Memorandum

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To: Geoff English
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Project: San Miguelito Mutual Water Company

SUBJECT: Water Resource Analysis 2020 Update

Based on new information, San Miguelito Mutual Water Company (SMMWC) would like to update and supplement components of the 2015 Water Resource Analysis prepared by Garing Taylor & Associates in November 2015 (2015 Study). SMMWC hired Water Systems Consulting, Inc. (WSC) to provide water resource planning services to update portions of the 2015 Study as the Water Resource Analysis 2020 Update (Project). WSC was tasked with the review of the following:

1. Additional Water Resource Needed at Buildout
    a. Potential for updated water usage factors based on "New Normal" water usage patterns after 2013
    b. Recent will serve letters identifying estimated water demands are lower than previous SMMWC Master Plan demand assumptions
2. State Water Project Supplies
    a. Updated State Water Project (SWP) costs and reliability estimates are available
3. Potential Supply Options
    a. Evaluate quality and cost of treatment for additional wells to provide additional supply options
    b. Potential to reduce SWP contract allocations
4. Groundwater Supplies
    a. Incorporate results of pumping testing performed by Cleath Harris Geologists (Pumping Testing Wells 4A, 5A, 6A, January 2022).
5. Conclusions

The water resources needed at buildout, the existing supply options, and future requirements are analyzed in the following sections of this Memo.

- **Section 1 - Recommended Demands for Supply Planning**
    - Recommended demand estimate for supply reliability and resiliency planning purposes
- **Section 2 - Existing Customers Usage Factors**
    - "New normal" demand 2014-2019
    - Rainfall, drought, economy & other factors
- **Section 3 - Existing Customers' Future Usage**

  - Apply usage estimates from existing customer types
- **Section 4 - Future Customers' Usage**
  - Occupancy impacts to existing customers' future demand
  - Apply usage estimates from existing customer types and County standards to undeveloped projects
  - Apply usage estimates from existing customer types, State Water Project (SWP) surcharge, & developer estimates to undeveloped projects
- **Section 5 – Existing Supplies**
  - Updated SWP costs and supply projections
  - Review existing groundwater wells
- **Section 6 – Potential State Water Supply Options**
  - Discuss impacts of SWP contract allocations
  - Review basin quality and production capabilities
  - Evaluate cost of treatment for new wells
- **Section 7 – Conclusions**
- **Section 8 – References**

1 Recommended Demands for Supply Planning

Through analysis, WSC developed recommended demands for supply planning purposes. Table 1 and Figure 1 show the resulting demands for the Baseline Scenario, demand estimates from the 2015 Study, and maximum and minimum demand scenarios for comparison. The "Relevant Source Calculation Column" provides a reference key to other tables in the Memo that provide the calculated basis for the summarized data. Subsequent sections of this Memo provide details about how the recommended demands were developed. The Baseline Scenario discussed in Section 2 is recommended as the basis of usage factors, which are applied to existing customers and future customers development data to yield estimated demands. The maximum and minimum scenarios provide a range of credible water supply scenarios that have occurred or could occur.

Table 1. Summary of Demand Estimates (acre-ft)

Water Needed for Buildout	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Buildout 2015 Study Low Estimate	Buildout 2015 Study High Estimate	Buildout 2020 Update Estimates - Baseline	Buildout 2020 Update Estimates- Maximum	Buildout 2020 Update Estimates- Minimum	Relevant Source Calculation Column
Existing Uses																							
Residential	93	94	102	104	100	90	91	93	96	91	75	75	79	82	78	91	89	96.62	96.62	82.36	103.86	74.88	"D" in Table 5
Commercial (Domestic)	33	33	38	41	39	36	35	34	36	35	29	31	29	29	30	27	34	39.01	39.01	31.34	40.87	28.88	"Q" in Table 6
Irrigation- Residential HOA & Commercial	45	47	55	53	46	52	38	39	48	37	25	25	36	36	31	35	35	47.99	47.99	47.99	52.33	24.78	"E" in Table 5 & "R" in Table 6
Construction	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2	0.00	2.15	0.00	"U" in Table 7
System	0	0	3	2	2	3	0	2	6	8	6	6	6	6	6	5	4			6.20	2.28	5.60	"U" in Table 7
Non-revenue Water	12	11	19	20	14	6	25	16	26	23	13	13	15	15	14	16	17	6.03	6.03	14.96	17.96	11.95	8.91% in Section 2
Total Existing Customers Demand	**184**	**185**	**218**	**222**	**201**	**187**	**190**	**185**	**213**	**195**	**149**	**149**	**164**	**168**	**158**	**174**	**179**	**189.85**	**189.85**	**182.85**	**219.45**	**146.09**	
Future Uses																							
Convert Part-time to Full Time Occupancy																		7.39	7.39	5.22	5.66	3.97	"L" in Table 8
Build-out Existing Residential Developments																		9.15	20.16	3.09	3.23	2.80	"H" in Table 9
Planned Small Developments																		4.88	6.72	3.42	4.60	2.74	"AA" in Table 10
Potential Large Developments																		45.09	45.09	41.42	41.42	41.42	"AF" in Table 11
Non-revenue Water																		30.76	32.31	4.74	4.89	4.54	8.91% in Section 2
Total Future Customers Demand																		**97.27**	**111.67**	**57.90**	**59.80**	**55.47**	
Total Existing & Future Customers Demand																		**287.12**	**301.52**	**240.75**	**279.25**	**201.57**	

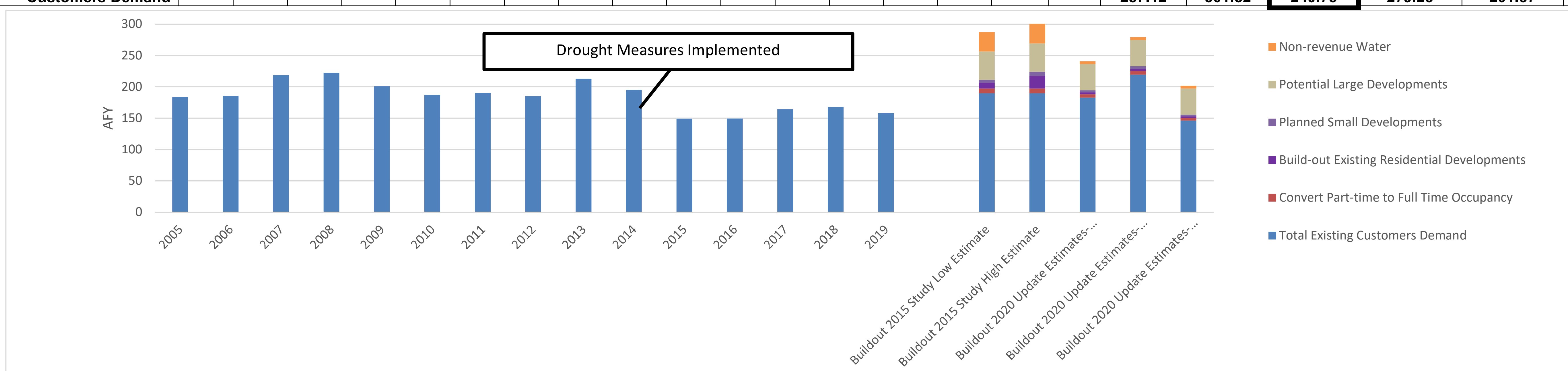

Figure 1. Summary of Historical Demand & Future Demand Estimates

2 Existing Customers Usage Factors

Existing customers' historical usage, rainfall, and the economic recession from 2005 to 2019 were analyzed to identify trends that reflect potential future demand patterns and usage rates. As shown in Figure 2, total water usage has been declining since 2008, inclusive of new development and conservation practices which reveals a few key trends. A review of historical usage is described in more detail in the following sections.

Initial Drought Response

Total usage tends to increase in the initial years of a drought period. Generally, this is attributable to increased residential irrigation during and shortly following an initial dry year(s). Typically usage declines as drought conditions persist. SMMWC also has the ability to mandate reduced water usage based on drought conditions.

Key Planning Assumption: Usage projections should account for the higher irrigation rates and peak usage in the initial year(s) of a drought.

Prolonged Drought Impacts

Lower usage patterns are generally sustained after droughts. This is assumed to be a result of permanent physical changes, such as plumbing and irrigation retrofits with more efficient devices and changes to landscaping. Additionally, social response to drought coverage in the media and SMMWC's drought measures implementation are assumed to reduce water usage.

Key Planning Assumption: Usage projections should account for sustained indoor usage and outdoor irrigation water usage reductions due to physical and non-physical factors that occur as a result of drought.

Residential and Commercial Indoor and Outdoor Usage Differences

Residential and commercial water usage, and their associated indoor water usage and outdoor irrigation usage, typically have different characteristics and responses to drought and other factors. Therefore, the SMMWC data is tracked in the categories shown in Figure 2.

