dewatering equipment includes a screw press of rotary press, which have a smaller footprint than a BFP and will permit future maintenance of the BFP. Construction should be sequenced to allow temporary dewatering activities with the new skid outside of the BFP building while demolition and maintenance activities commence inside the building. Once the non-operational BFP is removed and required maintenance is completed on the existing BFP the new dewatering equipment can be installed in the BFP building. The project would also address miscellaneous mechanical, electrical systems and controls upgrades to replace assets which are near the end of their useful life.

Function: The dewatering equipment dewaters digested sludge to reduce the volume of sludge that needs to be transported for disposal (approximately 85% reduction in sludge volume).

Failure Modes Addressed:

1. Lack of reliability/redundancy of existing dewatering equipment. There is currently only one operable BFP therefore if the BFP breaks down there would be no means of dewatering sludge requiring costly liquid hauling and/or emergency dewatering services.
2. Lack of maintainability of the existing BFP. The existing BFP cannot be rebuilt due to the adjacent non-operational BFP and lack of space adjacent to the unit.
3. The existing operational BFP was installed in 1998 and is need of repairs for reliable operations.
4. Other miscellaneous assets in the BFP building (e.g. filtrate return pumps, electrical and PLC equipment) are at the end of their useful life and should be replaced as part of this project for economies of scale.

Note: $500K on this project is listed under "Capital Improvement Projects" #1 Belt Press #2 & Polymer Delivery Rehabilitation. Staff originally felt this portion of project could be completed in-house.

Budget Amount: $291K in 2013/114 and $791K in 2014/15

11. Interim Digester Improvements (FY 2013/14)

Description: Equipment replacement inside the Digester Control Building including a new hot water boiler, new sludge spiral heat exchanger, new sludge recirculation pumps. Possible leaks in the natural gas feed line to the boiler need to be investigated and repaired. New interconnect piping between Digester #1 and Digester #2 to allow heating Digester #2 with new equipment.

Function: The Digester Control Building equipment is to heat the digester sludge to facilitate mesophilic conditions and pathogen removal in the anaerobic treatment process in order to meet Class B biosolids regulations.

Failure Modes Addressed:

1. Lack of reliability/redundancy of critical process equipment. Regulatory non-compliance of biosolids could result if there is a failure of the single sludge heater, because currently there is no redundancy of the existing sludge heating system.
2. The existing sludge heater has ~70% life consumed. Ferric chloride injected upstream of the Sludge Recirculation pump and Sludge heater have corroded the inside of this equipment which could lead to premature physical failures.
3. The piping valves that allow heating of Digester #2 are not functioning due to a long period of downtime.
4. The existing boiler runs on natural gas provided by PG&E. Leaks have been found recently in the existing natural gas feed line.
5. Digester #1 cannot be taken down for cleaning until after Digester Firm Capacity Improvements are completed. Potential increases in ragging of the heating recirculation system could occur as a result of lack of cleaning.

Budget Amount: $891K

12. <u>Aeration Valve/Gate & Instrument Rehab (FY 2017/18 – 2018/19)</u>

Description: Rehabilitate exposed process piping and valves in the area of the Aeration Basins. Replace failed Aeration Basin effluent sluice gates. Conduits, wiring and miscellaneous instrumentation will need to be rehabilitated.

Function: The Aeration Basin converts BOD to biomass. Piping conveys return activated sludge and mixed liquor to support the process and instrumentation provides monitoring for reporting and control of the process.

Failure Modes Addressed:

1. Exposed piping and valves in and around the aeration basins are in a corrosive environment and will need to be rehabilitated or replaced. PVC piping will need to be replaced due to exposure to UV light.
2. Sluice gates for the aeration basins effluent are corroded and are no longer operable. Sluice gates will need to be rehabilitated or replaced due to corrosion.
3. Instrumentation and associated electrical controls will need to be replaced at the end of their useful life as part of other rehab work in this project. Instrumentation is exposed to sunlight which reduces the life of panels and gauges.

Budget Amount: $41K & $367K

13. RAS Building Rehab (FY 2015/16 & 2019/20)

Description: Inspect and repair or replace electrical equipment (wiring, breakers) in the RAS Pump Building. Install new dedicated sludge wasting pumps and an ultrasonic level sensor in the RAS wet well. Mechanical improvements include installing permanent connections for portable pumps to the RAS wet well for emergency RAS pumping in the event of a failure of the RAS pumps, piping or valves. Rehabilitation/Replacement of existing pump valves.

Function: Equipment in the RAS Pump Building level of service is to pump activated sludge collected in the Secondary Clarifiers to the Anoxic Selector (upstream of aeration basins). Pump waste activated sludge to the thickener. Pump Secondary Clarifier Scum to RAS or WAS stream.

Failure Modes Addressed:

1. Existing electrical wiring has been severely compromised due to corrosion. Electrical equipment (wiring, breakers, etc.) are 40 years old which is beyond the average useful life of electrical equipment.
2. Existing mechanical (valves and piping) equipment is aged and will need to be rehabilitated or replaced.

3. Safety. In addition to the condition and age of electrical equipment, electrical equipment in the RAS Pump Building is in close quarters to working areas which increase hazards if work needs to be done to repair electrical equipment in the event of an electrical failure.
4. Sludge wasting pumps to replace the current practice of flow control valves may improve efficiency of the sludge process by reducing loading on solids treatment equipment.

Budget Amount: $122K & $1,098K

14. Primary Clarifier Rehab (FY 2020/21 – 2021/22)

Description: Rehabilitate the Primary Clarifier structures (by internal lining or concrete repair). Rehabilitate effluent launders (coating). Replace sludge collector mechanisms.

Function: The Primary Clarifiers remove settleable solids from the liquid treatment process.

Failure Modes Addressed:

1. The Primary Clarifier structures are over 40 years old which is the average useful life for this type of structure. There are signs of degradation of the concrete structure both on the exterior of the tanks (cracks with efflorescence) and inside the effluent and scum boxes (concrete biogenic sulfide corrosion).
2. The Primary Clarifier Sludge Collectors are beyond their useful life and will need to be replaced.

Budget Amount: $266K & $1,293K

15. Secondary Clarifier Rehab (FY 2020-21 – 2021/22)

Description: Rehabilitate Secondary Clarifier structures after detailed seismic review and materials testing of the structure. Rehabilitate effluent launders (coating). Replace sludge collector mechanisms.

