

LONG-TERM WATER SUPPLY AND STORAGE ALTERNATIVES

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TO: Cambria Community Services District Resources and Infrastructure Committee

FROM: Jim Webb
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SUBJECT: Cambria Community Services Long-Term Water Supply and Storage Options Update

INTRODUCTION

The Long-Term Water Supply and Storage Ad-Hoc Committee is tasked with summarizing water supply and water storage alternatives. This memorandum summarizes options included in previous studies, as well as options that have been proposed but not studied by the Cambria Community Services District (CCSD). This memorandum summarizes all options, without any intent to make recommendations. This memorandum does not assess the reliability or ability of CCSD's current supplies to meet demands. Such determinations are beyond the scope of this effort and have been previously included in the CCSD's Urban Water Management Plan.

OPTIONS IN PREVIOUS STUDIES

The *Assessment of Long-Term Water Supply Alternatives* (Kennedy/Jenks, 2004) identified eight potential water supply alternatives including:

- Seawater desalination
- Surface water from Lake Nacimiento
- Surface water from Whale Rock Reservoir
- Expanding the Santa Rosa Creek wellfield
- An Arroyo De La Cruz wellfield
- Hard rock wells
- Additional use of recycled water
- Demand management

These alternatives were further developed and refined in the *Cambria Water Supply Alternatives Engineering Technical Memorandum* (CDM/Smith, 2013). This memorandum reviewed 28 water supply options. The 28 options were screened, resulting in eight water supply alternatives. Each alternative is presented below, with an assessment of the pros and cons for each. The alternatives are grouped by type for ease of comparison.

IMPLEMENTED ALTERNATIVES

1. San Simeon Creek Road Brackish Water Desalting (CDM Smith Alternative 5)

This alternative is a version of CCSD's existing Water Reclamation Facility (WRF). Because this alternative has been implemented, it is no longer a source of new water or storage.

DESALINATION ALTERNATIVES

2. Desalinating Seawater from Shamel Park (CDM Smith Alternative 1)

This alternative entails installing two horizontal wells: one to serve as a subsurface seawater intake and one to serve as a subsurface brine line. The two horizontal wells would originate from the Shamel Park parking lot. Seawater would be treated to drinking water standards at a reverse osmosis plant located at the existing CCSD wastewater treatment plant.

Pros: - Provides a drought proof source of water.
- No long piping is needed, compared to other alternatives.

Cons: - A previous proposal for the Shamel Park Desalination Plant project was found not to be consistent with the Coastal Act and the Marine Sanctuary by the California Coastal Commission. It is unlikely that the Coastal Commission will reverse itself and approve this project.
- Relatively high costs.

3. Partner with Morro Bay's Seawater Desalination Plant (CDM Smith Alternative 3)

This alternative envisions partnering with the city of Morro Bay to convert its existing desalination plant into a plant that can supply water to CCSD as well as Morro Bay. The Morro Bay desalination plant has been idle since 2000, and its permits have lapsed. Therefore, this alternative has greater difficulties than outlined in the 2013 memorandum.

Pros: - Infrastructure for a desalination plant already exist in Morro Bay.

- Cons:
- The Morro Bay desalination plant permits have lapsed, and it is unclear if the plant's operation can be permitted again.
 - A relatively long pipeline must be built in the Caltrans right-of-way along Highway 1.
 - Relatively high costs.
 - Morro Bay likely has no reason to reactivate its desalination plant in partnership with CCSD because Morro Bay has invested in a Water Reclamation Facility as its supplemental water supply.

4. Estero Bay Marine Terminal Desalination Plant (CDM Smith Alternative 4)

This alternative is similar to the Shamel Park desalination plant alternative, but much of the infrastructure is located near the intersection of Highway 1 and Toro Creek Road, south of Cayucos. This alternative entails installing a horizontal well in Estero Bay to serve as a subsurface seawater intake. A desalination plant would be built on Toro Creek Road, and the brine would be piped to the Morro Bay outfall through a new pipeline.

- Pros:
- Provides a drought-proof supply of water.
 - Siting the desalination plant on Toro Creek Road, inland of the coastal zone, could potentially lessen some Coastal Commission permitting requirements.

- Cons:
- Permitting a desalination plant may be extremely difficult and time consuming.
 - CCSD does not own the land on which the desalination plant would be built.
 - A relatively long pipeline must be built in the Caltrans right-of-way along Highway 1.
 - Relatively high costs.
 - A previous proposal for the Shamel Park Desalination Plant project was found not to be consistent with the Coastal Act and the Marine Sanctuary by the California Coastal Commission. The Coastal Commission appears to be hesitant to approve new desalination plants.

