



Montecito Sanitary District & Montecito Water
District
Enhanced Recycled Water Feasibility Analysis

Technical Memorandum 2
CSD AND SANTA BARBARA WRP
CAPACITY

FINAL DRAFT | February 2022





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Abbreviations

ADWF	average dry weather flow
CSD	Carpinteria Sanitary District
Carollo	Carollo Engineers, Inc.
City	City of Santa Barbara
DPR	Direct Potable Reuse
El Estero	City of Santa Barbara El Estero Water Resource Center
IPR	Indirect Potable Reuse
mgd	million gallons per day
MSD	Montecito Sanitary District
MWD	Montecito Water District
NPDES	National Pollutant Discharge Elimination System
NPR	Non-Potable Reuse
PWWF	peak wet weather flow
TM	technical memorandum
WRP	water reclamation plants
WWTP	wastewater treatment plant

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Technical Memorandum 2

CSD AND SANTA BARBARA WRP CAPACITY

2.1 Introduction

This project will provide guidance to Montecito Water District (MWD) and Montecito Sanitary District (MSD) for implementation of recycled water and the beneficial use of treated wastewater from the community of Montecito. The project seeks to identify the best method of maximizing wastewater reuse capabilities, thus producing a new local drought proof water supply for the community and reducing the discharge of treated wastewater to the ocean. The analysis considers local and regional partnerships, non-potable and potable reuse alternatives, and various treatment methods and technologies. The options included in the study are as follows:

1. **Montecito Non-Potable Reuse (NPR)** – local project producing tertiary quality water for irrigation of large landscapes in Montecito.
2. **Carpinteria Indirect Potable Reuse (IPR)** – regional project producing purified water involving a partnership with neighboring special district(s) and the use of the Carpinteria Groundwater Basin.
3. **Montecito Direct Potable Reuse (DPR)** – local project in Montecito producing purified water and utilizing raw water augmentation at the MWD water treatment facility.
4. **Santa Barbara DPR** – regional project producing purified water and involving a partnership with the City of Santa Barbara (City) and raw water augmentation at the City's regional water treatment facility.

Figure 2.1 shows the potential regional partners.