Function: The Secondary Clarifiers remove suspended and floatable biomass from the mixed liquor coming from the Aeration Basins.

Failure Modes Addressed:

1. The secondary Clarifier Structures are 40 years old (Clarifier #1) and 30 years old (Clarifier #2) which is about the average useful life for this type of structure. Because they are nearing the end of their useful life the structures should be evaluated and repaired to extend the useful life.
2. The Secondary Clarifier Sludge Collectors are beyond their useful life and will need to be replaced.

Budget Amount: $242K & $1,079K

16. Digester Firm Capacity Improvements (FY 2013/14 – 2016/17)

Description: Construct a new approximately 360,000 gallon digester complete with ancillary equipment (mixing system, digester gas equipment, sludge heating equipment, etc.). The new digester would be integrated with Digester #1. New equipment would be placed on an elevated equipment pad adjacent to the new digester and the Digester Control Building.

Function: The digesters provide solids retention time of over 15 days for anaerobic digestion. Equipment level of service is to heat and mix the digester sludge to facilitate mesophilic conditions and pathogen removal in order to meet Class B biosolids regulation.

Failure Modes Addressed:

1. Capacity failure. The existing digestion system does not have adequate capacity to digest sludge with Digester #1 out of service (i.e. firm capacity with largest unit out of service).
2. Digesters #2 and #3 are both in poor condition and exhibit signs of structural degradation.
3. Digester #2 and #3 gas piping is in poor condition.
4. Digester #2 Mixer is losing a quart of oil every week which may be an indication of a pending failure.

Budget Amount: $197K; $197K $1,733K & $1,733K

17. #1 Water Improvements (FY 2013/14 – 2014/15)

Description: Construction of a new #1 Water Feed System (storage tank, distribution system pressurization pumps, and hydropneumatic tank). New #1 Water System feed system would be located in a new location not in the operations building electrical room. Replacement of #1 Water distribution piping not included (see Misc Yard Piping Rehab and Replacement Project).

Function: Supply potable water throughout the plant for use in restrooms, sinks, lab, pump seal water, and emergency eyewash showers.

Failure Modes Addressed: The existing #1 Water System has reached the end of its useful life and major components such as the storage tank could fail resulting in a loss of service.

Budget Amount: $132K each year

18. Storm Water Improvements (FY 2013/14 – 2014/15)

Description: Current system involves manual installation of a gate to stop flows at the end of the plant. Propose install a mini pump station at the end of the system and return the storm water and any spills to the head of the plant for processing.

This project will address the most glaring issue within this system and also include n evaluation of the entire storm water collection system. The current storm drain system is completely inadequate for protecting the riparian habitat surrounding the facility. Currently our storm water collection system has no reliable means of capturing the water leaving the plant if it proved necessary, i.e. hazardous chemicals being accidently spilled into a storm drain.

This project will create an in-house pump station for the plant's drainage system. This pump station would automatically return the collected liquid to the beginning of the treatment process for safe deposit, as opposed to discharging to the ocean. We will replace the current catch basin that is manually operated with a pump station equipped with an overflow system in the event that the pump station was to fail. Additionally, we will conduct an evaluation of the piping network that feeds the system.

Our recent (Feb 2013) audit by the EPA called us out on the inlet protection at each drain. We will solve this problem be installing barriers at each drain location to prevent soil and debris or other material from entering the storm drain drop inlets.

Failure Modes Addressed: The Plant storm water system should be self-contained and all water/spills returned to the head of the plant for processing. Anything less opens the door to potentially sending pollutants out into the habitat area surrounding the facility.

Note: Original staff estimate was for $100K; however, Kennedy Jenks has suggested that we should design something between a pump station and an underground tank with the necessary piping required to return collections to the headworks.

Budget Amount: $350K; $350K

19. Demo Project (FY 2022/23)

Description: As we rehab and rebuild there are structures that should be removed. For example: when a new digester is built the old digesters (#2, #3 & #4) should be demolished and removed from the treatment plant site.

Budget Amount $400K

20. **Headworks (FY 2023/24)**

Description: Rehabilitate equipment, piping and electrical assets in the headworks area. The assets that should be rehabilitated range from the channel grinder equipment, sludge piping, and electrical system to meet arc flash requirements.

Function: The Headworks process removes rags and grit from the liquid treatment process. Also in the Headworks structure is primary clarifier sludge and scum pumps which convey sludge and scum to the digesters.

Failure Modes Addressed:

1. The Headworks was originally built about 40 years ago. Improvements in 2001 addressed repairs to some equipment but other equipment has not been rehabilitated and is beyond the average useful life.
2. Existing electrical equipment is obsolete and therefore difficult to maintain.

Budget Amount: $675K

21. **Reclamation Thickener (FY 2013/14 & 2014/15) (50% Reclamation)**

Description: Replace Dissolved Air Flotation (DAF) Thickener with Gravity Belt Thickener (GBT). A GBT is designed to deliver higher solids at efficient operating costs, thereby adding value to the District's dewatering strategy. A GBT is a low power, high capacity thickening device designed to operate in a continuous, high throughput application. A large filtration area provides better performance. An automated control system minimizes operator requirements and provides the ability to monitor operation from the SCADA system.

Note: Kennedy Jenks has increased estimate to $1,000K each year for two years because a) there was no pre-design work done during asset evaluation, and b) staff has indicated they would like to be able to pipe the thickener between Tertiary and Secondary plant, i.e. in the event one side fails the other side will be available as backup, and c) the current Lamella thickener at Reclamation is not performing well and the solution is still not well defined.

Budget Amount: $1,000K each year

22. Chlorine Contact (2022/23) (25% Reclamation)

Description: Rehabilitate the Chlorine Contact structures after detailed seismic review and materials testing of the structure. Rehabilitate large diameter piping and potentially strengthen piers underneath the Chlor/Dechlor Building. Replace steel covers on top of the Chlorine Contact Pipe Gallery which leak and allow rainwater into the pipe gallery.

Function: The Chlorine Contact Channels provide contact time for chlorine to sufficiently remove or inactivate pathogens.