INCREASED STORAGE ALTERNATIVES

5. San Simeon Creek Off-Stream Storage (CDM Smith Alternative 2)

This alternative entails developing off-stream reservoirs in the San Simeon Creek watershed. The CDM Smith memorandum identified three potential reservoir locations. A fourth location, known as the Warren Reservoir, was not included in the memorandum, and is discussed separately, below. Water from CCSD's existing wellfield would be pumped into the off-stream reservoirs for storage and later use. The three reservoirs were

sized to cumulatively store approximately 1,200 acre feet of water, and supply approximately 250 acre-feet of water annually.

Pros: - The alternative uses existing CCSD wells as a water source.
- The proposed reservoirs are located relatively close to existing CCSD pipes and wells.

Cons: - CCSD's current permits do not allow water pumped by the San Simeon wells to be stored. This alternative would likely require CCSD to reopen its permits, potentially subjecting them to additional regulatory constraints and limitations.
- Stored water would need to be treated as surface water, requiring a full-time surface water treatment plant.
- CCSD would be required to build, manage, monitor, and maintain new reservoirs.
- Reservoir permitting can be relatively long and difficult.
- CCSD does not own the land proposed for the new reservoirs.
- High construction costs.
- The State has expressed concerns about the impact of the San Simeon wellfield on San Simeon Creek. Although the additional wellfield pumping that supplies the reservoirs would occur during the winter when there are higher stream flows, the additional pumping may amplify the State's concerns about stream impacts.

6. Hard Rock Water Storage and Recovery (CDM Smith Alternative 6)

This alternative entails pumping additional water from the Santa Rosa #4 well during the winter and piping the water to an Aquifer Storage and Recovery (ASR) wellfield. The water would be injected through ASR wells in the wet season and recovered in the dry season. The ASR wells would store water in fractured bedrock.

Pros: - Uses existing wells as a water source
- Proposed piping is not in Caltrans right of way, potentially simplifying permitting.

Cons: - CCSD's current permits do not allow water pumped by the Santa Rosa wells to be stored. This alternative would likely require CCSD to reopen its permits, potentially subjecting them to additional regulatory constraints and limitations.
- Hard rock fractures generally have very little storage capacity, and the amount of water that can be stored is uncertain.
- Requires up to 42 new ASR wells.
- CCSD does not own the land where the ASR wells would be located.

7. Seasonally Store Water in Whale Rock Reservoir (CDM Smith Alternative 7)

This alternative entails pumping additional water from CCSD's existing wells during the wet season, piping the water to Whale Rock Reservoir, and seasonally storing the water in the reservoir. Stored water could be piped from the reservoir to Cambria during the dry season.

Pros: - Uses an existing reservoir for storage.
- Relatively simple technology.

Cons: - CCSD's current permits do not allow water pumped by the Santa Rosa wellfield or San Simeon wellfield to be stored. This alternative would likely require CCSD to reopen its permits, potentially subjecting them to additional regulatory constraints and limitations.
- A relatively long pipeline must be built in Caltrans right-of-way along Highway 1.
- It is unclear if the City and County of SLO will permit seasonal storage in Whale Rock Reservoir.

WASTEWATER ALTERNATIVES

8. Use San Simeon's Treated Wastewater to Offset Cambria's Potable Water Demands (CDM Smith Alternative 8)

This alternative entails treating raw wastewater from San Simeon at an upgraded CCSD wastewater treatment plant.

Pros: - Uses known technologies.

Cons: - The limited demand for non-potable water (for business and irrigation) will likely not produce adequate potable water demand savings. The amount of new potable water is likely negligible.
- Discussions with San Simeon CSD regarding regional water and wastewater management have not been fruitful.
- The future status of the San Simeon wastewater treatment facility is unclear.

OPTIONS DEVELOPED AFTER PREVIOUS STUDIES

Four water supply and storage alternatives have been proposed or developed since the 2013 *Cambria Water Supply Alternatives, Engineering Technical Memorandum*.

9. Warren Reservoir

This alternative entails building a seasonal storage reservoir on private land near CCSD's existing WRF. This alternative is similar to the San Simeon Creek Off-Stream Storage alternative proposed in the memorandum. Water from CCSD's existing wellfield would be pumped into the Warren reservoir for storage and later use. The reservoir is sized to hold approximately 700 acre-feet of water, seasonally. It is unclear how much of the 700 acre feet would be available for annual supply.