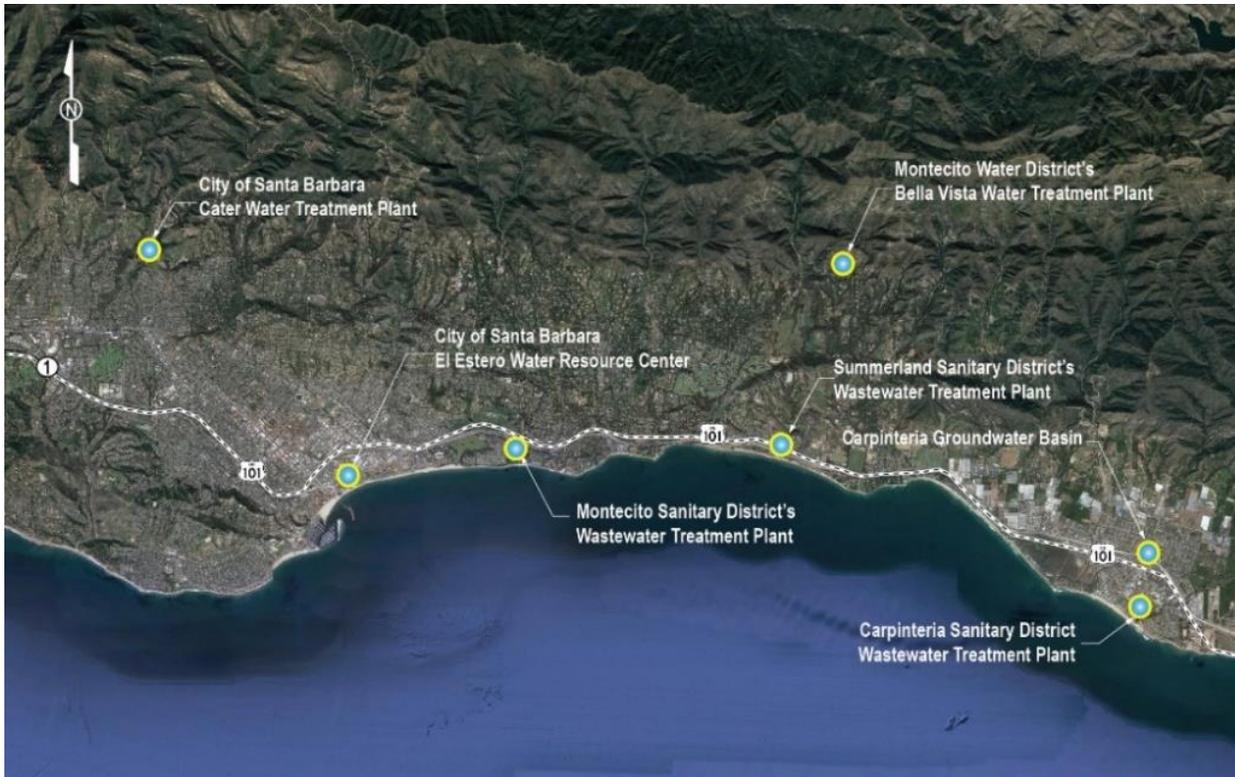


Figure 2.1 Potential Regional Partners

This technical memorandum (TM) provides important analysis of the wastewater treatment capacity of the Carpinteria Sanitary District (CSD) and City of Santa Barbara El Estero Water Resource Center (El Estero) to receive raw wastewater flow from the Montecito Sanitary District (MSD). With more flow from MSD, either of these potential regional partners could increase their water reuse production.

2.2 Objectives

The main objectives of this TM are:

- Review historical influent wastewater flows for the CSD to establish available capacity.
- Review historical influent wastewater and secondary effluent return flows for El Estero to establish available capacity.

2.3 Available Data

The following data was reviewed to perform the analysis that is summarized in this TM:

- CSD: hourly influent flows from December 2, 2020 to December 2, 2021.
- El Estero: monthly average day influent and monthly maximum day influent flows from January 2006 to June 2021.

- El Estero: average hourly influent, secondary effluent, and confluent flows for the month of October 2021¹.

2.4 Montecito Sanitary District Flow

A detailed flow analysis was completed for the MSD to establish average dry weather flow (ADWF), maximum day flow, peak wet weather flow (PWWF), and max instantaneous flow for both current and future conditions. The detailed flow analysis can be found in TM 1 MSD Flow and National Pollutant Discharge Elimination System (NPDES) Permit Analysis. For the analysis of the CSD and El Estero, it is assumed MSD would equalize all (or most) flow, noting that a future equalized ADWF for MSD is estimated at 0.70 million gallons per day (mgd). A few details on the equalization:

- 1) The equalization, which is presumed to be located at MSD, could be reduced in capacity if greater flows could be accepted at either CSD or El Estero².
- 2) Santa Barbara has expressed interest in providing equalization at or near El Estero, eliminating or minimizing the need for equalization at MSD.

The analysis below is intended to determine if capacity exists for the fully equalized flow (first) and for flows that are not fully equalized (second).

2.5 Carpinteria Sanitary District

CSD has a permitted capacity of 2.5 mgd. Flow through CSD is not significantly affected by any recycling within the facility or other outside flows. There is a small recycled flow that can be sent to the headworks of the facility when sludge is being pressed, but the recycled flow does not add substantially to the influent flow. Therefore, the measured influent flow can be used to analyze flow through CSD. With a permitted capacity of 2.5 mgd, and as shown further below, the CSD does have additional capacity. Figure 2.2 below shows the **hourly** influent flow to the CSD between December 2020 and December 2021. Figure 2.3 shows the **average daily** influent flow over the same period.

