2004 Master Plan Completion Report

Montecito Sanitary District

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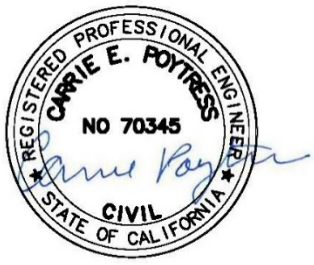

Dated:
August 2018

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I. PURPOSE OF REPORT

The 2004 Master Plan assessed the state of the Montecito Sanitary District's (MSD) assets and operations to plan for future site development. The 2004 Master Plan recommended the following action items:

A. Addition of an operations and collections maintenance building
B. Addition of an new administration building
C. Implementation of improved disinfection and grease and oil removal
D. Development of a contingency plan to increase aerobic digestion capacity
E. Implementation of improved rag and grit removal
F. Monitor the results of the collection system infiltration/inflow improvement program
G. Maintain the current road and turn-around areas for chemical and biosolids trucks
H. Replacement of existing aeration pipe and the repair aeration basin concrete

The purpose of this report is to summarize what has been accomplished for each of the 2004 Master Plan recommended items.

II. 2004 MASTER PLAN RECOMMENDATIONS

Below is a summary of how each recommended action item was addressed.

A. MAINTENANCE BUILDING

The Collections Operations and Maintenance Building was constructed in 2006. The building consists of a plant maintenance shop, parts storage, collections meeting room, collections system operators work stations, locker rooms, and parking for the sewer vacuum cleaning truck within the building at night. In 2014 a trellis was built adjacent to the Maintenance Building for the CCTV Van parking at night. This area is also used for outdoor meeting space.

B. ESSENTIAL SERVICES BUILDING

An essential services building is currently in design and expected to start construction in mid-2019. The project was renamed Essential Services Building due to the function and service of the planned building. The Essential Services building will be located adjacent to the Maintenance Building and Laboratory. A new driveway from Channel Drive, midway between the existing Maintenance Driveway and Monte Cristo Lane, will be the new public access to the District. Once the new building is competed, Monte Cristo Lane will return to a residential private lane. The Essential Services building will include a larger board room to act as a community meeting room, separate staff training room, public restroom, offices, work room, staff restrooms, and women's locker room. The current board room is not large enough to hold community meetings nor for staff training. There are not enough offices or space in the existing buildings to meet the current or future needs. Some District staff are working in high voltage areas and in abandoned chemical storage room. The existing board room and offices were poorly built as add-ons in the 1980's and have roof damage, termites, no insulation, and without a proper ventilation system. The work room will be used to lay out large plans, space for the copy machine, and intern workstation. Once the new Essential Services Building is completed, the existing Board Room and offices can be demolished.

C. DISINFECTION AND OIL AND GREASE REMOVAL

The District updated their standard operations procedures to address the concern of fats, oil, and grease (FOG) removal by increasing education and adding additional inspections**.** Ordinance 13 was implemented in 2014 to regulate and mandate FOG receptors on restaurants and commercial institutions. Collections staff stay in contact with commercial property owners and staff to educate on FOG control and to supervise their discharge. Collections staff especially pay attention to grease interceptors that consistently have problems to make sure they are being properly cleaned and maintained often. The total oil and grease entering the plant has subsequently decreased due to the increased education and monitoring; however this is an ongoing education and monitoring process. Additional treatment processes have not been implemented and are not necessary at this time as operations has been able to stay within NPDES permit limits.

The District has similarly not implemented improved disinfection because levels have been well within NPDES permit limits. The treatment plant operators increased the level of control with the replacement of three effluent disinfection chemical dosing pumps. Two new Sodium Hypochlorite chemical feed pumps and one Sodium Bisulfite chemical feed pump were installed in 2012**.** These pumps allow operators to add more accurate doses due to changes in the effluent. Also, with lower flows caused by the ongoing drought, the residence time in the contact chamber has increased, increasing CT and improving overall disinfection. However, the District would still like to see a longer residence time in the chlorine contact chamber so they would be able to decrease the concentration of disinfectant to reduce chemical expenses. But the cost to enlarge the chlorine contact chambers would not be offset by the reduction of chemical expenses.