Failure Modes Addressed:

1. The Chlorine Contact structure will be 40 years old at the time of this project and assessing the need for repairs will extend the useful life of this structure.
2. Piping in the pipe gallery should be recoated to avoid further corrosion of the pipes occurring where the coating has failed.

Budget Amount: $1,511K

23. Operation Building Improvements (FY 2024/25)

Description: Renovate the Ops Building interior including restrooms, office spaces, building mechanical, and redesigning the upstairs electrical room to facilitate a central SCADA monitoring and control station.

Function: The Ops building is the center of operations and control of the WWTP. Currently the Operations Building is a multi-purpose building with office space with computer stations, restrooms/locker rooms, electrical and MCC equipment room, and plant library. To meet the strategic WWTP levels of service of Reliability and Regulatory Compliance, the Operations Building should serve as the central Supervisory Control and Data Acquisition (SCADA) interface location where the plant processes can be effectively monitored and controlled.

Failure Modes Addressed:

1. The Ops Building SCADA control and monitoring is accessed via computers at small workstations which are directly adjacent to office workstations. The workstations are small such that it is difficult for multiple operators to view the SCADA screens simultaneously as a team. Furthermore, during main

Budget Amount: $599K

24. <u>Misc Yard Piping Rehab (FY 2013/14 and annually thereafter for 15 yrs)</u>

Description: After inspections of select buried piping segments that have a high consequence of failure it may be found that the buried pipeline should be rehabilitated. An allowance is estimated for rehabilitation of buried piping in the WWTP.

Buried piping with a high consequence of failure and selected for possible rehabilitation include:

- #1 Water Distribution Piping
- #3 Water Distribution Piping
- Natural Gas Piping
- Fire Water Piping
- Influent Piping
- Carmel Meadows Influent Pipeline
- Digester #1 Sludge Piping
- Digester #1 Gas Piping
- Digester Gas Piping to Flare
- Gas Pit
- Digesters Supernatant Piping
- Secondary Clarifier #1 Effluent Piping
- Piping between the Headworks and Primary Clarifiers

Function: Piping level of service to carry fluids, gas or chemicals without leaks or breaks. Leaks and breaks should be proactively mitigated to avoid spills to the environment.

Failure Modes Addressed:

1. Lack of proactive failure mitigation and condition assessment of buried piping.
2. The condition of buried piping is unknown however due to the prevalent corrosion that can occur in wastewater process piping it is likely that condition issues exist in some buried piping.

Budget Amount: $89K annually

25. <u>To Be Determined (FY 2025/26 – 2027/28)</u>

As we work through the current 15 year CIP plan Kennedy Jenks has allocated funds for additional as yet to be determined projects in the final years.

Budget Amount: $1,000K per year

CARMEL AREA WASTEWATER DISTRICT TREATMENT DEPT
CAPITAL PURCHASES FY 2013/14 - 2017/18

	PURCHASE ITEM	13/14	14/15	15/16	16/17	17/18	Unsched
1	Ops - Primary Sludge Pump (2), controls, valves	$50,000					
2	Self igniter at flame	$35,000					
3	Utility cart (2)	$25,000					
4	Lab - Standby Generator (*Reclamation 50%*)	$25,000					
5	Lab - Autoclave (*Reclamation 50%*)	$18,000					
6	Handrail repair/replacement	$10,000	$15,000	$15,000	$15,000	$15,000	
7	Forklift		$35,000				
8	Lab - Ammonia Distiller (*Reclamation 50%*)		$16,150				
9	Ops - Steam cleaner			$14,500			
10	Ops - 2" Portable Pump (2)			$12,000			
14	Lab - Coliform Water Bath (50% Reclamation)			$4,100			
11	Ops - Server Replacement					$7,000	
	SUBTOTALS	**$163,000**	**$66,150**	**$41,500**	**$15,000**	**$22,000**	**$0**
	RECLAMATION SHARE	$21,500	$8,075	$0	$0	$0	$0
	PBCSD SHARE	$47,120	$19,358	$13,833	$5,000	$7,333	$0
	COST TO CAWD	**$94,381**	**$38,717**	**$27,667**	**$10,000**	**$14,667**	**$0**

(1) PBCSD to pay 1/3 of costs. (After Reclamation portion deducted, if applicable) unless otherwise noted. *Projects in italics are not funded directly by PBCSD*

TREATMENT AND DISPOSAL CAPITAL PURCHASES
EXPLANATION/DESCRIPTION/JUSTIFICATION/COST ESTIMATES
Fiscal Years 2013/14 – 2017/18

1. **Primary Sludge Pump (2) Contols, Valves (FY 13-14)**

Replace primary sludge pump – current unit is in poor condition and this is a critical piece of equipment.

Estimated Cost: $50K

2. **Self Igniter at Flame (FY 13-14)**

The District's flame igniter needs to be replaced due to age – currently staff can only ignite the flame by using a pole with flame on the end. This is not a safe practice and staff proposes replacing the igniter mechanism.

Estimated Cost: $35K

3. **Utility Cart (2) (FY 13-14)**

Used to transport personnel, tools, and parts to various locations throughout the facilities. Purchased in 1992 – expected life 20 years.

Estimated Cost: $25K

4. **Lab – Standby Generator (FY 13-14) (50% Reclamation)**

Purchasing temp solution this year. It is a critical piece of equipment and we came up with a way to take care of the problem this year for $3,500. Beecher design will take care of the long term solution.

Estimated Cost: $25K

5. **Lab – Autoclave (FY 13-14) (50% Reclamation)**

Sterilizes bacteriological solutions for coliform analysis.
Purchased 1993 – expected life: 20 years.

Estimated Cost: $18K

6. **Handrail Replacement (FY 13-14 thru 17-18)**

Replace sections of rusted stainless with aluminum handrails around plant.

Estimated Cost: $10K, $15K thereafter per year

7. **Forklift (FY 14-15)**

Recommend purchasing forklift to replace existing unit which is over 30 years old. Staff feels it is prudent to have a reliable forklift on site before they begin rehab of belt press.

Increase FY 2012-13 budget from 25K to 35K.

Estimated Cost: $35K

8. **Lab – Ammonia Distiller (FY 14-15) (50% Reclamation)**

The amount of ammonia in a wastewater solution can be determined quantitatively by the distillation of the solution with sodium or potassium hydroxide, the ammonia evolved being absorbed in a known volume of standard sulfuric acid and the excess acid then determined volumetrically. This test then gives us the reportable and process control ammonia values.