Residential indoor usage is typically more stable than outdoor irrigation unless there are significant shifts in occupancy and/or the economy.

Indoor usage patterns of bathing, meal preparation, and cleaning within a home tend to not vary too much, whereas outdoor irrigation is highly variable dependent on climate, rainfall, SMMWC drought measures implementation, and economic conditions.

Commercial and recreational indoor water usage is very stable in contrast to residential usage, unless there are significant shifts in the economy and/or tourism. The Avila Beach community is a highly visited tourist destination and generally sustains a high level of tourism and commercial activity. Commercial activity is not anticipated to shift significantly due to the economy or tourism. Commercial water usage has consistently trended slightly downward since 2008, which is assumed to be due to plumbing improvements and retrofits with more efficient devices and minimal landscaping usage.

Key Planning Assumption: Usage projections should separate residential and commercial water usage and their associated indoor water usage and outdoor irrigation usage.

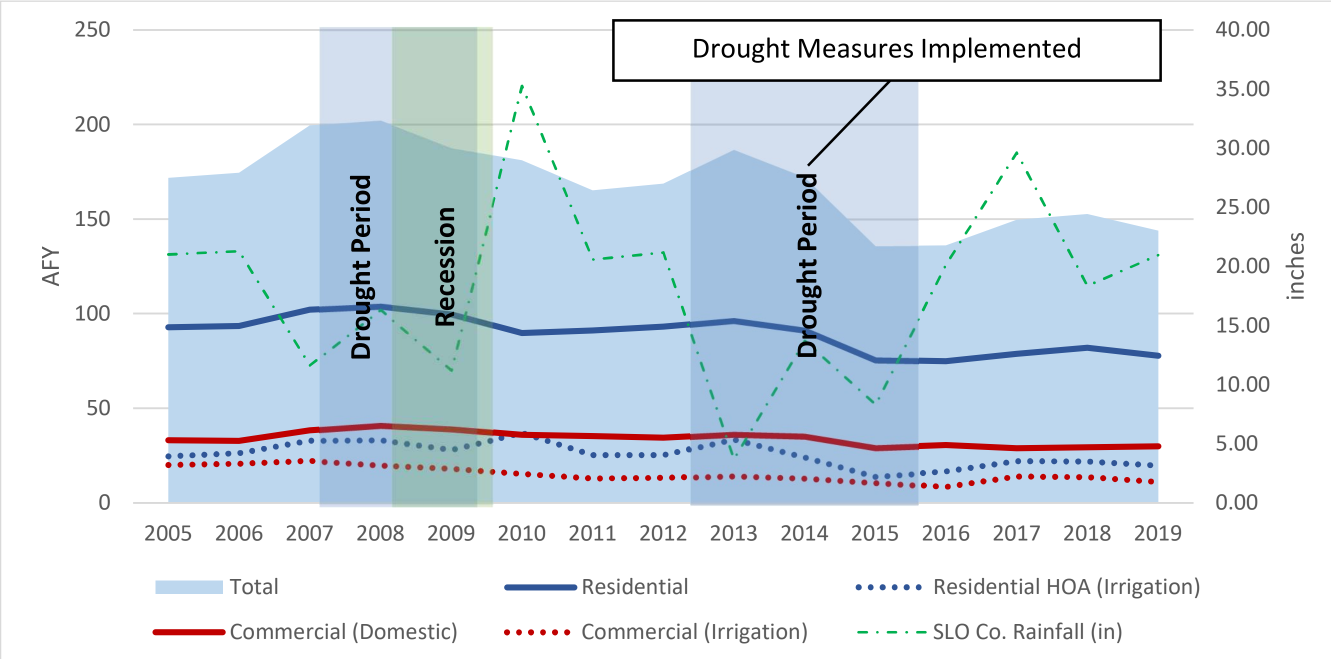

Figure 2. Rainfall & 2005-2019 Water Use by Use Type

Usage Factor Scenarios

The "Key Planning Assumptions" described above and historical conditions shown in Figure 2 were used to develop three (3) scenarios. The scenarios representing existing customers' potential future water usage shown as the Maximum Period, Baseline Period, and Minimum Period scenarios in Table 2, Table 3, and Table 4.

Table 2. Maximum Period Scenario Planning Assumptions

	Maximum Period		
Water Use Type	**Start Year**	**End Year**	**Key Planning Assumptions**
Residential	2008	2008	Maximum residential usage year, which includes embedded irrigation usage.
Commercial (Domestic)	2008	2008	Maximum usage year.
Residential HOA (Irrigation)	2010	2010	Maximum usage year.
Commercial (Irrigation)[1]	2007	2007	Maximum usage year.

[1]Excludes Avila Beach Resort irrigation with non-potable water.

Table 3. Baseline Period Scenario Planning Assumptions

	Baseline Period		
Water Use Type	**Start Year**	**End Year**	**Key Planning Assumptions**
Residential	2013	2019	Average for years since the most recent drought to account for some increased rebound from sustained low usage. Incorporates peak usage of the initial years, historic low usage during mid-drought, and sustained reduced usage after the drought. This includes embedded irrigation usage.
Commercial (Domestic)	2013	2019	See above
Residential HOA (Irrigation)	2013	2013	Conservative assumption that irrigation may rebound to levels experienced in the initial year of the most recent drought.
Commercial (Irrigation)[1]	2013	2013	See above

[1]Excludes Avila Beach Resort existing irrigation with non-potable water.

Table 4. Minimum Period Scenario Planning Assumptions

	Minimum Period		
Water Use Type	**Start Year**	**End Year**	**Key Planning Assumptions**
Residential	2016	2016	Minimum residential usage year, which includes embedded irrigation usage.
Commercial (Domestic)	2017	2017	Minimum usage year.
Residential HOA (Irrigation)	2015	2015	Minimum usage year.
Commercial (Irrigation)[1]	2016	2016	Minimum usage year.

[1]Excludes Avila Beach Resort existing irrigation with non-potable water .

The usage for each scenario did not include Non-revenue water (NRW). NRW is equal to production minus billed metered usage. It is assumed that the NRW volume of 8.91 percent of total production from 2019 should be representative of future NRW amounts. NRW is captured in Table 1 as a separate water use.

Recommended Scenario for Future Usage Factors

Since 2005, there have been slight rebounds in usage after droughts, but the lower water usage trend is assumed to be relatively permanent due to multiple factors. The key factors include plumbing and irrigation retrofits with more efficient devices and changes to landscaping that occurred as a result of the drought, which will result in sustained lower water usage rates that may rebound slightly in non-drought or drought conditions. It is anticipated that irrigation usage could rebound more than indoor usage to levels experienced in 2013. Therefore, the Baseline Scenario is assumed to be a reasonable basis for developing water usage factors for predicting future usage for existing and future customers. The Baseline scenario provides a conservative yet realistic representation of how usage could rebound from their current sustained low levels without rebounding to their highest levels. The Baseline Scenario period is used for usage factors presented in subsequent sections of this Memo for planning purposes and other scenarios are summarized and shown for comparison in Table 1 and Figure 1.

3 Existing Customers' Future Usage

Calculations for existing customers' future Baseline Scenario usage from the "Existing Uses" rows in Table 1 are described in the following sections.

Residential

Calculations and data shown in Table 5 Column “D” reflect how the values for the Baseline Scenario in Table 1 were developed for existing residential customers.

Commercial (Domestic)

Calculations and data shown in Table 6 Column “Q” reflect how the values for the Baseline Scenario in Table 1 were developed for existing commercial customers.

Irrigation- Residential HOA & Commercial

Calculations and data shown in Table 5 column “E” and Table 6 column “R” reflect how the values for the Baseline Scenario in Table 1 were developed for existing residential and commercial irrigation customers.

Construction & System

Calculations and data shown in Table 7 Column “U” reflect how the values for the Baseline Scenario in Table 1 were developed for construction and system users.

Non- revenue Water

NRW of 8.91 percent was developed as described in Section 2 and applied to all the usage described in the preceding sections as summarized in Table 1 and Figure 1.

