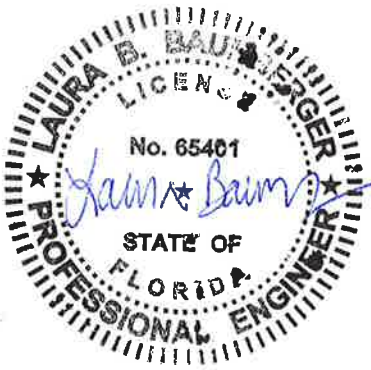
September 2015

# 2015 WATER SUPPLY STUDY

## FINAL REPORT

carollo

Engineers...Working Wonders With Water®




Laura B. Baumberger
P.E. No. 65401

carollo

# CITY OF PUNTA GORDA

# 2015 WATER SUPPLY STUDY

# WATER SUPPLY STUDY REPORT

**FINAL**
September 2015

401 NORTH CATTLEMEN ROAD, SUITE 306 • SARASOTA, FLORIDA 34232 • P. 941.371.9832 • F. 941.371.9873
pw://Carollo/Documents/Client/FL/Punta Gorda/7549Y00/Deliverables/WSS Report

**CITY OF PUNTA GORDA**

**2015 WATER SUPPLY STUDY**

**WATER SUPPLY STUDY REPORT**

## TABLE OF CONTENTS

**Page**

## LIST OF TABLES



## LIST OF FIGURES

# 1.0 EXECUTIVE SUMMARY

The purpose of the Water Supply Study is to evaluate supplemental water sources that will allow the City of Punta Gorda (City) to meet the total dissolved solids (TDS) standard at all times through 2035. This Executive Summary (ES) provides an overview of the analysis and results of two potential projects evaluated for their ability to meet this standard.

## 1.1 Project Overview

The Shell Creek Facility (SCF) experiences high TDS concentrations and requires a supplemental water source that can be used to augment the finished water supply and lower the TDS to 500 mg/L or less in order to meet the secondary maximum contaminant level (SMCL), referred to in this document as the TDS standard. The two projects evaluated as supplemental water supply sources are:

1. The Phase 1 pipeline, which would allow the City to purchase water from the Peace River Manasota Regional Water Supply Authority (Authority), and

2. A 4-mgd reverse osmosis (RO) facility.

The City has the option to participate in a project with the Authority to construct a pipeline between the SCF and the Peace River Facility (PRF). This pipeline would provide a regional connection between the facilities, allowing the City to qualify for cooperative funding (matching grant funding) from the Southwest Florida Water Management District (SWFWMD). The Authority's pipeline project, termed Phase 1, is a 6-mile, 24-inch diameter pipeline capable of transferring 4 mgd from the Authority to the City. It should be noted that if a booster pump station were constructed to allow transfer of more water (up to 5 mgd) the results of this study would vary. However, because the booster pump station is not included in the current project description it was not included in this report.

## 1.2 Project Evaluations

The WSS evaluates the Authority Phase 1 pipeline and RO facility projects and assesses the ability of each to provide a blended water TDS concentration of 500 mg/L or less. For this analysis, it was assumed that both projects would be completed in 2018. The Authority project was evaluated as a short-term solution from 2018 to 2020, and the RO facility was evaluated as a long-term solution from 2018 through 2035.

Blending analyses were conducted to evaluate project performance in a historical "look-back" scenario using actual monthly water demand and TDS data from 2007 to 2014. The projects were also evaluated in future scenarios (termed "projection scenarios") based on future water demand projections and average/maximum historical SCF TDS concentrations.

Projection scenarios used average Authority finished water TDS concentrations for all analyses.

A cost analysis was completed to determine the blended finished water costs of each project in combination with the existing SCF. The cost analysis included 2015 capital cost estimates for the RO facility and assumed a City contribution of $2 million towards the Authority Phase 1 pipeline project. Operation and maintenance (O&M) costs were calculated for each water source (SCF, Authority Phase 1 pipeline, and RO facility) and applied to the annual amount of water required from each source based on the blending analysis results. An agreement between the City, Authority, and SWFWMD is being negotiated in which SWFWMD will provide cooperative funding for half of the capital RO facility costs if the City participates in the Phase 1 pipeline interconnect project. The combined costs of the Phase 1 pipeline and the funded RO facility were evaluated based on the proposed agreement.

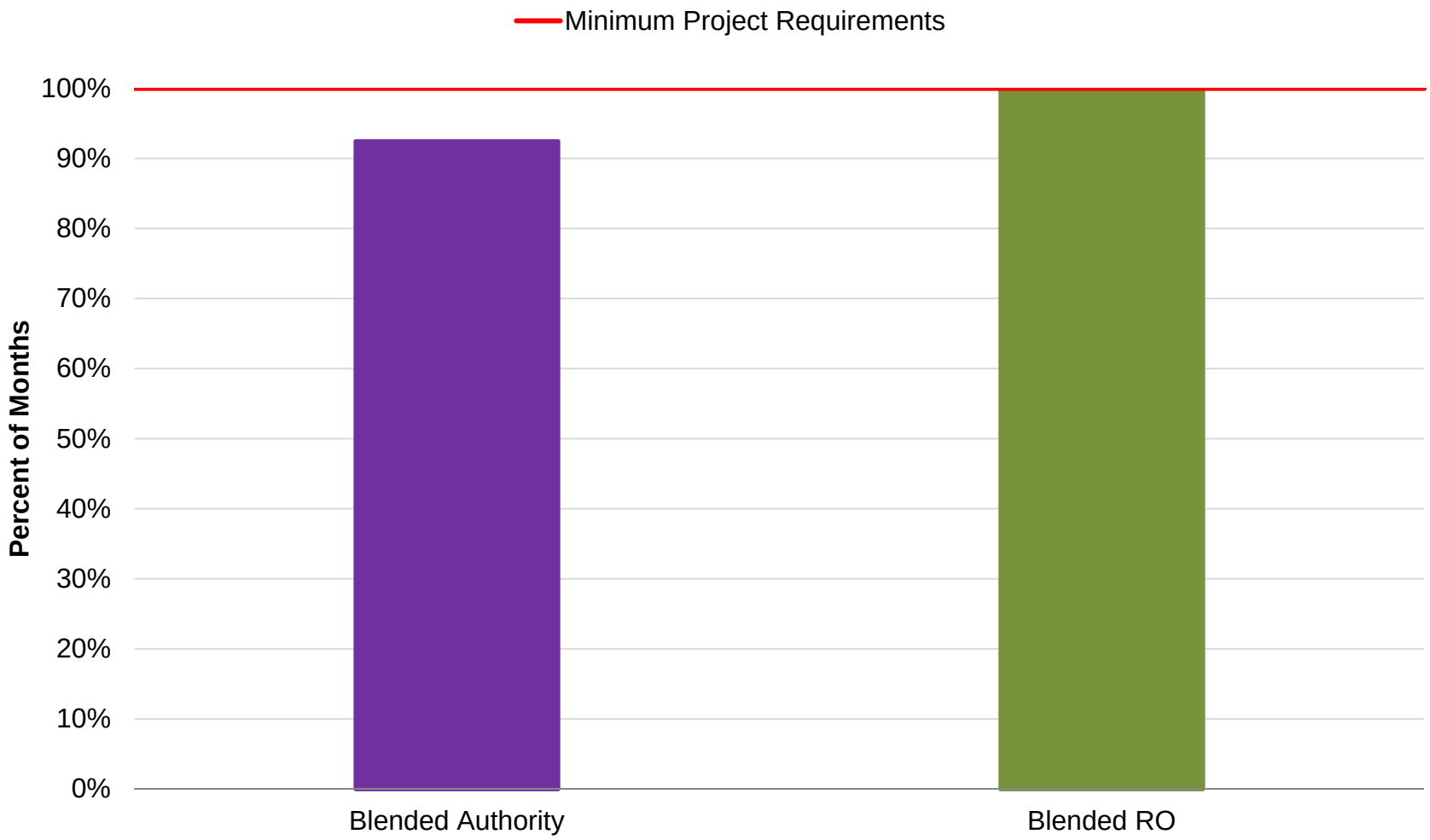
## 1.3 Results

The blending analysis revealed that the RO project can meet the TDS standard within all evaluated scenarios while the Authority Phase 1 pipeline project could not meet the TDS standard under all evaluated scenarios.

The look-back evaluation showed that the RO project would have been able to meet the TDS standard 100 percent of the time (Figure 1). Had the Authority Phase 1 pipeline been in place, the TDS standard would have been met 92 percent of the time (assuming a maximum 4 mgd water purchase from the Authority and minimum 2 mgd production at SCF). The look-back evaluation methodology has validity because it uses actual historical water demand and TDS concentrations and it does not have the uncertainty associated with future projections.

The projection scenarios showed that the RO project can meet the TDS standard at all times for both average and maximum historical SCF TDS concentrations. The RO facility would allow the SCF to produce blended TDS concentrations that are less than 500 mg/L for projected peak flow conditions through 2035.

In the future projection scenarios, the Authority Phase 1 pipeline project was able to meet the TDS standard at historical average but not historical maximum TDS conditions at the SCF. If the SCF TDS were to repeat its historical maximum condition (since 2007), the blended water TDS could be expected to exceed 500 mg/L three times per year from 2018 to 2020. This blending result assumes a Phase 1 pipeline maximum capacity of 4 mgd and minimum of 2 mgd production at SCF. The Phase 1 pipeline capacity could be increased with the installation of a booster pump station. Though the Authority Phase 1 pipeline project was not evaluated at a capacity of 5 mgd, it is expected that the blending analysis results would vary from the results presented in this report.




**LOOK-BACK SCENARIO RESULTS: PERCENT OF MONTHS TDS STANDARD MET**

FIGURE 1

CITY OF PUNTA GORDA
2015 WATER SUPPLY STUDY

carollo

pw:\\Carollo/Documents\Client/FL/Punta Gorda/7549Y00/Deliverables\Figure 1

The blending results for the look-back and projection scenarios are summarized in Figure 2.

The projected total water cost ranges from $2.64/kgal to $3.13/kgal for the Authority Phase 1 pipeline project depending on SCF TDS concentrations. These costs are the total blended water costs for both water produced at the SCF and water purchased from the Authority.

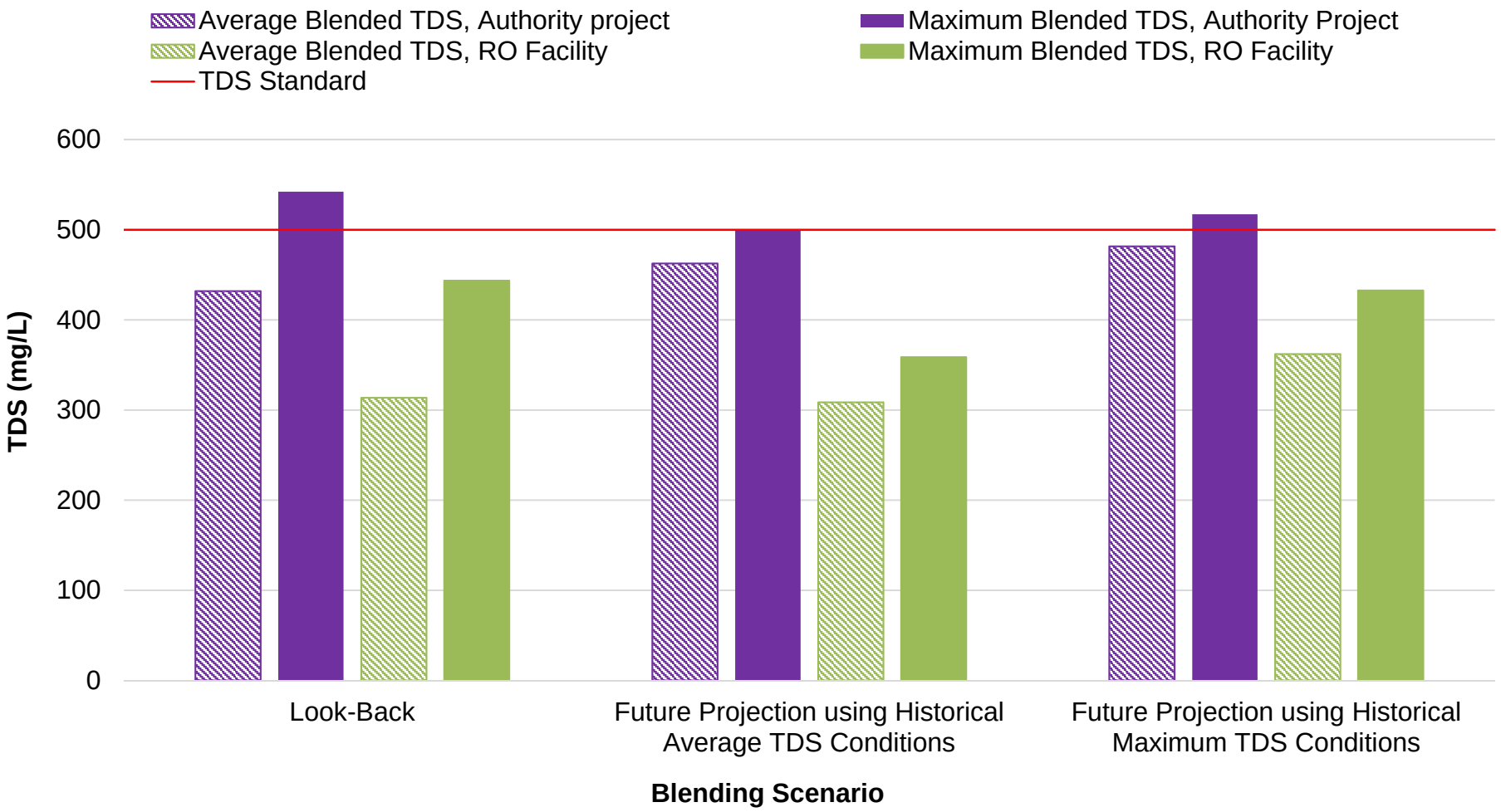
The total projected water cost for the RO facility with cooperative funding (50 percent match) is $2.59/kgal. The cost would increase to $3.23/kgal without cooperative funding. These costs are the total blended water costs for water produced at both the SCF and the RO facility.

If both projects are constructed, the blended water cost (average over the 20-year analysis period) including existing SCF costs is $2.65/kgal. In this scenario, the City would construct both projects, but relies on the RO facility for blending to meet the TDS standard and does not purchase water from the Authority for blending. The Phase 1 pipeline would provide reliability and redundancy to an interconnected regional water source. Table 1. summarizes the cost estimates.

**Table 1 Cost Analysis Summary**
**2015 Water Supply Study**
**City of Punta Gorda**

| Project | Scenario | Cost ($/kgal)(1) |
|---|---|---|
| Authority Phase 1 Pipeline | Projection based on historical average SCF TDS(2) | $2.64 |
| Authority Phase 1 Pipeline | Projection based on historical maximum SCF TDS(3) | $3.13 |
| RO Facility (no SWFWMD funding) | Projection based on historical SCF TDS(4) | $3.23 |
| RO Facility (with SWFWMD funding) | Projection based on historical SCF TDS(4) | $2.59 |
| RO Facility (funded) and Authority Phase 1 Pipeline | Projection based on historical SCF TDS(4) | $2.65 |

Notes:
(1) Total blended water costs for water produced at both the SCF and the new water supply project. Cost reflects average blended water cost over life of the project (2018-2020 for purchase of Authority water through Phase 1 pipeline and 2018-2035 for the RO facility).
(2) Based on historical average SCF TDS concentrations, 2007 to 2014.
(3) Based on historical maximum SCF TDS concentrations, 2007 to 2014.
(4) There is no cost difference between historical average and historical maximum TDS for the RO project.




**BLENDING ANALYSIS RESULTS SUMMARY**

FIGURE 2

CITY OF PUNTA GORDA
2015 WATER SUPPLY STUDY

carollo

pw:\\Carollo/Documents\Client/FL/Punta Gorda/7549Y00/Deliverables\Figure 2

## 2.0 INTRODUCTION

In 2009, Carollo prepared the Water Supply Master Plant (WSMP) Update to address the City's water supply needs through 2034. A number of water supply strategies were evaluated to determine the most appropriate and effective approach to meet the City's projected water needs. The recommended scenario in WSMP Update was to construct an RO treatment facility to treat brackish water from a groundwater source. Water from the RO facility would supplement the 10 mgd capacity of the SCF, a surface water treatment system, to meet the City's future water demand needs and to meet the required TDS concentration. Blending the lower salinity (low TDS) water produced by the RO process with the water produced by the SCF would allow the City to continue to utilize the SCF while meeting the TDS standard.

Following the 2009 WSMP Update, a preliminary design report was completed for a 4 mgd RO treatment facility. The City applied to the SWFWMD for the 2015 Cooperative Funding Initiative (CFI) funding cycle for the RO project. SWFWMD staff requested the evaluation of an additional water supply alternative: regional purchase from the Authority. The City would purchase water produced by the PRF, which would be blended with SCF water to meet the TDS standard. The Authority Phase 1 pipeline project includes the installation of approximately six miles of 24-inch diameter pipeline capable of transferring 4 mgd between the PRF and the SCF.

The purpose of the Water Supply Study is to evaluate supplemental water sources that will allow the City to meet the TDS standard at all times through 2035.

## 3.0 WATER DEMAND PROJECTIONS

Average annual water demand projections were developed using three different methods: 1) based on historical water use and the historical growth rate in the City's water service area, 2) linear regression of historical water demand, and 3) based on historical water use and Bureau of Economic and Business Research (BEBR) population projections for Charlotte County.

Historical water demand data were evaluated to estimate annual water use. Historical water production and functional population, determined by the SWFWMD methodology, were used to calculate the average gallons per capita per day (gpcd) for each historical year. The average annual water demand from 1990 to 2001 was assumed to be equal to the annual metered raw water withdrawals. The City commenced operation of aquifer storage recovery (ASR) wells in 2001. The ASR wells are used to store water withdrawn in excess of demand and can also provide water when demands exceed raw water withdrawals. The raw water withdrawals occurring after 2001 were adjusted based on ASR injections/withdrawals to represent actual water demand (water sent to City utility customers). Annual ASR injection amounts were removed from the total amount of raw

water withdrawn, while the amount of water withdrawn from the wells to supplement the raw water supply was added to the amount of raw water withdrawn.

Since the implementation of the Phase 1A pipeline in 2012, the City and the Authority have exchanged water through the Phase 1A pipeline for operational and maintenance purposes. The monthly demand values for October 2012 through December 2014 were adjusted to account for water transferred between the Authority and the City. Water transferred to the Authority was subtracted from the monthly water production, as this water was not used to meet the City's demand. The amount of water received from the Authority was added to the monthly demand. Annual average demands for 2004 to 2014 were calculated from the monthly total water to town amounts provided in the City's monthly operating reports. The annual average water demand was divided by the functional population to determine the average gpcd for each year. Average gpcd values ranged from 112 to 142 gpcd over the last ten years. The 10-year average gpcd, 122, was used for the water demand projections presented within this study.

Demand projections calculated in the following sections provide annual demand projections, but do not account for the seasonal variations in demand that are typically seen in Punta Gorda. To account for these variations, 10 years (2005 to 2014) of historical monthly demand data were used to develop average monthly peaking factors. These peaking factors (PFs) were applied to the annual demand for each month to estimate average monthly demands. The 10-year monthly PFs are included in Table 2.

**Table 2 10-Year Average Monthly Peaking Factors**
**2015 Water Supply Study**
**City of Punta Gorda**

| Month | Peaking Factor |
|---|---|
| January | 1.05 |
| February | 1.08 |
| March | 1.13 |
| April | 1.15 |
| May | 1.12 |
| June | 0.97 |
| July | 0.83 |
| August | 0.80 |
| September | 0.84 |
| October | 0.92 |
| November | 1.06 |
| December | 1.06 |

## 3.1 Water Demand Projections Based on Historical Per Capita Demand and 10-Year Historical Growth Rate

Estimated functional populations derived using the SWFWMD methodology were used to determine historical population growth rates. The number and type of water meter accounts within the service area were used to estimate the population within the City service area. The SWFWMD methodology also accounts for seasonal, tourist, and commuter populations. Average growth rates ranged from -0.23 percent over the last five years to 2.34 percent over the period of record (1990 to 2014). The 10-year average growth rate, 1.61 percent, was used to estimate the projected functional population from 2015 to 2035 in this analysis method.

