Attachment 3

Santa Barbara County Region

IRWM Implementation Grant Proposal

Project Justification

Attachment 3 consists of the following items:

Project Justification. Attachment 3 provides a project description, estimated physical benefits, technical justification, a description of how claimed benefits can be achieved, and least cost alternative information for each project. Attachment 3 also provides a summary of how the proposed projects meet the needs created by the drought.

The *Santa Barbara County Region Implementation Grant Proposal* involves implementation of three projects to meet the region's water management needs:

1. Lake Cachuma Drought Pumping Facility Project
2. Recycled Water Enhancement Project
3. Grant Administration Project

For each of these projects, Attachment 3 contains a detailed project description, estimated physical benefits, technical justification, a description of how claimed benefits can be achieved, and least cost alternative information organized into the table format provided in the Drought Solicitation PSP. This attachment is organized to first provide the project summary table and the regional project map, followed by the project information listed above. Also included as part of this attachment are appendices containing the supporting documents listed for each project.

Project Summary Table

The following table (Table 4 in the PSP) provides information on how each project meets Drought Project Elements and IRWM Project Elements. Each project meets at least one item in each of these categories. Please note that the Grant Administration Project does not apply. Further justification for how each project will meet the Drought Project Elements is included in the individual project descriptions that can be found later in this attachment.

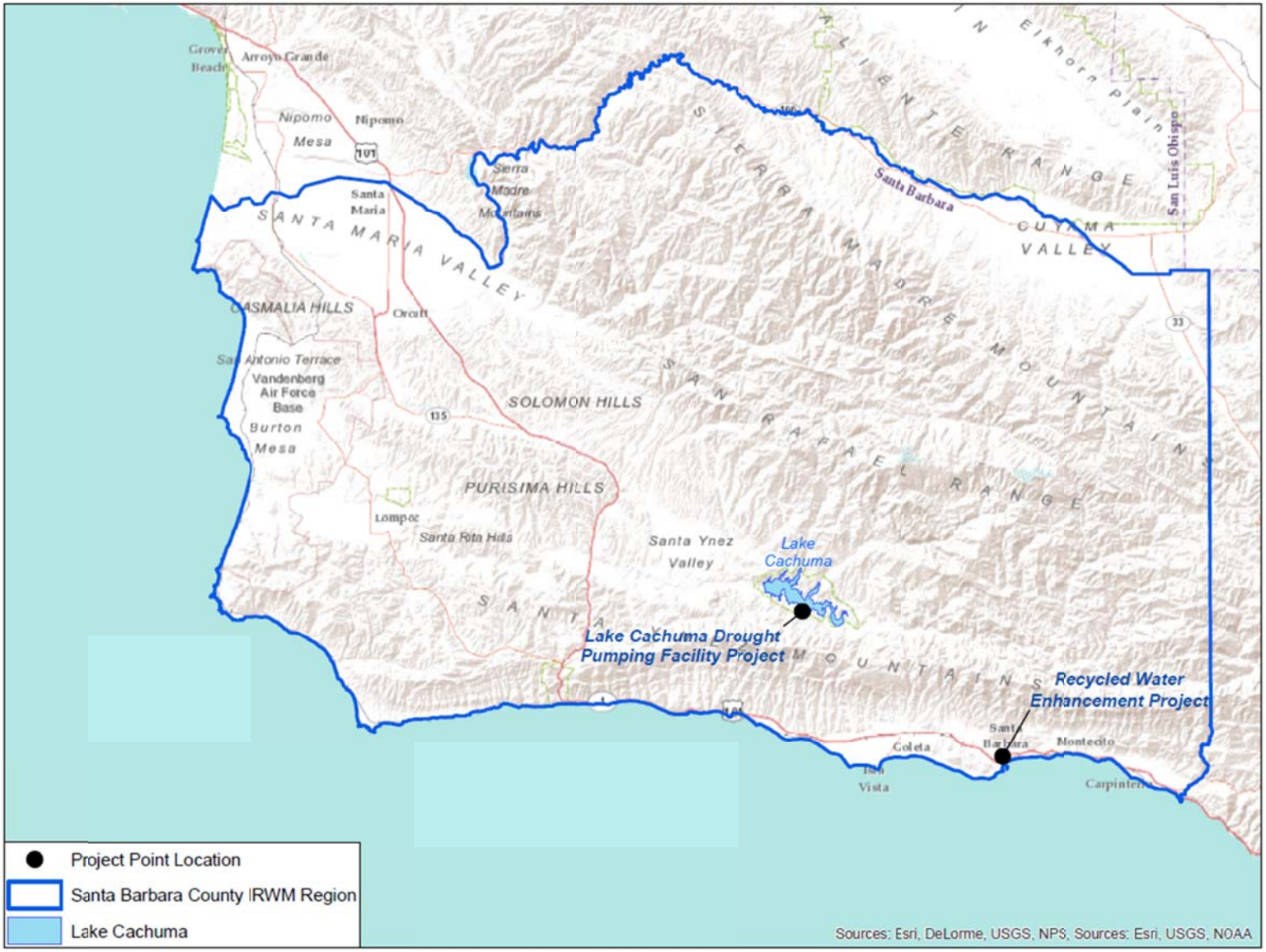
	Drought Project Element	1. Lake Cachuma Drought Pumping Facility Project	2. Recycled Water Enhancement Project	3. Grant Admin Project
D.1	Provide immediate regional drought preparedness	✓	✓	n/a
D.2	Increase local water supply reliability and the delivery of safe drinking water	✓	✓	n/a
D.3	Assist water supplier and regions to implement conservation programs and measures that are not locally cost-effective			n/a
D.4	Reduce water quality conflicts or ecosystem conflicts created by the drought			n/a

	Drought Project Element	1. Lake Cachuma Drought Pumping Facility Project	2. Recycled Water Enhancement Project	3. Grant Admin Project
	IRWM Project Element			
IR.1	Water Supply reliability, water conservation, and water use efficiency	✓	✓	n/a
IR.2	Stormwater capture, storage, clean-up, treatment, and management			n/a
IR.3	Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands			n/a
IR.4	Non-point source pollution reduction, management, monitoring			n/a
IR.5	Groundwater recharge and management			n/a
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users			n/a
IR.7	Water banking, exchange, reclamation, and improvement of water quality		✓	n/a
IR.8	Planning and implementation of multipurpose flood management programs			n/a
IR.9	Watershed protection and management			n/a
IR.10	Drinking water treatment and distribution			n/a
IR.11	Ecosystem and fisheries restoration and protection			n/a

Regional Map

Figure 3-1 provides a regional map that shows the Santa Barbara County IRWM Region boundaries and the project locations. Note that the Grant Administration Project provides grant administration support only, and therefore is not shown on this map.

Figure 3-1: Santa Barbara County IRWM Regional Boundaries and Project Locations



Lake Cachuma Drought Pumping Facility Project

Project Description

(25 Words) This Project will provide access to previously inaccessible water in Lake Cachuma during drought conditions by installing a floating pump platform and pipelines.

(Expanded) Lake Cachuma, located on the Santa Ynez River in Santa Barbara County, serves as the primary water supply reservoir for over 200,000 residents served by the City of Santa Barbara, Goleta Water District, Montecito Water District and Carpinteria Valley Water District, which are located along the south coast of Santa Barbara County (see Figure 3-2 below). Santa Ynez River Water Conservation District ID #1 also receives water from Lake Cachuma through an exchange agreement with the previously mentioned water districts. Those five water districts (or Member Units) comprise the Joint Powers Authority of the Cachuma Operation and Maintenance Board (COMB). COMB is responsible for conveying the Member Units' water entitlements as requested, which include both water from Lake Cachuma and water from the State Water Project (SWP) through the South Coast Conduit (see Figure 3.3 below). The South Coast Conduit conveys Lake Cachuma water through a 26-mile gravity fed system designed and constructed by the U.S. Bureau of Reclamation (USBR) and operated under contract by COMB. Due to current severe and potential future drought conditions, the existing gravity fed system is projected to become inoperable as the lake level falls to the lowest intake portal at 679 feet (ft) by September 2014. The Project will allow access to the remaining Lake Cachuma supplies by installing a floating pumping system to convey water from lower lake levels to existing intake structures that connect to the South Coast Conduit. The Project will install a floating barge that can house seven pumps and a new 3,600-foot permanent pipeline to the existing intake. Note that the pumps will be leased during drought periods, and therefore are not included in the overall budget for this grant proposal under Attachment 5. Since the current lowest intake is blocked by accumulated sediment, the Project will also use a crane to dredge the sediment to allow for improved intake of water elevation the new system.