Table 5. Existing Residential Customer Usage Estimates

Relevant Source Calculation Column reference from Table 1	*A*	*D*	*E*	*F*	*G*
Description/ Location	**Lots with Water Use as of 2019**	**User Baseline Usage (AFY)**	**Irrigation Baseline Usage (AFY)**	**Total Baseline Usage (AFY)**	**Baseline Usage Factor (AFY/lot)**
Indian Hill	162	21	7	28	0.17
Pelican Point	117	10	15	25	0.21
Skylark	65	6	4	11	0.16
Mallard Green	53	6	5	11	0.20
Kingfisher Cyn	118	15	0	15	0.13
Quail Cyn	22	3	0	3	0.15
Silver Oaks Ln	6	1	0	1	0.20
Heron Crest	61	16	0	17	0.28
Avila Valley Orch.	13	2	0	2	0.17
Misc. Resid. (Marre House & Yellow House)	2	1	3	4	1.76
Total	**619**	**82**	**34**	**116**	

Table 6. Existing Commercial Customer Usage Estimates

Relevant Source Calculation Column reference from Table 1	*N*	*Q*	*R*	*S*	*T*
Water Use	**Occupied units in 2019**	**User Baseline Usage (AFY)**	**Irrigation Baseline Usage (AFY)**	**Total Baseline Usage (AFY)**	**Baseline Usage Factor (AFY/lot)**
San Luis Bay Inn	144	15.11	6.58	21.69	0.15
Avila Bay Club	0	6.79	1.06	7.85	0
Avila Beach Resort	0	2.13	0.78	2.91	0
Avila Village Inn[1]	30	5.47	2.39	7.86	0.15
Avila Village Business	0	1.49	2.39	3.88	0
I.H. Clubhouse	0	0.08	0	0.08	0
Others	0	0.27	1.05	1.32	0
Total	**174.00**	**31.34**	**14.26**	**45.60**	

Table 7. Existing Construction & System Customer Usage Estimates

Relevant Source Calculation Column reference from Table 1	*U*
	Total Baseline Usage (AFY)
Construction	0.00
System	6.20

[1] Future demands for Avila Village Inn are captured in the Planned Small Developments section of this Memo.

4 Future Customers' Usage

Calculations for future customers' Baseline Scenario usage from the "Future Uses" rows in Table 1 are described in the following sections.

Convert Part-time to Full Time Occupancy

While occupancy rates of homes may vary, it is prudent to plan for an assumed increase in occupancy. Existing residential customers' usage data was analyzed to determine how many housing units in each SMMWC neighborhood were unoccupied for more than half the year on average. This was determined by comparing each customers' historical usage in each given year from 2013-2019 with their average usage from 2013-2019.

Calculations and data shown in Table 8 Column "L" reflect how the values for the Baseline Scenario in Table 1 were developed for the Convert Part-time to Full Time Occupancy row.

Table 8. Future Residential Customer Usage Increased Occupancy Estimates

Relevant Source Calculation Column reference from Table 1	***G***	***J***	***K***	***L=G*J*K***
Description/ Location	**Baseline Usage Factor (AFY/lot)**	**# of Units Unoccupied More than 50% of the Year**	**Unoccupied Units % Below Average Use**	**Additional Use for 100% Occupancy (AFY)**
Indian Hill	0.17	8	68.95%	1.0
Pelican Point	0.21	11	69.22%	1.5
Skylark	0.16	4	68.40%	0.5
Mallard Green	0.20	3	80.17%	0.5
Kingfisher Cyn	0.13	10	81.98%	1.0
Quail Cyn	0.15	0	69.55%	0.0
Silver Oaks Ln	0.20	0	54.94%	0.0
Heron Crest	0.28	3	79.00%	0.6
Avila Valley Orch.	0.17	0	63.62%	0.0
Misc. Resid. (Marre House & Yellow House)	1.76	0	0.00%	0.0
Total		**40**		**5**

Build-out Existing Residential Developments

Calculations and data shown in Table 5 Column "H" reflect how the values for the Baseline Scenario in Table 1 were developed for the Build-out Existing Residential Developments row. The Baseline Usage Factor calculated in Table 5 for each neighborhood was applied to the potential future lots to calculate estimated usage at buildout.

Table 9. Build-out Existing Residential Developments Usage Estimates

Relevant Source Calculation Column reference from Table 1	B	G	H=B*G
Description/ Location	Potential Future Lots	Baseline Usage Factor (AFY/lot)	Potential Future Estimated Use based on # of Lots (AFY)
Indian Hill		0.17	
Pelican Point		0.21	
Skylark		0.16	
Mallard Green		0.20	
Kingfisher Cyn	12	0.13	1.5
Quail Cyn		0.15	
Silver Oaks Ln		0.20	
Heron Crest	5	0.28	1.4
Avila Valley Orch.	1	0.17	0.17
Misc. Resid. (Marre House & Yellow House)		1.76	
Total	**18**		**3.1**

Planned Small Developments

Calculations and data shown in Table 10 columns “X” and “AA” reflect how the values for the Baseline Scenario in Table 1 were developed for the Planned Small Developments row. For comparison, Table 10 columns “Y” and “Z” show estimates from the 2015 Study.

Table 10. Planned Small Developments Usage Estimates

Relevant Source Calculation Column reference from Table 1	V	W	X=V*W	Y	Z	AA=X
Description/Location	Future Residential Units	Use Rate (AFY/unit)	Potential Future Estimated Use (AFY)	SLO County Standards Estimated Use (AFY)	2015 Study Estimate	Selected Potential Future Estimated Use (AFY)
Avila Village Inn Expansion[1]	14	0.15	2.11	3.14	2.24	2.11
Lot 69	8	0.16	1.31	3.58	2.64	1.31
Total	**22**		**3.42**	**7**	**5**	**3.42**

[1] Future reductions of existing turf areas have the potential to offset portions of the current water usage estimate associated with this expansion.

Potential Large Developments

Calculations and data shown in Table 11 column “AF” reflect how the values in Table 1 were developed for the Potential Large Developments row. For comparison, Table 11 columns “AC”, “AD”, and “AE” show the 2015 Study and developer estimates provided by SMMWC.

Table 11. Potential Large Development Usage Estimates

Relevant Source Calculation Column reference from Table 1	***AB***	***AC***	***AD***	***AE***	***AF***
Contractor	**Project Location and Description**	**Surcharge Amounts Sept. 2015 (AFY)**	**2019 Avila by the Sea TM (AFY)**	**2017 Cottage Parcel TM (AFY)**	**Potential Future Estimated Use (AFY)**
Rossi Living Trust	Lot 279	0.14			0.14
Jane Miller	Parcel 2	0.14			0.14
Rossi Living Trust	Parcel 3	0.14			0.14
Avila Beach Resort	Avila Beach Resort	13.50	18.60[1]		18.60
Avila Beach Resort	Avila Beach Resort	6.78			
Other	Cottage Parcel	14.00		12.40	12.40
Pacho LP	Lot Y - Rancho San Miguelito	10.00			10.00
Total		**45.09**			**41.42**

[1]Excludes Resort irrigation, estimate is for added indoor water use only

Non-revenue Water

NRW of 8.91 percent was developed as described in Section 2 and applied to all the usage described in the preceding sections.

5 Existing Supplies

SMMWC utilizes and blends two (2) primary sources of water, the State Water Project (SWP or State Water) and wells in the Avila Valley Sub-basin. In addition, SMMWC has the potential to access two (2) additional groundwater basins, the East and West Harford basins, which have not historically been used for SMMWC's groundwater production due to issues with water quality. Each of these sources or potential sources will be discussed in this section.

State Water Project

State Water is managed and operated by the California Department of Water Resources (DWR). DWR distributes State Water to 29 water contractors, including the San Luis Obispo Flood Control and Water Conservation District (SLOFC&WCD). The SLOFC&WCD then distributes to 11 State Water subcontractors. The SLOFC&WCD also contracts with the Central Coast Water Authority (CCWA) for water treatment plant and pipeline operation and maintenance. SMMWC receives State Water as a subcontractor to SLOFC&WCD through the Coastal Branch of the SWP via the Lopez turnout.

The Coastal Branch of the SWP conveys water from the California Aqueduct to San Luis Obispo and Santa Barbara Counties. Water in the Coastal Branch pipeline is treated at the Polonio Pass Water Treatment Plant. Water from the SWP Coastal Branch enters the Lopez pipeline near the intersection of Orcutt Road and Lopez Drive. Water from the Lopez reservoir is treated at the Lopez Water Treatment Plant and combined with State

Water for delivery through the Lopez pipeline. The Lopez pipeline consists of approximately 13 miles of pipeline and terminates in Port San Luis Obispo. Using the Lopez pipeline, the SLOFC&WCD delivers State Water to the following SWP subcontractors: City of Pismo Beach; Oceano Community Services District (OCSD); SMMWC; Avila Beach Community Services District (ABCSD); Avila Valley Mutual Water Company (AVMWC); and the San Luis Coastal Unified School District. Figure 3 shows a schematic representation of the Lopez Pipeline.

Figure 3. Lopez Pipeline

State Water is available to SWP contractors under four different programs, Table A Water, Article 21 Water, Turnback Water, and Carryover Water all through the Water Supply Contract with DWR.

Table A Water

Each SWP contractor has a predetermined allocation of State Water. Despite State Water allocations, water deliveries vary from year to year depending on available supply from rainfall, snowpack, runoff, reservoir storage, pumping capacity from the Delta, and legal and environmental constraints. The SWP allocates its Table A water deliveries based upon each contractor's Table A amount, so that each Contractor's deliveries are reduced by the same fraction. From 2007-2021 the highest allocation has been 85% in 2017 and the lowest allocation has been 5% in 2014. The average allocation from 2008-2019 has been 49%. The average allocation during the 2012-2016 drought years was 37%.