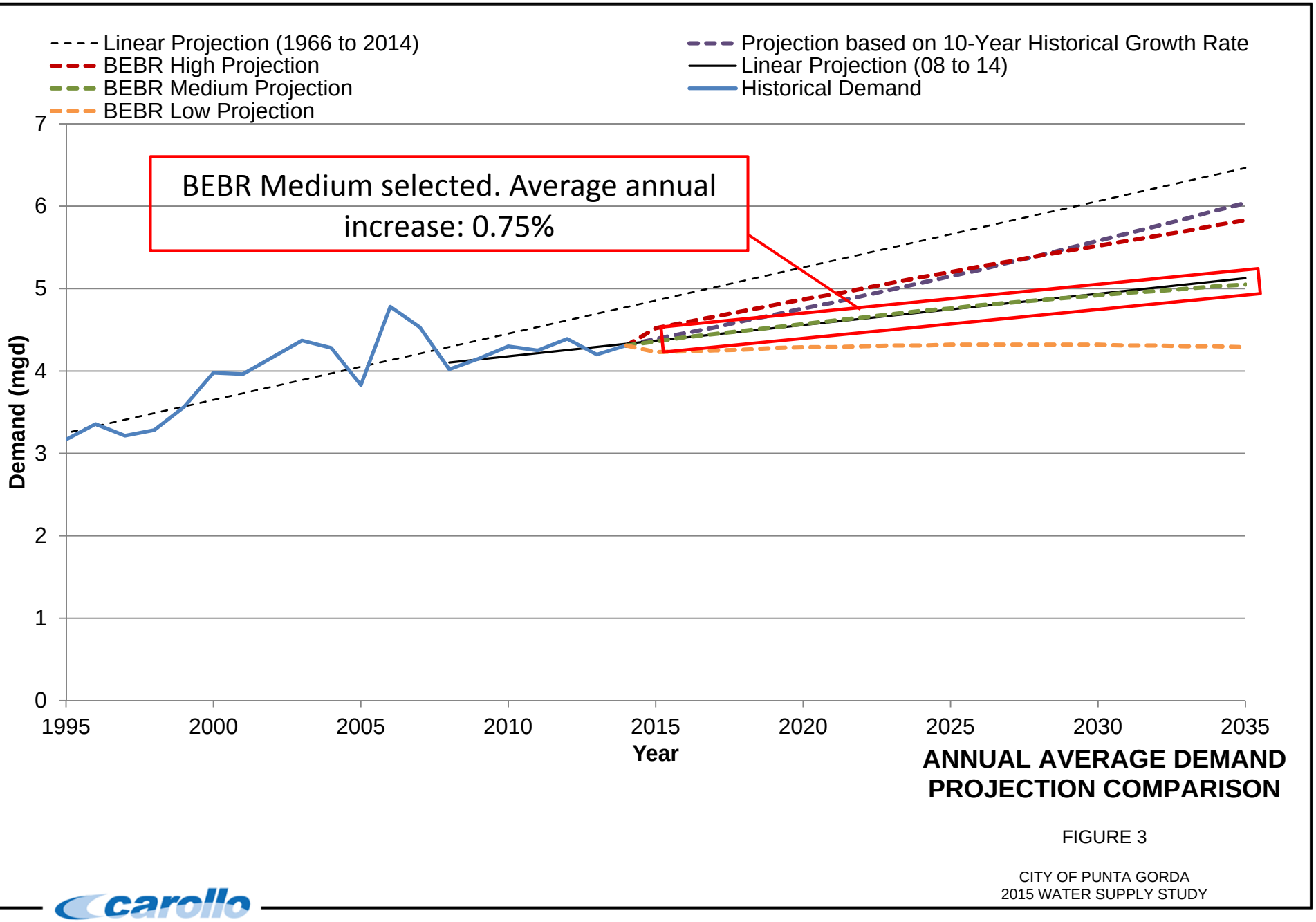
Water demand projections were developed by multiplying the projected functional populations from 2015 to 2035 by the average per capita water demand, 122 gpcd. Projected annual average demands are displayed in Figure 3 along with the demand projections developed using the linear regression and BEBR methods, which are discussed in subsequent sections.

## 3.2 Linear Regression Water Demand Projections

Historical water demands were plotted for the entire period of record (1966 to 2014), the last 20 years, the last 10 years, and the period from 2008 to 2014 to develop linear regression models to predict future water demand. The period of record linear regression had the best fit ($R^2$ = 0.9432) and is included in Figure 3. This projection method resulted in the highest projected demand over the planning period. Figure 1 also shows the 2008 to 2014 linear regression ($R^2$=0.4525), as this projection was more closely related to the results from the other projection methods.

## 3.3 Water Demand Projections Based on Historical Per Capita Demand and BEBR Population Projections

BEBR provides high, medium, and low population projections for five-year periods for all counties in Florida. The Charlotte County current BEBR population estimate and BEBR projections for 2015, 2020, 2025, 2030, and 2035 were used to calculate the percent change for each period based on the high, medium, and low projections. The calculated percent change for each period was then applied to the City's 2014 functional population. The populations for the years between each five-year period were interpolated linearly. The average percent change over the 20-year period from 2015 to 2035 was -0.03, 0.75, and 1.44 percent for the BEBR Low, Medium, and High projections, respectively. The average 10-year per capita water use (122 gpcd) was applied to determine the annual average demand for 2015 to 2035. The BEBR High, Medium, and Low water demand projections are shown in Figure 3.




**ANNUAL AVERAGE DEMAND PROJECTION COMPARISON**

FIGURE 3

CITY OF PUNTA GORDA
2015 WATER SUPPLY STUDY

carollo

## 3.4 Selected Demand Projection Summary

The estimated water demand projected by the 10-year historical growth rate method, the linear regression method, and the BEBR Low, Medium, and High projection methods are compared in Figure 3. The BEBR Medium method was selected as the projection method for this study. The BEBR Medium projection method has been used in previous reports for the City and was used for the SWFWMD 2015 Regional Water Supply Plan as a reasonable water supply demand estimate. The TDS blending scenarios were evaluated based on the projected populations and water demand determined using the BEBR Medium projection method. Table 3 includes the 2015 to 2035 BEBR Medium projections for the annual population and annual average, maximum month, and peak day demand.

**Table 3 Water Demand Projections for the Punta Gorda Service Area 2015 Water Supply Study City of Punta Gorda**

| Year | Punta Gorda Service Area Population[1] | Annual Average Demand (mgd)[2] | Maximum Month Demand (mgd)[3] | Peak Day Demand (mgd)[4] |
|---|---|---|---|---|
| 2013[5] | 35,176 | 4.20 | 4.81 | 6.07 |
| 2014[5] | 35,414 | 4.31 | 5.32 | 6.45 |
| 2015 | 35,761 | 4.36 | 5.80 | 7.37 |
| 2016 | 36,108 | 4.41 | 5.87 | 7.45 |
| 2017 | 36,455 | 4.45 | 5.92 | 7.52 |
| 2018 | 36,801 | 4.49 | 5.97 | 7.59 |
| 2019 | 37,147 | 4.53 | 6.02 | 7.66 |
| 2020 | 37,492 | 4.57 | 6.08 | 7.72 |
| 2021 | 37,803 | 4.61 | 6.13 | 7.79 |
| 2022 | 38,113 | 4.65 | 6.18 | 7.86 |
| 2023 | 38,426 | 4.69 | 6.24 | 7.93 |
| 2024 | 38,737 | 4.73 | 6.29 | 7.99 |
| 2025 | 39,047 | 4.76 | 6.33 | 8.04 |
| 2026 | 39,305 | 4.80 | 6.38 | 8.11 |
| 2027 | 39,560 | 4.83 | 6.42 | 8.16 |
| 2028 | 39,817 | 4.86 | 6.46 | 8.21 |
| 2029 | 40,072 | 4.89 | 6.50 | 8.26 |
| 2030 | 40,328 | 4.92 | 6.54 | 8.31 |

| Table 3 Water Demand Projections for the Punta Gorda Service Area<br>2015 Water Supply Study<br>City of Punta Gorda | | | | |
|---|---|---|---|---|
| Year | Punta Gorda Service Area Population[(1)] | Annual Average Demand (mgd)[(2)] | Maximum Month Demand (mgd)[(3)] | Peak Day Demand (mgd)[(4)] |
| 2031 | 40,546 | 4.95 | 6.58 | 8.37 |
| 2032 | 40,765 | 4.97 | 6.61 | 8.40 |
| 2033 | 40,985 | 5.00 | 6.65 | 8.45 |
| 2034 | 41,202 | 5.03 | 6.69 | 8.50 |
| 2035 | 41,420 | 5.05 | 6.72 | 8.53 |

Notes:

(1) Based on BEBR Medium population projection growth in Charlotte County
(2) Calculated using the average per capita water use amount of 122 gpcd
(3) Maximum 10-year maximum month PF (1.33) applied to average demand
(4) Maximum 10-year peak day PF (1.69) applied to average demand
(5) Actual functional populations and water demand

The demand projections presented in Table 3 were used to conduct the blending analysis for the Authority and RO projects. The BEBR Medium projections provide annual average demand, and the 10-year monthly PFs (Table 2) were applied to the annual demand for each month to estimate monthly demands.

## 3.5 Peak Water Demand Projections

Projected maximum month and peak day demands were evaluated for the City using the BEBR Medium population and water demand projections. Future demands were estimated by applying historical 10-year maximum month and peak day PFs to the projected average daily demands.

### 3.5.1 Maximum Month Water Demand Projections

The maximum monthly demand is defined as the average daily demand that occurs during the highest demand month within a year. Since 1966, the highest demands have occurred in May (33 percent) and April (29 percent) followed by March (10 percent). Over the last 10 and 20 years, the highest demands occurred in March and May followed by April. Demand data were not available for 2002, so the 20-year analysis extends back to 1995. The maximum monthly PF over the period of record (1966 to 2014) was 1.57 and the average was 1.29. The two highest monthly demands, 1.57 and 1.51, which occurred in May 1983 and April 2006, respectively, were excluded from the selection of the maximum PFs since these were the only PFs greater than 1.5 over the entire 49 year period of record. The maximum monthly PF was therefore 1.46 over the period of record (1966 to 2014), 1.35 over the last 20 years, and 1.33 over the last 10 years. The 10-year maximum monthly

peaking factor was selected for the demand analysis. Though the monthly peaking factor has been higher, the 1.33 peaking factor better represents the most recent conditions in the distribution system.

The 10-year maximum monthly PF, 1.33, was used to project the maximum monthly demands through 2035. Table 3 summarizes the projected maximum monthly demands.

### 3.5.2 Peak Day Demand Projection

Historical water withdrawal data was used to determine the peak day demand factors for the period from 1972 to 2014, the past 20 years, and the past 10 years. The highest peak day demand factor, 2.67, which occurred in 2006, was excluded from the analysis as it was substantially higher than the typical peak day peaking factors. The maximum peak day peaking factor between 1972 and 2014 was therefore 1.91, while the 20-year maximum was 1.74 and the 10-year maximum was 1.69. The average peak day peaking factor was the same, 1.65, for the period from 1972 to 2014, the past 20 years, and the past 10 years. The maximum peak day peaking factor that occurred within the last 10 years, 1.69, was selected for predicting future peak day demands in this study. Though lower peak day factors have been seen in recent years, the 1.69 peaking factor was selected as a conservative planning factor to allow for peaks seen throughout the past 10 years. The projected peak day demands are summarized in Table 3.

# 4.0 MINIMUM PROJECT REQUIREMENTS

The two water supply projects, in combination with the existing SCF, were evaluated based on the ability to meet the minimum project requirements listed below.

- Meet projected water supply demands through 2035.
- Meet the TDS standard of 500 mg/L at all times.

The blending analysis methodology in this study uses monthly demands with actual TDS values in the look-back scenario and average and maximum TDS values in the future projection scenarios. This can be reasonably expected to demonstrate if a project will meet the TDS standard of 500 mg/L at all times. When a project does not meet the TDS standard using the blending analysis methodology, it does not meet the project requirement.

# 5.0 WATER SUPPLY PROJECT ALTERNATIVES EVALUATION

The City's demand is projected to reach 5.05 mgd by 2035 based on the BEBR Medium demand projection method. The SCF has the capacity to provide the required quantity of water demand; however, the TDS concentration of the SCF finished water historically exceeds the TDS standard of 500 mg/L more than half of the time. The TDS standard (a secondary maximum contaminant level) is set for aesthetic water quality purposes and exceedances do not present a public health concern. In order to meet the TDS standard,

finished SCF water requires blending with a water supply that has lower TDS concentrations. The SCF was granted a variance from the Florida Department of Environmental Protection (FDEP) that allows the City to exceed the TDS standard until May of 2016. The City plans to request an extension until the selected water supply solution is implemented.

This study evaluates two project alternatives (the RO facility and regional purchase from the Authority) for the ability to meet the City's future water demands, the TDS standard, and the associated costs. Blending analyses were conducted to determine if the projects can achieve a maximum TDS of 500 mg/L and the amount of water that will be required from each project. Operational complexities at the SCF increase substantially when less than 2 mgd is produced. Therefore, 2 mgd was assumed to be the minimum water volume that SCF can produce before becoming inactive (0 mgd produced). The RO facility capacity is 4 mgd, and the Phase 1 pipeline connecting the SCF to the Authority will allow for the transfer of a maximum of 4 mgd. The addition of a booster pump station would increase the Phase 1 pipeline capacity. The booster pump station was not evaluated for this report, but would be expected to alter the results of the blending analysis.

It was assumed for this study that both the RO and Authority project could be completed in fiscal year 2018. The RO project was evaluated as a long-term water supply solution for 2018 through 2035. The Authority project was evaluated as a short-term water supply source for 2018 through 2020, since this is not a long-term water supply solution.

A look-back scenario was evaluated using historical SCF and Authority TDS data in order to determine if the TDS standard could have been met in recent history if the Phase 1 pipeline or the RO facility had been in place. Future projection scenarios were evaluated using the City's projected monthly water demand, historical average Authority TDS data, and historical average and maximum SCF finished water TDS data. The RO facility and Authority projects were assessed on the ability to meet 500 mg/L TDS based on the blending analysis and the costs associated with each project.

## 5.1 Blending Analysis

Blending analyses were conducted to evaluate each project's ability to meet the TDS standard of 500 mg/L. Three scenarios were used to evaluate both projects: 1) a look-back scenario using actual historical water demand, monthly PFs, and TDS data, 2) a projection scenario using the BEBR Medium demand projections, 10-year average monthly PFs, and historical average monthly SCF TDS data, and 3) a projection scenario using the BEBR Medium demand projections, 10-year average monthly PFs, and the historical maximum monthly SCF TDS values. Average historical Authority TDS concentrations were used for both projection scenarios. The projection scenarios were short-term (2018 to 2020) for the Authority project and long-term (2018 to 2035) for the RO project.

A mass balance analysis was conducted to determine the amount of Authority or RO water needed to supplement water production at the SCF in order to achieve a blended TDS concentration of 500 mg/L or less. The blending analysis for the RO project assumed an initial blending ratio of 50 percent RO water and 50 percent SCF water. In the event that the blended TDS exceeded 500 mg/L, the blending percentages were altered to achieve 500 mg/L. The mass balance was designed to allow for a maximum of 4 mgd from the Authority or RO projects. For both projects, the amount of SCF water could not be between 0 mgd and 2 mgd due to operational constraints (a minimum of 2 mgd would be produced or the facility would be offline).

### 5.1.1 TDS Data Summary

Monthly lab-certified TDS data were provided for the SCF for 2001, 2002, and 2007 through 2014. TDS values prior to the Watershed Management Plan, implemented in 2004, are not considered to be representative of the existing conditions, and were not included in the blending analysis. Historical (2007 to 2014) average and maximum monthly TDS values from the SCF are presented in Table 4. Appendix A includes all historical TDS data used for the look-back scenario.

**Table 4 TDS Data Used for Future Projection Blending Analysis**
**2015 Water Supply Study**
**City of Punta Gorda**

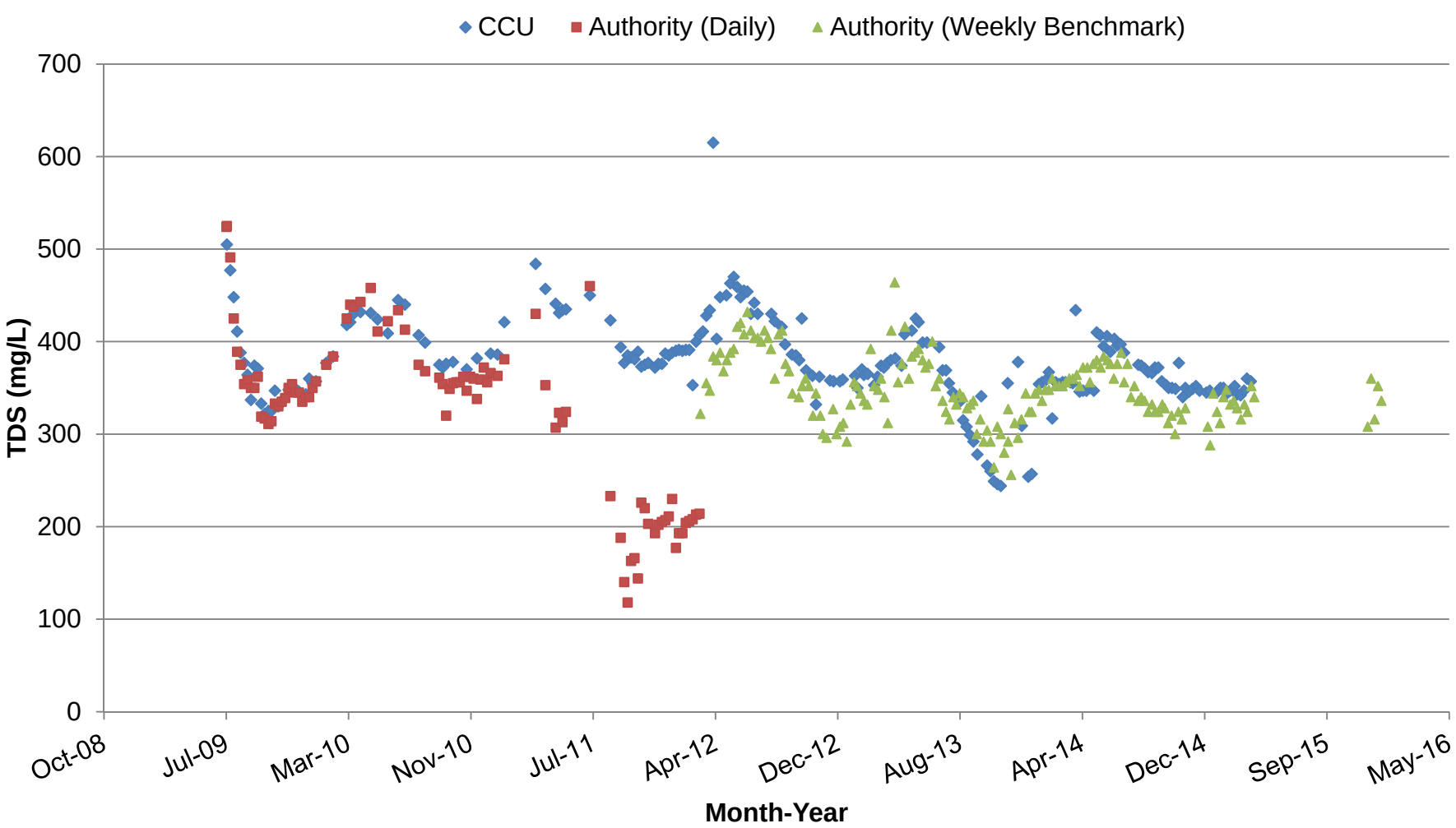
| | SCF[1] | | Authority[2] | RO[3] |
|---|---|---|---|---|
| Month | Average TDS (mg/L) | Maximum TDS (mg/L) | Average TDS (mg/L) | TDS (mg/L) |
| January | 582 | 652 | 331 | 100 |
| February | 618 | 696 | 349 | 100 |
| March | 600 | 676 | 347 | 100 |
| April | 611 | 740 | 376 | 100 |
| May | 609 | 700 | 386 | 100 |
| June | 604 | 644 | 388 | 100 |
| July | 499 | 720 | 365 | 100 |
| August | 419 | 544 | 356 | 100 |
| September | 315 | 432 | 329 | 100 |
| October | 359 | 452 | 316 | 100 |
| November | 461 | 568 | 306 | 100 |
| December | 508 | 632 | 320 | 100 |

Notes:
(1) Average and maximum lab-certified values from 2007 to 2014
(2) Average lab-certified values from March 2012 to April 2015
(3) Conservative estimate based on simulated finished water quality from the 2010 Tetra Tech Preliminary Design Report

The Authority has daily conductivity data available from July 2009 until February 2012, measured using an Oakton® TDS meter (accurate within +/- 1 percent), that was used to estimate TDS with a conversion factor of 0.67. Weekly Authority TDS lab-certified data is available from March 2012 to April 2015. Authority TDS values measured prior to the completion of the reservoir in July 2009 are not considered representative and were not included in the analysis. It is suspected that the Authority conductivity meter failed between August 2011 and February 2012 based on the uncharacteristically low values; therefore, these TDS data were not included in the analysis. Instead, weekly TDS data from Charlotte County, sampled from the County's point of connection with the Authority on Harbor Boulevard, were used as representative values of Authority TDS for August 2011 to February 2012. As shown in Figure 4, the Charlotte County Utilities (CCU) and Authority TDS concentrations are similar (excluding the period in 2011 when the Authority probe malfunctioned).