This Project provides immediate regional drought preparedness by providing access to approximately 45,000 acre-feet (AF) of water supply that will be inaccessible when the water level drops below an elevation of 679 ft. Three years of severe drought have reduced lake levels and the ability to access these remaining supplies. This Project will assist southern Santa Barbara County in meeting potable water demands despite reductions in SWP imported water allocations and local surface water supplies. Should the drought continue and this Project not be implemented, the Member Units would not be able to access the remaining Lake Cachuma water and instead need to locate and purchase water from other external sources (which may not even be available) to import into the area. This Project provides an immediate means of accessing existing local supply as opposed to increasing the need to access critically diminished imported supplies to meet demands. The pumping system installed will be permanent and can therefore be used to help prepare for and mitigate against subsequent droughts in the Region.

The Project increases local water supply reliability and the delivery of safe drinking water by providing permanent fixtures to continually provide access to the 45,000 AF of inaccessible local water supply for current and future droughts. The design consists of fixtures that will reliably provide and deliver water under future drought conditions and would not need to be operated under normal conditions. During the 2007 Zaca Fire, approximately 56 percent of the Lake Cachuma watershed was burned, causing sediment to accumulate from runoff. Preventative actions were taken in an effort to reduce the anticipated amount of runoff from entering the lake; however, a large amount of sediment was still deposited. The sediment has blocked the lowest intake portal, and reduced the ability to intake water from Lake Cachuma at this level. The Project will increase water supply reliability and the delivery of safe drinking water by allowing water to be reliably pumped to the Intake Tower and into the South Coast Conduit to provide a continuous delivery to the Member Units.

Expedited funding is needed for this Project in order to immediately enable water to be pumped to the intake portal and allow for continued use of the currently inaccessible reservoir water. Various rainfall/inflow scenarios have been evaluated to determine the potential 2014 dates when the lake water level may fall below the elevation of the intake portal and render the existing gravity fed system inoperable. Based on rainfall during the wet season (October – May) and no predicted rain in the summer, it is estimated the gravity fed system could become inoperable by September 2014.

Project Maps

COMB delivers water to the south coast communities through the Intake Tower (see Figure 3.3), Tecolote Tunnel starting at the North Portal, and various conduits that deliver water to the cities of Goleta, Santa Barbara, Montecito and Carpinteria as shown in Figure 3.2.

Figure 3-2: South Coast Santa Barbara County Area Water System Map

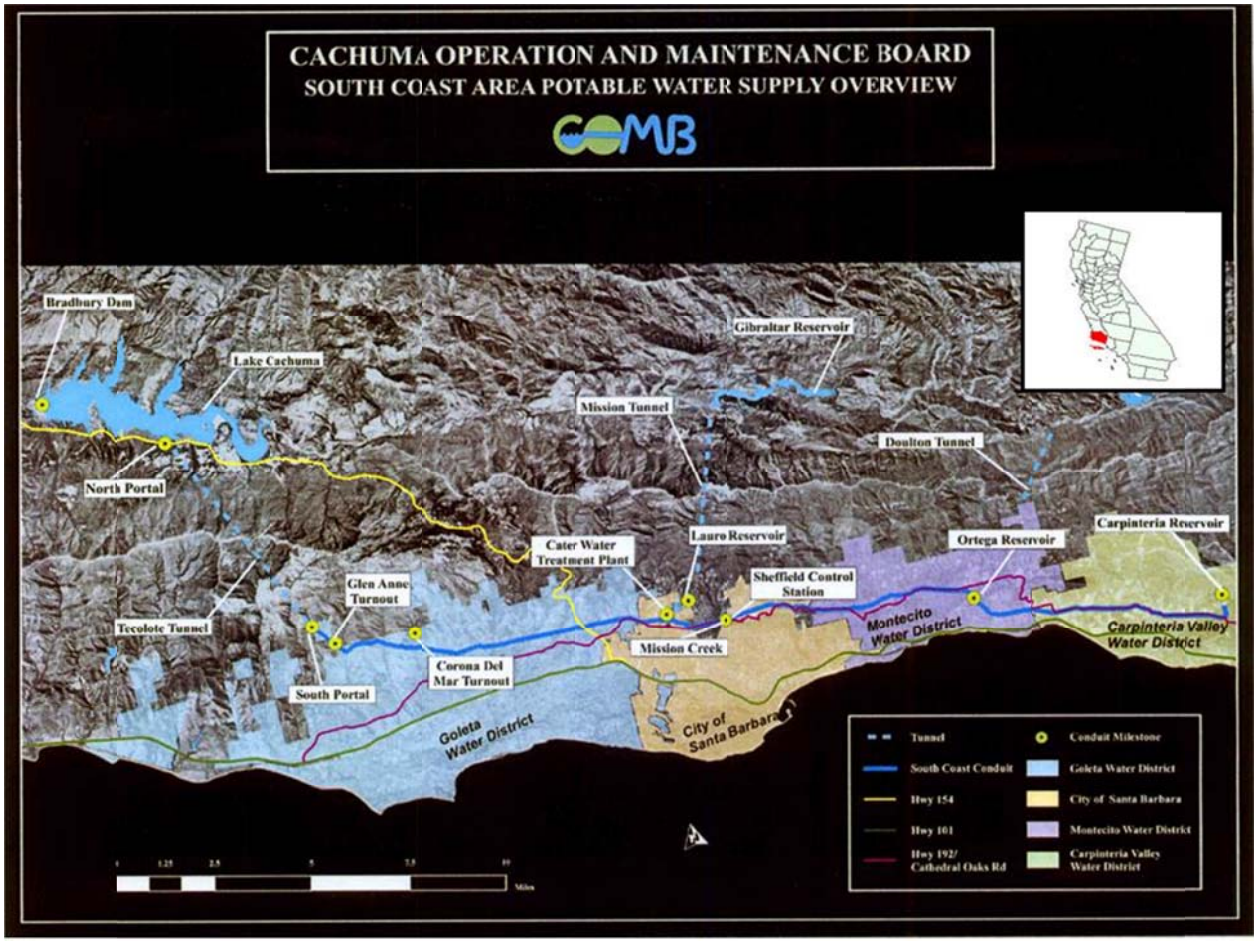
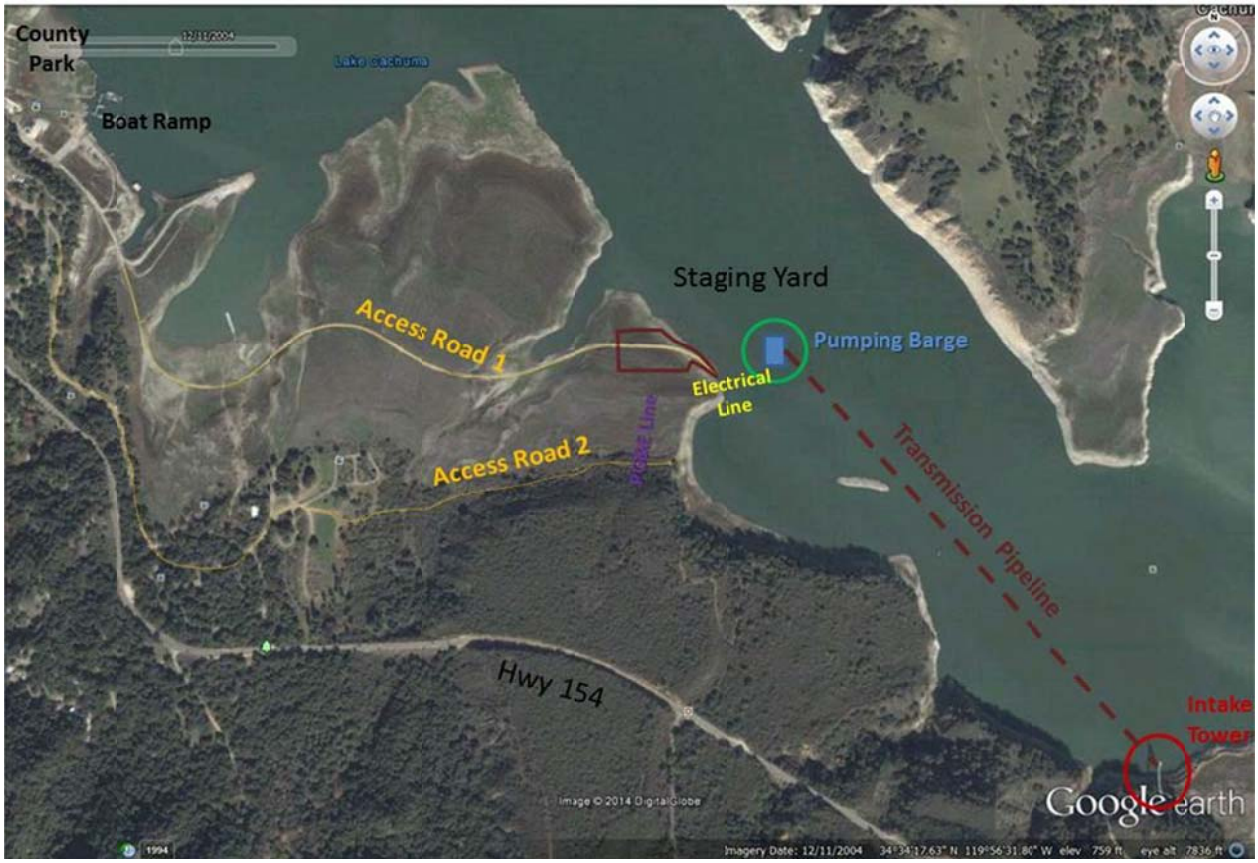