Purchased 1993 – expected life: 20 years.

Estimated Cost: $16,150

9. Ops – Steam Cleaner (FY 15-16)

Mobile steam cleaner used by staff on location to clean structures and equipment that have been subjected to particularly harsh conditions. Original purchased in 1996 – expected life **15** years.

Estimated Cost: $14.5K

10. Ops – 2" Portable Pump (FY 15-16)

Two inch portable pumps used by staff to dewater tanks, wet wells and sumps. Equipped with level sensor for unattended operations.

Estimated Cost: $12K

11. Lab – Coliform Water Bath (FY 15-16) (50% Reclamation)

The Coliform Water Bath incubates the 24 hour Multiple Tube Fermentation (MTF) process for the Escherichia coli (**E. coli**) bacteria analysis. Original purchased in 1990 – expected life **15** years.

Estimated Cost: $4.1K

CAWD/PBCSD Reclamation Project
CAPITAL BUDGET - FY 2013/14 - FY 2017/18

	PROJECT	13/14	14/15	15/16	16/17	17/18	Unsched
	Capital Improvement Projects						
1	Hypochlorite/SBS (*Reclamation 25%*)	$136,000	$612,000	$612,000			
2	Chemical containment - MF/RO (*Reclamation 100%*)	$100,000					
3	Field Instrument Study/Repair/Rplc and Modifications (*Reclamation 25%*)	$50,000	$50,000				
4	Water champ - automatic chlorine injection (*Reclamation 50%*)	$50,000					
5	Laboratory Information Management System (LIMS) (*Reclamation 50%*)	$50,000					
6	Preventative Maintenance Software Implementation - Consultant (*Reclamation 25%*)	$32,240					
7	Tertiary and Waste Activated Solids Study (*Reclamation 50%*)	$25,000					
8	Secondary System dissolved oxygen study (*Reclamation 50%*)	$15,000					
9	Moisture Analyzer (*Reclamation 25%*)	$12,500					
10	Recl Thickener (*Reclamation 50%*)	$1,000,000	$1,000,000				
11	Install Grinder, Rehab Inlet Gates & Interconnect Gates in Influent Wet Well (*Reclamation 15%*)		$175,000				
12	Reliability study of SCADA, PLC, and Communication Systems (*Reclamation 50%*)		$72,500				
13	Instrumentation upgrade SBS pumps at CDC install flow mtrs & totalizer (*Reclamation 100%*)		$40,000				
14	Total Organic Carbon Analyzer (*Reclamation 50%*)		$38,000				
15	Tertiary pH Adjustment System (*Reclamation 100%*)		$30,000				
16	Equalization Spray System (*Reclamation 50%*)			$40,000			
	Capital Purchases						
1	Lab - Standby Generator (*Reclamation 50%*)	$25,000					
2	Lab - Autoclave (*Reclamation 50%*)	$18,000					
3	Lab - Ammonia Distiller (*Reclamation 50%*)		$16,150				
	TOTAL	**$1,513,740**	**$2,033,650**	**$652,000**	**$0**	**$0**	**$0**
	RECLAMATION SHARE (1)	$749,185	$825,075	$173,000	$0	$0	$0
	PBCSD SHARE (2)	$254,852	$402,858	$159,667	$0	$0	$0
	CAWD COST	**$509,703**	**$805,717**	**$319,333**	**$0**	**$0**	**$0**

(1) Assumed Reclamation Project will pay 30% of Disinfection Project, 10% of Instrumentation Evaluation, and 50% of Effluent Station PLC

(2) PBCSD to pay 1/3 of costs. (After Reclamation portion deducted, if applicable) unless otherwise noted. *Projects in italics are not funded directly by PBCSD*

Carmel Area Wastewater District
EXPLANATION/DESCRIPTION/JUSTIFICATION/COST ESTIMATES
Reclamation Share of Capital Budget - FY 2013/14 through FY 2017/18

Capital Improvement Projects

1. Hypochlorite/SBS Improvements (FY 13-14) (25% Reclamation)

Description: Convert the existing chlorine gas disinfection system to a bulk 12.5% liquid sodium hypochlorite disinfection system. A new tank storage double containment pad would be built with multiple polyethylene storage tanks to store sodium hypochlorite chemical. Chemical feed pumps would be located on the double containment pad and would pump sodium hypochlorite upstream of the chlorine contact channels for disinfection. A feed would also be provided for disinfection of the recycled water upstream of the recycled water chlorine contact channels.

Construct an additional sodium bisulfite (SBS) storage tank to provide a redundant SBS storage tank to increase reliability of the dechlorination system.

Function: The level of service of the chlorination and dechlorination chemical systems is to dose and disperse chlorine upstream of the chlorine contact channel and does SBS downstream of the chlorine contact channel.

Failure Modes Addressed:

1. The existing chlorine gas cylinder room is used for both storage of standby chlorine gas cylinders and for use of cylinders. Because the chlorine gas cylinder room is used for storage of cylinders a chlorine scrubber is required per California Fire Code (CFC) Section 3704.2.2.7 Exception 2. The gas storage room is currently not equipped with a scrubber.
2. There have been minor valve failures in the chlorine gas system in the past which calls for upgrades and rehabilitation of the existing gas feed system piping.

Budget Year: 2013/14; 2014/15 & 2015/16
Budget Amount: $136,000; $612,000 & $612,000

2. Chemical containment area, tertiary CIP cleaning (FY 13-14)(100% Reclamation)

Staff is recommending that a section of asphalt next to the northwest corner of the MF/RO facility which holds the inventory of chemicals needed for maintenance washes, CIP (clean in place), and neutralization chemicals be converted into a functional, contracted OSHA approved containment storage for chemicals.

At any given time there is approximately 2000 to 5000 gallons of chemicals in various containers (i.e. drums, totes,) on hand for use at the MF/RO facility. Quantities have to be stored on hand because of changes in operational needs and long lead times before delivery of chemicals. Chemicals have been stored on the ground with a sock barrier around the area to capture any leaking chemicals but will not contain a major spill or prevent vehicles accidentally hitting a chemical container. This risk factor is increased because of the close proximity to the facility storm drains.

