City of Riverside

WASTEWATER COLLECTION AND TREATMENT FACILITIES INTEGRATED MASTER PLAN

VOLUME 8: SOLIDS TREATMENT AND HANDLING
CHAPTER 6: SOLIDS DEWATERING

FINAL
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Chapter 6

SOLIDS DEWATERING

6.1 PURPOSE

The purpose of this chapter is to provide a summary of the dewatering options that were recommended to the City of Riverside (City) in the City's Regional Water Quality Control Plant (RWQCP) 2003 Bio-Solids Handling Improvement Report that was completed by Brown and Caldwell. The Capital Improvement Plan (CIP) relating to dewatering from the 2003 Report will be used as input into the Master Plan Manager™ (MPM™) and Financial Planning Tool™ (FPT™). A copy of the report is included as Appendix A to this Volume of the Integrated Master Plan.

6.2 BACKGROUND

In 2002, the City hired Brown and Caldwell to study its solids handling facilities operation and to develop options for a two-phase expansion from 40- and 50-mgd average dry weather influent flows basis. The recommended plan was intended to phase in new facilities over several years rather than completing them all at one time. Part of the study included an evaluation of the City's dewatering facilities. The City plans to continue with the dewatering implementation plan based on the recommendations from the 2003 Report. The focus of this chapter is, therefore, a review and a summary of the dewatering options presented in the 2003 Report. No additional evaluations on dewatering facilities were completed.

6.3 SUMMARY OF 2003 BIOSOLIDS HANDLING IMPROVEMENT REPORT

At the time of the study, the City's dewatering facilities consisted of two 2.2-meter Andritz SMX belt presses with an average capacity of 100 gpm each and a peak capacity of 200 gpm each. Both machines operated together without a redundant unit at an average feed rate of 150 gpm and produced a 12-percent cake solids. The study concluded that the two belt presses had reached their capacity limit and additional dewatering capacity was needed immediately.

The evaluated dewatering options included belt presses and centrifuges. The analysis concluded that the performance of the belt presses could be improved (achieving 15-percent cake solids) by lowering the feed flows. It further concluded that 18-percent cake solids could be obtained from new belt presses. The centrifuges that were evaluated for the master plan were high-speed units that could produce dewatered solids with percent solids in the range of 25 to 28 percent.

Table 6.1 lists the estimated dewatering performance of the belt presses and centrifuges. The information was taken from Table 2 of Chapter 7 of the 2003 Report.

A cost and non-cost assessment for the two dewatering options was conducted for the master plan.

Table 6.1 Performance Data of Dewatering Equipment[(1)]
Wastewater Collection and Treatment Facilities Integrated Master Plan
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Parameter	Belt Press	High-Speed Centrifuge
Feed Rate, gpm		
Average	100	200
Peak	160	300
Cake Solids Content, %	16	25
Solids Capture, %	95	96
Estimated Polymer Dose (lb active/dry ton)	12	20
Typical Power Load per Machine, kW	20	110

Notes:
(1) Information taken from 2003 Biosolids Handling Improvement Report.

6.3.1 Recommendations for the 40-mgd Flow Condition

Based on the digested sludge flow rates and characteristics for dewatering, the 2003 Report recommended that the City refurbish their two belt presses and add one 200-gpm centrifuge for the Phase 1 project. This was based on dewatering facilities operating at 16 hours per day, 5 days a week.

Since the completion of the study, the City has implemented this recommendation. However, the City installed a 120-gpm high-speed centrifuge instead of a 200-gpm centrifuge. The combined capacity of the smaller centrifuge and the two belt presses do, however, provide the current plant influent flow capacity of 40 mgd with one belt press out of service.

6.3.2 Recommendations for the 50-mgd Flow Condition

For the Phase 2 project, the 2003 Report recommended removal of all belt presses and installation of two additional 200-gpm high-solids centrifuges (a total of three centrifuges; two duty and one standby). The City has begun to implement this phase of the project by installing a second centrifuge, which has a hydraulic capacity of 275 gpm.

6.4 DEWATERING REQUIREMENT VERSUS CAPACITY FOR THE 52.2-MGD FLOW CONDITION

The Biotran model projected that the RWQCP will need to dewater approximately 0.40 mgd of solids for the 52.2-mgd (annual average flow) condition. This is based on the assumptions that Gravity Belt Thickeners (GBTs) will be used to thicken the primary sludge to 6-percent solids; the WAS is thickened by the Dissolved Air Flotation Thickeners (DAFTs) to 3.5 percent and the Acid-Phased Anaerobic Digestion (APAD) will be used to stabilize the solids.

Based on the above projection, with a combined dewatering capacity of 0.57 mgd, the two centrifuges (120 gpm and 275 gpm) will provide enough dewatering capacity for the RWQCP. Therefore, there is no requirement for installation of any additional centrifuges for the master planning period.

The two belt presses will be used for standby purposes when one of the centrifuges is out of service. Since the City has just refurbished these belt presses, it is assumed that these belt presses will have useful lives for the duration of the master planning period.