Figure 3-3: Project Facility Map



Project Physical Benefit

The following physical benefits are claimed for the Project and are listed in the tables below.

- Increased Local Water Supplies/Reliability and Decreased Dependence on Imported Water
- Reduced Demands on the Bay-Delta
- Reduced Energy Usage
- Reduced Greenhouse Gas Emissions

Benefit #1 – Increased Local Water Supplies/Reliability and Decrease Dependence on Imported Water

The table below provides information on the benefit of increasing the local water supply and reliability from Lake Cachuma for the 25-year lifespan of the Project. This Project is expected to be needed during current and future droughts. Drought conditions are conservatively assumed to apply to both the imported water from the SWP as well as surface waters that enter the lake from the Santa Ynez River. In other words, it is assumed that the lake will receive no inputs from SWP or surface water during severe drought periods. Historically, Lake Cachuma water levels have dropped near to or below the elevation of the lowest intake portal (679 ft above sea level) approximately once every 10 years over the last 30 years.

The table below assumes that drought conditions occur every 10 years. During severe drought conditions, as defined above, the lake could supply typical demands to COMB for a duration of approximately 18 months based on the new available supply of approximately 45,000 AF provided by the Project (the estimated volume below the 679 ft elevation). It is assumed that approximately 30,000 AFY could be drawn from the lake during the first 12 months of drought to supply COMB demands (based on average demands of 28,771 AFY for 2009-2013). Then, it is assumed that approximately 15,000 AFY could be drawn during the remaining six months (i.e., a total supply benefit of 45,000 AF over 18 months). If the Project is not implemented, South Coast Member Units would likely need to purchase equivalent volumes of imported water and deliver through other

systems, which may not even be available due to the severe drought conditions described above. There would be no additional supply benefits from this Project in non-drought years.

Table 5 – Annual Project Physical Benefits

Project Name: Lake Cachuma Drought Pumping Facility Project

Type of Benefit Claimed: Supply additional Lake Cachuma water (local surface and imported) during drought years

Units of the Benefit Claimed: AF

Additional Information About this Benefit: The volumes below show the increase in local water supply during an assumed drought that occurs every 10 years, for a duration of 18 months, for the 25-year lifespan of the Project.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2013	0	0 – Construction	0
2014	0	30,000	30,000
2015	0	15,000	15,000
2016	0	0	0
2017	0	0	0
2018	0	0	0
2019	0	0	0
2020	0	0	0
2021	0	0	0
2022	0	0	0
2023	0	0	0
2024	0	30,000	30,000
2025	0	15,000	15,000
2026	0	0	0
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	0	0	0
2031	0	0	0
2032	0	0	0
2033	0	0	0
2034	0	30,000	30,000
2035	0	15,000	15,000
2036-2038	0	0	0

Comments:

- *County of Santa Barbara Public Works Department Water Agency, Lake Cachuma Formed by Bradbury Dam Results of 2013 Survey & Sedimentation Update (February 2014), Page 49*. This report discusses the storage capacity for Lake Cachuma and provides the amount of water available at elevation 679 ft above sea level.
- *Cachuma Operation and Maintenance Board Memorandum (July 2014), Page 3.* This table provides the total amount of water available per year and provides the demands for COMB Member Units from 2009 to 2013..
- *Santa Barbara County Water Resources, Cachuma Reservoir – Historical Water Storage Levels, Page 1.*

Benefit #2 – Reduced Demands on Bay-Delta

The table below provides information regarding the benefit of reducing demands on the Bay-Delta by increasing the accessibility of stored supplies from Lake Cachuma. In the severe drought conditions described above, assuming no supply inputs to Lake Cachuma and water elevations at or below the 679 ft, COMB would have to seek other water supplies if the Project is not implemented. This would mean obtaining scarce and expensive imported supplies from another entity connected to the SWP system, increasing demands on the Bay-Delta. The Project would allow COMB to avoid the need to import these supplies during severe drought conditions for a time period of 18 months, as described under Benefit #1. This would help address the CALFED Bay-Delta objectives and preserve water from the Delta for other high-value purposes. There would be no Bay-Delta benefits in non-drought years.

Table 5 – Annual Project Physical Benefits

Project Name: Lake Cachuma Drought Pumping Facility Project
Type of Benefit Claimed: Reduced Demands on Bay-Delta
Units of the Benefit Claimed: AF
Additional Information About this Benefit: The percentage of SWP water that is reduced with the Project will proportionally reduce demands on the Bay-Delta ecosystem and help address the CALFED Bay-Delta objectives. The volumes below reflect only those reduced demands from the Bay-Delta during drought periods. Values in column (d) show the amount of demand reduced through implementation of the Project over the 25-year lifespan.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2013	0	0 Construction	0
2014	30,000	0	30,000
2015	15,000	0	15,000
2016-2023	0	0	0
2024	30,000	0	30,000
2025	15,000	0	15,000
2026-2033	0	0	0
2034	30,000	0	30,000
2035	15,000	0	15,000
2036-2038	0	0	0

Comments:

- *County of Santa Barbara Public Works Department Water Agency, Lake Cachuma Formed by Bradbury Dam Results of 2013 Survey & Sedimentation Update (February 2014), Page 49*. This report discusses the storage capacity for Lake Cachuma and provides the amount of water available at elevation 679 ft above sea level.
- *Personal communication with COMB*: Proportion of imported water used as offset (100% SWP) and volume of imported water to be delivered to Lake Cachuma in 2013.
- *Santa Barbara County Water Resources, Cachuma Reservoir – Historical Water Storage Levels*

Benefit #3 – Reduced Energy Usage

The table below provides information regarding reduced energy usage from the offset of treated imported water (100% SWP water) from the Delta. Approximately 2,800 kilowatt-hours per acre-foot (kWh/AF) are required for conveyance and pumping of SWP water to southern California. Based on this information, an estimated 2,800 kWh/AF of energy is assumed to be used to provide imported supplies to Lake Cachuma. The amount of additional energy required to operate the pumps to access the 45,000 AF from Lake Cachuma with the Project is 60kWh/AF. The reduced energy usage is estimated to be the difference between the "no project" imported water conveyance and the pumps required to operate the Project, approximately 2,740 kWh/AF. Therefore, the energy benefit is calculated as 82,200,000 kWh for the first 12 months of drought and 41,100,000 kWh for the subsequent six months under the conditions described above. Over the 25-year lifespan of the Project, this offset enables approximately 369,900,000 kWh of reduced energy usage. The table below shows drought conditions occurring as described under Benefit #1. There would be no energy benefits in non-drought years.