Staff recommends creating a platform to hold multiple drums and totes to be accessed by forklift and able to capture a chemical spill. Numerous bollards will be inserted around the perimeter to protect the chemical holding area from traffic. Pictures below are a representation of suggested platform.

Ultra-Modular IBC Spill Pallets

- New Ultra-Modular IBC Spill Pallets provide low cost spill containment for multiple IBC tanks. Standard offerings include: 2-tank, 3-tank, 4-tank and 5-tank indoor and outdoor models. In addition, components may be purchased separately to allow users to "build-your-own" configurations for indoor models.
- Each IBC tank sits on a heavy-duty spill pallet that offers a Uniformly Distributed Load Capacity of 9,000 lbs. Each of the low profile spill pallets has a containment capacity of 75-gallons and measures 62" x 62" x 8.75"H.
- To increase containment capacity, a 65-gallon capacity Expansion Tank is available. "Flow-through" bulkhead fittings (1.25-inch diameter) are used to connect spill pallets and Expansion Tanks together. This patented feature allows spills to be channeled throughout the containment system, thereby "borrowing" containment capacity from adjacent spill pallets and Expansion Tanks.
- Any number of the modular spill pallets can be connected together with the bulkhead fittings. Two (2) bulkhead fittings are used to connect one pallet to the next.
- Connecting an Expansion Tank to a spill pallet also requires two (2) bulkhead fittings. Bulkhead fittings are included with each 2-, 3-, 4-, or 5-tank model. Once five (5) or more spill pallets are connected together, the total containment capacity is 375 gallons minimum and does not require use of an Expansion Tank to meet the spill containment regulations.
- Optional Extender Kits (Part# 9658) provide for the addition of another compartment to Outdoor Models. (1 tank per Extender Kit).
- Ultra-Modular IBC Spill Pallets are constructed of 100% polyethylene, eliminating the potential for rust and corrosion. They offer excellent chemical resistance to a broad range of chemicals including acids, solvents and oils.

Estimated Cost: $40K

3. **Field instrument Study/Repair/Replacement and Modifications (FY 13-14, 14-15) (25% Reclamation)**

Field instruments (e.g. flow meters, pressure regulators, level indicators, etc.) are the nerve endings of the SCADA system and are responsible for the measurements that are reported for diagnosis, evaluation, troubleshooting, process control and reporting.

Funds will be utilized to develop a TM with 10 year forecast and recommendations to integrate, improve or modify our current system along with the identification and repair of instruments in need of immediate attention (e.g. nuisance alarms should be evaluated).

Estimated Cost: $50K each year

4. **Water Champ Modification (FY 13-14) (50% Reclamation)**

Staff recommends that the primary and the secondary water champ chlorine injection system be modified. Approximately two years ago the #1 water champ used for disinfecting our secondary flow and to create mono-chloramines for the MF/RO pad had a failure during the night. The result of this failure caused a violation NPDES.

To address this, a number of changes were made to prevent this from occurring again. One of the changes was to install a second water champ chlorine injection system in the vault next to the primary system. Although this is a good redundant system it does not address the fact that it manually has to be implemented. Someone has to drive in on an emergency call-out and make necessary valve changes and power the second unit up.

Staff has determined that during the 45 minute drive to the facility the District has a potential for a violation again. We plan to cure the potential for violation and properly add the necessary solenoid valving, piping, electrical and PLC controls to resolve this issue.

Reclamation: The Water Champ serves dual purpose for injection of ammonia and chlorine. These are used to produce mono-chloramine that prevents biofouling.

Estimated Cost: $50K

5. **Laboratory Information Management System (LIMS) (FY 13-14) (50% Reclamation)**

A Laboratory Information Management System (LIMS) is a software based laboratory and information management system that supports lab operations by managing multiple aspects of

laboratory informatics. Automating operations and integrating instruments allows operators and labs to increase capacity and sample throughput and build in regulatory compliance, while also reducing the costs associated with time spent on manual activities, such as recording data in paper notebooks or using spreadsheets to create reports.

In today's wastewater laboratories LIMS are commonplace because of the strict guidelines we are held to by the many agencies we are require to report to. A LIMS designed for wastewater and/or environmental labs can significantly enhance a lab's capability for any audit situation that requires evidence of controlled sample management, proper labeling and identification, records of all proficiency training, instrument calibration schedules and full audit traceability of all records. LIMS simplifies the audit process by enabling the lab to mine all sample-related data to give an end-to-end review. With specific functionality built into the LIMS to improve workflow and lab efficiency, reports can be automated to ensure full traceability and integrity of the lab's data.

The CAWD laboratory produces an inordinate amount of data for a small plant because of our multiple permits required to produce water for public use. Our current system is antiquated, inefficient and is prone to errors. In addition to reporting capabilities, the LIMS serves as the database for the data generated by the lab. This database has the functionality to be queried and graphed unlike our current system. Having this ability serves as a tool for proper process control and troubleshooting. Our current system only offers a snapshot of the plant performance as a LIMS will offer a more historical look at the entire process.

Estimated Cost: $50K

6. Preventative Maintenance Software Implementation (13-14) (25% Reclamation)

The District purchased a Computerized Maintenance Management Software package in June 2000 but has not been successful in its implementation. Staff proposes outsourcing the project for (1) development of implementation plan and timeline, and (2) data entry necessary to get program to the point of use.

After implementation is complete staff envisions the need for a clerical/administrative type position at the plant to maintain and run the program. Implementation will need to run concurrently with any planned upgrade/rehab to the plant.

Estimated costs: (25% Reclamation)

Consultant $40/hr x 15.5/hrs x 52 wks	$32,240

7. Tertiary and Waste Activated Solids Study (FY 13-14) (50% Reclamation)

These funds will be utilized to create a Technical Memorandum in regards to the treatment of Tertiary and WAS to determine if there is a more efficient and/or economical way to treat them. The hope is that we can combine these flows and increase the capture rate.

Tertiary Thickener

Microfiltration solids to the tertiary thickener can be inconsistent at times and in turn decrease the efficiency with this system. Along with that is the potential of this complex system to get out of balance and have the same negative effects. A decrease in these efficiencies leads to an increased and potentially detrimental solids loading to our secondary system. This increased loading can lead to incorrect trouble shooting for process control, increased solids in the final effluent and increased solids to MF system.