¹ The diurnal from October 2021 was used as an example. Note that the average of the diurnal in October 2021 was 6.54 mgd and average of monthly average day flows from Jan 2006 – Jun 2021 were 6.96 mgd, which are comparable.

² Equalization at MSD provides the benefit of reduced infrastructure sizes to transport flow from MWD to CSD or El Estero. There is limited space at CSD for equalization. There is potential for flow equalization at or near El Estero, which requires larger pipe sizes for flow transportation. Further discussion between project partners is required to identify the most suitable location for flow equalization.

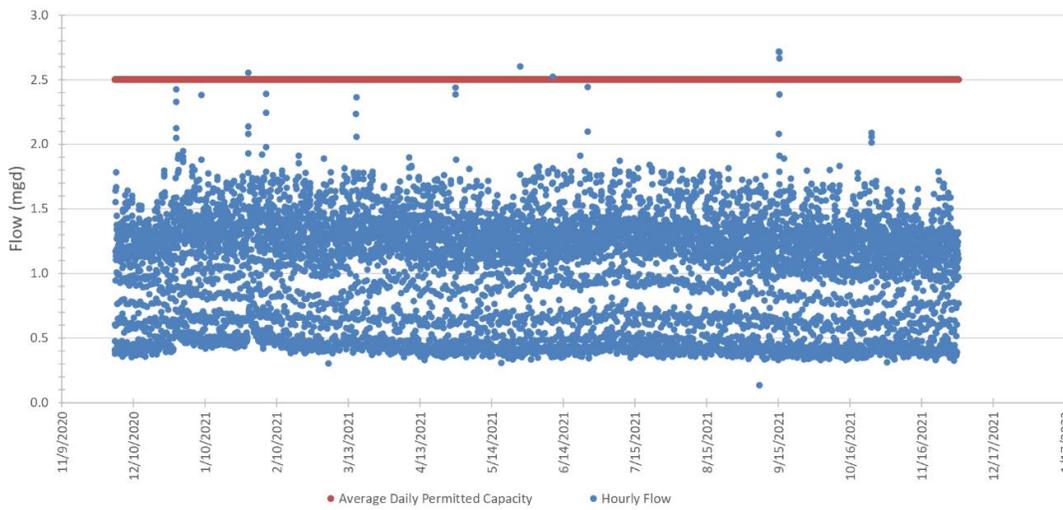


Figure 2.2 Hourly Influent Flow to CSD – December 2020 to December 2021

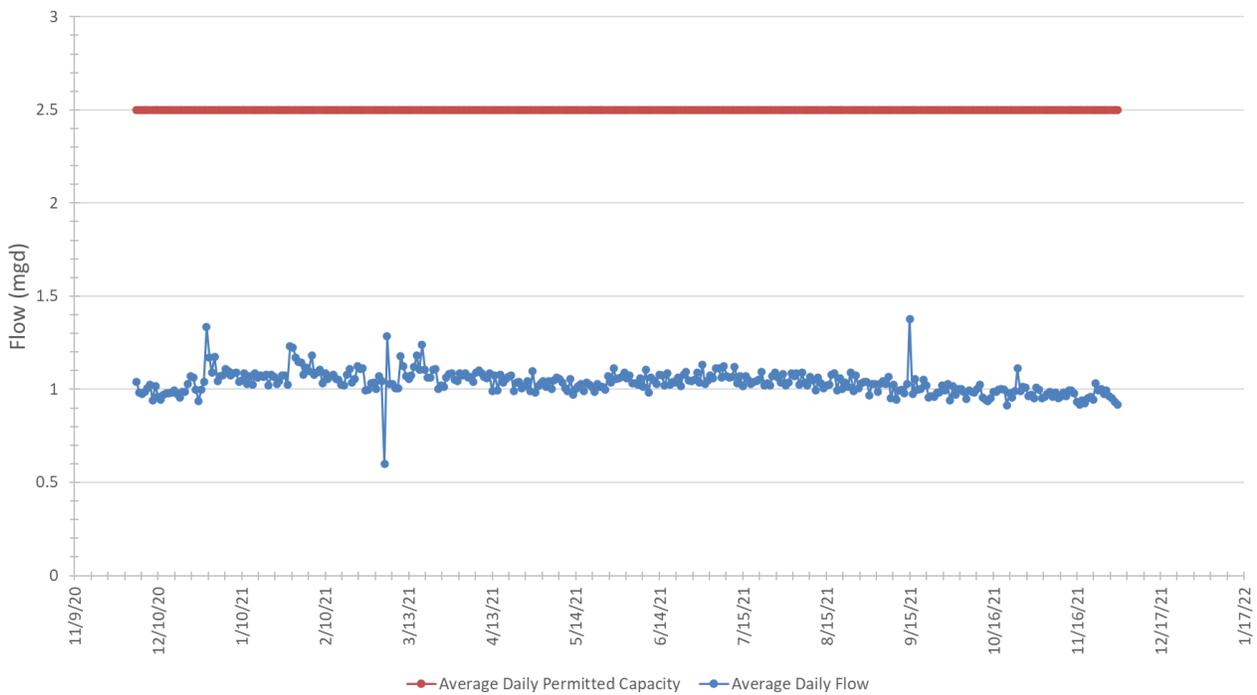


Figure 2.3 Average Daily Influent Flow to CSD – December 2020 to December 2021

The hourly influent flow data show that flows to CSD vary between 0.14 and 2.72 mgd. **The available capacity based upon these charts requires feedback from CSD.** Analysis, for example, shows that between December 2020 and December 2021:

- The average influent flow to CSD is 1.04 mgd.
- The 99th percentile influent flow is 1.78 mgd.

Table 2.1 shows the available capacity at the CSD at the average, maximum, minimum, and 99th percentile hourly flows. On average, the CSD could accommodate an additional 1.46 mgd per hour. The CSD could accommodate 0.72 mgd of additional flow for 99 percent of the hours over the last year. Should that capacity be deemed “available” by CSD, essentially complete equalization of MSD flows would be required prior to sending flow to CSD.

Table 2.1 Carpinteria WWTP Hourly Flow

	Hourly Flow (mgd)	Corresponding Available Capacity (mgd)
Average	1.04	1.46
Max	2.72	-0.22
Min	0.14	2.36
99th Percentile	1.78	0.72

2.6 City of Santa Barbara El Estero Water Resource Center

El Estero has a design flow rate of 11 mgd and a PWWF design flow rate of 19 mgd. El Estero has a wide range of hourly influent flow rates and does not have an equalization basin to equalize flow throughout the day. To better support process operation, El Estero recirculates secondary effluent through primary treatment throughout the day to maintain an equalized flow. Figure 2.4 below shows the average diurnal curve for El Estero in October 2021, which is a reasonable representation of diurnal flows at El Estero.