The 2009 through 2014 Authority data were used for the historical look-back evaluation and are included in Appendix A. For the projection scenarios, the 2012 through 2015 weekly lab-certified Authority TDS data were used to calculate monthly average TDS concentrations. The less than four years of lab-certified TDS data available for the Authority may not fully characterize the range of potential TDS values and may lead to an under- or over-estimation of blended TDS concentrations. The Authority's average monthly TDS concentrations are included in Table 4.

The Rothberg, Tamburini & Winsor (RTW) Model was used to simulate RO finished water quality in the 2010 Tetra Tech Preliminary Design Report. The model predicted a finished TDS value of 70 mg/L following RO treatment, chlorine gas, and caustic soda addition. A TDS concentration 100 mg/L was used for this report as a conservative estimate of RO finished water quality.




**AUTHORITY AND CHARLOTTE COUNTY (CCU) TDS**

FIGURE 4

The blending scenarios evaluated for this WSS and the data descriptions are summarized in Table 5.

| **Table 5** **Blending Scenarios and Data Summary<br>2015 Water Supply Study<br>City of Punta Gorda** | | |
|---|---|---|
| | **Project** | |
| | **Authority** | **RO** |
| General Blending Parameters | • 4 mgd maximum from the Authority<br>• 2 mgd minimum from the SCF<br>• Maximum blended water TDS of 500 mg/L | • 4 mgd maximum from the RO facility<br>• 2 mgd minimum from the SCF<br>• Maximum blended water TDS of 500 mg/L<br>• 50% SCF/RO facility blending (on average) |
| **Scenario** | **Data Description** | |
| Look-Back | • Historical SCF and Authority TDS data (July 2009 to December 2014)<br>• Historical water demand<br>• Historical monthly PFs | • Historical SCF TDS data (2007 to 2014)<br>• RO TDS (100 mg/L)<br>• Historical water demand<br>• Historical monthly PFs |
| Projection Based on Historical Average SCF TDS Concentrations | • Average monthly SCF TDS concentrations (2007 to 2014)<br>• Average monthly Authority TDS concentrations (March 2012 to April 2015)<br>• BEBR Medium demand projections (2018 to 2020)<br>• Average 10-year monthly PFs | • Average monthly SCF TDS concentrations (2007 to 2014)<br>• RO TDS (100 mg/L)<br>• BEBR Medium demand projections (2018 to 2035)<br>• Average 10-year monthly PFs |
| Projection Based on Historical Maximum SCF TDS Concentrations | • Maximum month SCF TDS concentrations (2007 to 2014)<br>• Average monthly Authority TDS concentrations (March 2012 to April 2015)<br>• BEBR Medium demand projections (2018 to 2020)<br>• Average 10-year monthly PFs | • Maximum month SCF TDS concentrations (2007 to 2014)<br>• RO TDS (100 mg/L)<br>• BEBR Medium demand projections (2018 to 2035)<br>• Average 10-year monthly PFs |

### 5.1.2 Results

The projects were evaluated based on the ability to meet the TDS standard of 500 mg/L. Blending ratios were calculated for each month based on the water demand and the TDS

concentrations. The total amount of water required from each source (Authority/RO/SCF) was calculated and used for the cost analysis presented in Section 5.2. The number of days during which the SCF would be offline was quantified on an annual basis.

A summary of the results for the look-back scenario, projection based on historical average SCF TDS concentrations, and projection based on historical maximum SCF TDS concentrations is presented in Table 6. The summary table includes the average number of months per year over the evaluation period during which a TDS failure occurred (blended TDS exceeds 500 mg/L) or the SCF was offline. The results are compared with the historical TDS data of the SCF operating alone.

**Table 6 Summary of Blending Analysis Results**
**2015 Water Supply Study**
**City of Punta Gorda**

| Scenario | TDS Failures (Months/Year) | | | SCF Inactive (Months/Year) | |
|---|---|---|---|---|---|
| | SCF Alone(1) | SCF Blended with Authority | SCF Blended with RO | SCF Blended with Authority | SCF Blended with RO |
| Look-back(2) | 6-7 | 1 | 0 | 1 | 0 |
| Projection based on historical average TDS(3) | 7 | 0 | 0 | 0 | 0 |
| Projection based on historical maximum TDS(3) | 10 | 3 | 0 | 1 | 0 |

Notes:
(1) Based on historical finished water TDS data (2007 to 2014)
(2) Average number based on percentage of occurrence over the entire look-back period
(3) Includes average blending analysis data from 2018 to 2020 (Authority) and 2018 to 2035 (RO)

#### *5.1.2.1 Look-Back Evaluation*

The look-back scenarios were evaluated for each project using actual historical TDS, water demand data, and monthly PFs (Appendix A). The dates of the samples were matched between the SCF and the Authority such that the monthly SCF sample and the daily/weekly Authority sample collected closest to the date of the monthly SCF sample were compared. Authority data prior to 2009 when the reservoir came online was not included in this analysis. The RO look-back scenario included historical SCF data from 2007 to 2014 (Appendix A). The RO TDS was assumed to be 100 mg/L consistently.

The Authority project was evaluated over the 66 months included in the look-back (2009 through 2014) while the RO project was evaluated over 96 months in the look-back (2007 through 2014). The average and maximum TDS concentrations measured at SCF and

calculated for the Authority and RO projects during the look-back time periods are presented in Table 7.

**Table 7 Look-Back Blending Results**
**2015 Water Supply Study**
**City of Punta Gorda**

| | Authority Project | | | RO Project[1] | |
|---|---|---|---|---|---|
| | SCF[2] | Authority[3] | SCF Blended with Authority | SCF[4] | SCF Blended with RO |
| **TDS** | | | | | |
| Average TDS (mg/L) | 487 | 369 | 432 | 515 | 314 |
| Maximum TDS (mg/L) | 696 | 491 | 542 | 740 | 444 |
| % Meet TDS Standard (500 mg/L) | 92% | | | 100% | |
| **Average Annual Water Amount** | | | | | |
| SCF Water Produced (MG) | 1,175 (75%) | | | 804 (51%) | |
| Authority or RO Water Purchased/Produced (MG) | 387 (25%) | | | 757 (49%) | |

Notes:
(1) RO TDS = 100 mg/L
(2) Historical finished water data from July 2009 to December 2014 (66 months)
(3) Daily conductivity data from the Authority used for July 2009 to July 2011. CCU data used for August 2011 through February 2012 due to conductivity meter malfunction at the Authority. Authority weekly TDS data used for March 2012 to December 2014. Collection dates were matched between the Authority/CCU and the SCF samples.
(4) Historical finished water data from 2007 to 2014 (96 months)

Historically, TDS failures have occurred, on average, six months out of the year at the SCF. The average TDS at the SCF was 487 mg/L and the maximum was 696 mg/L from July 2009 to December 2014. When the data range was expanded to include the period from 2007 to 2014, the average TDS was 515 mg/L and the maximum was 740 mg/L.

The blended Authority TDS was 432 mg/L on average but exceeded 500 mg/L five times (approximately once per year) in the look-back scenario. The SCF would have been offline five months over the 66-month period, or about 1 month per year, if blending with the Authority had occurred between July 2009 and December 2014. Overall, the City would have needed to purchase 25 percent of their water from the Authority for blending with the SCF in order to meet the TDS standard 92 percent of the time. Figures 3 and 4 show the historical monthly demand and the amount of water required from the Authority and RO

projects, respectively, and the SCF in order to meet the demand and TDS standard. Figure 5 and Figure 6 also show the blended TDS concentrations for each month.

The RO project met the TDS standard 100 percent of the time in the look-back scenario with an average TDS of 314 mg/L, and there were no inactive days at the SCF. Figure 7 shows the percent of months that each project would have met the TDS standard over the look-back period. Figure 8 shows the percent of total demand met by the SCF and purchasing water from the Authority or producing water at the RO facility for the look-back scenario.

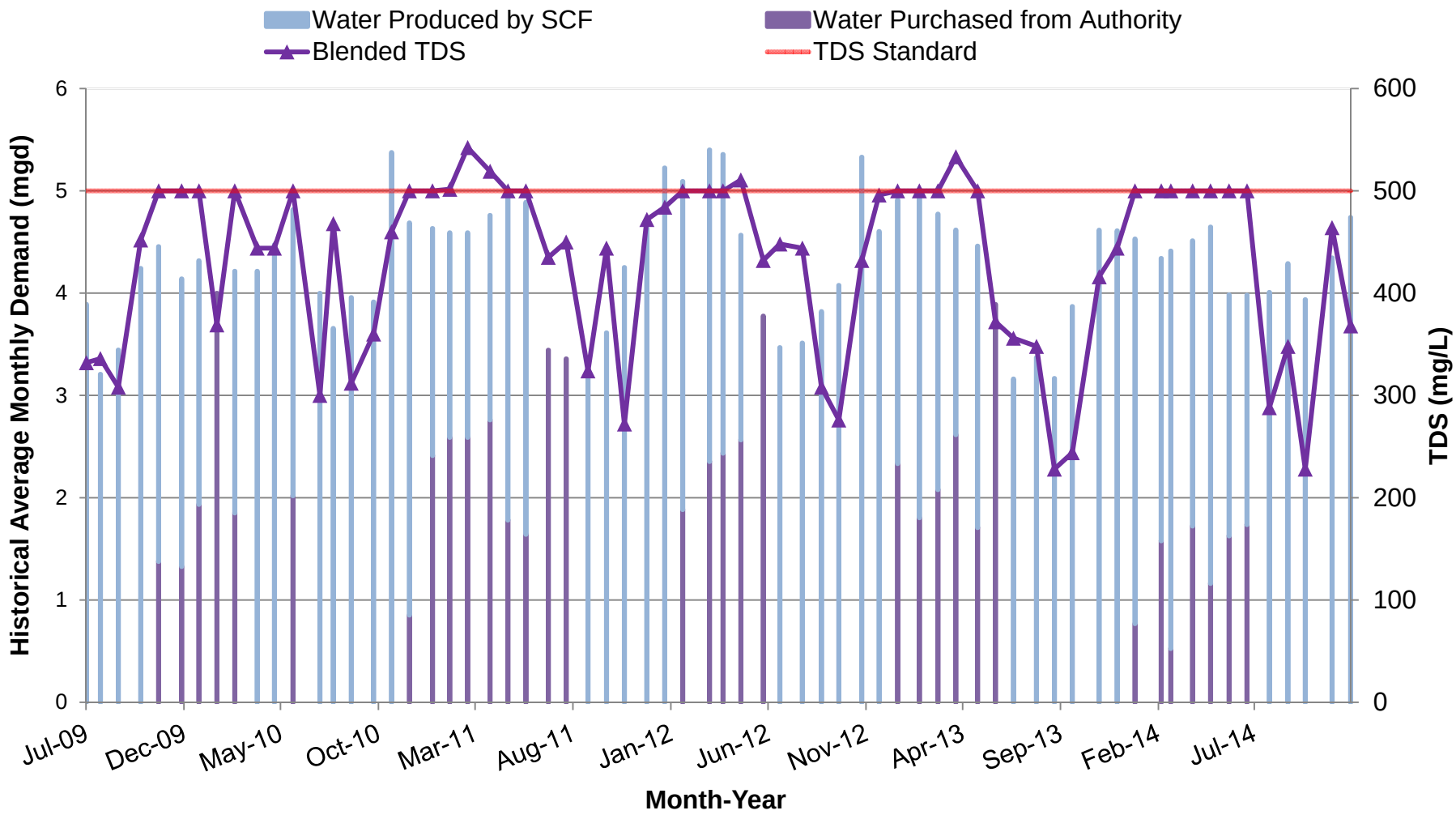
#### *5.1.2.2 Future Projection Evaluations Based on Historical Average and Maximum SCF TDS Concentrations*

The BEBR Medium water demand projections (Table 3) and 10-year average monthly PFs (Table 2) were used to estimate future blending analyses for the Authority and RO projects. Blending amounts were projected for the Authority project using the average monthly Authority TDS concentrations and for the RO project using 100 mg/L as the finished water TDS. Blending projections were calculated for the historical average and maximum month SCF TDS concentrations to simulate a range of potential water quality conditions.

The Authority project was evaluated for TDS failures and inactive SCF days from 2018 to 2020 since it is considered a short-term water supply option, while the RO project was evaluated from 2018 to 2035 since it is a long-term project.

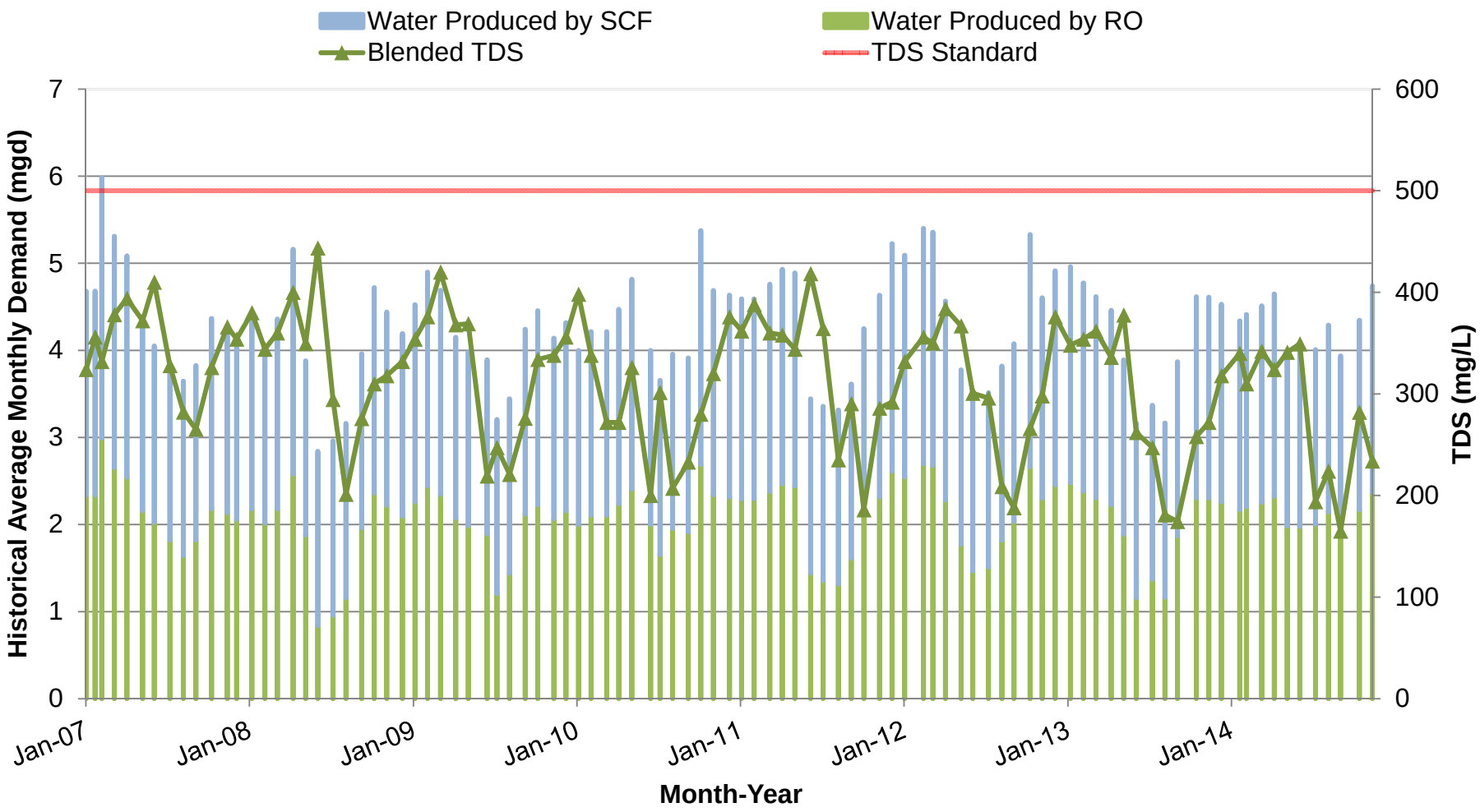
The projected blended monthly TDS concentrations based on the historical average and maximum SCF TDS concentrations (Table 3) are presented in Figure 9 for the Authority project. The Authority blended TDS is projected to meet the TDS standard from 2018 to 2020 under historical average SCF TDS conditions. When the SCF TDS concentrations were assumed to be the historical maximums before blending with the Authority water, the blended TDS exceeds the TDS standard nine times (months) over the three year period. It is unlikely that the SCF would experience an entire year of maximum TDS concentrations. However, it is also possible that the average conditions would be exceeded at some point during the 2018 to 2020 projection period.

To assess the variation in the blended TDS based on the range of historical SCF TDS concentrations, the 25th and 75th percentiles of the historical SCF TDS data were evaluated. Figure 10 shows the projected (blended) TDS based on the historical average, 25th, and 75th percentile TDS concentrations at the SCF. The blended TDS exceeds 500 mg/L in June when the SCF TDS concentrations reach the historical 75th percentile concentrations. Therefore, though the Authority project will allow the SCF to meet the TDS standard at historical average TDS concentrations, slight variations could lead to exceedances.