How it works

The Lamella Thickener went online at CAWD in 1994. It is located at the Tertiary building on the south side of aeration basins. It consists of two solids sludge pumps, a rapid mixer, a rake drive, a flocculator, polymer blending unit for coagulation. Since 2007, its use has been modified from its original use to treat the waste flow from the microfiltration and reverse osmosis systems.

The microfiltration and reverse osmosis (MF/RO) sends about 150,000 gallons of waste per day. It is used to capture the solids that accumulate from microfiltration monthly clean in place, daily maintenance washes, and backwash flow (every 22 minutes per cell) and the waste flow from the RO clean in place tank.

The Lamella Thickener receives about 65,000 to 80,000 gallons a day of waste from MF/RO (micro filtration and reverse osmosis), of that flow, percent solids range from 1.0 to 2.5 percent, which are pumped directly to digester No.1. The remainder of the flow goes through the emergency reject sump and is pumped back to the head of the plant. This is done because of the size of the lamella thickener. It can only handle about 90 gallons per minute before it becomes hydraulically overloaded; almost half the flow bypasses the thickener and overflows to the Headwork's. Also it should be noted that the flow may vary depending on number of MF cells and RO trains that are online.

A daily operation of this equipment is vital. When the thickener is not working adequately and the solids that come from MF/RO get placed back into the system at Headwork's and has caused the biological process to become upset and making it difficult to run the plant efficiently. Due to the thickener only being able to accommodate approximately 50% of the waste sent to it on a given day, the negative effects (decreased efficiency, increased blower costs, etc.) are ongoing.

Waste Activated Sludge

WAS solids that are discharged to the Diffused Air Flotation Thickener (DAFT) can be inconsistent at times and in turn decrease the efficiency with this system. There is a strong potential for this complex system to get out of balance and have the same negative effects. A

decrease in these efficiencies leads to an increased and potentially detrimental solids loading to our secondary system. This increased loading can lead to incorrect trouble shooting for process control, increased solids in the final effluent and increased solids to MF system.

DAFT System Operation for Waste Activated Sludge

Our Dissolved Air Flotation Thickener System (DAFT) was built in the late 1980's and is located north to the equalization basin. Waste activated sludge at a rate of 325 gallon per minute (GPM) and scum from the secondary clarifiers are pumped to the DAFT continuously. The purpose of this thickener is to thicken the sludge from a .67% average solids content to a more manageable 3%+ solids content. This now decreased volume of sludge is discharged to our digester system. The dissolved air floatation thickener has four basic components:

1. Thickener tank (including the mechanism for skimming)
2. Pressurization system (including pressurization pump and air injection system)
3. Sludge and Scum pumping systems and the
4. Polymer feed system

How the DAFT works:

The rising air bubbles suspend or float solids to the tank water surface where solids are removed by a skimmer. The solids that do not float settle to the bottom where is raked to a hopper in the bottom of the tank for periodic withdrawal by the sludge or scum pump. The practice of adding polymer to the WAS flow stream is utilized to increase coagulation. Effluent from the Thickener flows through over a weir through the launder to the effluent recirculation sump, and by pipeline to the headworks grit tank. The thickened solids are skimmed to a sump where it is pumped to the primary digester.

Estimated Cost: $25K

8. <u>Secondary system dissolved oxygen study (FY 13-14) (50% Reclamation)</u>

Our dissolved oxygen levels within the aeration tanks are inconsistent due to several factors that will be evaluated. This project will include an evaluation of our current blower system, regulating valves, and diffusers. The goal of this study is to provide a TM that will help guide our decision-making as we move forward.

Aeration Blowers and diffusers:

CAWD uses three separate processes to treat wastewater: primary treatment, secondary (biological) treatment and disinfection. The biological treatment process is called "activated sludge". Being a biological process operators are required to control the pH, ratio of microorganisms to their "food" (influent BOD) or F/M and the amount of free dissolved oxygen in the basin. D.O. is one of the primary energy sources for the microorganisms.

Dissolved oxygen is supplied to the basins through a system of diffusers mounted to the bottom of each of our three aeration basins, which in turn are fed by our Turbolex blower.

The current aeration system as a whole is significantly over sized and a significant portion of the diffusers are plugged or "blinded off". (Note: we replaced diffuser bladders that were 15+ years old from the original project and purchased spares for future failures.) This has been done in an attempt to maintain a D.O. between 1.00mg/l and 2.50 mg/l. regularly operating the system outside these parameters will have several negative effects on plant operation and chemical costs. Too low dissolved oxygen negatively affects the nitrification process by not giving the microorganisms enough oxygen to get the work done. Too high dissolved oxygen negatively affects the solids settling in the secondary clarifiers by stripping the floc and creating very poor settling that results in more solids passing through to the outfall and MF/RO. These improvements were made specifically for Reclamation.

Additionally we have encountered other issues due to the excessive size of our air supply system. One such issue has been attempting to operate the main air regulating valves located on each basin (also known as "header valves"). Since the valves were designed and built to operate at a much higher volumes of air, it has proven extremely difficult to be precise. Another issue encountered operating the valves in this manor are increased backpressure, which causes the blower to automatically shut down.

Another concern regarding our air supply system is lack of redundancy. While the old blowers (built by "Lamson") are still in place, their reliability is questionable.

Estimated Cost: $15K,

9. Moisture Analyzer (FY 13-14) (25% Reclamation)

This unit is used to generate total and percent solids results.

The current method of analysis is a gravimetric process that takes 24 hours to achieve results. This involves oven drying overnight for total solids determination, followed by volatilizing in a muffle furnace to determine percent solids. The lab currently runs solids samples once per week.

A microwave or infra-red analyzer can produce the same results in a matter of minutes. These results are useful for process control in several areas of the plant and can potentially result in less solids loading to the secondary system and ultimately the MFRO system. Because we produce multiple "filtrate" side stream we should carefully monitor them for solids loadings and polymer usage where used. The RO reject is sampled for filterable effluent.