Article 21 Water

Article 21 of the Water Supply Contract allows surplus water to be made available for purchase by contractors. There are two (2) restrictions, the water cannot be stored in SWP facilities and the water must be used within the service area of the requesting contractor. As a subcontractor to the County of San Luis Obispo, Article 21 water is not available to SMMWC.

Turn-Back Water Pool Program

Under this program contractors are allowed to turn-back water if the allocated Table A supply is greater than their needs that year. This water will be placed in the Turn-Back Water Pool Program which is available to other SWP contractors to purchase in all types of hydrologic years. There are a couple restrictions on this water, the water cannot be stored or carried over in SWP facilities and the water must be used within the service area of the requesting contractor.

Carryover Water

Carryover water is Table A water that is allocated to a Contractor in a given year but is unused by the Contractor that year. The water is then stored for that contractor in SWP supply reservoirs for use by that same contractor in later years. Carryover water can only be stored in a SWP reservoir when there is available capacity. If the reservoir overtops, the carryover water will spill first and is lost.

SMMWC SWP Contract

The contracts between DWR and the 29 SWP water contractors define the terms and conditions governing the water delivery and cost repayment for the SWP. SWP Table A is an exhibit to these contracts. All water-supply related costs of the SWP are paid 100% by the contractors, and SWP Table A serves as a basis for allocating costs among the contractors. In addition, SWP Table A plays a key role in the annual allocation of available supply among contractors. When the SWP was being planned, the amount of water projected to be available for delivery to the contractors was 4,173,000 AFY. This was referred to as the maximum project yield. It was recognized that in some years the project would be unable to deliver that amount, and in other years project supply could exceed that amount. The SWP Table A amount was used as the basis for apportioning available supply to each contractor and as a factor in calculating each contractor's share of the SWP's costs. Other contract provisions permit changes to an individual contractor's SWP Table A under special circumstances.

SLOFC&WCD's SWP Table A contract amount is 25,000 AFY (1). The CCWA and SLOFC&WCD have entered into a Master Water Treatment Agreement, which defines the available capacity for treatment and conveyance for

SLOFC&WCD as 4,830 AFY (2). Since SLOFC&WCD has 25,000 AFY Table A amount and a treatment and conveyance capacity in the Coastal Branch of 4,830 AFY, the SLOFC&WCD has used this “excess allocation” to improve reliability for their subcontractors. However, this practice has been inconsistent and the reliability benefits associated with the excess allocation cannot be relied upon into the future as the SLOFC&WCD has sold excess allocation to other CCWA users in past years and may consider changes in the future in how this system is operated.

SMMWC subcontracted for 275 AFY of State Water in 1993 and started receiving deliveries in 1997. In 1999, SMMWC opted to subcontract for an additional 275 AFY of drought buffer. Drought buffer for San Luis Obispo County Subcontractors works by increasing the total Table A allocation to SMMWC when calculating delivery percentages up to the total Table A allocation. For example, if an agency had 100 acre-feet (AF) of Table A allocation and it was a 60% delivery year that agency would be eligible to receive delivery of 60 AF of water. If that same agency had 100 AF of drought buffer, under that same scenario, they would receive their full 100 AF of water. This hypothetical agency would receive its full delivery in all years exceeding 50% of supply. For a 10 % delivery year the agency would receive 10 AF of water without drought buffer and 20 AF with the drought buffer. Historic State Water allocations for the Lopez Turnout Sub-contractors are summarized in Table 12.

Table 12. SLOFC&WCD SWP Allocation Summary

SWP Sub-Contractor	SWP Allocations (AFY)		
	Water Service Amount	**Drought Buffer (Supply)**	**Total Reserved**
Chorro Valley Turnout			
Morro Bay, City of	1,313	2,290	3,603
California Men's Colony	400	400	800
County Operations Center	425	425	850
Cuesta College	200	200	400
Subtotal 1	***2,338***	***3,315***	***5,653***
Lopez Turnout			
Pismo Beach, City of	1,240	1,240	2,480
Oceano CSD	750	750	1,500
San Miguelito MWC	275	275	550
Avila Beach CSD	100	100	200
Avila Valley MWC	20	20	40
San Luis Coastal USD	7	7	14
Subtotal 2	***2,392***	***2,392***	***4,784***
Shandon	100	-	100
Subtotal 3	**100**	**-**	**100**
Total	**4,830**	**5,707**	**10,537**
SLO County Table A Allocation			***25,000***
"Excess Allocation"			**14,463**

SWP Reliability

State Water is intended to be a supplemental water supply since it is by contract an interruptible supply. SWP Table A allocations are not a guarantee of water delivery. Water deliveries vary from year to year depending on available supply from rainfall, snowpack, runoff, reservoir storage, pumping capacity from the Delta, and legal environmental constraints. Every year, DWR conducts modeling studies of the State Water system to determine the annual allocation, or percentage of the amount of Table A that can be delivered by the SWP system. This allocation is revised throughout the year as hydrologic conditions and other factors change.

The historical allocations of State Water are shown in Figure 4. As mentioned previously, SMMWC has a drought buffer of 275 AFY which has allowed them to take delivery of their full annual SWP allocation when the Table A allocation is greater than or equal to 50%. When the Table A allocations is less than 50%, the drought buffer water delivery is reduced by the same percentage as the Table A water.

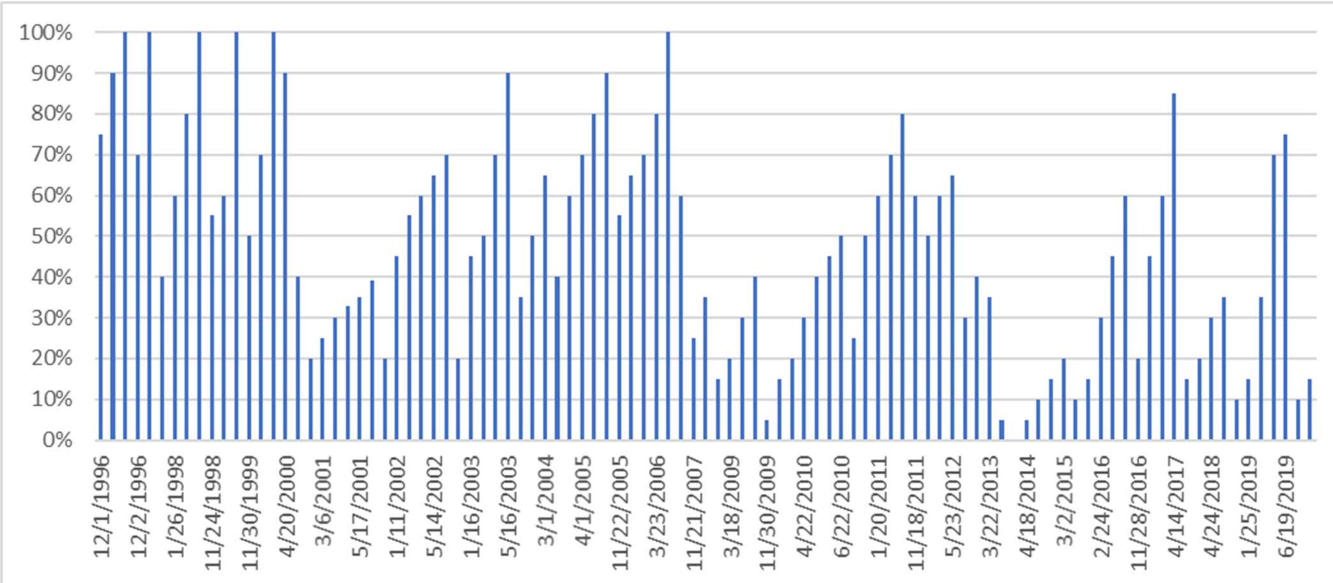

Figure 4. Historical SWP Table A Allocations

The 2019 Delivery Capability Report estimates a long-term average reliability of 58% of the contracted Table A amount. The maximum delivery is estimated to be 97% and the minimum delivery is estimated to be 7%. The long-term average of 58% is assumed to be the average year supply available for SMMWC's Table A allocation, or 275 AFY. However, this will vary year to year as DWR adjusts deliveries based on current environmental conditions, and as we noted above, during the most recent drought (2012-2016) average deliveries were 37%.

Figure 5 shows the last 10 years of deliveries and the approximate maximum and minimum deliveries SMMWC could receive based on the 2019 Delivery Capability Report projections.

Another factor that could potentially affect State Water deliveries is catastrophic interruptions to supply conveyance infrastructure, such as earthquakes, which could have serious impacts on availability of State Water. A catastrophic interruption could cause a sudden failure of the facilities used to import water into the region and therefore potentially cause deliveries to cease completely.