Table 5 – Annual Project Physical Benefits

Project Name: Lake Cachuma Drought Pumping Facility Project
Type of Benefit Claimed: Reduced Energy Usage
Units of the Benefit Claimed: kWh
Additional Information About this Benefit: Values in column (d) show the amount of energy saved through implementation of the Project over the 25-year lifespan. Energy saved results from replacing imported water from SWP with pumped water from Lake Cachuma during periods of drought. Energy benefits are calculated as the difference between kWh/AF required to import water and the kWh/AF required to operate the pumps for the Project.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2013	0	0 – Construction	0
2014	82,200,000	0	82,200,000
2015	41,100,000	0	41,100,000
2016-2023	0	0	0
2024	82,200,000	0	82,200,000
2025	41,100,000	0	41,100,000
2026-2033	0	0	0
2034	82,200,000	0	82,200,000
2035	41,100,000	0	41,100,000
2036-2038	0	0	0

Comments:

- *Analysis of the Energy Intensity of Water Supplies for West Basin Municipal Water District, WBMWD (March 2007),* Page 12 Lists the energy associated with SWP imported to the Santa Barbara Region as 2,826 kWh/AF.
- *Personal communication with COMB*: Proportion of imported water used as offset (100% SWP) and volume of imported water to be delivered to Lake Cachuma in 2013.
- *Santa Barbara County Water Resources, Cachuma Reservoir – Historical Water Storage Levels*
- *Proposal for Design, Build, Operate, and Maintain Emergency Pumping Facility at Lake Cachuma, COMB (April 2014),* Page 11 lists energy requirement for Scenario A at 675 ft elevation and 6 pumps to be 60 kWh/AF.

Benefit #4 – Reduced Greenhouse Gas Emissions

The Project would avoid greenhouse gas (GHG) emissions generated by the extra energy needed to convey imported water from northern California to supply COMB under the drought conditions described above. This value may be calculated by applying a factor of 0.724 pounds of CO_2 equivalents per kWh and converting to total tons of CO_2 equivalents, based on the California Action Registry, General Reporting Protocol. The reduced GHG emissions are estimated at approximately 27,000 MT for the first 12 months of drought and 13,500 MT for the subsequent six months under the conditions described above. Over the 25-year lifespan of the Project, this totals approximately 121,500 MT of avoided carbon emissions. The table below shows drought conditions occurring as described under Benefit #1. There would be no GHG reduction benefits in non-drought years.

Table 5 – Annual Project Physical Benefits

Project Name: Lake Cachuma Drought Pumping Facility Project
Type of Benefit Claimed: Reduced GHG Emissions
Units of the Benefit Claimed: MT
Additional Information About this Benefit: The Project would avoid GHG emissions generated by the extra energy needed for imported water. Values in column (d) show the amount of GHG emissions reduced through implementation of the Project.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2013	0	0 – Construction	0
2014	27,000	0	27,000
2015	13,500	0	13,500
2016-2023	0	0	0
2024	27,000	0	27,000
2025	13,500	0	13,500
2026-2033	0	0	0
2034	27,000	0	27,000
2035	13,500	0	13,500
2036-2038	0	0	0

Comments:

- *California Action Registry, General Reporting Protocol. Version 3.1, (August 2008), Section 3*: Document used to convert amount of energy saved to a reduction in emissions of CO_2 equivalents. Applied a factor of 0.724 pounds of CO_2 equivalents per kWh and converted the quantity to total tons of CO_2 equivalents.
- *Personal communication with COMB*: Proportion of imported water used as offset (100% SWP) and volume of imported water to be delivered to Lake Cachuma in 2013.
- *Santa Barbara County Water Resources, Cachuma Reservoir – Historical Water Storage Levels*

Technical Analysis of Physical Benefits Claimed

Primary Physical Benefit

Type of Physical Benefit: Increased Local Water Supplies/Reliability and Decreased Dependence on Imported Water **Amount of Benefit:** 45,000 AF per drought period (assumed to be 18 months)	
Technical Basis of the Project	• *County of Santa Barbara Public Works Department Water Agency, Lake Cachuma Formed by Bradbury Dam Results of 2013 Survey & Sedimentation Update (February 2014).* o Page 49: shows the maximum elevation where the Intake Tower would no longer be able to supply water. o This report discusses the storage capacity for Lake Cachuma and provides the amount of water available at elevation 679 ft above sea level. • *Cachuma Operation and Maintenance Board Memorandum (July 2014)* o Page 3: This table provides the total amount of water available per year. • *Santa Barbara County Water Resources, Cachuma Reservoir – Historical Water Storage Levels* o Page 1
Recent and Historical Conditions that Provide Background for the Benefit Being Claimed	Lake Cachuma has been serving as the primary water supply in southern Santa Barbara County. Water is delivered to the South Coast communities through the Intake Tower, Tecolote Tunnel, South Coast Conduit, West Goleta Conduit, and the CCWA Pipeline (State Water exchange to the Cities of Santa Ynez and Solvang). This critical "lifeline" system is currently at less than 37.6% of capacity due to three consecutive years of drought.
Description and Estimates of Without-Project Conditions	Without implementation of this Project, COMB will not be able to access the water in Lake Cachuma. The original gravity fed system built in the 1950s that served the South Coast of Santa Barbara County was not designed in the deepest portion of Lake Cachuma. The ability to gravity feed the Intake Tower will be lost as the lake level continues to fall below the inlet gates located at the Intake Tower.
Methods Used to Estimate the Physical Benefit	The elevations at Lake Cachuma were determined with the Intake Tower. These elevations were utilized to determine the amount of water available.
New Facilities, Policies, and Actions Required to Obtain Physical Benefit	This Project will include a barge to house pumps for the water system, a pipe between the barge and intake structure, and a connection to the Intake Tower. The Project will also remove sediment from the lowest gate in the Intake Tower.
Any Potential Adverse Physical Effects	None

Secondary Physical Benefits

Type of Physical Benefit:	**Reduced Demands on the Bay-Delta**	**Reduced Energy Usage**	**Reduced Greenhouse Gas Emissions**
Amount:	**45,000 AF per drought period (18 months)**	**123,300,000 kWh per drought period (18 months)**	**40,500 MT per drought period (18 months)**
Technical Basis of the Project	• *County of Santa Barbara Public Works Department Water Agency, Lake Cachuma Formed by Bradbury Dam Results of 2013 Survey & Sedimentation Update (February 2014).* o Page 49 shows the maximum elevation where the Intake Tower would no longer be able to supply water. o This report discusses the storage capacity for Lake Cachuma and provides current data regarding sedimentation influx into the lake. • *Personal communication with COMB* o Provided proportion of imported water used as offset (100% SWP) and volume of imported water to be delivered to Lake Cachuma in 2013. • *Santa Barbara County Water Resources, Cachuma Reservoir – Historical Water Storage Levels* o Page 1	• *Analysis of the Energy Intensity of Water Supplies for West Basin Municipal Water District, WBMWD (March 2007),* o Page 12 lists the energy associated with SWP imported to the Santa Barbara Region as 2,826 kWh/AF. • *Personal communication with COMB* o Provided proportion of imported water used as offset (100% SWP) and volume of imported water to be delivered to Lake Cachuma in 2013. • *Proposal for Design, Build, Operate, and Maintain Emergency Pumping Facility at Lake Cachuma, COMB (April 2014)*, Page 11 lists energy requirement for Scenario A at 675 ft. elevation and 6 pumps to be 60 kWh/AF.	• *Analysis of the Energy Intensity of Water Supplies for West Basin Municipal Water District, WBMWD (March 2007):* o Page 4: Estimates how much energy is used to provide SWP water. • *California Action Registry, General Reporting Protocol. Version 3.1 (August 2008):* o Section 3: Document converts energy saved to a reduction in emissions of CO_2 equivalents. • *Personal communication with COMB* o Provided proportion of imported water used as offset (100% SWP) and volume of imported water to be delivered to Lake Cachuma in 2013.
Recent and Historical Conditions that Provide Background for the Benefit Being Claimed	In order to increase supplies, COMB has been providing SWP to Lake Cachuma. In 2013, approximately 3,200 AF of water was delivered to the lake through the member agencies.	The imported water delivered consumes energy to transport from the Bay-Delta at a higher rate than would be required to operate the pumps for the Project.	The imported water delivered consumes energy to transport from the Bay-Delta at a higher rate than would be required to operate the pumps for the Project. This energy usage generates GHG emissions that cause climate change.