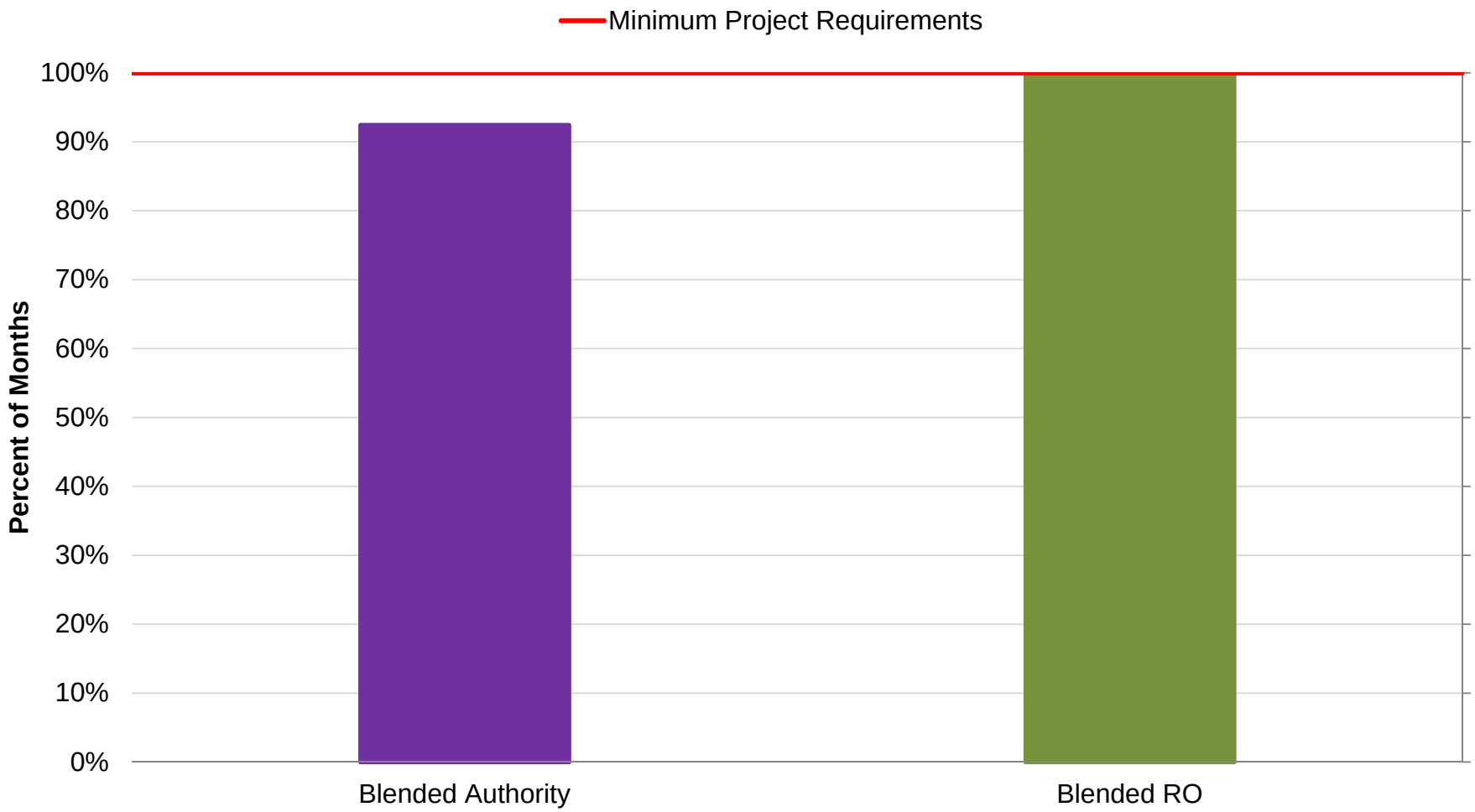

**LOOK-BACK SCENARIO TDS BLENDING RESULTS FOR AUTHORITY PROJECT**

FIGURE 5




**LOOK-BACK SCENARIO TDS BLENDING RESULTS FOR RO FACILITY**

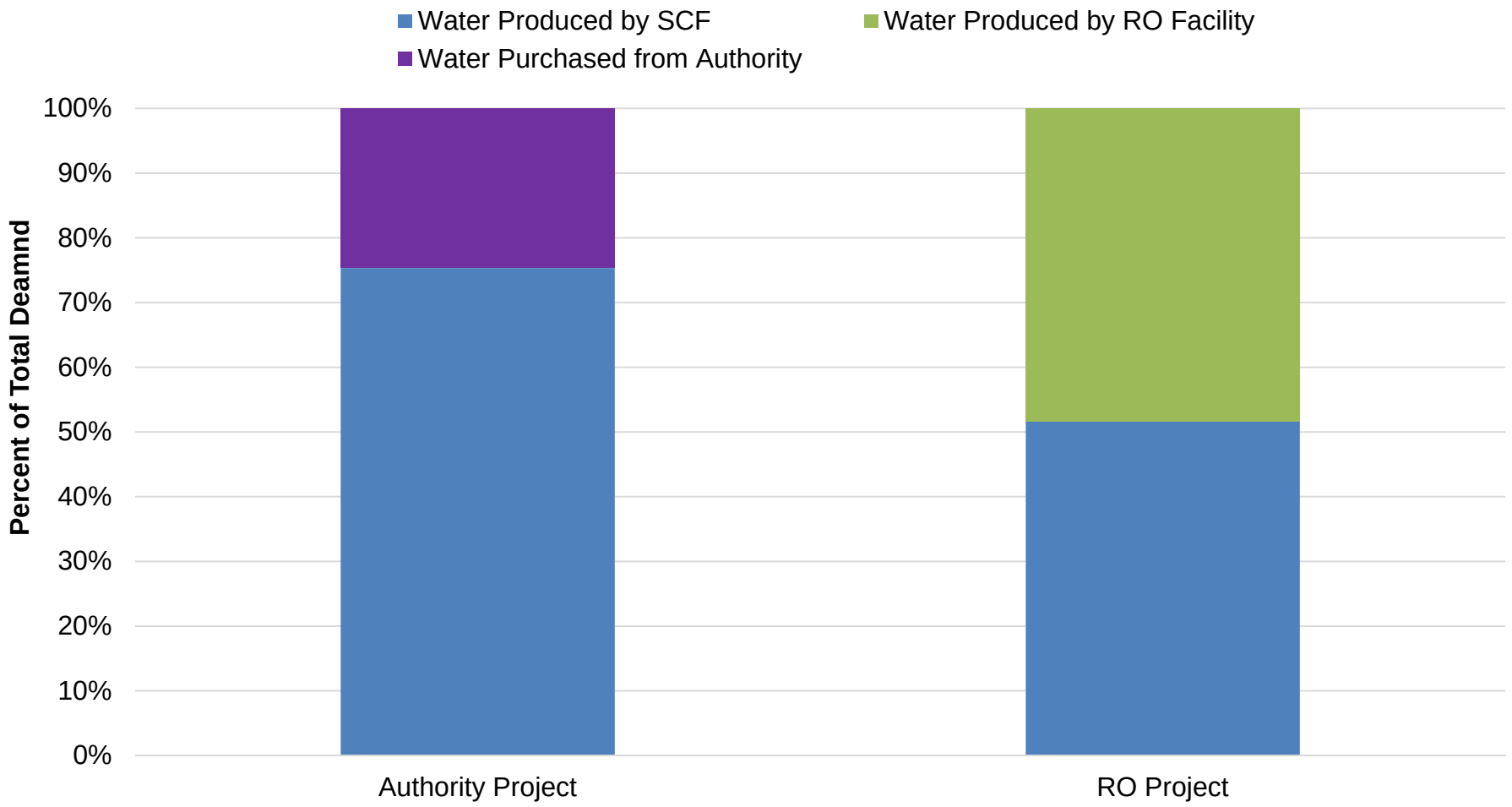
FIGURE 6




**LOOK-BACK SCENARIO RESULTS:**
**PERCENT OF MONTHS TDS SMCL MET**

FIGURE 7

CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*

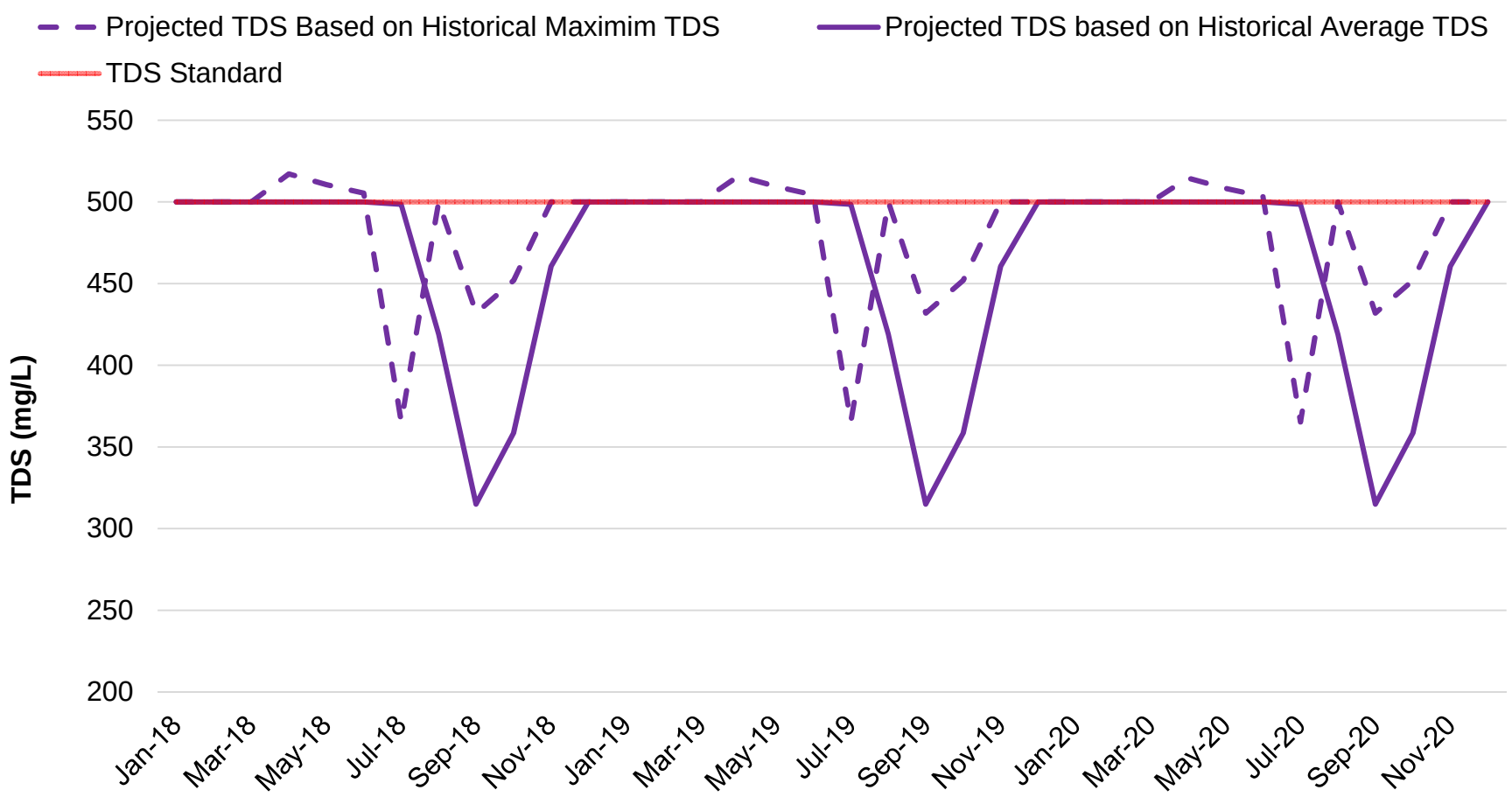



**LOOK-BACK SCENARIO RESULTS: BLENDED WATER BY SOURCE**

FIGURE 8

CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*

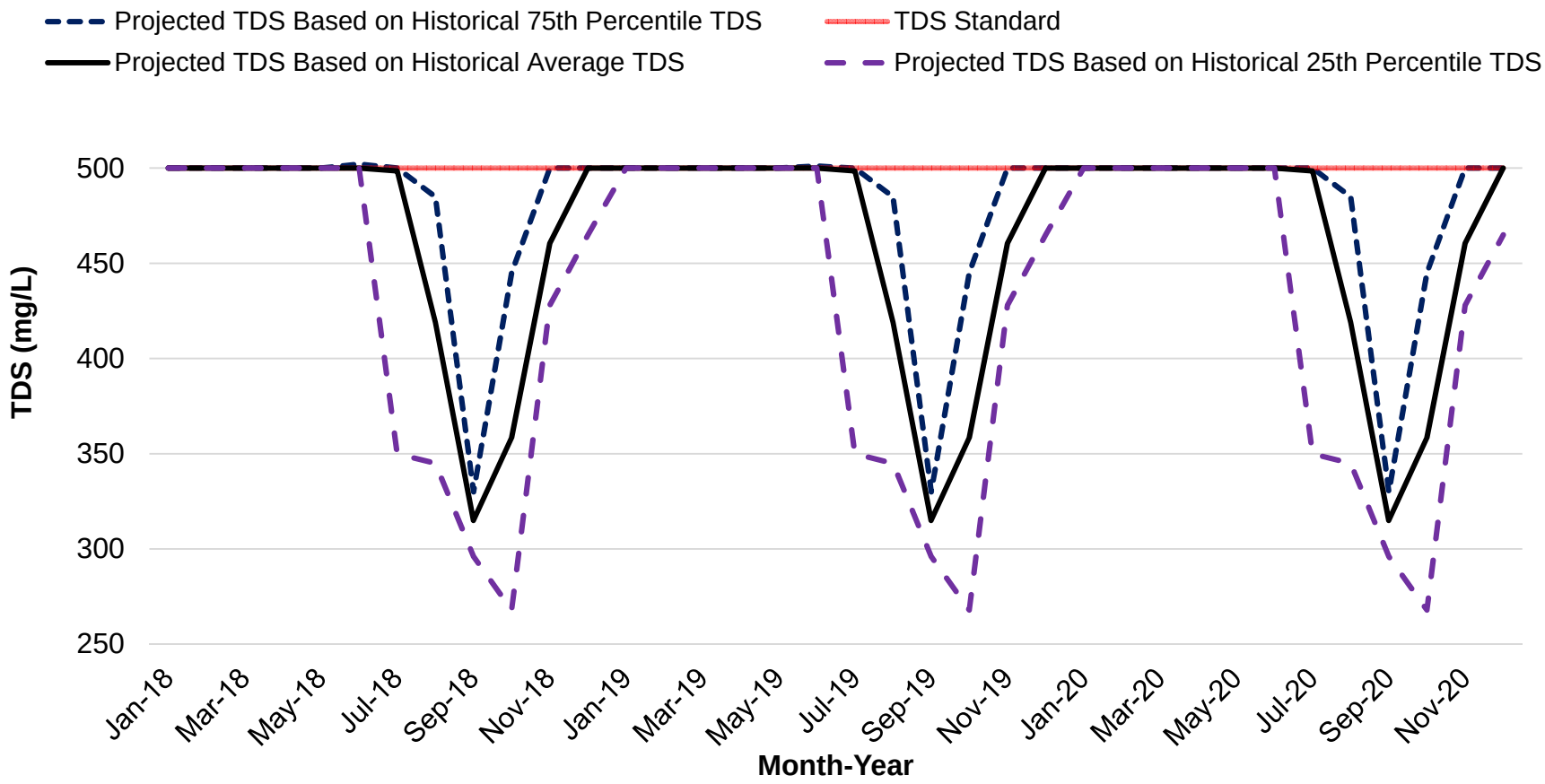
carollo




**BLENDED AUTHORITY TDS PROJECTIONS BASED ON HISTORICAL AVERAGE AND MAXIMUM SCF TDS**

FIGURE 9

CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*




**BLENDED AUTHORITY TDS PROJECTIONS BASED ON THE 25TH AND 75TH PERCENTILES OF HISTORICAL SCF TDS CONCENTRATIONS**

FIGURE 10

CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*

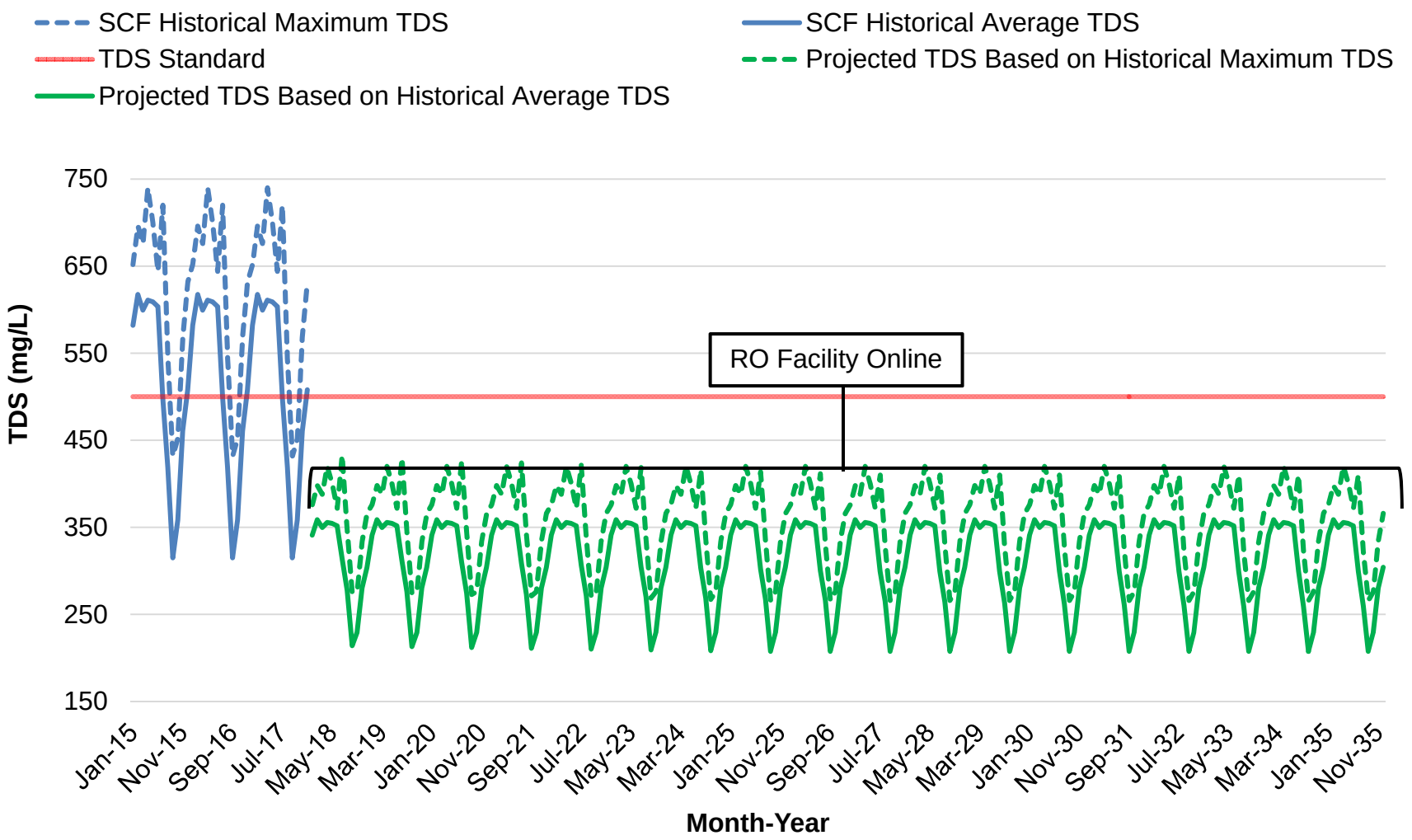
The RO project is able to meet the TDS standard in the projection scenarios for both historical average and maximum TDS concentrations through 2035. Figure 11 summarizes the historical average and maximum SCF TDS concentrations that are expected prior to the RO facility coming online and the blended TDS values beginning in 2018. The blended TDS is expected to range from 309 mg/L to 433 mg/L under average to maximum historical conditions at the SCF. The maximum blended TDS is 433 mg/L assuming maximum historical TDS at the SCF.

Figure 12 and Figure 13 show the amount of blended water from each source (Authority or RO and SCF) based on the historical average and historical maximum TDS conditions at the SCF, respectively. Table 8 summarizes the blended TDS concentrations and the percentage of water required from each source under the average and maximum conditions.

**Table 8 Projection Blending Results**
**2015 Water Supply Study**
**City of Punta Gorda**

| | **Authority Project** | | **RO Project** | |
|---|---|---|---|---|
| Projection | Projection based on Historical Average TDS(1) | Projection based on Historical Maximum TDS(2) | Projection based on Historical Average TDS(1) | Projection based on Historical Maximum TDS(2) |
| **Blended Water TDS** | | | | |
| Average TDS (mg/L) | 463 | 482 | 309 | 362 |
| Maximum TDS (mg/L) | 500 | 517 | 359 | 433 |
| **Average Annual Water Amount** | | | | |
| SCF Water Produced (MG) | 1263 (76%) | 915 (55%) | 880 (50%) | 880 (50%) |
| Authority or RO Water Purchased/ Produced (MG) | 391 (24%) | 739 (45%) | 871 (50%) | 871 (50%) |

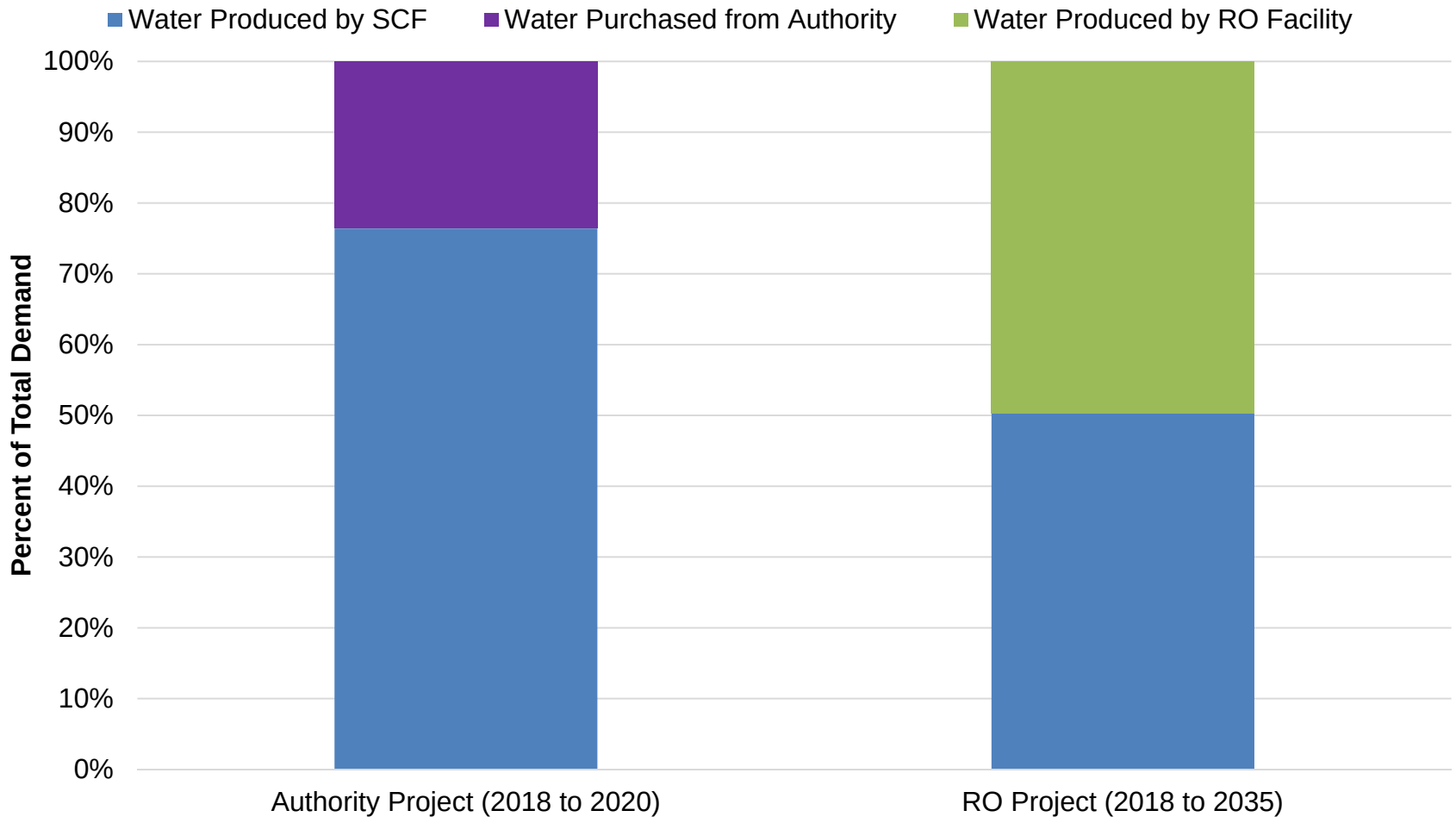
Notes:
(1) Based on historical average SCF TDS data (2007 to 2014).
(2) Based on historical maximum SCF TDS data (2007 to 2014).