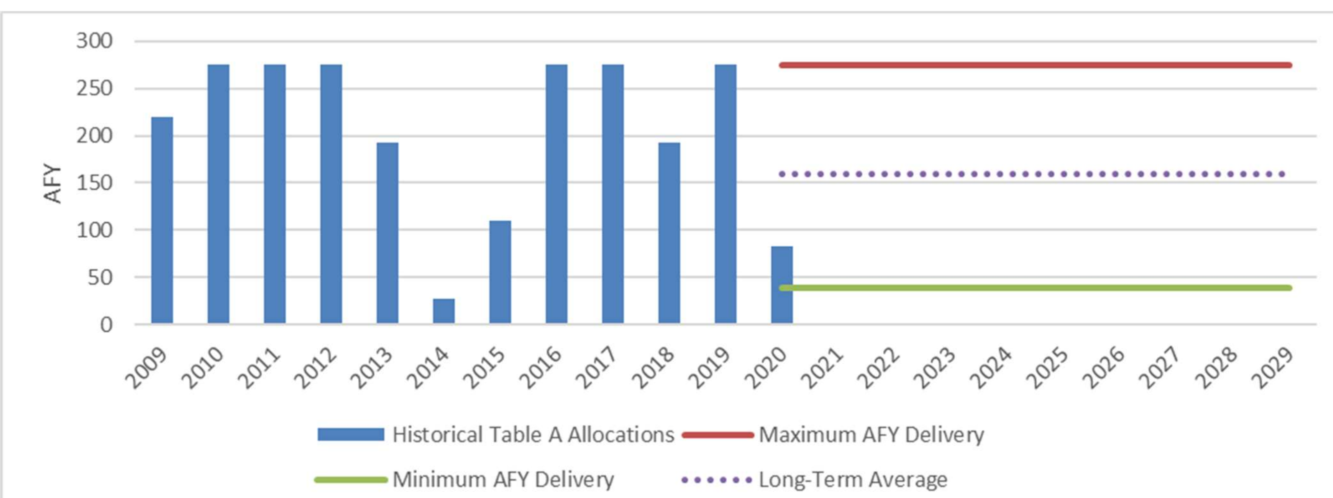

Figure 5. Historical and Projected Table A Allocations (including drought buffer)

State Water Costs

State Water costs come from several different sources. There are costs from DWR, CCWA, and SLOFC&WCD that are passed down to SMMWC. A description of these costs is included in Table 13.

Table 13. State Water Costs

State Water Cost	Description	Source for Cost Projections
DWR Charges for State Water	Fixed & Variable, based on volume delivered	Projected costs are escalated at 5%
DWR Charges for State Water Drought Buffer	Not based on the volume of water delivered	Projected costs are escalated at 5%
CCWA (O&M, Wheeling - State Water Aqueduct to Lopez)	Fixed & Variable, maintenance and operation of the Coastal Branch of the California Aqueduct and the Polonio Pass Water Treatment Plant	Included in the CCWA fixed and variable O&M costs
SLOFC&WCD (O&M, Wheeling - Lopez to SMMWC)	Operating and maintaining the Lopez distribution system	Projected data is escalated at 5% as done in the CCWA 2020-21 FY Budget on page 255-256
CCWA Variable O&M Costs	CCWA variable O&M costs are based on a 5% inflation factor. CCWA variable costs include WTP Variable Retreatment charges and credits	Projected costs are from CCWA 2020-21 FY Budget on page 255-256
CCWA Fixed O&M Costs	CCWA fixed costs are based on a 3% inflation factor. There is a change in Fixed Costs reflected in fiscal years 2022/23 thru 2029/30 due to the payoff of CCWA Revenue Bond Debt, thereby changing the Retreatment Fixed and Capital Charges	Projected costs are from CCWA 2020-21 FY Budget on page 255-256
CCWA Bond Payments & O&M Credits	CCWA Bond payments reflect Series 2016A Bond Debt Service Schedule	Projected costs are from CCWA 2020-21 FY Budget on page 255-256

SMMWC expenses for State Water have risen over the years. The cost breakdown between DWR, SLOFC&WCD, and CCWA is shown in Figure 6. The majority of the costs for State Water are from DWR. DWR costs are mostly fixed costs but there are some variable components for the Table A allocation and the drought buffer. The O&M costs are mostly variable but there are also some fixed costs from CCWA and SLOFC&WCD. The CCWA Bond Payments & O&M Credits are fixed costs. For simplicity sake, we are assuming DWR costs represent fixed costs and CCWA and SLO County represent the variable cost in future calculations. It is important to note that SMMWC receives reimbursement for State Water from developers. This reimbursement accounts for approximately 18-25% of the costs. Since this graph is focusing on total costs, the reimbursement was not subtracted out from the costs shown. This allocation of State Water, while being paid for by future users, provides a reliability benefit to current users.

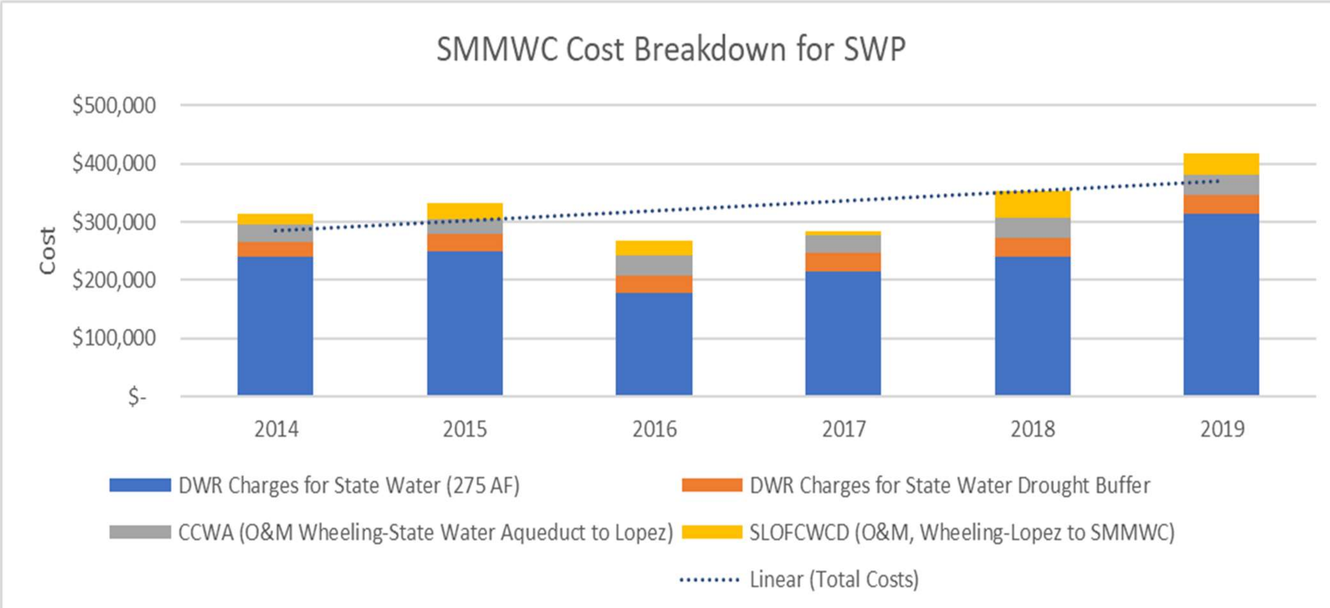

Figure 6. Historical Costs to SMMWC for State Water

The historical costs/AF are shown in Figure 7. The “Cost/AF of Available State Water (275 AFY) - Fixed” is the sum of the DWR charges for the 275 AFY Table A allocation plus drought buffer charges divided by the total AFY that is available to SMMWC (275 AFY). The “Cost/AF Delivered of Wheeling – Variable” is the sum of the CCWA costs (O&M Wheeling-State Water Aqueduct to Lopez) and SLOFC&WCD costs (O&M, Wheeling-Lopez to SMMWC) divided by the actual delivered amount of water. The “Cost/AF of Available State Water” is the sum of the two of those. The “Cost/AF of Delivered State Water” is the sum of the total costs divided by the AFY that was delivered to SMMWC. Lastly, the “Total Cost/Available Amount minus 20% Future User Reimbursement” is the sum of the total costs divided by the AFY that could have been delivered (with Drought Buffer) to SMMWC under the worst-case allocation for the corresponding year, minus the amount of contributions provided directly by the future users. Although the costs/AF has varied from year to year, the goal of showing the different combinations is to calculate the best and worst-case costs scenarios per AF of State Water.