D. AEROBIC DIGESTION CAPACITY AND DAFT

Increased aerobic digestion capacity has not been implemented since the treatment plant is currently experiencing low flows. Due to the ongoing drought, the incoming flows have decreased by half since 2004. Therefore, the capacity at this time is not a concern.

The Dissolved Air Flotation Thickener (DAFT) is a separate process from the aerobic digestion capacity however the DAFT performance effects the aerobic digestion performance. Replacement of the DAFT system will be completed in 2019.

E. ROTARY SCREEN

The District has not implemented additional rag removal since 2004. Currently, preliminary treatment grinds the rags, then pumps the shredded material back into the waste stream. The shredded rags tend to re-form downstream. The treatment plant operators manually remove the rags from the influent pump station, aeration basin pumps, secondary clarifier, and RAS.

Additional grit removal has also not been implemented although staff researched grit removal and found it to be costly and will cause odor issues that are not acceptable for a residential neighborhood. To help assist in rag, grit, grease and oil removal from the return activated sludge, a fine barrel screen is used, however it does not remove grit as effectively as other techniques and requires constant maintenance.

F. INFILTRATION AND INFLOW IMPROVEMENTS

Ordinance No. 12 was adopted by the Board in September 2007 to establish rules regarding connections to the District's sewer system and prohibiting connections that result in rainwater or storm water discharges into the District's sewer system. Smoke testing of select areas was performed to determine which properties were contributing to the inflow.

Collection staff placed 6 flow meters at the influent pump station and lift stations to obtain dry and wet weather flow information. The District purchased 20 Smart Covers in September of 2008 to be installed in manholes throughout the District's Collection System. Smart Covers are stand-alone ultrasonic sensors that are placed at site-sensitive, critical areas in various locations of the collection system as well as in front of our four lift stations and treatment plant to help reduce Sanitary Sewer Overflows (SSO's). The collection crew maintains and monitors the smart covers. The Smart Covers monitor changes in the level of sewage through the manhole. The sensors give staff adequate time to respond with the Vac-Con to clear the obstructions in the District mainlines well before a spill could occur. Due to the Districts pro-active approach, staff purchased 10 more Smart Covers to further help reduce SSO's.

In 2006, a program was created to provide financial incentive for the rehabilitation or replacement of private sewer laterals. In total, 171 property owners participated in this program and replaced or repaired their deteriorated laterals. The replacement of damaged laterals helps to reduce infiltration to the collection system after a rain storm. This program also allows for inspection of the property which helps to discover illegal rain water connections.

The District has relined and rehabilitated approximately 25.9 miles of VCP pipe with PVC liners within the collection system at various locations throughout the District as shown in Exhibit 2. The relined pipes help to greatly reduce infiltration.

In 2006, the influent treatment plant pumps were replaced with larger and more efficient pumps and SCADA controls. The replacement of these pumps improved the District's ability to handle wet weather flows. Upgrades to the treatment plant SCADA monitoring system were completed in 2011. Additional essential treatment plant equipment and an after-hours alarm notification system was added to the SCADA system as the primary notification system with the existing auto dialer (ADA) becoming the back up. In 2015 Mission boxes at the treatment plant were installed for the internet SCADA system to monitor flows. In 2009, the influent channel grinders were replaced with two new units increasing flow volume from 3.5 MGD to 6.0 MGD.

G. ROAD AND TURN-AROUND AREAS

Asphalt paving work around the wastewater treatment plant was preformed to maintain good working order of the road and site in 2016. An asphalt repair and replacement program was established to budget for ongoing maintenance every 5 years. The access for fire, chemical, and biosolids trucks has not changed.

H. AERATION BASIN PIPING AND CONCRETE

The aeration basins air headers, air header diffusers, and swing arms were replaced 2017. Spot repairs have been made to the concrete on a continuing basis to maintain the integrity of the aeration basins, secondary clarifiers, and chlorine contact chambers.

III. 2004 FUTURE NEEDS

The 2004 Master Plan report described a potential future need for expansion, preliminary treatment, primary clarification, grease and oil removal, disinfection, bio-solids, wet weather storage, recycled water, and facility replacement.