**PROJECTED BLENDED TDS FOR RO FACILITY**

FIGURE 11

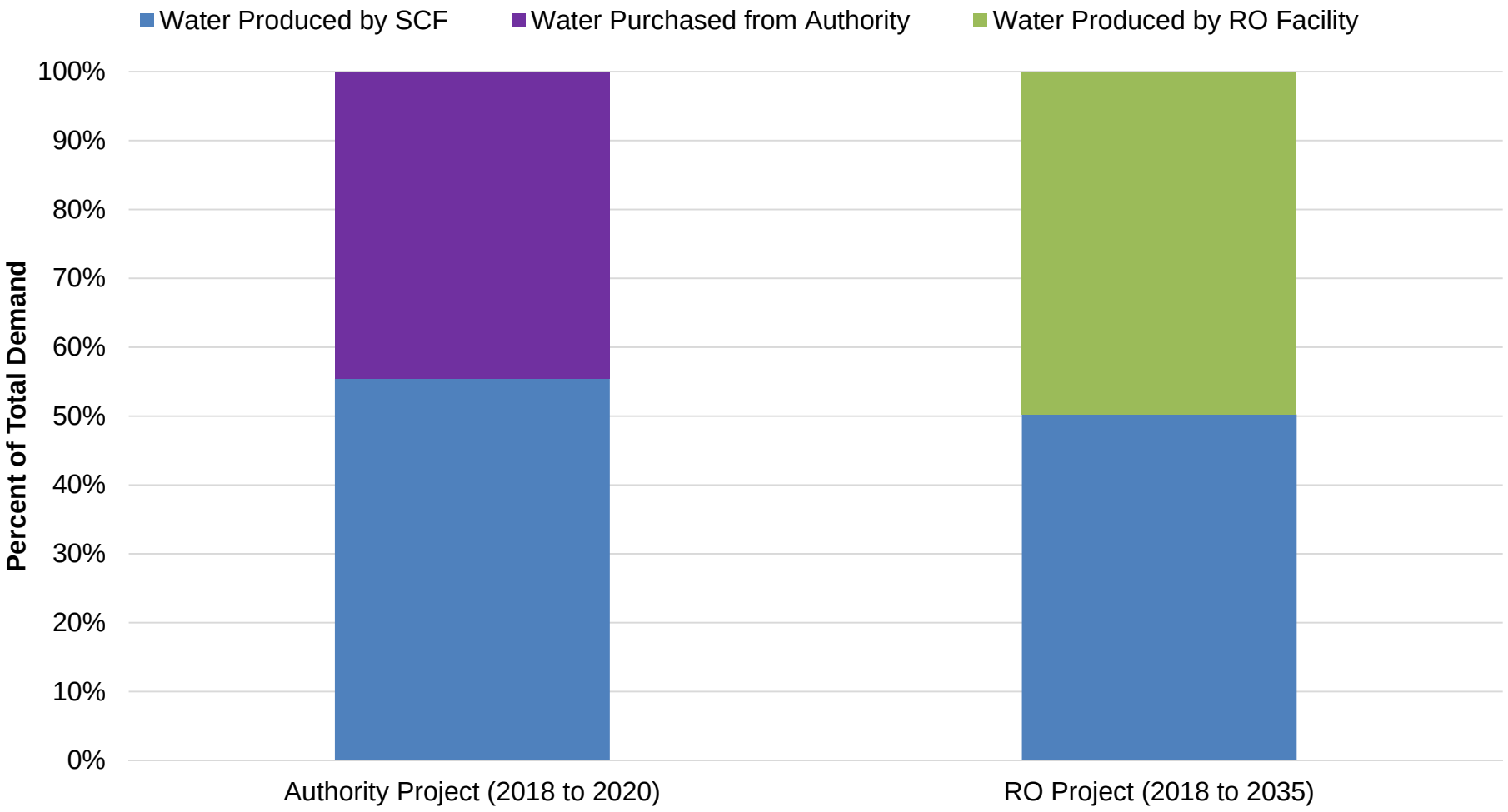
CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*




**BLENDED WATER BY SOURCE BASED ON HISTORICAL AVERAGE SCF TDS**

FIGURE 12

CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*




Historical SCF TDS data from 2007 to 2014

**BLENDED WATER BY SOURCE BASED ON HISTORICAL MAXIMUM SCF TDS**

FIGURE 13

CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*

carollo

## 5.2 Cost Analysis

Cost estimates were developed for the Authority Phase 1 pipeline and RO projects based on capital and O&M costs. A summary and description of each cost is presented in Table 9.

The Authority Phase 1 pipeline capital costs were presented at the April 8, 2015 Authority Board of Directors meeting (Appendix B). The total estimated capital cost of the Phase 1 pipeline is $12 million. Because it is a regional project, it is anticipated that SWFWMD cooperative grant funding will contribute 50 percent of the cost. The City's portion of the capital cost is $6 million, of which $4 million is anticipated to be funded by a State appropriation. Therefore, the City's contribution to the Phase 1 pipeline is $2 million. The purchase price of Authority water is estimated at $2.70/kgal.

**Table 9 Cost Summary**
**2015 Water Supply Study**
**City of Punta Gorda**

| Cost Component | Cost to City | Description | Source |
|---|---|---|---|
| Authority Phase 1 Pipeline Capital Cost | $2,000,000 | The City's portion of the pipeline capital cost is $6,000,000, of which $4,000,000 is to be provided by a State appropriation | City of Punta Gorda |
| Authority Water Purchase Cost | $2.70/kgal | Cost will apply to all water purchased from Authority via the Phase 1 pipeline | Estimated cost based on discussions with City and Authority staff |
| RO Facility Capital Cost | $32,115,928 | Capital cost of RO facility including professional engineering services | 2015 Tetra Tech Preliminary Opinion of Capital Cost |
| RO Facility O&M | $1.04/kgal | Includes chemical, power, additional labor (beyond current staffing at the SCF), repair, maintenance, and membrane replacement costs | 2010 Tetra Tech Preliminary Design Report |

| Table 9 Cost Summary<br>2015 Water Supply Study<br>City of Punta Gorda | | | |
|---|---|---|---|
| **Cost Component** | **Cost to City** | **Description** | **Source** |
| SCF Base O&M Costs | $5,831/day | Base O&M cost of the SCF including labor, administrative costs, and 75% of electric costs (to account for power required for high service and booster pump station). This cost is incurred even if the SCF is offline. | Average SCF 2013 and 2014 actual O&M costs |
| SCF O&M (when SCF is operational) | $0.41/kgal | 25% of electrical costs and 100% of chemical costs | Average SCF electric and chemical costs and average annual water demand for 2013 and 2014 |

The RO facility capital costs included in this report are from the 2015 Tetra Tech RO Addition Preliminary Design Report Preliminary Opinion of Capital Cost (Appendix B) and include professional engineering service costs. The RO O&M costs were developed by Tetra Tech for the RO facility in the Tetra Tech 2010 Preliminary Design Report.

The SCF O&M costs were estimated using the 2013 and 2014 actual expenditures (Appendix B). The base O&M costs, or the costs that are incurred independent of water production, include the total O&M costs minus 25 percent of the electrical costs and 100 percent of the chemical costs. It is assumed that 75 percent of the electrical costs will apply when the SCF is inactive to account for power that will still be required for the high service pump station at the SCF and the Bal Harbor Booster Pump Station. When SCF is operational, the water cost therefore includes the remaining 25 percent of the electrical costs and 100 percent of the chemical costs. O&M cost calculations for the SCF and the RO facility are included in Appendix C.

### 5.2.1 Methodology

The assumptions used for this study are listed in Table 10. The cost analysis includes the total capital costs, total O&M costs, and the total water cost (per kgal) based on annual debt service payments or lump sum payments, average annual O&M costs, and the average annual projected demand. The look-back scenario cost analysis does not include capital costs due to the retroactive nature of the analysis. Cost analysis summary tables are included in Appendix C.

| Table 10 Cost Estimating Assumptions<br>2015 Water Supply Study<br>City of Punta Gorda |
|---|
| **Assumptions** |
| The City contributes $2 M towards the Phase 1 pipeline (assumes lump sum payments with no financing). |
| Total RO capital cost financed over a 20-year period with a 3.5 percent financing rate. |
| O&M costs include costs for existing water treatment and Authority water purchase and/or RO production. |
| Total water cost = $\frac{\text{Annual O\&M cost (Authority or RO + SCF) + SCF Base O\&M Cost + Annual capital (debt service or lump sum)}}{\text{Annual average system yield}}$ |
| The City will receive funding for half of the RO facility capital costs if the Phase 1 pipeline is completed. |
| The Phase 1 pipeline and the RO facility will be completed in 2018. |

The Phase 1 pipeline capital cost was assumed to be split across three years (2018 through 2020) and paid in lump sums instead of being financed. The RO facility financing rate was assumed to be 3.5 percent over 20 years.

The blending analysis mass balance was used to determine the amount of water required from each source on an annual basis. Appendix C summarizes the annual water demands for each source based on the blending analysis and the associated costs. The cost per thousand gallons was applied to the calculated water demand for the Authority or RO facility water in addition to water produced at the SCF. The SCF base costs were applied daily, regardless of if the SCF was producing water. Therefore, the total annual O&M costs presented in this report include the Authority or RO costs based on water purchased or produced, SCF costs based on water produced, and the SCF base costs.

Based on the proposed agreement between the City, SWFWMD, and the Authority, the City will receive funding for half of the total capital costs for the RO facility if the Phase 1 pipeline is also built (to provide a plant-to-plant connection to the regional system). The cost analysis for the future projection scenario includes the funded RO option and the combined RO/pipeline funded option.

### 5.2.2 Results

The results of the cost analysis are presented in Table 11. The results include three years of blending for the Authority project (2018 to 2020) and 18 years of blending for the RO project (2018 to 2035). The projected total blended water cost is $2.64/kgal for the Authority project if the SCF experiences average TDS concentrations and $3.13/kgal if the SCF experiences maximum TDS concentrations. These costs are the total blended water costs for both water produced at the SCF and water purchased from the Authority.

**Table 11 Cost Analysis Results 2015 Water Supply Study City of Punta Gorda**

| Project | Scenario | Capital Cost ($M) | Annual Capital Payment ($M)[1] | Annual O&M ($M)[2] | Average Blended Water Cost based on Projected Demand ($/kgal)[2] |
|---|---|---|---|---|---|
| Authority Phase 1 Pipeline | Projection based on historical average TDS | $2.0 | $0.66 | $3.71 | $2.64 |
| Authority Phase 1 Pipeline | Projection based on historical maximum TDS | $2.0 | $0.66 | $4.50 | $3.13 |
| RO Facility (Not Funded) | Projection based on historical TDS[3] | $32.12 | $2.26 | $3.40 | $3.23 |
| RO Facility (Funded) | Projection based on historical TDS[3] | $16.06 | $1.13 | $3.40 | $2.59 |
| RO Facility (Funded) and Authority Phase 1 Pipeline | Projection based on historical TDS[3] | $18.06 | $1.79 (year 1 to 3)[4] $1.13 (year 4 to 20)[4] | $3.40[5] | $2.65[5][6] |

Notes:

(1) Annual debt service payment for RO facility. Lump sum payment (total divided over three years) for Authority Phase 1 pipeline.
(2) Includes project (Authority Phase 1 pipeline or RO facility) and SCF O&M costs based on blended water percentage.
(3) There is no cost difference between historical average and historical maximum TDS for the RO project.
(4) The first three years include Authority lump sum capital costs in addition to debt service payment for RO. The remaining 17 years include only the debt service payment for the RO facility.
(5) Does not include Authority water purchase cost since the RO facility is a sufficient supplemental water source for the SCF.
(6) Average cost over 20 years.

The projected total water cost for the RO project is $2.59/kgal if receiving 50 percent matching cooperative funding and $3.23/kgal if no funding. These costs are the total blended water costs for water produced at both the SCF and the RO facility. O&M costs for

the RO project did not vary based on average or maximum scenarios since the amount of water required from the RO system does not change (approximately 50 percent blend from SCF and 50 percent from the RO facility).

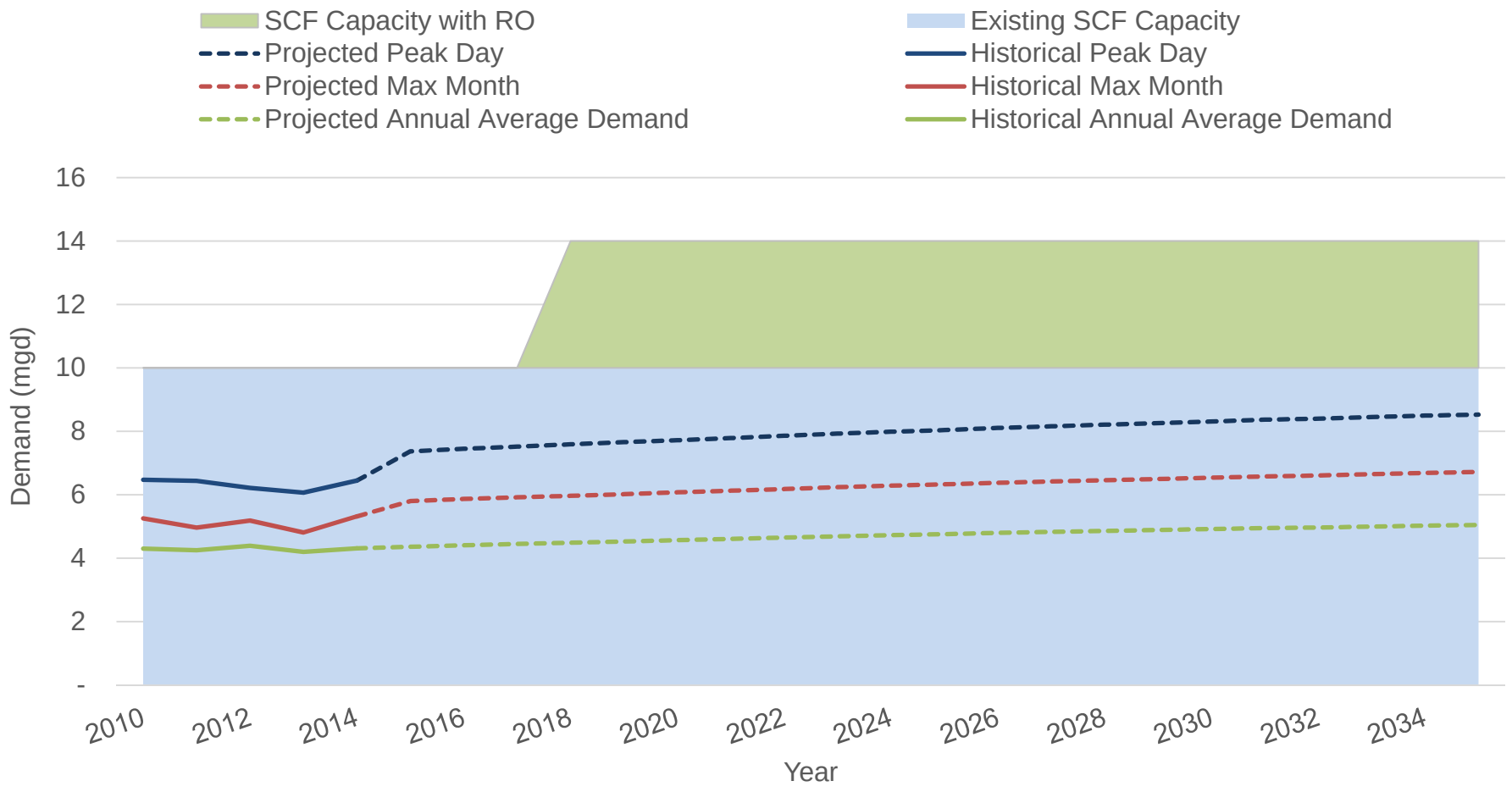
Assuming that the funding for the RO facility is contingent upon the completion of the Phase 1 pipeline, the total water cost if both projects are constructed is $2.65/kgal (average blended water cost over 20 years). The combined total water cost includes the capital cost of the Phase 1 pipeline and the annual debt service payment for the RO facility. O&M costs for the Authority project are not included in the combined scenario, as the RO facility would provide sufficient blending for meeting the TDS standard. The pipeline would provide reliability and redundancy to an interconnected regional water source.

# 6.0 WATER TREATMENT FACILITY CAPACITY ANALYSIS

The capacity of the SCF is 10 mgd. After construction of the RO facility, the total combined water treatment capacity will be 14 mgd. The combined capacity was evaluated to determine if the projected average, maximum month, and peak day demand could be met. The average 10-year maximum monthly peaking factor (1.33) and average 10-year peak day peaking factor (1.69) were applied to the BEBR Medium annual average demand projections to determine the maximum month and peak day demands through 2035 (Table 2). The demand projections and capacities are presented in Figure 14. The annual average demand reaches 5.05 mgd, the historical maximum month daily demand reaches 6.72 mgd, and the peak day demand reaches 8.53 mgd in 2035. The highest demand can be met by the SCF and RO facility combined capacities through 2035.

A mass balance was conducted to determine if the TDS standard can continue to be met at peak demand conditions. When the demand reaches the expected peak day demand of 8.53 mgd in 2035 the combined SCF and RO facility will meet the TDS standard.

A mass balance was also conducted to determine if the TDS standard could be met at the full 14 mgd capacity of the SCF and RO facility. At average historical SCF TDS concentrations (2007 to 2014), the blended SCF/RO water TDS continues to remain below 500 mg/L with 10 mgd from the SCF and 4 mgd from the RO facility.




**ANNUAL AVERAGE, MAXIMUM MONTH, AND PEAK DAY DEMAND PROJECTIONS**

FIGURE 14

CITY OF PUNTA GORDA
*2015 WATER SUPPLY STUDY*

carollo

# 7.0 CONCLUSIONS

A supplemental water source is required to augment the SCF finished water in order for the City to meet the TDS standard of 500 mg/L at all times. Two projects were evaluated for this report: regional water purchase from the Authority via the Phase 1 pipeline and the addition of a 4 mgd RO facility. The Authority pipeline is seen as a short-term water supply augmentation option (and reliability and redundancy benefit), but is not a long-term water supply project for the City. The construction of an RO facility for the City would provide a long-term, sustainable water supply source.