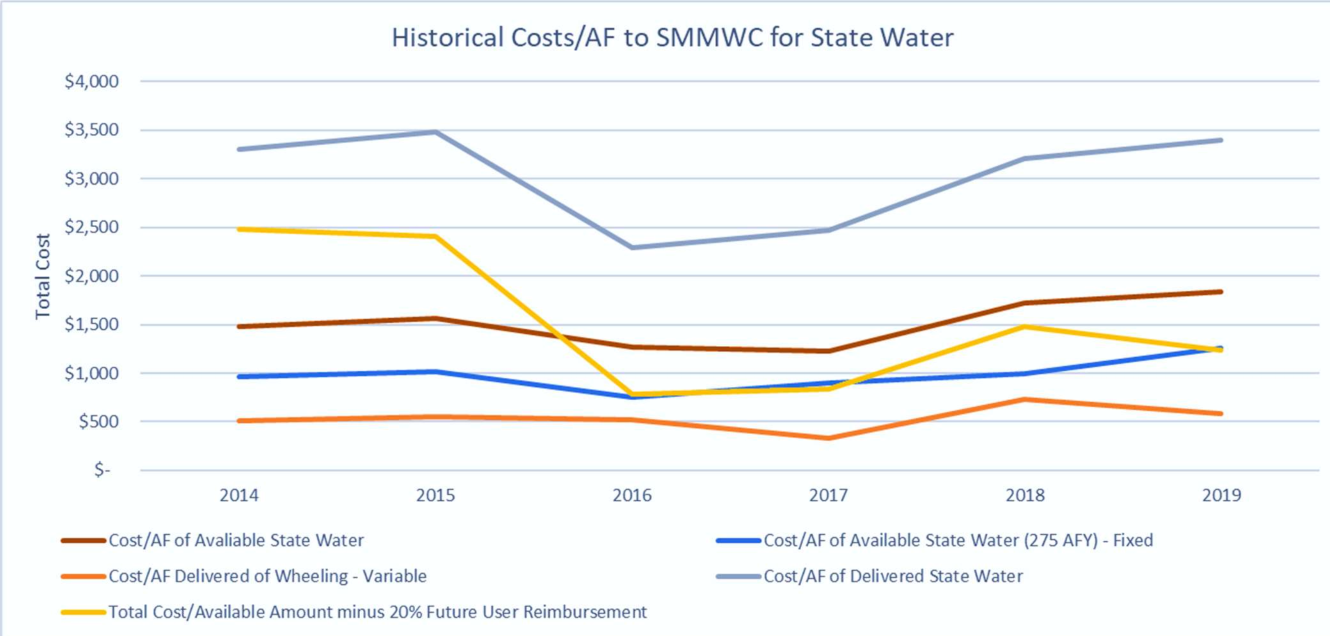

Figure 7. SMMWC Cost/AF for SWP

Figure 8 shows the projected cost per acre-foot (cost/AF) for State Water for SMMWC based on the projected long-term average. The projected costs assume inflation rates consistent with what is described in the 2020-21 CCWA budget. The cost/AF is calculated based on the projected 58% of the Table A allocation plus the drought buffer (275 AFY). There is a decrease in Fixed Costs reflected in fiscal years in 2023 due to the payoff of CCWA Revenue Bond Debt, thereby eliminating the Bond Payments.

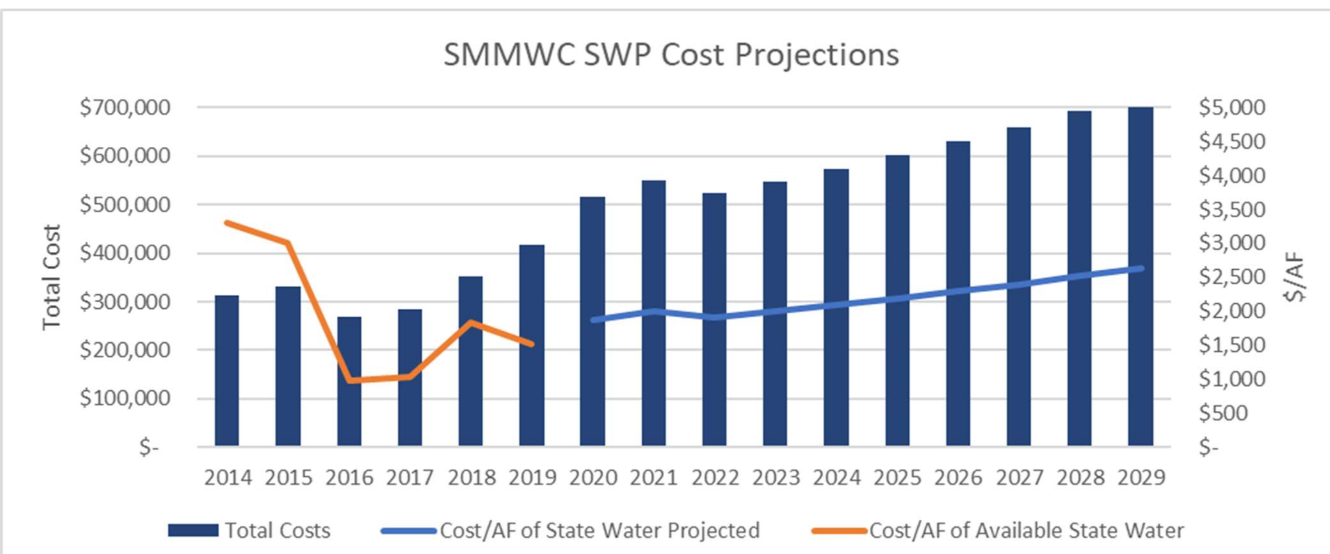

Figure 8. SMMWC SWP Cost Projections

If SLOFC&WCD takes part in the Delta Conveyance Project, formally known as California Water Fix, then SMMWC would be responsible for their proportional cost share and in turn would receive higher reliability of water deliveries. DWR estimates with the California Water Fix that the Delta Conveyance Project would provide long-term average reliability for the participants at 67% to 69% of contracted Table A amount, approximately a

10% increase in reliability from the current projected reliability of 58%. Initial cost estimates from the Central Coast Water Authority (CCWA) predicts that water from the Delta Conveyance Project will cost approximately an additional $300/AF as shown in Table 14. This cost would be in addition to current State Water costs.

Table 14. Delta Conveyance (Water Fix) Cost Per AF

	CCWA Estimates
Total Project Cost	15.9 Billion
Annual Cost to CCWA	12.4 Million
Total Cost Per AF	**$300/AF**

Groundwater

Due to the minimal and dated information available on the company wells located in and around the SMMWC service area, groundwater was analyzed on a basin level instead of well by well. This approach allows the analysis to leverage the limited data to highlight potential opportunities for additional groundwater supplies for SMMWC. Additional focused water quality sampling and pump testing will need to occur if SMMWC wants to further analyze any of the wells or basins. Some of the wells will also need to be inspected to assess the condition of the current equipment and to determine if it meets State Health Department drinking water well standards.

There are three (3) groundwater basins in the SMMWC's service area: the Avila Valley Sub-basin, East Hartford Canyon, and West Harford Canyon. SMMWC currently produces its groundwater entirely from the Avila Valley Sub-basin of the San Luis Obispo Valley Groundwater Basin.

In addition to the currently utilized Avila Valley Sub-basin wells, SMMWC has identified several wells in their reporting to the California Department of Public Health and during the analysis for their 2014 Baseline Water and Wastewater Capacity Evaluation Technical Memorandum. The wells include several agricultural wells and several destroyed, inactive, or abandoned wells. The wells are located in the Avila Valley Sub-basin, East Harford Canyon, and West Harford Canyon as shown in Table 15. As mentioned earlier, there is some missing data for some of the wells.

Table 15. Existing Wells in Service Area

Basin	Details	Well	Use	Depth (ft)	Perforation Depth (ft)	Active?
Avila Valley Sub-basin	Shallow Alluvium less than 100 ft deep	Well 7[2]	Domestic			No
		Well 4A	Domestic	47		Yes
		Well 5A	Domestic	60	20-60	Yes
		Well 6A	Domestic	45	25-45	Yes
		Coffeeberry[1]	Domestic			
	Taps dark brown shale aquifers 522-1240 feet depth. Hot water with temperatures measured at 106 degrees Fahrenheit	Well 01H	Agricultural	1240	550-1240	No
East Harford Canyon	Taps tightly folded sandstone and fractured shale aquifers of the Plio-Miocene-age Pismo Formation, and cherty shale aquifers of the Miocene-age Monterey Formation	EH-2	Agricultural	640	260-640	Yes
		EH-5 (AKA EH-1)	Agricultural	595	260-640	No
		EH-6	Agricultural	700	300-700	Yes
West Harford Canyon	Taps an alluvial aquifer	Well 3[3]	Agricultural	80	40-80	Yes
		Well 2[4]	Agricultural			No

[1] This well is 830’ deep and taps into the Monterey formation. According to an ATEC study done in 2019, petroleum was found in the Coffeeberry well. Due to the risks and costs of removing petroleum to meet drinking water standards, this well was not considered as a potential drinking water source.