A. TREATMENT PLANT EXPANSION

The permitted capacity of the existing plant 1.5 MGD. The current average daily flow is approximately 0.6 MGD. As stated in the 2004 Master Plan if all parcels were to be developed, the resulting additional flow would be approximately 200,000 gallons per day. The potential future flow of 0.8 MGD would be less than the rated plant capacity and therefore future expansion is not expected.

B. PRELIMINARY TREATMENT

Preliminary treatment includes rag and grit removal. As stated in Section II. E. staff researched grit removal and found it to be costly and likely to cause odor issues that are not acceptable for a residential neighborhood. Preliminary treatment will be reevaluated as part of the treatment plant replacement.

C. PRIMARY CLARIFICATION

Primary Clarification includes clarifiers, primary sludge pumping, scum pumping, and odor control. As stated in the 2004 Master Plan primary clarification would be considered to increase the overall capacity of the plant and to better remove grease, oils, and floatables. This is not required based on the flow projections discussed above. The solids removed from primary clarifiers would also require processing and significant amount of odor control. Primary clarification will be evaluated as part of the treatment plant replacement.

D. GREASE AND OIL REMOVAL

As stated in Section II.C. the total fats, oil, and grease (FOG) entering the plant has subsequently decreased due to the ongoing education and monitoring. Additional secondary treatment processes have not been implemented and are not necessary at this time as operations have stayed well within NPDES permit limits. If the recycled water process requires additional grease and oil removal in order for the membranes to operate efficiently, then a small grease and oil removal system could be used to protect those processes. Further research and testing as part of the recycled water pilot project is proposed.

E. DISINFECTION

As stated in Section II.C. the cost to enlarge the chlorine contact chambers would not be offset by the reduction of chemical expenses. Any changes to the disinfection would be evaluated as part of the treatment plant replacement.

F. BIOSOLIDS

The District is nearing completion of the design for the replacement of the Dissolved Air Floatation Thickener (DAFT). The project is split into two phases in which each phase will be bid separately. The first phase includes purchasing the DAFT equipment, installing it in a temporary location, and startup of the equipment. The second phase includes demolition of the old DAFT equipment, moving the new

DAFT to the permanent location, and constructing the permanent piping. It is anticipated that the first phase will go out for bid in September 2018.

The DAFT and aerobic digester processes help to thicken the sludge then it is dewatered at the belt press to create biosolids, the solid residue. The biosolids are hauled to Santa Maria to the Santa Barbara County designated composting facility. The compost is sold as Harvest Blend compost. The production of Class B biosolids is not required or necessary at this time.

G. WET WEATHER STORAGE

The 2004 Master Plan report stated that the wet weather flow through the treatment plant should be limited to about 4 MGD average daily flow which equates to operating two of the three influent pumps. The actual wet weather instantaneous peak flow rate coming into the treatment plant could be as high as 6 MGD.

As stated in Section II.F above, the influent pumps were replaced as well as the influent channel grinders to handle a flow rate up to 6 MGD. The wet weather flow to the treatment plant has been significantly reduced since 2004 by District's rehabilitation sewer collection system, prohibiting property owners from tying their storm drains into the sewer system, and incentivizing owners to replace/repair their private sewer laterals.

Furthermore, the collection system is sized only wastewater. Ordinance No. 12 makes it illegal to discharge storm water/ rain water to the sewer system. Therefore the District does not have plans to create wet weather storage. Potentially when the treatment plant is replaced, equalization tanks may be considered.

H. RECYCLED WATER

The District has been coordinating with the Montecito Water District (MWD) for a recycled water project. MWD hired Woodard & Curran to create a Recycled Water Feasibility Study to examine all recycled water options. MSD decided that a recycled water pilot project would be beneficial in order for the Sanitary District to become more familiar with recycled water on a small scale for onsite use before attempting a full scale project to serve large irrigation commercial/institution customers. The pilot project would evaluate the quality of recycled water produced, quantity produced, discharge concentrate quality and quantity, electrical usage, chemical usage, backwash timing, and overall operational needs.