Estimated Cost: $12.5K

10. Reclamation Thickener (FY 13-14 &14-15) (50% Reclamation)

Description: Replace Dissolved Air Flotation (DAF) Thickener with Gravity Belt Thickener (GBT). A GBT is designed to deliver higher solids at efficient operating costs, thereby adding value to the District's dewatering strategy. A GBT is a low power, high capacity thickening device designed to operate in a

continuous, high throughput application. A large filtration area provides better performance. An automated control system minimizes operator requirements and provides the ability to monitor operation from the SCADA system.

Budget Year: 2013/14 & 2014/15
Budget Amount: $1,000,000 each year

11. Install Grinder at Influent Wet Well (FY 14-15) (15% Reclamation)

These funds will be utilized for the research, engineering and installation of a grinder system that will alleviate the problems faced by staff and improve the current system.

When wastewater initially enters our facility, the first structure it enters is the "Influent Wet well". This structure is located on the north side of the influent building. The wet well itself is a sump approximately 30' long, 8' wide and 12' deep. The wastewater stays in this structure for approximately one hour depending on the influent flow rate. During this detention time the grease, rags and other constituents which readily float rise to the surface. These accumulated materials eventually form a thick "blanket" on the surface and must be manually skimmed. This process is labor intensive, involves the use of a gas detector and requires two operators. One operator remains on the deck above the wet-well and manually manipulates the wastewater level. He also raises and lowers a skimming pump so as to only collect the thick material from the surface. The second operator is required to enter the room where the wet-well is housed and uses hoses, shovels and other various tools to push the grease and other accumulated materials to the skimmer pump. This operator must have an atmosphere monitor with them due to the potential for hazardous environments caused by hydrogen sulfide or other dangerous gases. The material that is collected is pumped to digester #1 for disposal.

The influent pumps draw suction from this wet-well and are in danger of ragging that in turn decreases efficiency and can lead to pump failure. As part of the current maintenance schedule two operators are require to de-rag the influent pumps twice a week. A problem that can and is encountered with influent "garbage" is that is can be inconsistent. For instance the first storms of the year will have a "scouring" effect on the influent piping and increase the grease and rags entering the plant.

Also located in this wet well are three gates, two on the west side of the sump and one on the east, which enable staff to isolate portions of the sump as needed for maintenance, etc. While the gates are currently operational, their reliability is questionable. All three of the gates are nearing or at the end of their usable life span. The dependability of these gates is of the utmost importance due to the criticality they play in plant operation. Staff's ability to operate them to re-direct flow in emergency circumstances and the extremely dangerous circumstances that would occur as the result of any one of these gates failing while being utilized make it necessary to address them now.

Reclamation allocation 15% - use of flushing channel and washdown

Estimated Cost: $175K

12. Reliability study of our SCADA, PLC and Communication Systems (FY 14-15) (50% Reclamation)

These funds will be used for the following purposes:

- Complete Health Check of SCADA Systems. From Instrument input to PLC to Network to Interface.
- Development of a TM with recommendations and potential strategies for the next 10 years.

SCADA and PLC System:

Supervisory Control and Data Acquisition (SCADA) was placed in service in 1994 and has been utilized, modified, upgraded, improved and maintained ever since. SCADA is used to monitor and control several complex systems throughout the plant and collections system and also serves as our main alarm system for each plant process.

CAWD consist of two SCADA:

1. SCADA 1 is in the lead and is considered the brains of the plant
2. SCADA 2 is used for editing and as a backup.

SCADA and the PLC system is a vital part of our daily operations. It is utilized to improve plant performance and is a tool used to gather information and troubleshoot process issues. It also enables the trending of data in real time and examination of historical data. This system also collects and generates data that is reportable to our NPDES and TITLE 22 permits.

Estimated Cost: $72.5K

13. Improve instrumentation to SBS (sodium bisulfite) Pumps at CDC (FY 14-15) (100% Reclamation)

Staff is recommending that the existing SBS injection line for de-chlorination be equipped with flow meters and totalizers. In 2007 the Chlorination building was equipped with four new SBS injection systems. Those new systems were for the benefit of de-chlorinating all water relating to the MF/RO process.

There are two SBS systems in the room that were pre-existing to address all water relating to the CAWD ocean discharge. All SBS systems draw from the same SBS inventory outside the building (8000 gals.) During any period night or day water could be coming from the storage tank addressing any number of different flow streams for CAWD or MF/RO.

Right now there is no way to tell exactly how much SBS should be charged to the separate facilities because there are no meters on the separate systems. Staff believes this can be accomplished with some outside expertise in small flow chemical metering engineering injection

systems contracting and installation. Staff would also like to connect this flow metering to the SCADA system.

Estimated Cost: $40K

14. Total Organic Carbon Analyzer (TOC) (FY 14-15) (50% Reclamation)

TOC analysis results can be obtained in approximately five minutes as opposed to our current analysis which takes five days for results. This would be a benefit to our process control as the food to micro-organism (F/M) ratios can be calculated in essentially real time. Also organic content can be measured more readily and help mediate negative bio-fouling of the MFRO systems along with potential impacts on the disinfection process.

Total organic carbon is a more convenient and direct expression of total organic content than either biochemical oxygen demand (BOD) or chemical oxygen demand (COD). A repeatable empirical relationship can be established between TOC, BOD and COD

Estimated Cost: $38K

15. Tertiary PH adjustment system (FY 14-15) (100% Reclamation)

These funds will be utilized to purchase a new PH adjustment system for the Tertiary Facility. Currently the system in place was created in house in 1994 by operations staff to address any water which was low in PH and therefore a violation to our health department permit (Title 22).

In 1994 the PH adjustment was overlooked during the sand filtration system built by Engineering Science. In 2007 a PH system was installed in the MF/RO facility to address water leaving with a low PH. Shortly after the MF/RO system went online the PH system at MF/RO failed for a number of reasons, line plugged, pump failed, PH probe instrumentation failure, etc.

Most of these failures caused water to get to the reclaim pumps five hours downstream before it was noticed. There was no way to PH adjust the hundred thousand gallons or more of water in the channels without the use of the unit which was setup on the tertiary facility 15 years ago.

Now it is time to make this system a more viable redundant option to prevent hours of downtime without sending any water to Pebble Beach as well as to protect our Health Permit.

Staff believes this can be accomplished with little or no outside contracting except from Tesco Controls and Day Electric.