A blending analysis revealed that finished water from the RO facility can supplement the SCF water supply to meet the TDS standard 100 percent of the time based on historical average and historical maximum SCF TDS concentrations. The Authority project could not consistently meet the TDS standard in a "look-back" scenario (considering actual TDS values from 2009 to 2014). Depending on SCF TDS concentrations, the Authority project may be able to meet the TDS standard. At historical average SCF TDS concentrations, blending with Authority water is projected to meet the TDS standard; however, it would fail to meet TDS at higher TDS concentrations seen in recent history (75th percentile concentrations and greater). Therefore, blending with Authority water will not ensure that TDS requirements can be met at all times.

The cost analysis results indicate that the total water cost to the City with the funded RO facility is the most economical long-term option at $2.59/kgal. This cost increases to $3.23/kgal if cooperative funding is not granted. In order to be approved for cooperative funding, a regional connection to the Authority via the Phase 1 pipeline is required. Construction of the pipeline will increase the City's total water cost to $2.65/kgal assuming cooperative funding is granted. This cost assumes that RO facility would provide sufficient blending for meeting the TDS standard and therefore no water would be purchased from the Authority for blending. The Phase 1 pipeline would provide reliability and redundancy to an interconnected regional water source.

The RO project as a supplemental water source for the SCF is expected to allow the City to meet water demands and the TDS standard through 2035. The Authority project could be expected to meet water demands and the TDS standard given that the SCF TDS remains at historical average values. The Authority Phase 1 pipeline project provides regional cooperation opportunities while the RO project provides confidence that the City will be able to meet the TDS standard at all times.

# APPENDIX A – HISTORICAL DATA (TDS, DEMAND, AND PEAKING FACTORS) FOR LOOK-BACK ANALYSIS

Historical Demand and TDS Data Used for Blending Analysis

| Historical Monthly Peaking Factors | | | | | |
|---|---|---|---|---|---|
| Month-Year | PF | Month-Year | PF | Month-Year | PF |
| Jan-07 | 1.04 | Apr-10 | 0.98 | Jul-13 | 0.75 |
| Feb-07 | 1.04 | May-10 | 1.04 | Aug-13 | 0.80 |
| Mar-07 | 1.33 | Jun-10 | 1.12 | Sep-13 | 0.75 |
| Apr-07 | 1.18 | Jul-10 | 0.93 | Oct-13 | 0.92 |
| May-07 | 1.13 | Aug-10 | 0.85 | Nov-13 | 1.10 |
| Jun-07 | 0.96 | Sep-10 | 0.92 | Dec-13 | 1.10 |
| Jul-07 | 0.9 | Oct-10 | 0.91 | Jan-14 | 1.05 |
| Aug-07 | 0.85 | Nov-10 | 1.25 | Feb-14 | 1.01 |
| Sep-07 | 0.81 | Dec-10 | 1.09 | Mar-14 | 1.02 |
| Oct-07 | 0.85 | Jan-11 | 1.09 | Apr-14 | 1.05 |
| Nov-07 | 0.97 | Feb-11 | 1.08 | May-14 | 1.08 |
| Dec-07 | 0.95 | Mar-11 | 1.08 | Jun-14 | 0.92 |
| Jan-08 | 1.03 | Apr-11 | 1.12 | Jul-14 | 0.92 |
| Feb-08 | 1.09 | May-11 | 1.16 | Aug-14 | 0.93 |
| Mar-08 | 1.01 | Jun-11 | 1.15 | Sep-14 | 0.99 |
| Apr-08 | 1.09 | Jul-11 | 0.81 | Oct-14 | 0.91 |
| May-08 | 1.29 | Aug-11 | 0.79 | Nov-14 | 1.01 |
| Jun-08 | 0.97 | Sep-11 | 0.78 | Dec-14 | 1.10 |
| Jul-08 | 0.71 | Oct-11 | 0.85 | | |
| Aug-08 | 0.74 | Nov-11 | 1.00 | | |
| Sep-08 | 0.79 | Dec-11 | 1.09 | | |
| Oct-08 | 0.99 | Jan-12 | 1.19 | | |
| Nov-08 | 1.18 | Feb-12 | 1.16 | | |
| Dec-08 | 1.11 | Mar-12 | 1.23 | | |
| Jan-09 | 1.01 | Apr-12 | 1.22 | | |
| Feb-09 | 1.09 | May-12 | 1.04 | | |
| Mar-09 | 1.18 | Jun-12 | 0.86 | | |
| Apr-09 | 1.13 | Jul-12 | 0.79 | | |
| May-09 | 1 | Aug-12 | 0.80 | | |
| Jun-09 | 0.96 | Sep-12 | 0.87 | | |
| Jul-09 | 0.94 | Oct-12 | 0.93 | | |
| Aug-09 | 0.77 | Nov-12 | 1.21 | | |
| Sep-09 | 0.83 | Dec-12 | 1.05 | | |
| Oct-09 | 1.02 | Jan-13 | 1.17 | | |
| Nov-09 | 1.07 | Feb-13 | 1.18 | | |
| Dec-09 | 1.00 | Mar-13 | 1.14 | | |
| Jan-10 | 1.00 | Apr-13 | 1.10 | | |
| Feb-10 | 0.93 | May-13 | 1.06 | | |
| Mar-10 | 0.98 | Jun-13 | 0.93 | | |

| Historical Demand | |
|---|---|
| Year | Demand (mgd) |
| 2007 | 4.5 |
| 2008 | 4 |
| 2009 | 4.15 |
| 2010 | 4.3 |
| 2011 | 4.25 |
| 2012 | 4.39 |
| 2013 | 4.2 |
| 2014 | 4.31 |

| Historical SCF Data Used for Look-Back. Average/Max Monthly Used for Projection Scenarios | | | | | |
|---|---|---|---|---|---|
| Date of Sample | TDS (mg/L) | Date of Sample | TDS (mg/L) | Date of Sample | TDS (mg/L) |
| 1/31/2007 | 548 | 1/6/2010 | 612 | 1/2/2013 | 652 |
| 2/20/2007 | 612 | 2/3/2010 | 696 | 2/5/2013 | 596 |
| 3/7/2007 | 564 | 3/3/2010 | 576 | 3/6/2013 | 608 |
| 4/4/2007 | 656 | 4/7/2010 | 444 | 4/3/2013 | 624 |
| 5/2/2007 | 688 | 5/4/2010 | 444 | 5/7/2013 | 572 |
| 6/6/2007 | 644 | 6/2/2010 | 552 | 6/4/2013 | 640 |
| 7/2/2007 | 720 | 7/14/2010 | 300 | 7/2/2013 | 356 |
| 8/6/2007 | 536 | 8/4/2010 | 468 | 8/7/2013 | 348 |
| 9/5/2007 | 432 | 9/1/2010 | 312 | 9/4/2013 | 228 |
| 10/3/2007 | 416 | 10/6/2010 | 360 | 10/2/2013 | 244 |
| 11/7/2007 | 552 | 11/3/2010 | 460 | 11/13/2013 | 416 |
| 12/12/2007 | 632 | 12/1/2010 | 540 | 12/11/2013 | 444 |
| 1/2/2008 | 608 | 1/6/2011 | 652 | 1/8/2014 | 536 |
| 2/5/2008 | 660 | 2/2/2011 | 624 | 2/18/2014 | 580 |
| 3/5/2008 | 588 | 3/2/2011 | 676 | 3/5/2014 | 520 |
| 4/2/2008 | 620 | 4/6/2011 | 620 | 4/8/2014 | 584 |
| 5/7/2008 | 700 | 5/4/2011 | 616 | 5/6/2014 | 548 |
| 6/4/2008 | 584 | 6/1/2011 | 588 | 6/4/2014 | 580 |
| 7/1/2008 | 588 | 7/6/2011 | 648 | 7/2/2014 | 596 |
| 8/4/2008 | 388 | 8/3/2011 | 544 | 8/6/2014 | 288 |
| 9/2/2008 | 260 | 9/6/2011 | 324 | 9/4/2014 | 348 |
| 10/7/2008 | 448 | 10/5/2011 | 444 | 10/1/2014 | 228 |
| 11/4/2008 | 520 | 11/2/2011 | 272 | 11/12/2014 | 464 |
| 12/2/2008 | 536 | 12/7/2011 | 472 | 12/11/2014 | 368 |
| 1/6/2009 | 564 | 1/4/2012 | 484 | | |
| 2/3/2009 | 608 | 2/1/2012 | 564 | | |
| 3/3/2009 | 652 | 3/14/2012 | 612 | | |
| 4/1/2009 | 740 | 4/4/2012 | 600 | | |
| 5/5/2009 | 636 | 5/2/2012 | 668 | | |
| 6/2/2009 | 636 | 6/6/2012 | 604 | | |
| 7/14/2009 | 332 | 7/2/2012 | 448 | | |
| 8/5/2009 | 336 | 8/6/2012 | 444 | | |
| 9/2/2009 | 308 | 9/5/2012 | 308 | | |
| 10/7/2009 | 452 | 10/2/2012 | 276 | | |
| 11/4/2009 | 568 | 11/7/2012 | 432 | | |
| 12/10/2009 | 576 | 12/4/2012 | 496 | | |

Historical Demand and TDS Data Used for Blending Analysis

| CCU | Daily Authority TDS (from conductivity) | Weekly Authority |
|---|---|---|

| Historical Authority Data Used for Look-back | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Authority Monthly Match with SCF | | | | | | | | |
| * 2009 to August 2011 data are daily TDS values estimated from conductivity. Aug 2011 to Feb 2012 values were replaced with CCU values (closest date match) because the Authority conductivity probe malfunctioned. March 2012 to 2015 data are weekly TDS benchmark lab data. All matched to City data based on date of sample | | | | | | | | |
| SCF Sample Date (matched) | Date of Sample | TDS (mg/L) | SCF Sample Date (matched) | Date of Sample | TDS (mg/L) | SCF Sample Date (matched) | Date of Sample | TDS (mg/L) |
| 7/14/2009 | 7/14/2009 | 491 | 10/5/2011 | 10/4/2011 | 385 | 1/8/2014 | 1/7/2014 | 324 |
| 8/5/2009 | 8/5/2009 | 384 | 11/2/2011 | 11/1/2011 | 373 | 2/18/2014 | 2/18/2014 | 360 |
| 9/2/2009 | 9/2/2009 | 357 | 12/7/2011 | 12/6/2011 | 376 | 3/5/2014 | 3/4/2014 | 352 |
| 10/7/2009 | 10/7/2009 | 318 | 1/4/2012 | 1/3/2012 | 388 | 4/8/2014 | 4/9/2014 | 364 |
| 11/4/2009 | 11/4/2009 | 348 | 2/1/2012 | 1/31/2012 | 391 | 5/6/2014 | 5/6/2014 | 356 |
| 12/10/2009 | 12/10/2009 | 339 | 3/14/2012 | 3/13/2012 | 355 | 6/4/2014 | 6/3/2014 | 384 |
| 1/6/2010 | 1/6/2010 | 362 | 4/4/2012 | 4/3/2012 | 380 | 7/2/2014 | 7/1/2014 | 376 |
| 2/3/2010 | 2/3/2010 | 369 | 5/2/2012 | 5/1/2012 | 388 | 8/6/2014 | 8/5/2014 | 352 |
| 3/3/2010 | 3/3/2010 | 403 | 6/6/2012 | 6/5/2012 | 432 | 9/4/2014 | 9/2/2014 | 324 |
| 4/7/2010 | 4/7/2010 | 446 | 7/2/2012 | 7/3/2012 | 400 | 10/1/2014 | 10/1/2014 | 332 |
| 5/4/2010 | 5/4/2010 | 470 | 8/6/2012 | 8/8/2012 | 408 | 11/12/2014 | 11/10/2014 | 316 |
| 6/2/2010 | 6/2/2010 | 428 | 9/5/2012 | 9/5/2012 | 344 | 12/11/2014 | 12/9/2015 | 316 |
| 7/14/2010 | 7/14/2010 | 424 | 10/2/2012 | 10/2/2012 | 360 | | | |
| 8/4/2010 | 8/4/2010 | 376 | 11/7/2012 | 11/6/2012 | 300 | | | |
| 9/1/2010 | 9/1/2010 | 362 | 12/4/2012 | 12/4/2012 | 300 | | | |
| 10/6/2010 | 10/6/2010 | 348 | 1/2/2013 | 1/2/2013 | 332 | | | |
| 11/3/2010 | 11/3/2010 | 354 | 2/5/2013 | 2/5/2013 | 332 | | | |
| 12/1/2010 | 12/1/2010 | 320 | 3/6/2013 | 3/5/2013 | 360 | | | |
| 1/6/2011 | 1/6/2011 | 360 | 4/3/2013 | 4/2/2013 | 464 | | | |
| 2/2/2011 | 2/2/2011 | 407 | 5/7/2013 | 5/7/2013 | 384 | | | |
| 3/2/2011 | 3/2/2011 | 439 | 6/4/2013 | 6/4/2013 | 372 | | | |
| 4/6/2011 | 4/6/2011 | 446 | 7/2/2013 | 7/2/2013 | 360 | | | |
| 5/4/2011 | 5/4/2011 | 295 | 8/7/2013 | 8/6/2013 | 332 | | | |
| 6/1/2011 | 6/1/2011 | 326 | 9/4/2013 | 9/4/2013 | 332 | | | |
| 7/6/2011 | 7/6/2011 | 435 | 10/2/2013 | 10/1/2013 | 292 | | | |
| 8/3/2011 | 7/19/2011 | 450 | 11/13/2013 | 11/12/2013 | 280 | | | |
| 9/6/2011 | 8/30/2011 | 423 | 12/11/2013 | 12/10/2013 | 296 | | | |

Historical Demand and TDS Data Used for Blending Analysis

| Authority Weekly Data Averaged on a Monthly Basis (Table 3 in Text) and Used for Projection Scenarios | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date of Sample | TDS (mg/L) | Date of Sample | TDS (mg/L) | Date of Sample | TDS (mg/L) | Date of Sample | TDS (mg/L) | Date of Sample | TDS (mg/L) |
| 3/1/2012 | 322 | 11/27/2012 | 327 | 8/13/2013 | 344 | 5/1/2014 | 372 | 1/13/2015 | 344 |
| 3/13/2012 | 355 | 12/4/2012 | 300 | 8/20/2013 | 340 | 5/6/2014 | 356 | 1/21/2015 | 324 |
| 3/20/2012 | 347 | 12/11/2012 | 308 | 8/28/2013 | 328 | 5/13/2014 | 376 | 1/27/2015 | 312 |
| 3/27/2012 | 384 | 12/18/2012 | 312 | 9/4/2013 | 332 | 5/20/2014 | 380 | 2/3/2015 | 340 |
| 4/3/2012 | 380 | 12/25/2012 | 292 | 9/10/2013 | 336 | 5/28/2014 | 372 | 2/9/2015 | 348 |
| 4/10/2012 | 388 | 1/2/2013 | 332 | 9/17/2013 | 300 | 6/3/2014 | 384 | 2/17/2015 | 332 |
| 4/17/2012 | 368 | 1/9/2013 | 356 | 9/24/2013 | 316 | 6/11/2014 | 380 | 2/24/2015 | 336 |
| 4/24/2012 | 380 | 1/15/2013 | 352 | 10/1/2013 | 292 | 6/17/2014 | 376 | 3/3/2015 | 328 |
| 5/1/2012 | 388 | 1/22/2013 | 344 | 10/8/2013 | 304 | 6/24/2014 | 360 | 3/11/2015 | 316 |
| 5/8/2012 | 392 | 1/29/2013 | 336 | 10/15/2013 | 292 | 7/1/2014 | 376 | 3/18/2015 | 332 |
| 5/15/2012 | 416 | 2/5/2013 | 332 | 10/22/2013 | 264 | 7/9/2014 | 388 | 3/24/2015 | 324 |
| 5/22/2012 | 420 | 2/12/2013 | 392 | 10/29/2013 | 308 | 7/15/2014 | 356 | 4/1/2015 | 352 |
| 5/29/2012 | 408 | 2/19/2013 | 352 | 11/5/2013 | 300 | 7/22/2014 | 376 | 4/7/2015 | 340 |
| 6/5/2012 | 432 | 2/27/2013 | 348 | 11/12/2013 | 280 | 7/29/2014 | 340 | | |
| 6/12/2012 | 412 | 3/5/2013 | 360 | 11/20/2013 | 292 | 8/5/2014 | 352 | | |
| 6/19/2012 | 404 | 3/12/2013 | 340 | 11/26/2013 | 256 | 8/13/2014 | 336 | | |
| 6/26/2012 | 404 | 3/19/2013 | 312 | 12/3/2013 | 312 | 8/19/2014 | 340 | | |
| 7/3/2012 | 400 | 3/26/2013 | 412 | 12/10/2013 | 296 | 8/26/2014 | 336 | | |
| 7/10/2012 | 412 | 4/2/2013 | 464 | 12/17/2013 | 316 | 9/2/2014 | 324 | | |
| 7/17/2012 | 404 | 4/9/2013 | 356 | 12/26/2013 | 344 | 9/10/2014 | 332 | | |
| 7/23/2012 | 392 | 4/17/2013 | 376 | 1/2/2014 | 324 | 9/16/2014 | 324 | | |
| 7/31/2012 | 360 | 4/23/2013 | 416 | 1/7/2014 | 324 | 9/23/2014 | 324 | | |
| 8/8/2012 | 408 | 5/1/2013 | 360 | 1/14/2014 | 344 | 10/1/2014 | 332 | | |
| 8/15/2012 | 412 | 5/7/2013 | 384 | 1/22/2014 | 348 | 10/6/2014 | 328 | | |
| 8/22/2012 | 376 | 5/14/2013 | 388 | 1/28/2014 | 336 | 10/13/2014 | 312 | | |
| 8/29/2012 | 368 | 5/21/2013 | 392 | 2/4/2014 | 348 | 10/20/2014 | 320 | | |
| 9/5/2012 | 344 | 5/29/2013 | 380 | 2/11/2014 | 348 | 10/27/2014 | 300 | | |
| 9/18/2012 | 340 | 6/4/2013 | 372 | 2/18/2014 | 360 | 11/3/2014 | 324 | | |
| 9/25/2012 | 352 | 6/11/2013 | 376 | 2/24/2014 | 352 | 11/10/2014 | 316 | | |
| 10/2/2012 | 360 | 6/18/2013 | 400 | 3/4/2014 | 352 | 11/17/2014 | 328 | | |
| 10/9/2012 | 352 | 6/25/2013 | 352 | 3/11/2014 | 352 | 11/25/2015 | 308 | | |
| 10/17/2012 | 320 | 7/2/2013 | 360 | 3/18/2014 | 356 | 12/2/2015 | 360 | | |
| 10/23/2012 | 344 | 7/9/2013 | 336 | 3/25/2014 | 360 | 12/9/2015 | 316 | | |
| 11/1/2012 | 320 | 7/16/2013 | 324 | 4/1/2014 | 360 | 12/16/2015 | 352 | | |
| 11/6/2012 | 300 | 7/23/2013 | 316 | 4/9/2014 | 364 | 12/23/2015 | 336 | | |
| 11/14/2012 | 296 | 7/31/2013 | 340 | 4/15/2014 | 352 | 1/2/2015 | 308 | | |
| 11/20/2013 | 327 | 8/6/2013 | 332 | 4/22/2014 | 372 | 1/7/2015 | 288 | | |

# APPENDIX B – COST ANALYSIS REFERENCES

*PEACE RIVER MANASOTA REGIONAL WATER SUPPLY AUTHORITY*
*BOARD OF DIRECTORS MEETING*
*April 8, 2015*

**REGULAR AGENDA**
**ITEM 4**

**Regional Integrated Loop System – Phase 1 Interconnect**
**[U.S. 17 to Punta Gorda]**

---

**Presenter -** Patrick Lehman, Executive Director
Doug Manson, Legal Counsel

**Recommended Action -** **Board Concurrence** with state funding appropriation proviso concept.

The Phase 1 Interconnect Project provides a plant-to-plant connection between the Authority's Peace River Facility in DeSoto County and the City of Punta Gorda's Shell Creek Water Treatment Facility in Charlotte County (see attached location maps). The project includes installation of approximately six (6) miles of 24-inch diameter pipeline interconnecting the regional system at its terminus on U.S. 17 at the DeSoto/Charlotte County border to the City of Punta Gorda's Shell Creek Water Treatment.

Staff will provide an update to the Board on the water project application for state appropriation approved by the Board for the project and proviso language submitted with regard to both the Authority's funding application and the City's funding application for its reverse osmosis project (draft and subject to change through the legislative process).

