



**AGENCY:** City Council  
**MEETING DATE:** June 11, 2018  
**DEPARTMENT:** Public Works  
**PRESENTED BY:** D O'Connor  
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## AGENDA ITEM SUMMARY

**TITLE:**

**Receive Report and Presentation for Desalination Plant Feasibility Study and Provide Direction**

**ISSUE:**

The City's recent experience with prolonged drought (from 2013 through 2016) raised questions about the City's ability to serve existing and future water customers. A variety of potential, supplemental water sources are being considered, including desalination. Water Desalination has been a topic of discussion at various City Council meetings since the water emergency in 2015. This desalination feasibility study has been prepared to evaluate the use of brackish water desalination as a potential water supply.

**ANALYSIS:**

In order to identify a long-term solution to the City's water supply issues, the City is exploring the feasibility of constructing a small-scale desalination plant. Desalination is a process that extracts minerals from saline or brackish water. The Reverse Osmosis (RO) system is now the fastest growing segment of the desalination market. The basis of the RO system is a semi-permeable membrane that allows the water that is being purified to pass through it, while rejecting a high percentage of unwanted constituents (salts). About 50% of all recently installed seawater desalination plant capacities are based on RO technology. The remarkable growth in this desalination method is due to reduced energy consumption, lower specific investment cost, shorter plant construction time and simplified capacity increases via expansion of the membrane systems.

On August 14, 2017, City Council directed the City to proceed with a Desalination Feasibility Study. The primary objective for performing the study is to determine if desalination can provide water security for the City. Desalination has the potential to provide an independent and locally controlled water supply that avoids some of the reliability and regulatory issues associated with the City's current surface water supplies, and should enable the City to provide a reliable supply of water for new development.

**Current Water Supply & Storage.** The City currently has sufficient water supply and storage to meet demand under normal operation conditions. The challenge for the City is that all of the City's water comes from surface diversions listed in the table below.

Table 1: City of Fort Bragg Water Appropriations			
Water Supply Source	Permit or License ID	Maximum Annual Water Appropriations in Acre Feet (AF) and Million Gallons (MG)	Estimated Reliable Diversion Capacity in Gallons per Minute (gpm)
1. Noyo River	P11383	1,500 AF (489 MG)	1346 gpm
2. Newman Gulch	S009340	300 AF (98 MG)	224 gpm
3. Waterfall Gulch	012171	475 AF (155 MG)	300 gpm
<b>Total</b>	<b>n/a</b>	<b>2,275 AF (741 MG)</b>	<b>1870 gpm</b>

During the fall of 2015 drought conditions, the City needed to replace 200,000 to 300,000 gallons per day when salt water intrusion took the Noyo River source temporarily off-line during double high tides. In 2016, the City constructed a 45 AF (14.6 MG) water storage facility on Summers Lane in order to provide emergency water supply, increasing the City's total raw water storage to 18 million gallons. Had the Summers Lane Reservoir been at full capacity it would have been sufficient to meet the water supply and storage challenges given the 2015 drought conditions. The City's current water supply is nearing capacity, however, and alternatives need to be considered for future water supply reliability.

***Future Water Storage and Supply Issues.*** Over the long term, other factors affect the City's water supply and storage options and/or increase water demand, including:

1. Future development on the Mill Site may increase water demand by up to an additional 200,000 gallons per day. Developers of this area will be expected to closely collaborate with the City in identifying water supply for mill site development.
2. Climate change may result in long-term changes to the quality and quantity of our annual rainfall, potentially limiting surface intake. A sea level rise could lead to more salt water intrusion into the City's water collector on the Noyo during periods of high tide and low river flow. This could potentially reduce the availability of Noyo River water during low flow/high tide periods.
3. Regulatory changes may further impact diversion rates on one or more current surface water sources.

The Request for Proposals (RFP) for the desalination feasibility study was distributed on August 22, 2018. The contract was awarded to Coleman Engineering by City Council Resolution 4048-2017 on November 27, 2017. Coleman Engineering was tasked with determining optimal system sizing and preparing an overview of the regulatory process, including a summary of regulatory agencies, anticipated issues, and possible permitting costs. Coleman was provided with the brine chemistry from a local well in order to anticipate processing requirements. Coleman proposed providing a schematic design and highlighting technical issues associated with constructing a local desalination plant. The project deliverables were supplied in a technical memo format and include construction and operational cost estimates.

The technical memos provided by Coleman Engineering address many of the issues to be considered before building a desalination plant here in the City, which include:

1. **Brine Supply:** Access to an adequate supply of brine. The brine chemistry and the volume of dissolved solids will determine what level of treatment will be required. Ideally the brine will come from subsurface near sea-level wells rather than directly from the ocean.
2. **Site Location:** Finding an acceptable site which considers both sensitive environmental areas and construction and operational costs.
3. **Power Supply:** Extending electricity (or alternate power source) to power the plant
4. **Disposal:** Determining an acceptable brine disposal method and location.
5. **Permitting:** Securing appropriate environmental permitting and public approval.
6. **Funding:** Obtaining adequate funding.

Constructing an RO desalination plant with a potential 75% recovery rate of water could provide the City with an additional 200,000 gallons of water per day (139 GPM). As water demand grows, the plant can increase volumes by adding to the existing membrane system.

**RECOMMENDED ACTION:**

Receive presentation from Coleman and provide direction to Public Works regarding the pursuit of desalination technologies for the City of Fort Bragg.

**ALTERNATIVE ACTION(S):**

No action.

**FISCAL IMPACT:**

The preliminary estimate of construction costs for a complete desalination facility based on the study is around \$5.2 million with operating costs approximating \$124,000 per year.

**CONSISTENCY:**

The study is consistent with and met all requirements of the RFP for the Desalination Feasibility Study.

**IMPLEMENTATION/TIMEFRAMES:**

None.

**ATTACHMENTS:**

1. Technical Memorandum

**NOTIFICATION:**

None.