Estimated Cost: $30K

16. Equalization Spray System (FY 15-16) (50% Reclamation)

Staff is recommending that the existing Equalization Basin have installed an automatic spraying system. Every morning when the equalization pumps are down the staff is spending 30 minutes

to manually hose down solids and control the EQ pump on the PLC because of solids settling during the night. This is done five days per week and excluded on Saturdays and Sundays because of reduced staffing. The equalization basins were established solely for the benefit of Reclamation.

This can be easily controlled by an automatic spray system managed by the PLC (Programmable Logic Controller). This would be contracted and installed to start whenever the EQ basin becomes empty and using the level controls and existing PLC. This would free valuable staff time to monitor more technical aspects of the process.

Estimated Cost: $40K

Capital Equipment Purchases

1. Lab – Standby Generator (FY 13-14) (50% Reclamation)

Purchasing temp solution this year. It is a critical piece of equipment and we came up with a way to take care of the problem this year for $3,500. Beecher design will take care of the long term solution.

Estimated Cost: $25K

2. Lab – Autoclave (FY 13-14) (50% Reclamation)

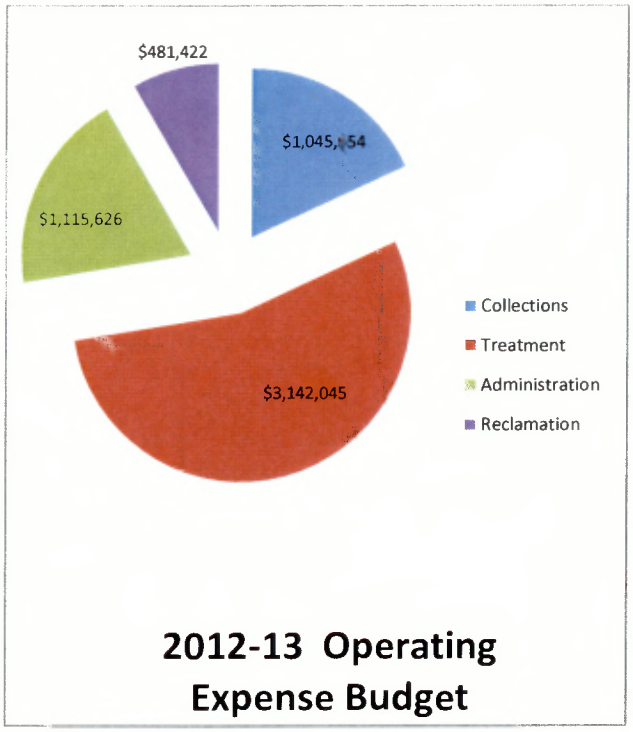
Sterilizes bacteriological solutions for coliform analysis.
Purchased 1993 – expected life: 20 years.

Estimated Cost: $18K

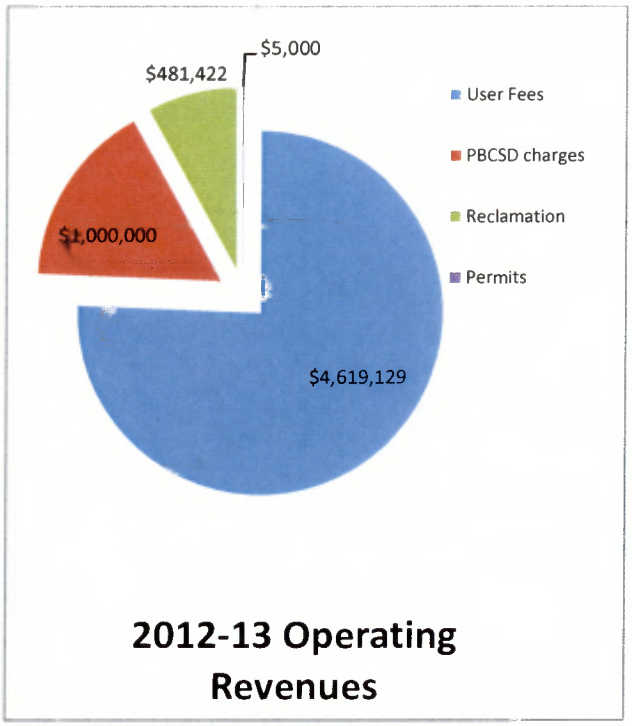
3. Lab – Ammonia Distiller (FY 14-15) (50% Reclamation)

The amount of ammonia in a wastewater solution can be determined quantitatively by the distillation of the solution with sodium or potassium hydroxide, the ammonia evolved being absorbed in a known volume of standard sulfuric acid and the excess acid then determined volumetrically. This test then gives us the reportable and process control ammonia values.
Purchased 1993 – expected life: 20 years.

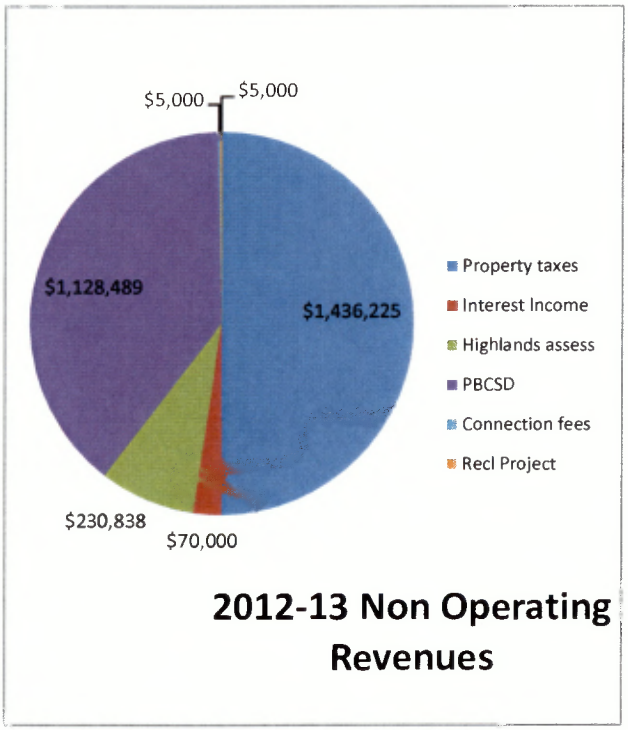
Estimated Cost: $16.1K



2012-13 Operating Expense Budget



2012-13 Operating Revenues



2012-13 Non Operating Revenues