**Budget Action:** None – Board to appropriate funding pending approval of state and SWFWMD funds.

# PEACE RIVER/MANASOTA REGIONAL WATER SUPPLY AUTHORITY

**MEMORANDUM**

April 8, 2015

TO: Board of Directors

FROM: Patrick J. Lehman, P.E.
Executive Director

SUBJECT: Regional Integrated Loop system Phase I Interconnect (U.S. 17 to Punta Gorda)
State Appropriation Application Update

The Authority submitted a water project application for state appropriation for the Phase I Interconnect with Punta Gorda and the City submitted an application for their reverse osmosis treatment project. The City of Punta Gorda's lobbyist has coordinated with key legislators, City staff and Authority staff and has submitted the following proviso language for state appropriation request in lieu of the submitted applications in an effort to further funding for both projects in coordination with SWFWMD funding conditions. This language is the draft submitted and subject to change through the legislative process.

*'The nonrecurring sum of $4,000,000 is appropriated from the _____ Fund to the Department of Environmental Protection to provide a grant to the City of Punta Gorda for its contribution towards the Peace River Manasota Regional Water Supply Authority for the Phase 1 Interconnect as part of the combined regional water quality and water supply project that includes the Punta Gorda Reverse Osmosis facility. As a condition of this appropriation, such funds may not be disbursed unless or until: 1) the Southwest Florida Water Management District and the Peace River Manasota Regional Water Supply Authority execute a cooperative funding agreement providing for the Southwest Florida Water Management District contributing fifty percent (50%) of the $14,000,000 cost of the Peace River Manasota Regional Water Supply Authority Phase 1 Interconnect; 2) the Southwest Florida Water Management District and the City of Punta Gorda execute a cooperative funding agreement providing for the Southwest Florida Water Management District contributing fifty percent (50%) of the $32,2000,000 cost of City of Punta Gorda's reverse osmosis water treatment plant; and 3) the payment of $6,000,000 including the $4,000,000 provided for in this appropriation, by the City of Punta Gorda to the Peace River Manasota Regional Water Supply Authority for the Phase 1 Interconnect.'*

Authority staff requests Board concurrence with the above proviso language.

cc: Doug Manson

**TABLE 6-2**

**CITY OF PUNTA GORDA**
**SHELL CREEK WTP RO ADDITION**
**PRELIMINARY DESIGN REPORT**

**Preliminary Opinion of Capital Cost**

| Item | Description | Estimated Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| **GENERAL REQUIREMENTS** | | | | | |
| 1. | Mobilization | 1 | LS | $ 350,000 | $ 350,000 |
| 2. | General Conditions | 13 | MO | $ 50,000 | $ 650,000 |
| 3. | Bonds & Insurance | 1 | LS | $ 350,000 | $ 650,000 |
| | | | | **Subtotal:** | **$ 1,350,000** |
| **SITEWORK** | | | | | |
| 1 | General | 1 | LS | $ 470,000 | $ 470,000 |
| 2. | Earthwork | 1 | LS | $ 60,000 | $ 60,000 |
| 3. | Pavement | 1 | LS | $ 155,000 | $ 155,000 |
| 4. | Drainage | 1 | LS | $ 12,000 | $ 12,000 |
| 5. | Sidewalk | 1 | LS | $ 15,000 | $ 15,000 |
| 6. | Fencing and Sidewalk | 1 | LS | $ 38,000 | $ 38,000 |
| 7. | Landscaping | 1 | LS | $ 60,000 | $ 60,000 |
| 8. | Temporary Facilities | 1 | LS | $ 145,000 | $ 145,000 |
| | | | | **Subtotal:** | **$ 955,000** |
| **RAW WATER SYSTEM** | | | | | |
| 1. | Exploratory Well Program and APT | 1 | LS | $ 1,326,000 | $ 1,326,000 |
| 2. | New Raw Water Supply Wells | 2 | LS | $ 137,250 | $ 274,500 |
| 3. | Converted ASR Wells | 1 | LS | $ 99,500 | $ 99,500 |
| 4. | Well Pumps | 4 | EA | $ 145,000 | $ 580,000 |
| 5. | Well Discharge Equipment and Appurtenances | 2 | EA | $ 60,000 | $ 120,000 |
| 6. | Electrical | 2 | EA | $ 52,000 | $ 104,000 |
| 7. | Emergency Power Well Feeders | 1 | EA | $ 29,000 | $ 29,000 |
| 8. | 10-inch Raw Water Main | 1250 | LF | 45 | $ 56,250 |
| 9. | 16-inch Raw Water Main | 1900 | LF | 64 | $ 121,600 |
| 10. | 20-inch Raw Water Main | 400 | LF | 75 | $ 26,000 |
| 11. | 24-inch Raw Water Main | 450 | LF | 87 | $ 39,150 |
| 12. | Raw Water Piping Appurtenances | 1 | LS | $ 40,000 | $ 40,000 |
| | | | | **Subtotal:** | **$ 2,820,000** |
| **RO WATER TREATMENT PLANT** | | | | | |
| 1. | Operations Building (~4,000 SF) | 1 | LS | $1,000,000 | $ 1,000,000 |
| 2. | Process Building/Chemical Storage Area (~11,000 SF) | 1 | LS | $2,000,000 | $ 2,000,000 |
| 3. | Process Water Micron Filters | 2 | EA | $ 85,000 | $ 170,000 |
| 4. | High Pressure Pumps and Cans | 2 | EA | $ 185,000 | $ 370,000 |
| 5. | High Pressure Pump Cans (Future Pumps) | 2 | EA | $ 30,000 | $ 60,000 |
| 6. | Membrane Treatment Skids | 2 | EA | $ 785,000 | $ 1,570,000 |
| 7. | Process Piping (Skids & Building SS) | 1 | LS | $ 460,000 | $ 460,000 |
| 8. | Blending Basin/Wetwell | 1 | LS | $ 200,000 | $ 200,000 |
| 9. | Transfer Pumps | 3 | EA | $ 52,000 | $ 153,000 |
| 10. | Degasifiers and Blowers | 2 | EA | $ 300,000 | $ 600,000 |
| 11. | Exhaust Blower and Stack | 1 | LS | $ 145,000 | $ 290,000 |
| 12. | Emergency Generator with ATS & Enclosure | 1 | LS | $ 405,000 | $ 405,000 |
| 13. | Fuel Storage | 1 | LS | $ 45,000 | $ 45,000 |
| 14. | Fuel Piping and Appurtenances | 1 | LS | $ 12,000 | $ 12,000 |

**TABLE 6-2 (Cont'd.)**
**CITY OF PUNTA GORDA**
**SHELL CREEK WTP RO ADDITION**
**PRELIMINARY DESIGN REPORT**
**Preliminary Opinion of Capital Cost**

| Item | Description | Estimated Quantity | Unit | Unit Cost | Total Cost |
|---|---|---|---|---|---|
| 15. | Electrical | 1 | LS | $1,390,000 | $ 1,390,000 |
| 16. | Instrumentation | 1 | LS | $ 1,050,000 | $ 1,050,000 |
| 17. | Cleaning System | 1 | LS | $ 140,000 | $ 140,000 |
| 18. | Laboratory Casework | 1 | LS | $ 17,500 | $ 17,500 |
| 19. | Miscellaneous Metals | 1 | LS | $ 175,000 | $ 175,000 |
| 20. | Pump Room Bridge Crane | 1 | LS | $ 50,000 | $ 50,000 |
| 21. | Septic Tank | 1 | LS | $ 70,000 | $ 70,000 |
| 22. | Neutralization Station | 1 | LS | $ 80,000 | $ 80,000 |
| 23. | Sodium Hydroxide Feed System | 1 | LS | $ 100,000 | $ 100,000 |
| 24. | Sulfuric Acid Feed System | 1 | LS | $ 100,000 | $ 100,000 |
| 25. | Antiscalant Feed System | 1 | LS | $ 40,000 | $ 40,000 |
| 26. | Chlorine Building (~1200 SF) | 1 | LS | $ 200,000 | $ 200,000 |
| 27. | Chlorine Feed System | 1 | LS | $ 100,000 | $ 100,000 |
| 28. | Ammonia Feed System | 1 | LS | $ 40,000 | $ 40,000 |
| 29. | Phosphate Feed System | 1 | LS | $ 35,000 | $ 35,000 |
| | | | | **Subtotal:** | **$ 10,780,500** |
| **YARD PIPING** | | | | | |
| 1. | Finished Water Piping | 1 | LS | $ 160,000 | $ 160,000 |
| 2. | Neutralization Piping | 1 | LS | $ 25,000 | $ 25,000 |
| 3. | Minor Piping | 1 | LS | $ 100,000 | $ 100,000 |
| 4. | Chemical Feed Piping | 1 | LS | $ 40,000 | $ 40,000 |
| 5. | Temporary Connections | 1 | LS | $ 45,000 | $ 45,000 |
| 6. | Modifications to Existing Piping | 1 | LS | $ 109,000 | $ 109,000 |
| | | | | **Subtotal:** | **$ 479,000** |
| **CONCENTRATE DISPOSAL** | | | | | |
| 1. | Deep Injection Well | 1 | LS | $4,300,000 | $ 4,300,000 |
| 2. | Dual Zone Monitoring Well | 1 | LS | $1,100,000 | $ 1,100,000 |
| 3. | Concentrate Piping | 1 | LS | $ 70,000 | $ 70,000 |
| | | | | **Subtotal:** | **$ 5,470,000** |
| **PERMEATE BLENDING FACILITIES** | | | | | |
| 1. | 2 MG GST | 1 | LS | $1,600,000 | $ 1,600,000 |
| 2. | RO Permeate Transfer Pumps | 2 | EA | $ 70,000 | $ 140,000 |
| 3. | Permeate Basin | 1 | LS | $ 45,000 | $ 45,000 |
| 4. | Permeate Piping | 1 | LS | $ 235,000 | $ 235,000 |
| | | | | **Subtotal:** | **$ 2,020,000** |
| | | | | **SUBTOTAL** | **$23,874,500** |
| **CONTINGENCY** | | | | 18% | $ 4,297,000 |
| **PROFESSIONAL SERVICES** | | | | | $ 3,657,428 |
| | | | | **GRAND TOTAL:** | **$31,828,928** |
| **ADDITIVE ALTERNATE BID ITEMS** | | | | | |
| 1. | Demolition of 0.46 MG Covered Clearwell | 1 | LS | $ 90,000 | $ 90,000 |
| 2. | Removal of HSP 6 and 7 | 1 | LS | $ 12,000 | $ 12,000 |
| 3. | Blend Water Micron Filters | 1 | EA | $ 50,000 | $ 50,000 |
| 4. | Chlorine Room Bridge Crane | 1 | LS | $ 75,000 | $ 75,000 |
| 5. | Parallel FW Main to HSPs | 1 | LS | $ 60,000 | $ 60,000 |
| | | **GRAND TOTAL w/ALTERNATE BID ITEMS:** | | | **$32,115,928** |

```
                  WORK-SHEET: DEPT1621
                 DESCRIPTION: UT WATER TREATMENT     FY 2016 BUDGET
                 FISCAL YEAR: 2015
                FROM ACCOUNT: 402-1621-500-11-00
                  TO ACCOUNT: 402-1621-599-99-99
                   SELECTION: RANGE
              TRANSACTION TYPE: EXPENDITURES
                        USER: BRIANF
                    SECURITY: Y
             OMIT DESCRIPTION:
             HORIZONTAL SHIFT: 0
               SUMMARY TOTALS:
           ACCOUNT SUPPRESSION: YES

                               SORT/BREAK/P_BREAK
            FUND SORT PRIORITY: 1
            DEPT SORT PRIORITY: 2
             DEPT CAT PRIORITY: 0
             DIV SORT PRIORITY: 3       1
            STAB SORT PRIORITY: 0
            STAS SORT PRIORITY: 0
             ELM SORT PRIORITY: 0
             OBJ SORT PRIORITY: 0
             CAT SORT PRIORITY: 4       1
              REV/EXP PRIORITY: 0
                ACCOUNT NUMBER:          &5-&6

FIELD USAGE:
    B Base   GMA2YR      1  7                    ACTUAL         FY 2013        J
    B Base   GMLYA       2  7                    ACTUAL         FY 2014        J
    B Base   GMORIG      3  7   ORIGINAL         BUDGET         FY 2015        J
    B Base   GMREVE      4  7     AMENDED       PROJECTION        FY 2015      J
    C Level  405         6  7   Level 405       DEPT ESTIM       FY 2015      J
    C Level  480         7  7   Level 480         BUDGET         FY 2016      J
    B Base   GMYTD           9
    B Base   GMENCUMB       9
    R Result YTDACT      5  7   YTD/ENC          ACTUAL         FY 2015        J
        GMYTD    + 0                .0000   0
        GMENCUMB + 1                .0000   0

            SPECIAL OPTIONS:
              ELEMENT RANGE: 1
           BEFORE HEAD TYPE:
          HEADER ON MI LINE: N
        BLANK LINE AFTER MI: Y
          FORCE NEG REVENUE:
         BUDGET LEVEL ALLOC:
       HEADER ON EVERY PAGE:

           RECORDS SELECTED:          44
            SUMMARY RECORDS:           5
```

| ACCOUNT | DESCRIPTION | ACTUAL FY 2013 | ACTUAL FY 2014 | ORIGINAL BUDGET FY 2015 | AMENDED PROJECTION FY 2015 | YTD/ENC ACTUAL FY 2015 | Level 405 DEPT ESTIM FY 2015 | Level 480 BUDGET FY 2016 |
|---|---|---|---|---|---|---|---|---|
| 12-01 | REGULAR SALARIES & WAGES | 651,213 | 636,323 | 670,895 | 670,895 | 281,465 | 670,895 | 670,895 |
| 12-06 | PAY PLAN CHANGES | 21,220 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14-00 | OVERTIME PAY | 20,078 | 27,952 | 31,200 | 31,200 | 13,125 | 31,200 | 33,120 |
| | OVERTIME FOR PAGER | | | | 9,140 | | | |
| | OVERTIME FOR HOLIDAYS | | | | 9,550 | | | |
| | OVERTIME FOR STAFF MEETINGS | | | | 3,190 | | | |
| | OVERTIME FOR SHIFT COVERAGE | | | | 5,310 | | | |
| | OVERTIME FOR MAINTENANCE CALL INS (INCREASED BY 3%) | | | | 5,930 | | | |
| | | | | | 33,120 | | | |
| 21-00 | F I C A TAXES | 49,846 | 47,548 | 50,194 | 50,194 | 21,361 | 50,194 | 50,194 |
| 22-00 | RETIREMENT CONTRIBUTION | 135,646 | 164,027 | 117,059 | 117,059 | 58,530 | 117,059 | 117,059 |
| 22-10 | RETIREMT -DEFINED CONTRIB | 727 | 2,601 | 4,727 | 4,727 | 2,343 | 4,727 | 4,727 |
| 23-00 | EMPLOYEE HLTH & LIFE INS | 134,645 | 138,522 | 146,448 | 146,448 | 59,488 | 146,448 | 146,448 |
| 23-02 | DEP HLTH + EMPL PD LIFE | 35,402 | 35,491 | 34,625 | 34,625 | 12,653 | 34,625 | 34,625 |
| 24-00 | WORKMEN'S COMP PREMIUMS | 19,326 | 22,118 | 23,173 | 23,173 | 16,296 | 23,173 | 23,173 |
| * | PERSONNEL SERVICES | 1,068,103 | 1,074,582 | 1,078,321 | 1,078,321 | 465,261 | 1,078,321 | 1,080,241 |
| 31-12 | LABORATORY TESTING | 80,550 | 68,168 | 80,000 | 80,000 | 44,179 | 80,000 | 80,000 |
| | SHELL CREEK MONITORING | | | | 36,060 | | | |
| | PLANT TESTING | | | | 27,575 | | | |
| | ASR TESTING | | | | 8,365 | | | |
| | STORET | | | | 8,000 | | | |
| | | | | | 80,000 | | | |
| 31-13 | EMPLOYEE TESTING | 0 | 1,100 | 300 | 300 | 0 | 300 | 300 |
| | LICENSE CHECKS | | | | 300 | | | |
| | | | | | 300 | | | |
| 32-00 | ACCOUNTING & AUDITING | 4,668 | 4,340 | 4,430 | 4,430 | 4,339 | 4,430 | 4,430 |
| | EST 2% INCR | | | | 4,430 | | | |
| | | | | | 4,430 | | | |
| 34-00 | CONTRACTUAL SERVICES | 19,620 | 25,520 | 16,390 | 16,390 | 7,238 | 16,390 | 7,390 |
| | CRANE SERVICE | | | | 790 | | | |
| | FLAT BED TRANSPORTATION SERVICE | | | | 500 | | | |
| | FIRE ALARM SERVICE | | | | 500 | | | |

| ACCOUNT DESCRIPTION | ACTUAL FY 2013 | ACTUAL FY 2014 | ORIGINAL BUDGET FY 2015 | AMENDED PROJECTION FY 2015 | YTD/ENC ACTUAL FY 2015 | Level 405 DEPT ESTIM FY 2015 | Level 480 BUDGET FY 2016 | |
|---|---|---|---|---|---|---|---|---|
| SCALE CONTRACT | | | | 900 | | | | |
| PRM MAINTENANCE | | | | 4,200 | | | | |
| ICE MACHINE SERVICE | | | | 500 | | | | |
| | | | | 7,390 | | | | |
| 40-00 TRAVEL & PER DIEM | 1,161 | 93 | 1,400 | 1,400 | 493 | 1,400 | 1,400 | ✓ |
| MOTELS | | | | 920 | | | | |
| MEALS | | | | 480 | | | | |
| | | | | 1,400 | | | | |
| 41-00 COMMUNICATIONS SERVICES | 8,583 | 4,920 | 6,800 | 6,800 | 2,084 | 6,800 | 6,800 | ✓ |
| PHONE SERVICE | | | | 5,100 | | | | |
| CELL PHONES | | | | 1,700 | | | | |
| | | | | 6,800 | | | | |
| 43-01 ELECTRICITY | 290,181 | 309,162 | 337,000 | 337,000 | 99,850 | 337,000 | 337,000 | ✓ |
| ELECTRIC SERVICE | | | | 337,000 | | | | |
| BASED ON PAST HISTORY PLUS EST. FOR TESTING WELL | | | | | | | | |
| | | | | 337,000 | | | | |
| 43-03 REFUSE COLLECTION | 1,322 | 2,176 | 2,400 | 2,400 | 661 | 2,400 | 2,400 | ✓ |
| COLLECTION | | | | 2,400 | | | | |
| | | | | 2,400 | | | | |
| 44-03 EQUIPMENT LEASES | 1,360 | 1,381 | 2,500 | 2,500 | 1,443 | 2,500 | 2,500 | ✓ |
| COPIER | | | | 2,500 | | | | |
| | | | | 2,500 | | | | |
| 44-05 CLOTHING & UNIFORMS | 1,511 | 1,490 | 3,120 | 3,120 | 2,531 | 3,120 | 3,120 | ✓ |
| UNIFORM SERVICE | | | | 3,120 | | | | |
| | | | | 3,120 | | | | |
| 45-01 FIRE/GENERAL LIAB INSUR | 84,471 | 95,543 | 117,625 | 117,625 | 80,386 | 117,625 | 117,625 | ✓ |
| EST 10% INCR | | | | 107,640 | | | | |