[2] Well 7 was mentioned in the Cleath Harris report that was part of the 2014 Baseline Water and Wastewater Capacity Evaluation Technical Memorandum. This well is effectively abandoned so it was not considered as a potential drinking water source for the purpose of this analysis.

[3] Well 3 does not have a sufficient sanitary seal and is not suitable for domestic use.

[4] Well 2 is abandoned and destroyed so it was not considered as a potential drinking water source.

Cleath-Harris Geologist performed pumping tests on Wells 4A, 5A, and 6A to determine operational capacity of the existing wells (3). SMMWC has pumped 28,100 AFY for the last 11 years from the Avila Valley Subbasin wells 4A, 5A, and 6A however based on pumping test results the wells have the potential to provide higher quantities of water. Due to the tributary area of the watershed and mandated flow contributions to San Luis Creek from the San Luis Obispo Water Resource Recovery Facility, provided there is sufficient flow in the creek, the wells could be pumped at a rate that would equal as much as 484 AFY. In their memo, Cleath Harris Geologists recommend using a pumping rate of 200gm which would extend to approximately 322 afy for water supply planning purposes Possible threats to the reliable supply from existing and potential groundwater sources is susceptibility to reduction due to stream flow conditions, contamination, the loss of protective benefits of the Marre weir, extended drought conditions, and water quality constraints. SMMWC's historical production from wells 4A, 5A, and 6A as well as the SWP deliveries are shown in Figure 9.

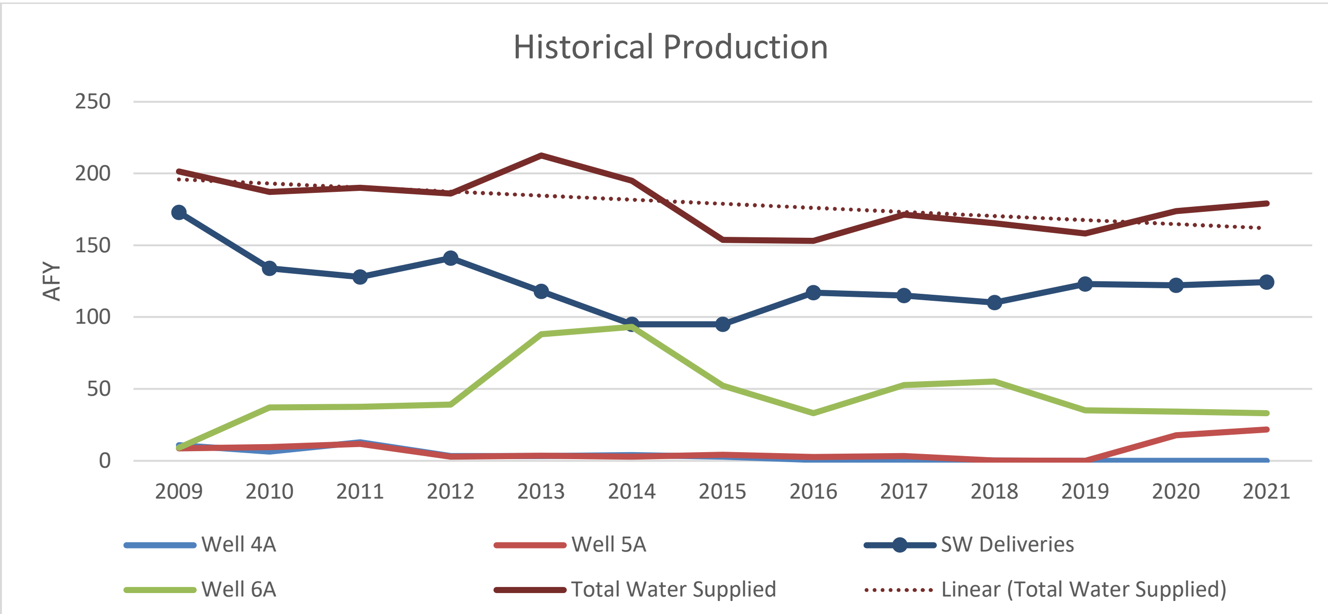

Figure 9. SMMWC Historical Production from 4A, 5A, and 6A with SWP Deliveries

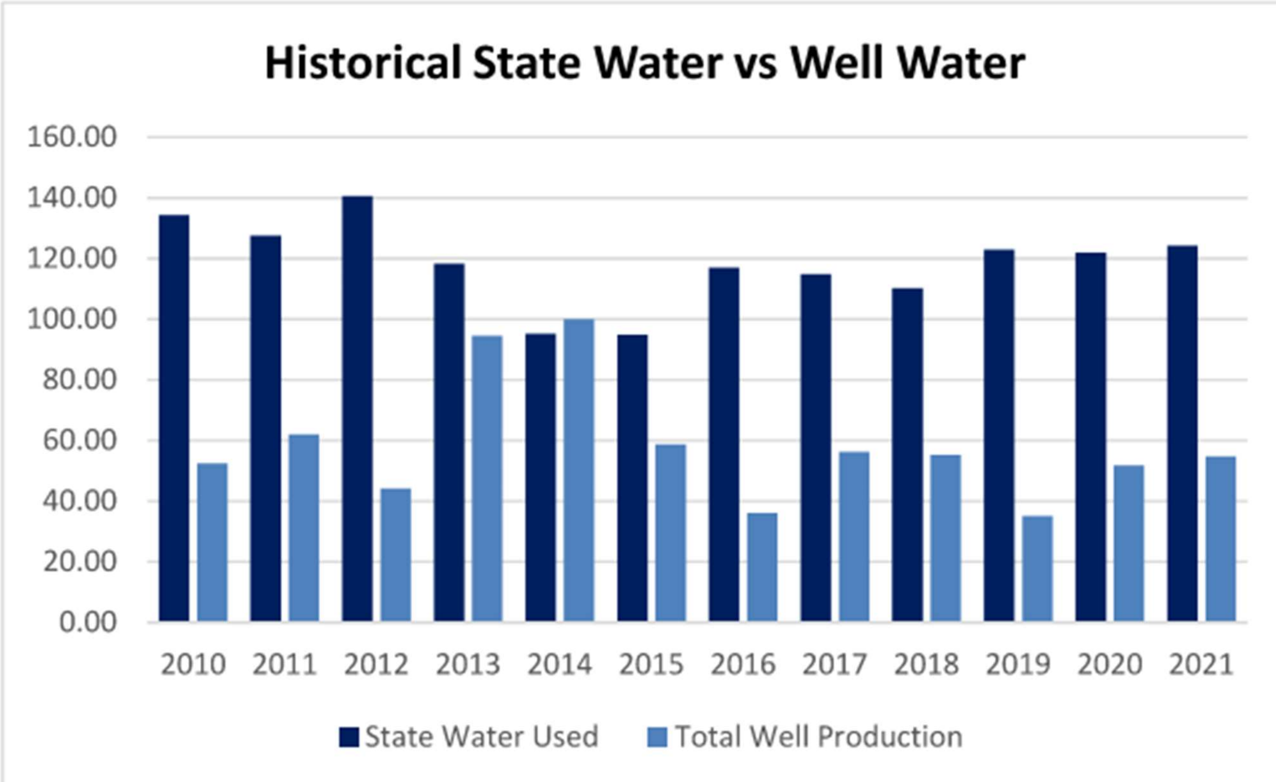

Figure 10. Historical SWP Deliveries and SMMWC Production from Wells 4A, 5A, and 6A (AFY)

6 Water Supply Considerations

SMMWC currently treats for high concentrations of iron and manganese in its Avila Valley Sub-basin wells with a pyrolusite pressure filtration system. Additionally, the treated groundwater is blended with better quality SWP water, when available, to improve the overall quality of the water delivered to the SMMWC's customers. Of the constituents in the well water that have historically exceeded the MCL, Total Dissolved Solids (TDS) would require the highest level of additional treatment to achieve sufficient removal. Without additional treatment, water quality may constrain SMMWC's production and use of its groundwater resources during those periods of time when State Water, or another source of water, is not available for blending. A reduction in State Water would require SMMWC to rely more on the local groundwater and the variability in volumes and quality of the water in the sub-basins. SMMWC may require an increase in the degree of treatment for the existing wells in order to support a reduced importation of State Water. Over the past 10 years, State Water has made up at least half of SMMWC's supply as shown in Figure 11.