Type of Physical Benefit:	**Reduced Demands on the Bay-Delta**	**Reduced Energy Usage**	**Reduced Greenhouse Gas Emissions**
Amount:	**45,000 AF per drought period (18 months)**	**123,300,000 kWh per drought period (18 months)**	**40,500 MT per drought period (18 months)**
Description and Estimates of Without-Project Conditions	Without the Project, the lake levels will continue to decrease, which will cause more demand on the Bay-Delta to import water as Member Units must purchase imported water to make up for the loss of Lake Cachuma water.	Without the Project, 123.3 million kWh of energy per drought period (assumed 18 months) would be used to serve imported water.	Without the Project, 40,500 MT of CO_2 equivalents per drought period (assumed 18 months) would be generated.
Methods Used to Estimate the Physical Benefit	Estimates of reduced imported water use were determined by estimating the amount of imported water would be needed to replace the water in Lake Cachuma. 100% SWP water was applied to the total water offset.	The SWP imported water use volume was applied to the energy use estimates (contained in documents cited above) for conveying and treating supply sources. The difference between the Project and imported water supplies was calculated.	The SWP imported water use volume was applied to the energy use estimates (contained in documents cited above) for conveying and treating all supply sources. The difference between the Project and imported water supplies was calculated. The California Action Registry, General Reporting Protocol was used to correlate the amount of energy saved to a reduction in emissions of CO_2 equivalents.
New Facilities, Policies, and Actions Required to Obtain Physical Benefit	This Project will include a barge to house pumps for the water system, a pipe between the barge and intake structure, and a connection to the Intake Tower.	This Project will include a barge to house pumps for the water system, a pipe between the barge and intake structure, and a connection to the Intake Tower.	This Project will include a barge to house pumps for the water system, a pipe between the barge and intake structure, and a connection to the Intake Tower.
Any Potential Adverse Physical Effects	None	None	None

Cost Effectiveness Analysis

Table 6 – Cost Effective Analysis **Project Name:** Lake Cachuma Drought Pumping Facility Project		
Question 1	**Types of benefits provided as shown in the Annual Project Physical Benefits Section (above)**	• Increase Local Water Supplies/Reliability and Decrease Dependence on Imported Water • Reduce Demands on the Bay-Delta • Reduce Energy Usage • Reduce Greenhouse Gas Emissions
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?**	Yes, alternative methods have been considered.
	If no, why?	Not applicable
	If yes, list the methods (including the proposed project) and estimated costs.	1. Selected project: Drought Pumping Facility (proposed Project) – This alternative will install a pumping system, which will provide water into the Intake Tower. This proposed project has an estimated capital cost of $3,795,250. 2. Alternative project: Hauling Imported Water with Trucks – This alternative would haul the water from Lake Cachuma to the South Coast of Santa Barbara County with trucks. This project has an estimated cost of $3,375,000 per month of operation, or $40.5 million for an entire year of drought conditions.
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.**	Not applicable. The proposed Project is the least cost alternative.
Comments:		

Recycled Water Enhancement Project (Project)

Project Description

(*25 Words)* This Project will replace the existing tertiary filtration system with full microfiltration technology, allowing the City to increase recycled water supplies by 990 AFY.

(Expanded) Since 1989, the City of Santa Barbara (City) has been providing recycled water to offset potable water demands. Recently, turbidity levels in the effluent from the City's advanced secondary treatment process have exceeded the capacity of the existing tertiary treatment process. Currently, average customer demands on the existing recycled water distribution system are approximately 800 acre-feet per year (AFY), plus an additional 300 AFY for on-site process demands at the El Estero Wastewater Treatment Plant (WWTP). In order to meet demands, the City blends tertiary filter effluent with potable water to decrease turbidity and total dissolved solids (TDS) in the recycled water (see Figure 3-6). The Project will replace the existing tertiary filtration treatment plant at the El Estero WWTP with a membrane filtration plant that utilizes microfiltration/ultrafiltration technology to treat secondary effluent to Title 22 recycled water standards, eliminating the need to blend the recycled effluent with potable water to meet turbidity requirements. The Project will demolish the existing 2,200 square foot granular media filter complex and construct a new 5,300 square foot complex, including a 2,900 square foot canopy to meet the existing recycled water demands; and it will provide supply capacity to expand the City's recycled water deliveries to a total of 1,100 AFY by 2034, a net increase of approximately 990 AFY. Improvements to the plant will allow future service of 1,400 AFY of recycled water; however, the facilities necessary to deliver this additional supply will be completed at a future date.

This Project provides immediate regional drought preparedness by reducing the amount of potable water required to blend into the recycled water effluent. Currently, the recycled effluent is blended with up to 90% potable water. The Project is expected to supply a total of 1,100 AF of recycled water supply in the future when blending is no longer needed, a net increase of 990 AFY. The Project will help the City meet demands in future years under drought conditions since recycled water is a reliable supply during drought. The proposed Project will help reduce the degree of shortage the City faces during drought conditions, reducing impacts to the community. A water shortage year is expected in October 2014 – September 2015; therefore, this Project is critical to the City's immediate water supply needs. In addition, the use of enhanced recycled water during non-drought years will allow the City to build cumulative storage in the local surface reservoirs, Gibraltar Reservoir and Cachuma Reservoir, and in local groundwater basins. By replacing potable water with recycled water, the groundwater basins will be better protected from overdraft and seawater intrusion, and the water supply shortages will be reduced. Without recycled water supplies, the City is at higher risk of shortages during extended drought periods; and there would be more reliance on imported water, groundwater, and other alternative supplies. If drought conditions persist through 2014, it is anticipated that penalties for high water use within the City's service area could go into effect by spring 2015.

The Project increases local water supply reliability and the delivery of safe drinking water by offsetting 990 AF of potable imported water use with recycled water, a supply source that is not subject to seasonal fluctuations or reductions in times of drought. This Project will allow the potable water currently being blended with the high-turbidity and TDS tertiary filter effluent to remain in the local groundwater basin and surface water reservoirs, increasing local supply reliability during extended periods of drought. Increasing the use of recycled water, a supply that is not dependent on precipitation, is critical to increasing the flexibility of, and expansion of, the state's available water supply. The pressures on the Bay-Delta ecosystem, climate change, and continuing population growth have increased the challenges to the state in providing clean water needed for a healthy population and economy. Recycled water can significantly expand the City's potable water supplies and help increase local water supply reliability.

Expedited funding is needed for this Project in response to drought-related water supply shortages. The City plans to use a substantial portion of available reserves and postpone some capital projects to fund the Project. Expedited funding is needed to reduce the financial impact on City water customers and protect reserves.