| ACCOUNT DESCRIPTION | ACTUAL FY 2013 | ACTUAL FY 2014 | ORIGINAL BUDGET FY 2015 | AMENDED PROJECTION FY 2015 | YTD/ENC ACTUAL FY 2015 | Level 405 DEPT ESTIM FY 2015 | Level 480 BUDGET FY 2016 | |
|---|---|---|---|---|---|---|---|---|
| ADD'L EST. 5% INCR | | | | 4,895 | | | | |
| | | | | 112,535 | | | | |
| 46-00 REPAIR & MAINTENANCE SVCS | 41,506 | 38,668 | 63,100 | 63,100 | 41,504 | 63,100 | 63,100 | ✓ |
| PUMP REPAIRS | | | | 42,400 | | | | |
| ELECTRIC MOTOR REPAIRS | | | | 8,000 | | | | |
| GENERATOR REPAIRS | | | | 3,200 | | | | |
| PRESS PARTS | | | | 9,500 | | | | |
| | | | | 63,100 | | | | |
| 46-01 REPAIR/MAINT BUILDINGS | 2,010 | 21,453 | 3,000 | 3,000 | 1,122 | 3,000 | 3,000 | ✓ |
| BUILDING REPAIRS | | | | 3,000 | | | | |
| | | | | 3,000 | | | | |
| 46-04 REPR/MAINT AIR CONDITION | 403 | 693 | 1,000 | 1,000 | 0 | 1,000 | 1,000 | ✓ |
| AC REPAIR | | | | 1,000 | | | | |
| | | | | 1,000 | | | | |
| 46-06 REPAIR/MAINT STORAGE TANK | 0 | 0 | 8,435 | 8,435 | 0 | 8,435 | 17,435 | ✓ |
| TANK REPAIRS | | | | 17,435 | | | | |
| | | | | 17,435 | | | | |
| 46-07 REP/MAINT INSTRUMENTATION | 8,456 | 8,903 | 9,000 | 9,000 | 5,226 | 9,000 | 9,000 | ✓ |
| SCADA REPAIRS | | | | 2,000 | | | | |
| METER REPAIRS | | | | 1,000 | | | | |
| ELECTRONIC EQUIPMENT REPAIR | | | | 3,000 | | | | |
| SCADA PARTS | | | | 1,500 | | | | |
| CAMERA PARTS | | | | 1,500 | | | | |
| | | | | 9,000 | | | | |
| 46-08 R&M AUTOS/TRUCKS FLEET | 6,600 | 5,447 | 7,000 | 7,000 | 6,451 | 7,000 | 7,000 | ✓ |
| REPAIR MAINTENANCE TRUCKS | | | | 7,000 | | | | |
| | | | | 7,000 | | | | |
| 46-09 REPAIR/MNT EQUIP FLEET | 4,824 | 2,875 | 2,000 | 2,000 | 1,744 | 2,000 | 2,000 | ✓ |

| ACCOUNT DESCRIPTION | ACTUAL FY 2013 | ACTUAL FY 2014 | ORIGINAL BUDGET FY 2015 | AMENDED PROJECTION FY 2015 | YTD/ENC ACTUAL FY 2015 | Level 405 DEPT ESTIM FY 2015 | Level 480 BUDGET FY 2016 |
|---|---|---|---|---|---|---|---|
| REPAIR MAINTENANCE EQUIPMENT-FLEET | | | | 2,000 | | | |
| | | | | 2,000 | | | |
| 46-13 REPAIR/MNT VEH & EQP DEPT | 1,473 | 3,874 | 4,000 | 3,000 | 829 | 4,000 | 4,000 ✓ |
| EQUIPMENT/VEHICLE REPAIR-BY DEPTARTMENT | | | | 4,000 | | | |
| | | | | 4,000 | | | |
| 47-00 PRINTING & BINDING | 861 | 0 | 0 | 0 | 0 | 0 | 0 |
| 49-06 ADMINISTRATIVE CHARGES | 430,942 | 430,767 | 430,790 | 430,790 | 215,395 | 430,790 | 430,790 ✓ |
| 49-07 COMPUTER OVERHEAD | 35,720 | 38,900 | 46,590 | 46,590 | 23,295 | 46,590 | 46,590 ✓ |
| 49-17 PERMIT FEES | 12,950 | 7,665 | 7,805 | 7,805 | 200 | 7,805 | 7,805 ✓ |
| RMP STATE FEES | | | | 1,000 | | | |
| FUEL AND CHEMICAL STORAGE | | | | 305 | | | |
| LAB | | | | 500 | | | |
| ANNUAL OPERATING PERMIT-DEP | | | | 6,000 | | | |
| | | | | 7,805 | | | |
| 51-00 OFFICE SUPPLIES | 1,174 | 880 | 2,000 | 2,000 | 7 | 2,000 | 2,000 ✓ |
| OFFICE SUPPLIES | | | | 2,000 | | | |
| | | | | 2,000 | | | |
| 52-01 GASOLINE, OIL, LUBRICANTS | 26,038 | 21,793 | 25,500 | 25,500 | 13,846 | 25,500 | 25,500 ✓ |
| REGULAR GAS | | | | 12,000 | | | |
| DIESEL | | | | 10,700 | | | |
| OIL AND LUBRICANTS | | | | 2,800 | | | |
| | | | | 25,500 | | | |
| 52-11 CHEMICALS | 605,673 | 512,682 | 564,215 | 564,215 | 348,274 | 564,215 | 564,215 ✓ |
| ALUM | | | | 301,800 | | | |
| CAUSTIC SODA | | | | 71,400 | | | |
| CARBON | | | | 47,800 | | | |
| AMMONA | | | | 28,000 | | | |
| CHLORINE | | | | 62,000 | | | |
| POLY PRESS - PLANT | | | | 33,500 | | | |
| STABILIZER | | | | 8,800 | | | |
| COPPER SULFATE | | | | 5,000 | | | |
| AMMONIUM | | | | 2,915 | | | |

| ACCOUNT DESCRIPTION | ACTUAL FY 2013 | ACTUAL FY 2014 | ORIGINAL BUDGET FY 2015 | AMENDED PROJECTION FY 2015 | YTD/ENC ACTUAL FY 2015 | Level 405 DEPT ESTIM FY 2015 | Level 480 BUDGET FY 2016 | |
|---|---|---|---|---|---|---|---|---|
| BLEACH | | | | 3,000 | | | | |
| | | | | 564,215 | | | | |
| 52-13 CHEMICALS - LABORATORY | 8,646 | 6,811 | 10,000 | 10,000 | 5,005 | 10,000 | 10,000 | ✓ |
| LAB CHEMICALS | | | | 4,000 | | | | |
| BACTI SAMPLES | | | | 5,000 | | | | |
| ASR TESTS | | | | 1,000 | | | | |
| | | | | 10,000 | | | | |
| 52-16 PRE-EMPLOYMENT COSTS | 0 | 928 | 500 | 500 | 0 | 500 | 500 | ✓ |
| PRE EMPLOYMENT TESTS | | | | 500 | | | | |
| | | | | 500 | | | | |
| 52-21 DEPT MATERIALS & SUPPLIES | 33,640 | 45,511 | 38,000 | 38,000 | 10,015 | 38,000 | 38,000 | ✓ |
| SCREENINS | | | | 11,200 | | | | |
| BUILDING MATERIALS AND SUPPLIES | | | | 5,000 | | | | |
| GROUNDS MAINTENANCE SUPPLIES | | | | 2,000 | | | | |
| HARDWARE | | | | 3,300 | | | | |
| PLUMPING SUPPLIES | | | | 6,000 | | | | |
| SHELL AND FILL | | | | 1,500 | | | | |
| HAND TOOLS | | | | 1,000 | | | | |
| REPAIR KITS | | | | 5,000 | | | | |
| ELECTRICAL SUPPLIES | | | | 3,000 | | | | |
| | | | | 38,000 | | | | |
| 52-22 SAFETY SUPPLIES | 1,566 | 2,314 | 2,800 | 2,800 | 1,584 | 2,800 | 2,800 | ✓ |
| SAFETY SHOES (15) | | | | 1,800 | | | | |
| EYE GLASSES | | | | 100 | | | | |
| PROTECTIVE GEAR | | | | 200 | | | | |
| FIRTS AID SUPPLIES | | | | 200 | | | | |
| BOOTS AND BACK SUPPORTS | | | | 100 | | | | |
| SAFETY MARKINGS | | | | 200 | | | | |
| SCBA CERTIFICATIONS | | | | 100 | | | | |
| SAFETY PLACARDS | | | | 100 | | | | |
| | | | | 2,800 | | | | |
| 52-32 LABORATORY SUPPLIES | 5,503 | 7,694 | 6,000 | 6,000 | 1,164 | 6,000 | 6,000 | ✓ |
| GLASSWARE | | | | 2,000 | | | | |

| ACCOUNT | DESCRIPTION | ACTUAL FY 2013 | ACTUAL FY 2014 | ORIGINAL BUDGET FY 2015 | AMENDED PROJECTION FY 2015 | YTD/ENC ACTUAL FY 2015 | Level 405 DEPT ESTIM FY 2015 | Level 480 BUDGET FY 2016 |
|---|---|---|---|---|---|---|---|---|
| | REPAIR PARTS | | | | 2,000 | | | |
| | BACTI MATERIAL | | | | 2,000 | | | |
| | | | | | 6,000 | | | |
| 54-00 | BOOKS/MEMBS/TRAINING/EDUC | 3,907 | 2,630 | 2,700 | 3,700 | 3,695 | 2,700 | 2,700 |
| | SCHOOLS | | | | 1,100 | | | |
| | EXAM FEES | | | | 800 | | | |
| | MEMBERSHIPS | | | | 620 | | | |
| | CERTIFICATION COURCES | | | | 180 | | | |
| | | | | | 2,700 | | | |
| 54-02 | SAFETY TRAINING | 0 | 249 | 830 | 830 | 0 | 830 | 830 |
| | SAFETY TRAINING | | | | 830 | | | |
| | | | | | 830 | | | |
| * | OPERATING EXPENSES | 1,725,319 | 1,674,630 | 1,807,230 | 1,807,230 | 922,560 | 1,807,230 | 1,807,230 |
| 64-01 | AUTOS & ON-ROAD VEHICLES | 0 | 0 | 0 | 0 | 0 | 0 | 30,000 |
| | 4X4 PICKUP -REPLACEMENT FOR 5514 | | | | 30,000 | | | |
| | | | | | 30,000 | | | |
| 64-03 | EQUIPMENT | 0 | 0 | 130,681 | 146,479 | 123,176 | 146,479 | 114,500 |
| | INCUBATOR | | | | 18,400 | | | |
| | 4HEAD SEMIAUTO FILLING MACHINE | | | | 20,500 | | | |
| | MULE- OFF ROAD VEHICLE | | | | 8,900 | | | |
| | MULE- OFF ROAD VEHICLE | | | | 8,900 | | | |
| | GEARBOX-PRESS | | | | 5,000 | | | |
| | ROOF FAN REPLACEMENT- CHEMICAL BUILDING | | | | 3,000 | | | |
| | HACH SL1000 PORTABLE ANALYZER | | | | 3,000 | | | |
| | PLANT FENCING | | | | 46,800 | | | |
| | | | | | 114,500 | | | |
| * | CAPITAL OUTLAY | 0 | 0 | 130,681 | 146,479 | 123,176 | 146,479 | 144,500 |
| ** | WATER TREATMENT | 2,793,422 | 2,749,212 | 3,016,232 | 3,032,030 | 1,510,997 | 3,032,030 | 3,031,971 |
| | | 2,793,422 | 2,749,212 | 3,016,232 | 3,032,030 | 1,510,997 | 3,032,030 | 3,031,971 |

| ACCOUNT DESCRIPTION | ACTUAL FY 2013 | ACTUAL FY 2014 | ORIGINAL BUDGET FY 2015 | AMENDED PROJECTION FY 2015 | YTD/ENC ACTUAL FY 2015 | Level 405 DEPT ESTIM FY 2015 | Level 480 BUDGET FY 2016 |
|---|---|---|---|---|---|---|---|

# APPENDIX C – COST ANALYSIS

## O&M Costs

| SCF O&M Costs (from 2013/2014 Actual Budget) | |
|---|---|
| Average Annual Water Production (past 24 months) | 4.255 |
| Current Monthly Average Total O & M Costs | 230,943.08 |
| Current Daily Average WTP Total Cost (past 24 months) | 7,592.65 |
| Average Total Cost ($/MG) | 1,784.41 |
| Current Monthly Average WTP Electrical Cost (past 24 months) | $24,972.63 |
| Current Daily Average WTP Electrical Cost (past 24 months) | $832.42 |
| Average Electrical Cost ($/MG) | $195.63 |
| Calculated Average Electrical Cost ($/1,000 gal) | $0.20 |
| Current Monthly Average WTP Chemical Costs (past 24 months) | $46,598.13 |
| Current Daily Average WTP Chemical Cost (past 24 months) | $1,553.27 |
| Average Chemical Cost ($/MG) | $365.05 |
| Current Average Chemical Cost ($/1,000 gal) | $0.37 |
| Total O&M ($/1,000 gal) | $1.78 |

| | |
|---|---|
| O&M Inactive (less Electrical and Chemical) | $1.37 |
| Daily Inactive Costs | $5,831.27 |
| O&M Active minus inactive $/kgal | $0.41 |

| RO O&M Costs from 2010 Tetra Teach Design Report | | |
|---|---|---|
| Chemical Costs per 1,000 Gallons | | 0.19 |
| Power Costs per 1,000 Gallons | | 0.38 |
| Labor Costs per 1,000 Gallons | | 0.17 |
| Membrane Replacement | | 0.09 |
| Other (including repair and maintenance) | | 0.21 |
| Total O&M ($/1,000 gal) | $ | 1.04 |

| Authority Water Purchase (O&M) | |
|---|---|
| $/kgal | $2.70 |

## Look-Back Scenario

### Authority Project

| Authority | | | | SCF Active | | | | SCF Base Costs | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Water Purchased (MG) | Water Purchased (kgal) | Total Water Cost | Annual Water Cost | Total Water Produced (MG) | Water Produced (kgal) | Water Cost | Annual Water Cost | Number of Days | Base Costs | Base Annual Costs |
| 1,925 | 1,925,461 | $ 5,198,745 | $ 945,226 | 6,635 | 6,634,662 | $2,746,448 | $ 499,354 | 2008 | $ 11,706,281 | $ 2,128,415 |

| | |
|---|---|
| Average Annual Costs | $ 3,572,995 |
| Total Costs | $ 19,651,474 |
| $/kgal | $2.29 |

### RO Project

| RO | | | | SCF Active | | | | SCF Base Costs | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Water Produced (MG) | Water Produced (kgal) | Total Water Cost | Annual Water Cost | Total Water Produced (MG) | Water Produced (kgal) | Water Cost | Annual Water Cost | Number of Days | Base Costs | Base Annual Costs |
| 6,053 | 6,052,681 | $ 6,294,788 | $ 786,849 | 6,407 | 6,407,200 | $2,652,289 | $ 331,536 | 2,920 | $ 17,027,318 | $ 2,128,415 |

| | |
|---|---|
| Average Annual Costs | $ 3,246,799 |
| Total Costs | $ 25,974,395 |
| $/kgal | $2.08 |

| Projection Scenario | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Authority based on Historical Average SCF TDS** | | | | | | | | | | |
| | Authority | | | | SCF | | | | | |
| | | | | | Active | | | Base O&M Costs | | |
| Year | Total Water Purchased (mg) | Water Purchased (kgal) | Total Water Cost | | Total Water Produced (MG) | Water Produced (kgal) | Water Cost | Number of Days per | Base Total Costs | **Total Costs** |
| 2018 | 387 | 387,447 | $ 1,046,106 | | 1,251 | 1,251,414 | $ 518,028 | **365** | **$ 2,128,415** | **$ 3,692,549** |
| 2019 | 391 | 391,084 | $ 1,055,926 | | 1,263 | 1,263,161 | $ 522,891 | **365** | **$ 2,128,415** | **$ 3,707,232** |
| 2020 | 395 | 394,721 | $ 1,065,745 | | 1,275 | 1,274,908 | $ 527,754 | **365** | **$ 2,128,415** | **$ 3,721,914** |

| | |
|---|---|
| Annual Payment (assume capital cost, $2M paid equally over three years) | $ 666,667 |
| Annual O&M Costs (SCF and Authority) | $ 3,707,232 |
| Average Water Demand (2015 to 2020) | 4.53 |
| $/MG | $ 2,644 |
| $/kgla | $ 2.64 |

| **Authority based on Historical Maximum SCF TDS** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Authority | | | | SCF | | | | | |
| | | | | | Active | | | Base O&M Costs | | |
| Year | Total Water Purchased (mg) | Water Purchased (kgal) | Total Water Cost | | Total Water Produced (MG) | Water Produced (kgal) | Water Cost | Number of Days per | Base Total Costs | **Total Costs** |
| 2018 | 731 | 730,568 | $ 1,972,534 | | 908 | 908,293 | $ 375,992 | **365** | **$ 2,128,415** | **$ 4,476,941** |
| 2019 | 739 | 739,135 | $ 1,995,663 | | 915 | 915,111 | $ 378,814 | **365** | **$ 2,128,415** | **$ 4,502,892** |
| 2020 | 748 | 747,701 | $ 2,018,792 | | 922 | 921,928 | $ 381,636 | **365** | **$ 2,128,415** | **$ 4,528,843** |

| | |
|---|---|
| Annual Payment (assume capital cost, $2M paid equally over three years) | $ 666,667 |
| Annual O&M Costs (SCF and Authority) | $ 4,502,892 |
| Average Water Demand (2015 to 2020) | 4.53 |
| $/MG | $ 3,125 |
| $/kgla | $ 3.13 |

| Projection Scenario | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **RO Project based on Historical SCF TDS (same for projection based on historical average and maximum SCF TDS)** | | | | | | | | | | |
| | RO | | | SCF | | | | | | |
| | | | | Active | | | Base O&M Costs | | | |
| Year | Total Water Produced (mg) | Water Produced (kgal) | Total Water Cost | Total Water Produced (MG) | Water Produced (kgal) | Water Cost | Number of Days per Year | Base Total Costs | | **Total Costs** |
| 2018 | 805 | 805,421 | $ 837,638 | 833 | 833,438 | $ 345,005 | 365 | $ 2,128,415 | | **$ 3,311,058** |
| 2019 | 815 | 814,709 | $ 847,297 | 840 | 839,534 | $ 347,529 | 365 | $ 2,128,415 | | **$ 3,323,241** |
| 2020 | 824 | 823,996 | $ 856,956 | 846 | 845,631 | $ 350,053 | 365 | $ 2,128,415 | | **$ 3,335,424** |
| 2021 | 832 | 832,374 | $ 865,669 | 851 | 851,130 | $ 352,329 | 365 | $ 2,128,415 | | **$ 3,346,413** |
| 2022 | 841 | 840,752 | $ 874,382 | 857 | 856,629 | $ 354,605 | 365 | $ 2,128,415 | | **$ 3,357,403** |
| 2023 | 849 | 849,130 | $ 883,096 | 862 | 862,128 | $ 356,882 | 365 | $ 2,128,415 | | **$ 3,368,392** |
| 2024 | 858 | 857,508 | $ 891,809 | 868 | 867,627 | $ 359,158 | 365 | $ 2,128,415 | | **$ 3,379,382** |
| 2025 | 866 | 865,863 | $ 900,497 | 873 | 873,150 | $ 361,444 | 365 | $ 2,128,415 | | **$ 3,390,356** |
| 2026 | 872 | 872,364 | $ 907,259 | 878 | 878,070 | $ 363,481 | 365 | $ 2,128,415 | | **$ 3,399,155** |
| 2027 | 879 | 878,775 | $ 913,926 | 883 | 883,082 | $ 365,556 | 365 | $ 2,128,415 | | **$ 3,407,896** |
| 2028 | 885 | 884,874 | $ 920,269 | 888 | 888,405 | $ 367,759 | 365 | $ 2,128,415 | | **$ 3,416,443** |
| 2029 | 891 | 890,973 | $ 926,612 | 894 | 893,728 | $ 369,963 | 365 | $ 2,128,415 | | **$ 3,424,989** |
| 2030 | 897 | 897,072 | $ 932,955 | 899 | 899,051 | $ 372,166 | 365 | $ 2,128,415 | | **$ 3,433,536** |
| 2031 | 902 | 902,261 | $ 938,352 | 904 | 903,580 | $ 374,041 | 365 | $ 2,128,415 | | **$ 3,440,807** |
| 2032 | 907 | 907,450 | $ 943,748 | 908 | 908,109 | $ 375,916 | 365 | $ 2,128,415 | | **$ 3,448,079** |
| 2033 | 913 | 912,639 | $ 949,144 | 913 | 912,639 | $ 377,791 | 365 | $ 2,128,415 | | **$ 3,455,350** |
| 2034 | 917 | 917,498 | $ 954,198 | 917 | 917,498 | $ 379,802 | 365 | $ 2,128,415 | | **$ 3,462,414** |
| 2035 | 922 | 922,357 | $ 959,251 | 922 | 922,357 | $ 381,814 | 365 | $ 2,128,415 | | **$ 3,469,479** |

| | Funded ($16.06M) | Not Funded ($32.12 M) |
|---|---|---|
| Amortized Capital Payment | $ 1,129,788 | $2,259,716 |
| Annual O&M Costs (SCF and RO) | $ 3,398,323 | $3,398,323 |
| Average Water Demand, mgd (2015 to 2035) | 4.80 | 4.80 |
| $/MG | $ 2,587 | $ 3,232 |
| $/kgla | $ 2.59 | $ 3.23 |

carollo

Engineers...Working Wonders With Water®

401 North Cattlemen Road, Suite 306
Sarasota, FL 34232
P: 941.371.9832
F: 941.371.9873