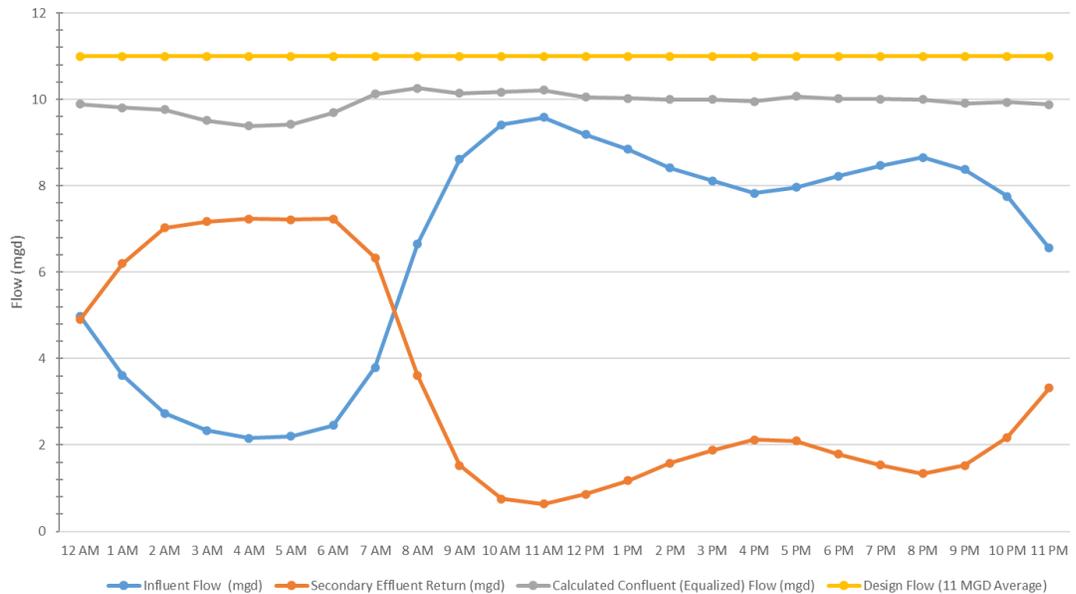


Figure 2.4 Average Influent Flow to El Estero – October 2021

As shown in Figure 2.4, the secondary effluent is recirculated throughout all hours of the day with flow rates varying between 0.63 and 7.24 mgd. The diurnal curve also shows the average confluent flow is 9.93 mgd, which is 1.07 mgd below the design flow of the facility. Figure 2.5

shows the average monthly and maximum daily influent flow to El Estero for every month between January 2006 and June 2021.

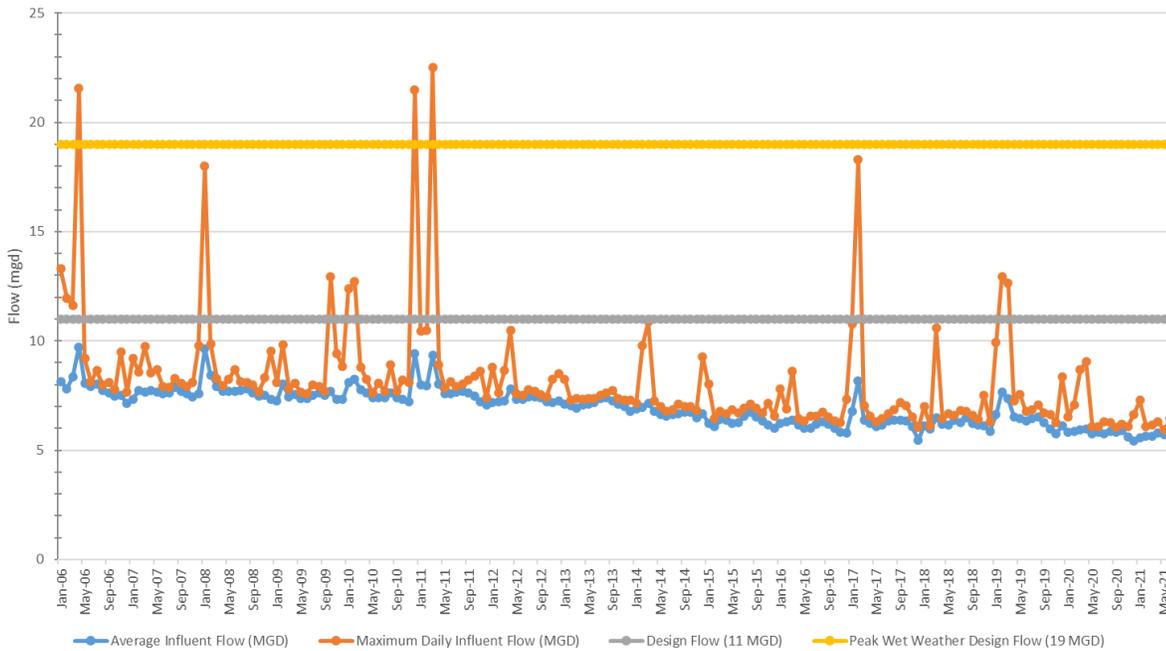


Figure 2.5 Average Monthly and Maximum Daily Influent Flow to El Estero - January 2006 to June 2021

