

Sacramento Regional County Sanitation District

Interceptor Sequencing Study

**Technical Memorandum 12**  
**Treatment Technologies Used for Centralized, Scalping,**  
**and Satellite Alternatives**

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**Sacramento Regional County Sanitation District**

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## TREATMENT TECHNOLOGIES USED FOR CENTRALIZED, SCALPING, AND SATELLITE ALTERNATIVES

### 1.0 BACKGROUND AND INTRODUCTION

In 2007, SRCSD completed a Water Recycling Opportunities Study (WROS) to evaluate the feasibility of implementing a large scale Water Recycling Program. Different treatment technologies were evaluated, which will form the basis of determining the potential costs of different treatment processes of satellite or scalping treatment facilities. The treatment alternatives evaluation methodology used in the WROS were used to evaluate both centralized and decentralized treatment plant alternatives. The WROS considered several solid separation technologies, and recommended to the use of Membrane BioReactor (MBR) technology for decentralized treatment plants. An MBR is a biological reactor with a membrane filtration system in the same unit or vessel. This TM assumes the use of MBR technology for liquid treatment at all decentralized facilities.

### 2.0 CENTRALIZED TREATMENT

The SRWTP is a secondary treatment facility with a permitted capacity of 181 mgd seasonal dry weather flow and includes on-site solids disposal facilities. The treatment train includes; aerated grit chambers followed by primary sedimentation; secondary treatment with high-purity oxygen activated sludge process and secondary clarifiers; and disinfecting process including chlorination/dechlorination basins. SRCSD also operates a Water Reclamation Facility (WRF) for tertiary treatment and the remaining flow is discharged to the Sacramento River.

Centralized treatment will be provided by a new or expanded Water Reclamation Facility at the SRWTP, which will provide Title 22 tertiary treatment of the secondary effluent produced by the SRWTP. The tertiary effluent (i.e. Recycled Water) is then transported from the SRWTP via distribution pipes to the point of discharge for the local system. Solid waste is treated on –site at the SRWTP.

The advantage of centralized treatment is that it eliminates the need for an off-site facility, and that the WRF can be operated seasonally, producing recycled water for irrigation only during summer or dry months. The plant would not operate during wet months when the demand is low or non-existent, when the minimal requirements could more cost-effectively be met by other sources.

#### 2.1 Liquid Treatment

The WROS considered several solid separation technologies, and recommended the use of MBR technology at the expanded treatment plants. MBR is a biological reactor with an

inclusive membrane filtration system that couples conventional activated sludge processes with low-pressure membranes in the same unit or vessel. The membrane portion of an MBR consists of a microfiltration (MF) or ultrafiltration (UF) membrane, eliminating the need for final clarifiers that are required in conventional activated sludge processes.

## **2.2 Solid Handling**

All wastewater is conveyed to SRWTP for treatment, so solids are handled through the normal SRWTP processes.

## **2.3 Discharge and Conveyance**

A pumping facility and conveyance piping will deliver recycled water from the expanded WRF to the local service areas.

## **3.0 SCALPING TREATMENT**

A scalping plant is an MBR treatment facility located along a major interceptor sewer to treat wastewater generated from certain areas. These plants are typically placed in close proximity to water recycling opportunities, which significantly reduces the transmission costs of pumping treated wastewater from the SRWTP to the recycled water place of use. As would be expected, the transmission savings associated with building a satellite facility increase with the distance from the SRWTP.

Depending on the interceptor flow rate, the scalping facility can be designed to provide recycled water based on the demand pattern or based on a steady flow making the design flexible with minimal need of redundant units. This facility treats the “scalped” sewer flows, discharges the tertiary treated effluent to a local distribution system, and returns the solid waste back into the sewer collections system for standard treatment at the SRWTP.

A scalping plant can be operated seasonally, producing recycled water for irrigation during summer or dry months. The plant would not operate during wet months when the demand is low or non-existent, when the minimal requirements could more cost-effectively be met by other sources.

The advantage of discharging the residuals back to the sewer interceptor to be treated downstream at the SRWTP facility is that it eliminates the need for on-site solid handling processes, which in turn reduces the footprint, costs, and odor emissions of the scalping facility.

## **3.1 Liquid Treatment**

The WROS considered several solid separation technologies, and recommended the use of MBR technology at the decentralized treatment plants. MBR is a biological reactor with an inclusive membrane filtration system that couples conventional activated sludge processes

with low-pressure membranes in the same unit or vessel. The membrane portion of an MBR consists of a microfiltration (MF) or ultrafiltration (UF) membrane, eliminating the need for final clarifiers that are required in conventional activated sludge processes.

### **3.2 Solids Handling**

Since the scalping facility would extract sewage flow from an existing sewer interceptor and discharge residuals back to the sewer interceptor to be treated at the downstream SRWTP, there will be no onsite solid handling facility.

### **3.3 Discharge and Conveyance**

Effluent from the scalping facility will be discharged to the recycled water distribution system or storage facilities; therefore, there will be no local water body discharge piping constructed under the scalping treatment alternatives.

## **4.0 SATELLITE TREATMENT**

A satellite plant is a MBR treatment facility that treats all influent flows and consistently produces acceptable water quality. As a result, sufficient reliability must be installed to allow for one or more membrane basins to be out of service and still maintain sufficient capacity to treat the influent flow under all conditions. This “end of pipe” treatment facility must accommodate the flow fluctuation from both diurnal flow and peak flows by either installing larger treatment units or by adding equalization tanks. Solid waste is treated on-site at the satellite facility or trucked back to the SRWTP for treatment. It also requires a discharge permit for excess flows and solid handling processes, which makes them less desirable in neighborhood locations due to its footprint.

The advantage of treating solids on-site is that it eliminates the need for an extensive network of interceptor pipes connecting to the SRWTP.

### **4.1 Liquid Treatment**

The WROS considered several solid separation technologies, and recommended the use of MBR technology at the decentralized treatment plants. MBR is a biological reactor with an inclusive membrane filtration system that couples conventional activated sludge processes with low-pressure membranes in the same unit or vessel. The membrane portion of an MBR consists of a microfiltration (MF) or ultrafiltration (UF) membrane, eliminating the need for final clarifiers that are required in conventional activated sludge processes.

### **4.2 Solid Handling**

Remaining solid from the filtration process could be handled by onsite solid handling facilities including digesters, Solids Storage Basin (SSBs) and Dedicated Land Disposal Parcels (DLDs). Offsite treatment at the SRWTP is also an option. Solids could be

conveyed to the SRWTP for processing by discharging back to the interceptor system or by trucking. The satellite treatment alternatives will assume onsite treatment. The option of conveying solids to the SRWTP will be evaluated under the scalping treatment alternatives. Preliminary estimates show the trucking of solids to the SRWTP might not be cost effective and is not recommended by SRWTP Operations.

### **4.3 Discharge and Conveyance**

Effluent from the satellite facilities will be discharged to a local surface water body such as the Cosumnes River. Discharge piping is considered to be part of the satellite treatment facility.