The Recycled Water Pilot Project purchase order was approved by the MSD Board on July 30, 2018 and the pilot is planned to be up and running by mid-2019. Recycled water has been a discussion topic and studied in several reports between MSD and MWD since 1989. With the ongoing drought, recycled water had become more prudent possible source of water for the community. The pilot system will add an equalization tank, ultra-filtration/micro-filtration, reverse osmosis membranes, a sodium hypochlorite pump, and a storage tank. The 10,000 gallon equalization tank will give the treatment operators an opportunity to remove any oil and grease. It was decided to use secondary clarifier effluent instead of the final effluent from the outflow due to the potential for small traces of chlorine in the final effluent which can harm the membranes. Water from the secondary clarifiers has more FOG than the final effluent, but the filtration after the initial equalization tank will help remove any final traces of FOG

prior to the reverse osmosis membranes. After the ultra-filtration process, water flows through the reverse osmosis system and meets up with a bypass line from the ultrafiltration to create 13 gpm of recycled water. The brine discharge of 0.5 gpm from the reverse osmosis membranes returns to the treatment plant headworks or can potentially discharge to the aeration basin. The blended recycled water is then disinfected with a sodium hypochlorite drip prior to the 10,000 gallon product water storage tank. The storage tank will then allow for the necessary chlorine contact time and to store the water for onsite use. MSD is purchasing the reverse osmosis skid and filtration process from IDE Technologies. IDE was chosen due to their local presence at the Santa Barbara desalination treatment plant. The recycled water produced will be used by the District for collection system cleaning, DAFT polymer mixing, belt press wash water, and potentially landscape irrigation in the future.

I. FACILITY REPLACEMENT

The existing treatment plant was constructed in 1961. The existing concrete in the aeration basins, secondary clarifies, and chlorine contact chambers have numerous cracks and some exposed rebar. The cracks and exposed rebar have been sealed with epoxy, but the cracks still continue to grow and expand. The repair of the cracks and exposed rebar is part of the ongoing maintenance of the treatment plant; however there is a point where the treatment plant will need to be replaced.

The District's plan is to continuously operate the existing treatment plant during construction of the facility replacement. The benefits of this operation is to eliminate the need for multiple temporary facilities and treatment processes, reduce the risk of a treatment plant NPDES permit violations, and reduce the cost of the construction. Therefore, the treatment plant replacement infrastructure cannot interfere with the existing infrastructure and operation activities. The District has adequate space for the facility replacement and has planned for this scenario. The following exhibit shows the conceptual layout of the facility replacement as part of the overall site plan.

LEGEND

1. EQ TANK FOR RECYCLED WATER
2. RECYCLED WATER TREATMENT
3. DISINFECTION
4. RECYCLED WATER STORAGE
5. RECYCLED WATER PUMP STATION
6. EQUIPMENT & TRUCK PARKING
7. DRYING BED
8. STAFF RESIDENCE
9. STAFF ON-CALL RES.
10. AERATION BASINS
11. SECONDARY CLAIRFIERS
12. AEROBIC DIGESTER
13. DIGESTER BLOWER BUILDING
14. ELECTRICAL ROOM
15. INFLUENT EQ TANK

CHANNEL DRIVE
OHW
PP
MAINTENANCE BLDG
LABORATORY BUILDING
DRAINAGE BASIN
DIRT
UPRR
GATE/ MAINTENANCE ENTRANCE
ESSENTIAL SERVICES BUILDING
ESSENTIAL SERVICES BUILDING
CUSTOMER AND EMPLOYEE PARKING
6' CLF
BIOSOLIDS HOLDING AREA
BELT PRESS AREA
6 COVERED CARPORT AREA
COVERED AREA
CHEMICAL STORAGE
7
7
12
13
14
36,400 SQ. FT.
2
3
5
4
1
RECYCLED WATER AREA
DAFT
11
10
EMPLOYEE PARKING
SHOP
GENERATOR ROOM
AERATION BLOWER ROOM
PARTS ROOM
VAULT
OPERATIONS
STAFF/ LUNCH ROOM
FUEL TANK
15
9
WALL
8
GARAGE (20' x 20')
MONTE CRISTO

MONTECITO SANITARY DISTRICT

N

SCALE: 1"=50'

0 50 100

OVERALL SITE PLAN
2004 MASTER PLAN
REVISED 2017

MONTECITO SANITARY DISTRICT

Master Plan Site Layout.dwg