In Figure 2.5, the blue line shows the average monthly influent flow to El Estero, which never exceeds the design flow of 11 mgd. The orange line represents the monthly maximum daily influent flow to El Estero, which exceeds the PWWF design flow of 19 mgd in 3 months over the last 15 years. Table 2.2 shows the average daily flow and available capacity compared to the design flow, and Table 2.3 below shows the monthly maximum daily flow and available capacity compared to the PWWF design flow.

Table 2.2 El Estero Average Monthly Flow – January 2006 to June 2021

	Average Monthly Flow (mgd)	Corresponding Available Capacity (mgd)
Average	6.96	4.04
Max	9.72	1.28
Min	5.42	5.58
99th Percentile	9.46	1.54

Table 2.3 El Estero Maximum Daily Flow – January 2006 to June 2021

	Maximum Daily Flow (mgd)	Available Capacity (mgd) ¹
Average	8.19	10.81
Max	22.49	-3.49
Min	5.92	13.08
99th Percentile	21.51	-2.51
98th Percentile	18.07	0.93

Notes:

1. Available capacity is calculated as follows: Peak Wet Weather Design Capacity (19 mgd) minus Maximum Daily Flow. For example, 19 - 8.19= 10.81

For El Estero, the addition of flow from MSD would allow for reduced recirculation of flow, the amount of which would be determined by El Estero staff. However, the reduction in recirculation could be significant, depending upon the time of day and rate of flow being sent from MSD to El Estero. For example, the diurnal curve of influent to El Estero shows flows less than 6 mgd between midnight and 8 a.m., with the lowest flows reaching 2 mgd. The captured and equalized MSD flow of 0.66 mgd could be pumped to El Estero over that 8-hour window, at a rate of 2 mgd. Such boosting of flow during the low flow periods would allow for the City of Santa Barbara to substantially increase the available water for reuse applications.

From the data above, the following conclusions can be made regarding available capacity at El Estero for MSD flows:

- The average monthly influent flow to El Estero is 6.96 mgd and the max average day flow is 9.72 mgd. During the maximum average day flow, El Estero would still have the capacity to accommodate an additional 1.28 mgd of influent flow. This capacity would be further increased if an equalization basin were located in or near El Estero, bringing additional capacity to ~3MGD of influent flow.
- The average of monthly peak day flow to El Estero is 8.19 mgd and the maximum monthly peak day flow is 22.49 mgd. Although there have been certain periods where wet weather flows exceed the design capacity, the data for the past 15 years show that El Estero is able to accommodate an additional 0.93 mgd of flow 98 percent of the time.
- The addition of flow from MSD would allow for a reduction of recirculation of flow at El Estero and increase water for water reuse applications.

With nothing else changed, El Estero could accommodate 0.93 mgd of additional flow for 98 percent of the time. Should that capacity be deemed “available” by the City of Santa Barbara, equalization and control of MSD wet weather flows would be applied either at MSD or at/near El Estero. Installation of additional equalization in the City would provide a greater safety factor to account for 100 percent of PWWF.

2.7 Summary

1. CSD could accommodate 0.72 mgd of additional flow for 99 percent of the hours over the last year. If MSD flows are to be sent to CSD, essentially 100 percent of MSD flows would need to be equalized.

2. El Estero could accommodate a range of flow from MSD, though the ability to equalize flows is needed so as to not impact El Estero capacity during extreme wet weather events. For 98 percent of the time, El Estero has 0.93 mgd of additional capacity. Equalization of MSD flows to this level at MSD would significantly reduce transport pipeline capacity challenges while not impacting El Estero capacity.