Pros: - Uses existing CCSD wells as a water source
- The proposed reservoir is located very close to existing CCSD pipes and wells

Cons: - CCSD's current permits do not allow water pumped by the San Simeon wells to be stored. This alternative would likely require CCSD to reopen its permits, potentially subjecting them to additional regulatory constraints and limitations.
- Stored water would need to be treated as surface water, requiring a full-time surface water treatment plant.

CCSD would be required to build, manage, monitor, and maintain a new reservoir.

- Reservoir permitting can be relatively long and difficult.
- CCSD does not own the land proposed for the new reservoirs. The land owner appears open to the project, but the cost and details of building the reservoir must still be developed.
- High construction costs.
- The State has expressed concerns about the impact of the San Simeon wellfield on San Simeon Creek. Although the additional wellfield pumping that supplies the reservoirs would occur during the winter when there are higher stream flows, the additional pumping may amplify the State's concerns about stream impacts.

10. Regional Desalination Plant

The County of San Luis Obispo has initiated a five-phase planning process for potentially developing and constructing a regional desalination plant. CCSD has expressed interest in being a participant in the planning process.

Pros: - Provides a reliable, drought-proof source of water.
- Costs could be shared with other regional partners, making this alternative potentially less expensive than a smaller desalination plant.

Cons: - Likely long timeline before a desalination plant is built. The County's current timeline shows the desalination plant potentially being built in 2045.

- The desalination plant's location is unknown. Piping water from the plant to CCSD may involve extensive and expensive piping.
- Cost of the plant and cost of the produced water is unknown.

11. Direct Potable Reuse

The state of California recently released its proposed Direct Potable Reuse (DPR) regulations for public review. Although not a new source of water, DPR may provide the District an option for more efficient operation of the WRF. The WRF currently employs Indirect Potable Reuse (IPR). Indirect potable reuse requires that WRF product water be injected and stored underground for an established period before the water can be pumped into the distribution system. Direct potable reuse would allow WRF product water to be directly placed into the District's distribution system.

Direct potable reuse would require improvements and upgrades to the existing WRF. Additionally, it is likely the state of California will proceed cautiously with its initial DPR permits. Therefore, although DPR provides the District increased efficiency in its use of WRF product water, this option may not be available for many years.

- Pros:
- More efficient use of existing wastewater.
 - Could leverage the existing WRF infrastructure. The WRF infrastructure provides some of the required treatment for DPR.
- Cons:
- Would require a change to the WRF project description.
 - Likely a long timeline for the state of California to adopt DPR regulations, tests DPR in highly monitored systems, then allow wider adoption of DPR.
 - Requires some additional treatment be added to the WRF.
 - May require additional monitoring and oversight of the WRF.

12. Reduce Water Loss

There is a discrepancy between the amount of water pumped into the CCSD's distribution system and the amount of water billed to customers. This is referred to as water loss and is endemic to all municipal water systems. The CCSD's water loss ranges between 10% and 17%. Water loss can result from leaks, pipe failures, meter errors, measurement inaccuracies, or water theft. Some of the losses due to leaks or pipe failures could be reduced by identifying and repairing leaks in the existing distribution system. This would effectively provide the CCSD additional water to provide customers.

Pros: - Relatively low cost to implement.
- No new wells or pipelines needed.

Cons: - The water savings may be minimal if the water loss is due to meter error or measurement inaccuracy
- Requires ongoing monitoring and maintenance to avoid future water loss.

13. Add San Simeon Wastewater to the WRF Input Stream¹

Increasing the amount of wastewater treated by the WRF could effectively increase the amount of water percolated into the aquifer supplying the San Simeon wellfield. This could result in additional water supplies for the San Simeon Wellfield, and possibly fewer stream impacts.

Pros: - Leverages CCSD's existing infrastructure.
- Relatively little infrastructure needs.
- The additional water stored in the aquifer may result in reduced stream impacts.

Cons: - Running the San Simeon wastewater through the WRF every year would require a change to the WRF project description.
- Discussions with San Simeon CSD regarding regional water and wastewater management have not been fruitful.
- The future status of the San Simeon wastewater treatment facility is unclear.

¹ California State Parks could also be a cooperating agency under this option by treating the State Parks wastewater through the WRF.

REFERENCES

CDM Smith, 2013. Cambria Water Supply Alternatives, Engineering Technical Memorandum, prepared for the Army Corp of Engineers and the Cambria Community Services District, 236 pp.

Kennedy/Jenks, 2004. Assessment of Long-Term Water Supply Alternatives, prepared for Cambria Community Services District, 118 pp.