Project Map

Figure 3-4: Project Area

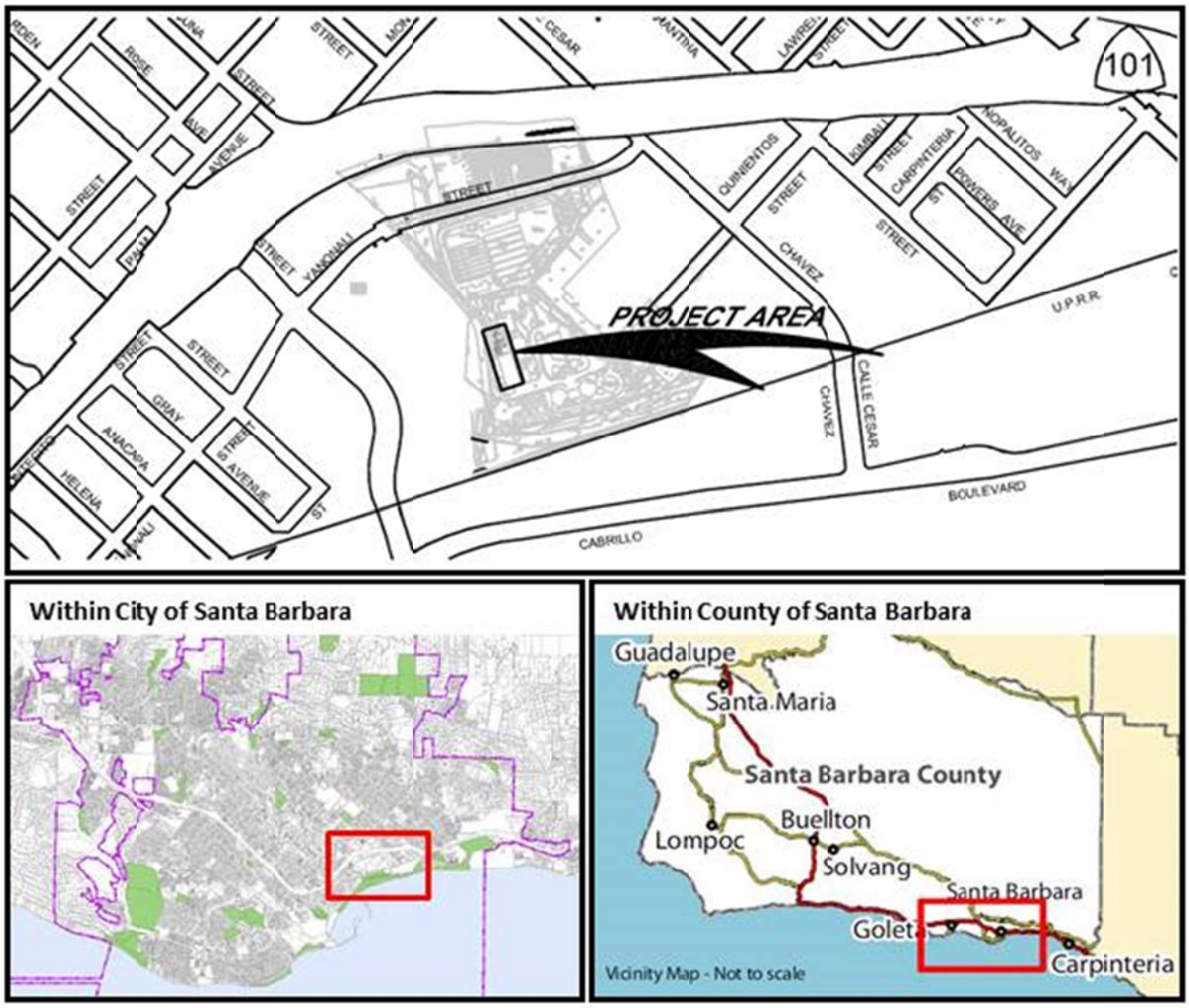


Figure 3-5: Project Facilities Locations

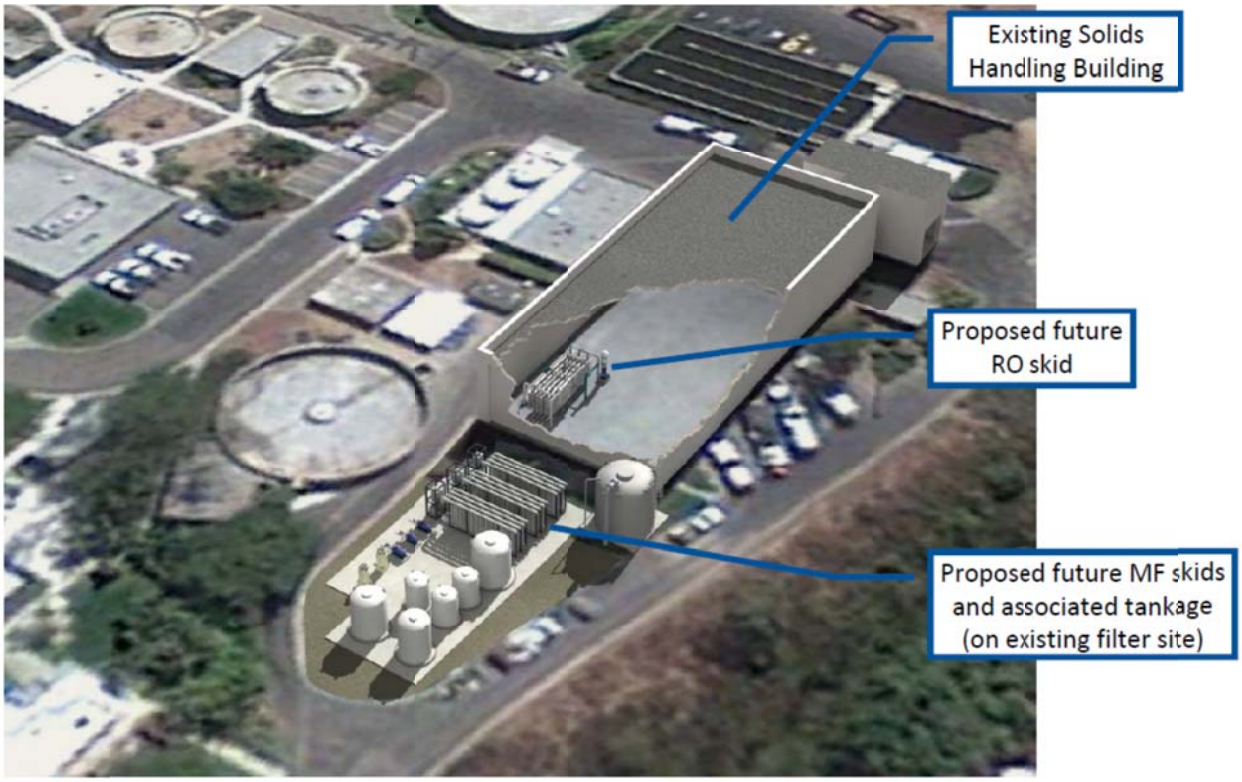
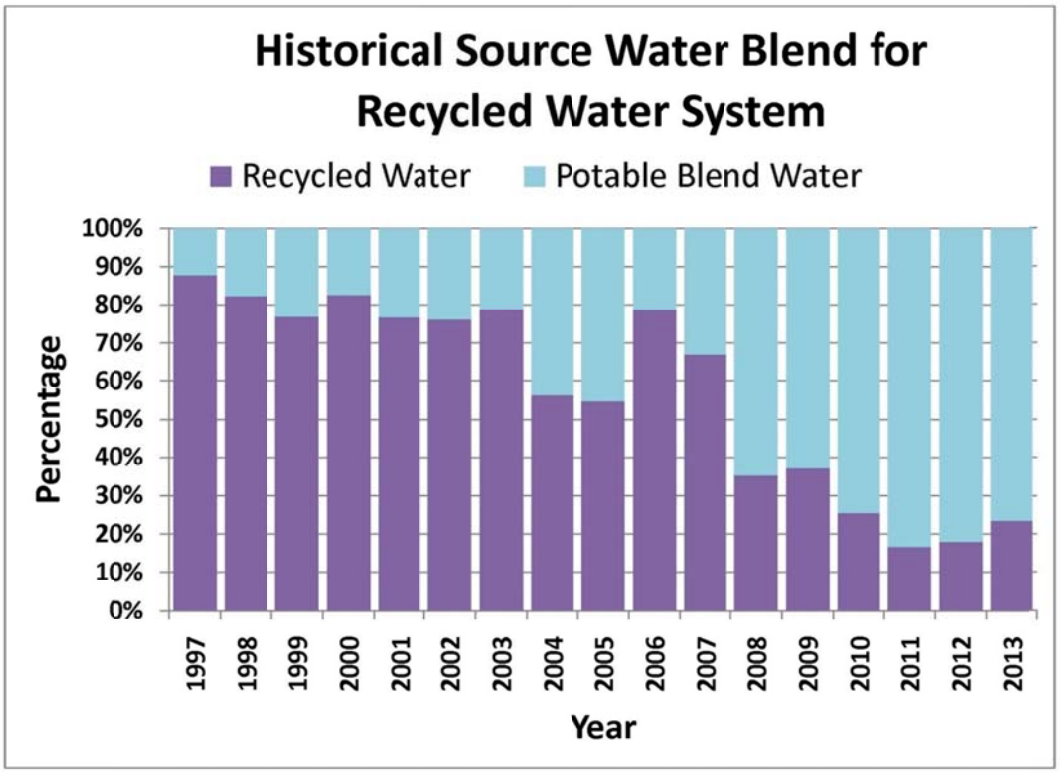


Figure 3-6: Historical Source Water Blend



Project Physical Benefit

The following physical benefits are claimed for the Project and listed in the tables below:

- Increased Local Supplies/Reliability and Decreased Dependence on Imported Water
- Reduced Demands on the Bay-Delta
- Improved Water Quality

Benefit #1 – Increased Local Water Supplies/Reliability and Decreased Dependence on Imported Water

The table below provides information regarding the benefit of increasing local water supplies and reliability by replacing potable water with drought resistant recycled water. The increase in recycled water is made possible by treatment system upgrades at the existing WWTP, a facility that currently discharges all excess recycled water (990 AFY) to an ocean outfall. This increase in local supplies will lead to a direct reduction in imported water demands. Currently, 90% (or 990 AFY) of the total recycled water demand is potable blend water and the remaining amount (110 AF) is recycled water. The anticipated lifespan of the Project is 25 years.

