

## Attachment 2 – Water and Energy Savings and Green House Gas Calculations

### References for Project Assumptions

#### J.B. Latham Treatment Plant Water and Energy Efficiency Project

References for the input values for Steps 1 through 10 are listed below:

Step	Reference
1	<i>“Evaluation of Xeriscape Water Impacts from New Landscaping”</i> (Memorandum dated December 5, 2014) and <i>“Optimized Irrigation Plan”</i> (December 3, 2014). See Note 1 below.
2	<i>“Evaluation of Xeriscape Water Impacts from New Landscaping”</i> (Memorandum dated December 5, 2014) and <i>“Optimized Irrigation Plan”</i> (December 3, 2014). See Note 1 below.
3	None/not applicable
4	None/not applicable
5	<i>“Technical Memorandum, Evaluation of Alternatives for Use of Digester Gas” Life Cycle Cost Analysis</i> (Draft, 2012) used a 20-year useful life
6	100% of the water supply for the south Orange County and SOCWA service area is imported.
7	Data provided by Metropolitan Water District of Southern California (MWD) via correspondence with Municipal Water District of Orange County (MWDOC) for Diemer Water Treatment Plant and South Orange County Pump Station. See Note 2 below.
8	Emission factors from <i>“The Climate Registry General Reporting Protocol” V2.0 April 2013 for the WECC California Subregion, Table 14.1: U.S. Emission Factors by eGRID Subregion</i> . See Note 3 below and <i>“Coastal Treatment Plant Aeration Upgrades Water/Energy Grant Application</i> (Draft, December 2014)
9	<i>DWR, 2014 Water-Energy Grant Program Guidelines and Project Solicitation Package, Table 6</i> (October 2014) (for Metropolitan Water District of Southern California supply blend of 50% Colorado River Aqueduct and 50% State Water Project). See Note 4 below for calculations.
10	<i>“Technical Memorandum, Evaluation of Alternatives for Use of Digester Gas”</i> (Draft, 2012)
<b>Total Project Cost</b>	See <i>Attachment 4 “Budget”</i> for breakdown of project costs.

#### Notes:

1. Steps 1 and 2: Existing baseline (pre-project) water demand for landscaping is 559.4 HCF/yr (418,400 gal/yr). The post-project water demand for xeriscaping is 60 HCF/yr (44,900 gal/yr). The net water savings attributable to the project is 499.4 HCF/yr (373,500 gal/yr). The reference

used in the memorandum dated 12/5/14 to estimate water savings with xeriscaping is: *“Yield and Reliability Demonstrated in Xeriscape”* Final Report Metro Water conservation, Incorporated (MWCI), December 2004.

2. Step 7: Energy intensity for:

Diemer Water Treatment Plant = 30 kWh/AF = 92 kWh/MG

South Orange County Pump Station = 175 kWh/AF = 537 kWh/MG

South Coast Water District local pumping = no data are available, so assume zero

Total = 629 kWh/MG

3. Step 8: Emission factors from Table 14.1: U.S. Emission Factors by eGRID Subregion. The Climate Registry General Reporting Protocol. V2.0. April 2013. Original U.S. Energy Information Administration (EIA) source information for Table 14.1: U.S. EPA eGRID2012 Version 1.0 (2009 data: eGRID subregion annual CO<sub>2</sub> total output emission rate). For the SOCWA project, the specific emissions factors were:

CO<sub>2</sub>: 656.68 lbs/MWh

CH<sub>4</sub>: 28.94 lbs CH<sub>4</sub>/MWh x 25 (lbs CO<sub>2</sub>/lb CH<sub>4</sub>)

N<sub>2</sub>O: 6.17 lbs N<sub>2</sub>O/MWh x 298 (lbs CO<sub>2</sub>/lb N<sub>2</sub>O)

Total is equivalent to: 0.5555 kg CO<sub>2</sub>e/kWh (using the Global Warming Potentials from the IPCC 4<sup>th</sup> Assessment Report)

4. Step 9: 100% of the water supply to the SOCWA service area is imported. SOCWA receives water from South Coast Water District, which is a member agency of Municipal Water District of Orange County (MWDOC). MWDOC is a member agency of Metropolitan Water District of Southern California (MWD), which is the wholesale agency importing water to much of Southern California. MWD owns and operates the Diemer Water Treatment Plant, which receives raw water from the East Branch of the California Aqueduct and supplies treated water to south Orange County and the SOCWA service area. The MWD Salinity Water Management Goal is to provide roughly a 50-50 blend of State Water Project and Colorado River Aqueduct water through the Diemer Water Treatment Plant. The actual blend of raw water treated at the Diemer Water Treatment Plant varies depending on available supplies. For this analysis, the energy intensity is calculated using a 50-50 blend of State Water Project and Colorado River Aqueduct water. The energy intensity factor used in Step 9 is based on the values in Table 6 of the DWR Guidelines and prorated by this 50-50 blend as follows:

State Water Project		Colorado River Aqueduct	
Pumping Plant	Energy Intensity (kWh/MG)	Pumping Plant	Energy Intensity (kWh/MG)
Harvey O. Banks (Delta)	909	Colorado River Aqueduct	6,066
Dos Amigos	1,332		
Buena Vista	2,075		
Teerink	2,981		
Chrisman	4,943		
Edmonston	11,807		
Pearblossom	13,606		
Total SWP	37,653	Total CRA	6,066
<b>AVERAGE for 50:50 SWP:CRA imported water supply</b>			<b>21,860</b>

## Coastal Treatment Plant Water and Energy Efficiency Project

References for the input values for Steps 1 through 10 are listed below:

Step	Reference
1	<i>“Coastal Treatment Plant Aeration Upgrades DWR Grant Application Study”</i> (December 2014)
2	<i>“Coastal Treatment Plant Aeration Upgrades DWR Grant Application Study”</i> (December 2014)
3	None/not applicable
4	None/not applicable
5	Assumed a 20-year useful life
6	100% of the water supply for the south Orange County and SOCWA service area is imported.
7	Data provided by Metropolitan Water District of Southern California (MWD) via correspondence with Municipal Water District of Orange County (MWDOC) for Diemer Water Treatment Plant and South Orange County Pump Station. See Note 1 below.
8	Emission factors from <i>“The Climate Registry General Reporting Protocol” V2.0 April 2013 for the WECC California Subregion, Table 14.1: U.S. Emission Factors by eGRID Subregion</i> . See Note 2 below and <i>“Coastal Treatment Plant Aeration Upgrades Water/Energy Grant Application</i> (Draft, December 2014)
9	<i>DWR, 2014 Water-Energy Grant Program Guidelines and Project Solicitation Package, Table 6</i> (October 2014) (for Metropolitan Water District of Southern California supply blend of 50% Colorado River Aqueduct and 50% State Water Project). See Note 3 below for calculations.

<b>10</b>	<i>“Technical Memorandum, Evaluation of Alternatives for Use of Digester Gas” (Draft, 2012)</i>
<b>Total Project Cost</b>	See <i>Attachment 4 “Budget”</i> for breakdown of project costs.

Notes:

1. Step 7: Energy intensity for:
  - Diemer Water Treatment Plant = 30 kWh/AF = 92 kWh/MG
  - South Orange County Pump Station = 175 kWh/AF = 537 kWh/MG
  - South Coast Water District local pumping = no data are available, so assume zero
  - Total = 629 kWh/MG
  
2. Step 8: Emission factors from Table 14.1: U.S. Emission Factors by eGRID Subregion. The Climate Registry General Reporting Protocol. V2.0. April 2013. Original U.S. Energy Information Administration (EIA) source information for Table 14.1: U.S. EPA eGRID2012 Version 1.0 (2009 data: eGRID subregion annual CO<sub>2</sub> total output emission rate). For the SOCWA project, the specific emissions factors were:
  - CO<sub>2</sub>: 656.68 lbs/MWh
  - CH<sub>4</sub>: 28.94 lbs CH<sub>4</sub>/MWh x 25 (lbs CO<sub>2</sub>/lb CH<sub>4</sub>)
  - N<sub>2</sub>O: 6.17 lbs N<sub>2</sub>O/MWh x 298 (lbs CO<sub>2</sub>/lb N<sub>2</sub>O)
  - Total is equivalent to: 0.5555 kg CO<sub>2</sub>e/kWh (using the Global Warming Potentials from the IPCC 4<sup>th</sup> Assessment Report)
  
3. Step 9: 100% of the water supply to the SOCWA service area is imported. SOCWA receives water from South Coast Water District, which is a member agency of Municipal Water District of Orange County (MWDOC). MWDOC is a member agency of Metropolitan Water District of Southern California (MWD), which is the wholesale agency importing water to much of Southern California. MWD owns and operates the Diemer Water Treatment Plant, which receives raw water from the East Branch of the California Aqueduct and supplies treated water to south Orange County and the SOCWA service area. The MWD Salinity Water Management Goal is to provide roughly a 50-50 blend of State Water Project and Colorado River Aqueduct water through the Diemer Water Treatment Plant. The actual blend of raw water treated at the Diemer Water Treatment Plant varies depending on available supplies. For this analysis, the energy intensity is calculated using a 50-50 blend of State Water Project and Colorado River Aqueduct water. The energy intensity factor used in Step 9 is based on the values in Table 6 of the DWR Guidelines and prorated by this 50-50 blend as follows:

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Total SWP	37,653	Total CRA	6,066
<b>AVERAGE for 50:50 SWP:CRA imported water supply</b>			<b>21,860</b>