Annual Project Physical Benefits

Project Name: Recycled Water Enhancement Project
Type of Benefit Claimed: Increased Local Supplies/Reliability and Decreased Dependence on Imported Water
Units of the Benefit Claimed: AF
Additional Information About this Benefit: The volumes shown below indicate the amounts of recycled water that will be available for groundwater recharge and reservoir storage with the Project. There is a current demand of 1,100 AF of which 90% is provided by supplemental potable sources (990 AF) for blend and the remaining (110 AF) is being provided by recycled water from the El Estero WWTP.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2014	110	110 – Construction	0
2015-2039	110	1,100	990

Comments:

- *City of Santa Barbara, Urban Water Management Plan (UWMP) 2010 Update. (June 2011; Addendum June 2012). Pages 17, 27, and 28:* consistent with long-term water supply plan policies, compares existing and future demands and supplies. Demonstrates the City's planned use of recycled water to meet system demands.
- *City of Santa Barbara, Long-Term Water Supply Plan (June 2011). Pages 10 through 11, 21, and 25:* establishes long-term water supply planning policy to continue to serve existing demands (800 AFY customer demands and 300 AFY El Estero demands).
- *El Estero Wastewater Treatment Plant Tertiary Filtration Facility, Engineering Assessment and Preliminary Design Services, Tertiary Filtration Facility Preliminary Design Report (February 2013).*
  Section 1.2.3 (pages 1-3 through 1-6) and Appendix B-2: involved evaluation of recycled water demand.

Benefit #2 – Reduce Demands on Bay-Delta

The table below provides information regarding the benefit of reducing demands on the Bay-Delta by increasing the recycled water supply from the El Estero WWTP. The City's service area receives imported water from only the SWP, which originates in the Bay-Delta system. Currently, the City serves its non-potable demands with a blend of 110 AFY of recycled water and 990 AFY of potable water. The excess recycled water produced by the WWTP (990 AFY) is currently discharged to an ocean outfall. This Project is expected to reduce demands on the Bay-Delta by using recycled water in lieu of imported water.

Annual Project Physical Benefits

Project Name: Recycled Water Enhancement Project
Type of Benefit Claimed: Reduce Demands on the Bay-Delta
Units of the Benefit Claimed: AF
Additional Information About this Benefit: The reduction in SWP water with implementation of the Project will proportionally reduce demands on the Bay-Delta ecosystem and help address the CALFED Bay-Delta objectives. The volumes below indicate the reduction in demands on the Delta.

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	990	0 – Construction	0
2015-2039	990	0	990

Comments:

- *City of Santa Barbara, Urban Water Management Plan (UWMP) 2010 Update. (June 2011; Addendum June 2012). Pages 17, 27, and 28:* consistent with long-term water supply plan policies, compares existing and future demands and supplies. Demonstrates the City's planned use of recycled water to meet system demands.
- *City of Santa Barbara, Long-Term Water Supply Plan (June 2011). Pages 10 through 11, 21, and 25:* establishes long-term water supply planning policy to continue to serve existing demands (800 AFY customer demands and 300 AFY El Estero demands).
- *Personal communication with City of Santa Barbara staff*: Proportion imported water used by the City that is SWP water (100% SWP).
- *El Estero Wastewater Treatment Plant Tertiary Filtration Facility, Engineering Assessment and Preliminary Design Services, Tertiary Filtration Facility Preliminary Design Report (February 2013).*
  Section 1.2.3 (pages 1-3 through 1-6) and Appendix B-2: involved evaluation of recycled water demand.

Benefit #3 – Improve Water Quality

The table below provides information regarding the amount of turbidity in the recycled water. Without the Project, turbidity levels are greater than 2 nephelometric turbidity units (NTU), which will require blending of recycled water with potable water to meet quality requirements. Once the Project is implemented, the turbidity levels will be below 2 NTU and will not require a blend to meet Title 22 requirements.

Annual Project Physical Benefits

Project Name: Recycled Water Enhancement Project
Type of Benefit Claimed: Improve Water Quality
Units of the Benefit Claimed: NTU
Additional Information About this Benefit: Improvements in turbidity levels will be accomplished by

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2014	Turbidity > 2 NTU	Turbidity > 2 NTU – Construction	0
2015-2039	Turbidity > 2 NTU	Turbidity < 2 NTU and removal of pathogens	Excellent tertiary-level recycled water quality that meets Title 22 requirements for turbidity without blending

Comments:

- *El Estero Wastewater Treatment Plant Tertiary Filtration Facility, Engineering Assessment and Preliminary Design Services, Tertiary Filtration Facility Preliminary Design Report (February 2013).*
  Section 4.2.1 (pages 4-1 through 4-3): describes water quality requirements and design goals.
  Section 1.2.3 (pages 1-3 through 1-6) and Appendix B-3: involved evaluation of several filtration alternatives to replace the existing failed filtration system and preliminary design for the recommended alternative of microfiltration technology.

Technical Analysis of Physical Benefits Claimed

Primary Physical Benefit

Type of Physical Benefit: Increase Local Water Supplies/Reliability and Decrease Dependence on Imported Water **Amount of Benefit:** 990 AFY	
Technical Basis of the Project	• *City of Santa Barbara, UWMP 2010 Update. (June 2011; Addendum June 2012).* o Pages 17, 27 through 28: consistent with long-term water supply plan policies, compares existing and future demands and supplies. Demonstrates the City's planned use of recycled water to meet system demands. • *City of Santa Barbara, Long-Term Water Supply Plan (June 2011).* o Pages 10 through 11, 21, and 25: establishes long-term water supply planning policy to continue to serve existing demands (800 AFY customer demand and 300 AFY El Estero demands) plus an additional 300 AFY of planned future demands. • *El Estero Wastewater Treatment Plant Tertiary Filtration Facility, Engineering Assessment and Preliminary Design Services, Tertiary Filtration Facility Preliminary Design Report (February 2013).* o *Section 1.2.3 (pages 1-3 through 1-6) and Appendix B-2*: involved evaluation of recycled water demand.
Recent and Historical Conditions that Provide Background for the Benefit	Although the City has been using recycled water since 1989, the existing tertiary treatment system at the El Estero WWTP has reached the end of its useful life and is not currently operating. Therefore, recycled water demands currently have to be met using 90% potable

Type of Physical Benefit: Increase Local Water Supplies/Reliability and Decrease Dependence on Imported Water **Amount of Benefit:** 990 AFY	
Being Claimed	water for blending to achieve turbidity and TDS requirements.
Description and Estimates of Without-Project Conditions	Without the Project, the City will not be able to provide recycled water supply to meet its demand, which is critical to the City's water supply reliability. Recycled water is available every year and allows the City to build cumulative storage in its surface reservoirs and groundwater. For every AF of recycled water produced, an AF of potable water can be stored or otherwise utilized. By preserving potable water supplies, potential supply shortages are reduced during extended drought periods, and groundwater basins are protected from overdraft and seawater intrusion. Without recycled water supplies, the City is at risk of greater shortages during extended drought periods, and would be more reliant on imported water, groundwater, and other alternative supplies such as ocean desalination. Furthermore, imported water and ocean desalination are more energy-intensive than recycled water.
Methods Used to Estimate the Physical Benefit	Average demands on the existing recycled water system are currently about 1,100 AFY and are expected to grow. However, recycled water demand is not constant throughout the year; there are typically higher demands during the summer peak irrigation season. In addition to fluctuating seasonal demands, the primary concern for available water from the recycled water system is the ability to meet recycled water demands at night when influent flows to the wastewater treatment plant are low. To determine the amount of flow available for the recycled water system during these low flow conditions, effluent flow data from the El Estero WWTP for April-May 2011 and July-August 2012 were analyzed. These months were used since they are typically the higher demand months, instead of winter months when demand was lower. The proposed tertiary filtration facilities have been sized to accommodate fluctuating daily recycled water demands and wastewater influent flow conditions.
New Facilities, Policies, and Actions Required to Obtain Physical Benefit	The existing tertiary filtration system will be replaced with microfiltration technology. Furthermore, the filtration project will enhance water quality and reliably meet water quality criteria specified in Title 22, Division 4 of the California Code of Regulations. The Central Coast Region of the RWQCB lists the current recycled water requirements in the Waste Discharge Requirements and Master Reclamation Permit (WDR/MRP) Order No. 97-44. The WDR/MRP will need to be modified as part of the Project (to reflect reclamation specifications for microfiltration technology and to obtain authorization for additional approved uses of recycled water).
Any Potential Adverse Physical Effects	None

Secondary Physical Benefits

Type of Physical Benefit:	**Reduce Demands on the Bay-Delta**	**Improve Water Quality**
Amount:	**990 AFY**	**Turbidity < 2 NTU**
Technical Basis of the Project	• *City of Santa Barbara, UWMP 2010 Update. (June 2011; Addendum June 2012).* o Pages 17, 27, and 28: consistent with long-term water supply plan policies, compares existing and future demands and supplies. Demonstrates the City's planned use of recycled water to meet system demands. • *City of Santa Barbara, Long-Term Water Supply Plan (June 2011).* o Pages 10 through 11, 21, and 25: establishes long-term water supply planning policy to continue to serve existing demands (800 AFY customer demands and 300 AFY El Estero demands). • *Personal communication with City of Santa Barbara staff:* o Proportion imported water used by the City that is SWP water (100% SWP) o Non-potable demands currently met with 990 AFY of potable water, and 110 AFY of recycled water • *El Estero Wastewater Treatment Plant Tertiary Filtration Facility, Engineering Assessment and Preliminary Design Services, Tertiary Filtration Facility Preliminary Design Report (February 2013).* o *Section 1.2.3 (pages 1-3 through 1-6) and Appendix B-2*: involved evaluation of recycled water demand.	• *El Estero Wastewater Treatment Plant Tertiary Filtration Facility, Engineering Assessment and Preliminary Design Services, Tertiary Filtration Facility Preliminary Design Report*. City of Santa Barbara. CDM Smith. (February 2013). o Section 4.2.1 (pages 4-1 through 4-3): describes water quality requirements and design goals. o Section 1.2.3 (pages 1-3 through 1-6) and Appendix B-3: involved evaluation of several filtration alternatives to replace the existing failed filtration system and preliminary design for the recommended alternative of microfiltration technology.
Recent and Historical Conditions that Provide Background for the Benefit Being Claimed	Imported water supplies have historically been used as a blend with the tertiary filter effluents. Of the imported water, 100% is from the SWP. The portion of imported water that is currently served from the SWP impacts the Bay-Delta. The offset of this SWP portion of the imported water supply with recycled water will reduce demands on the Bay-Delta.	Effluent from existing recycled water treatment facilities does not reliably meet Title 22 recycled water quality standards for turbidity without blending with potable water. In addition, the recycled water effluent is high in turbidity and TDS.

Type of Physical Benefit:	**Reduce Demands on the Bay-Delta**	**Improve Water Quality**
Amount:	**990 AFY**	**Turbidity < 2 NTU**
Description and Estimates of Without-Project Conditions	Without the Project, the City would continue to use imported water, requiring that the imported water demands will continue at a rate of 100% SWP.	Without the Project, the City will not be able to provide recycled water supply, which is critical to the City's water supply reliability. Recycled water is available every year and allows the City to build cumulative storage in its surface reservoirs and groundwater. For every AF of recycled water produced, an AF of potable water can be stored. By preserving potable water supplies, potential supply shortages are reduced during extended drought periods, and groundwater basins are protected from overdraft and seawater intrusion. Without recycled water supplies, the City is at risk of greater shortages during extended drought periods, and would be more reliant on imported water, groundwater, and other alternative supplies such as ocean desalination. Furthermore, imported water and ocean desalination are more energy-intensive than recycled water.
Methods Used to Estimate the Physical Benefit	100% SWP imported supply was applied to the total imported water offset.	Effluent from the existing recycled water treatment facility does not reliably meet Title 22 recycled water quality standards for turbidity without blending with potable water. The City considered several filtration technology alternatives and analyzed them against multiple evaluation criteria. Full microfiltration technology was determined to be the preferred alternative to meet Title 22 recycled water quality standards.

Type of Physical Benefit:	**Reduce Demands on the Bay-Delta**	**Improve Water Quality**
Amount:	**990 AFY**	**Turbidity < 2 NTU**
New Facilities, Policies, and Actions Required to Obtain Physical Benefit	The existing tertiary filtration system will be replaced with microfiltration technology. Furthermore, the filtration project will enhance water quality and reliably meet water quality criteria specified in Title 22, Division 4 of the California Code of Regulations. The Central Coast Region of the RWQCB lists the current recycled water requirements in the Waste Discharge Requirements and Master Reclamation Permit (WDR/MRP) Order No. 97-44. The WDR/MRP will need to be modified as part of the Project (to reflect reclamation specifications for microfiltration technology and to obtain authorization for additional approved uses of recycled water).	The existing tertiary filtration system will be replaced with microfiltration technology. Furthermore, the filtration project will enhance water quality and reliably meet water quality criteria specified in Title 22, Division 4 of the California Code of Regulations. The Central Coast Region of the RWQCB lists the current recycled water requirements in the Waste Discharge Requirements and Master Reclamation Permit (WDR/MRP) Order No. 97-44. The WDR/MRP will need to be modified as part of the Project (to reflect reclamation specifications for microfiltration technology and to obtain authorization for additional approved uses of recycled water).
Any Potential Adverse Physical Effects	None	None

Cost Effectiveness Analysis

Table 6 – Cost Effective Analysis **Project name:** Recycled Water Enhancement Project		
Question 1	**Types of benefits provided as shown in the Annual Project Physical Benefits Section (above)**	• Increased Local Water Supplies/Reliability and Decreased Dependence on Imported Water • Reduced Demands on the Bay-Delta • Improved Water Quality
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?**	Yes, alternative methods have been considered.
	If no, why?	Not applicable
	If yes, list the methods (including the proposed project) and estimated costs.	1. Alternative 1: This project would rehabilitate the existing gravity deep bed filter with side stream microfiltration. The estimated capital cost is $4,900,000. 2. Alternative 2: This project would have a continuous up flow of backwash through the filters in the existing structure with side stream microfiltration. The estimated capital cost is $4,800,000. 3. Alternative 3: This project would have a continuous up flow of backwash in a new filter structure with side stream microfiltration. The estimated capital cost is $6,600,000. 4. Alternative 4: This project would use cloth or disk filters in existing filter structure with side stream microfiltration. The estimated capital cost is $4,600,000. 5. Alternative 5 (Proposed Project): This project will install a full microfiltration/ultrafiltration plant. The estimated capital cost is $6,500,000.
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.**	The various filtration alternatives were evaluated and ranked based on several criteria including 1) increased ease of O&M and safety for plant staff, 2) optimization of site layout, 3) minimization recycled water system shutdowns, 4) improvement of water quality by reducing turbidity and TDS, 5) minimization of the need for blending with potable water, and 6) life-cycle costs. Based on the evaluation criteria and scoring, the full microfiltration alternative was determined to be the preferred technology to provide tertiary filtration to produce Title 22 recycled water. This is the proposed Project.
Comments:		

Grant Administration Project

Project Description

(*25 Words)* This Project will provide grant administration support for the Santa Barbara County Region's Proposition 84, Round 3 Drought Solicitation Grant funds.

(Expanded)

The SBCWA's Grant Administration Project will provide administration support for the Santa Barbara County Region's Proposition 84, Round 3 Drought Solicitation Grant funds, and serve as the contracting agency for DWR. As this Project is intended to provide administration support only, the requirement to meet one of the four drought project elements (provide immediate regional drought preparedness, increase local water supply reliability and the delivery of safe drinking water, assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective, reduce water quality conflicts or ecosystem conflicts created by the drought) is not applicable. The requirement to explain why expedited funding is needed for this project is also not applicable.

Project Map

Not applicable

Project Physical Benefit

Not applicable

Technical Analysis of Physical Benefits Claimed

Not applicable

Cost Effectiveness Analysis

Not applicable