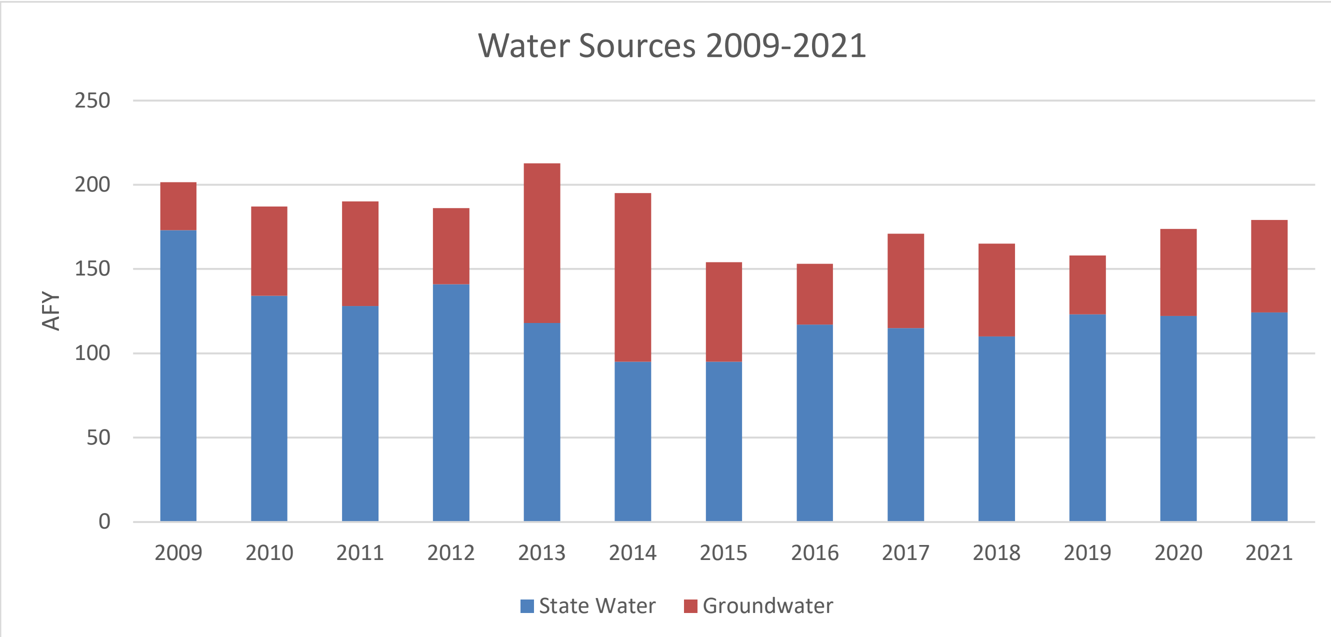

Figure 11. Water Sources from 2009-2021

Potential Groundwater Supply Descriptions

Avila Valley Sub-basin Wells

SMMWC has been pumping groundwater from the basin since the late 1960s from wells that were subsequently replaced by wells 4A, 5A, and 6A during the 1980s. There are three (3) active wells within the shallow alluvium of the Avila Valley Sub-basin, which is under the influence of San Luis Obispo Creek. The freshwater underflow available in the sub-basin is likely sustained by the presence of the Marre Weir. The Marre Weir is located approximately 1,800 feet downstream of wells 4A, 5A, and 6A. It was installed in 1969 under a permit from the State Department of Fish & Game. The purpose of the weir construction was to prevent seawater intrusion in the upstream wells. Since its construction, the weir has been effective in protecting the alluvial aquifer from seawater intrusion in the vicinity of SMMWC's active wells.

There are two (2) issues of particular concern regarding the reliability of the Avila Valley Sub-basin: the protective benefits of the Marre Weir with sea level rise and upstream discharges, uses, and contamination. The condition and presence of the Marre Weir is integral to maintaining a barrier to seawater intrusion in the sub-basin and therefore provides a protective benefit of the reliability of the Avila Valley Sub-basin supply. Furthermore, the reliability and quality of the Avila Valley Sub-basin and associated underflow of the San Luis Obispo Creek is affected by continued discharges to the creek including discharges from the City of San Luis Obispo Water Resource Recovery Facility (WRRF), the amount of water used by upstream users, as well as potential natural and manmade contamination to the upstream sections of San Luis Obispo Creek. Due to the shallow nature of the underlying aquifer, the sub-basin is expected to be responsive to changes in surface water conditions for both flow and quality.

There is one inactive geothermal well (Well 01H) located within the Avila Sub-basin. The proximity of this well relative to the Health Club and the temperature and quality of this well will likely make it unusable for domestic water purposes. New pumping tests and current water-level data are necessary to more accurately estimate potential production, yield, and treatability of Well 01H.

Quantity

The groundwater production as documented in the Statements of Diversion and Use S137232 in 1991 had a maximum annual water use of 180 AF (in 1988) and a minimum use of 157 AF. The potential production could be higher given the pumping capacity of the wells. The maximum production capacity for SMMWC's existing public water supply wells is approximately 500 AFY based on continuous pumping at existing active wells (312 gpm). However pumping capacity and safe yield are not synonymous. Historic production is presented in Table 16. The maximum volume pumped from the Avila Valley Sub-basin over the past ten years was 100 AFY. While 100 AFY is the recent historical production, a safe yield has not been determined however, Cleath Harris Geologists performed recent pumping tests and recommended that in assessing water supply needs a rate of 200 gpm or 322 afy be used.

Table 16. Avila Valley Sub-basin Groundwater Production

Groundwater Production from 2009-2019 (AFY)			
	Minimum	**Maximum**	**Average**
Wells 4A, 5A, and 6A	29	100	57
Well 01H		105[1]	
[1]Yield from drilling log during pumping test in 1986			

Quality

The water quality analysis is based on reports available for the producing wells 4A, 5A, and 6A from February 2009 to July 2013. The conclusions of the water quality analysis are shown below:

<u>Avila Valley Sub-basin Wells 4A, 5A, 6A, and 01H</u>

- Laboratory results for each of the sampling events at wells 4A and 5A indicate relatively high concentrations of iron exceeding California State maximum contaminant levels (MCL) for secondary water-quality standards.
- High concentrations of manganese exceeded the MCL for secondary standards in samples from each sampling event in all three (3) alluvial wells.
- TDS concentrations were highest at Well 4A, exceeding the MCL, and were at or just below the standard at wells 5A and 6A.
- Electrical conductivity (EC) exceeded the MCL at Well 4A during the August 17, 2011 sampling event.
- The water quality in the three (3) alluvial wells indicated a magnesium bicarbonate character.
- Well 01H would require cooling as temperatures were measured at 106 degrees Fahrenheit in 1986.

SMMWC currently treats for high concentrations of iron and manganese in its wells with a pyrolusite pressure filtration system. Additionally, the treated groundwater is blended with SWP water, when available, to improve the quality of the water delivered to the SMMWC's customers. When State Water is down for maintenance, SMMWC receives Lopez Lake water for supply and blending. Of the constituents that have historically exceeded the MCL, TDS would require the highest level of additional treatment to achieve sufficient removal. Without additional treatment, water quality could constrain SMMWC's production and use of its groundwater resources during those periods of time when State Water or another source of water is not available for blending.

East Harford Canyon Wells

The SMMWC Wells EH-2, EH-5, and EH-6 are located in East Harford Canyon. These wells are not currently used by SMMWC. EH-2 and EH-5 are currently being used by the Avila Beach Resort Golf Course for irrigation pursuant to an agreement with SMMWC. Significant improvements to the existing infrastructure would be required to incorporate these wells into SMMWC's water system since they: 1) are not be constructed to current public water supply well standards; 2) are not connected to SMMWC's distribution system; and 3) would require significant treatment to meet drinking water quality requirements. In addition, crude oil has been found in these wells which would preclude us from recommending their use as a drinking water source.

Quantity

New pumping tests at each well and current water-level data are necessary to estimate potential production and yield. Water-level trends in the bedrock aquifers at these wells could be characterized with water level monitoring. Historic production is presented in Table 17. The actual safe yield of the basin has not been determined, additional analysis and pump testing could establish a safe yield estimate for East Harford Canyon.

Table 17. East Harford Canyon Historic Production

Water Source	Historic Production (AFY)	Basis
East Harford Canyon (Wells EH-2, EH-5, and EH-6)	70-100	Extended Pumping Tests (performed during 1990-1992), Actual use 1993-Present

Quality

The water quality analysis is based on reports for the EH-2 well in 1989, 2010, and 2019 and for EH-5 well in 2010. The conclusions of the water quality analysis are shown below:

<u>East Harford Sub-basin Wells EH-2, EH-5, EH-6</u>

- Water quality results indicate a manganese concentration and TDS exceeding the MCL.
- The water quality indicates a sodium potassium bicarbonate character.
- Wells are known to have a sulfuric odor. The quality of water supplied by public water systems is regulated by the U.S. Environmental Protection Agency (EPA). Sulfate is classified under the Secondary Maximum Contaminant Level standards, which are based on aesthetic factors such as taste, odor, and staining properties of water, rather than health effects. The standard in drinking water for sulfate is 250 milligrams per liter (mg/l), sometimes expressed as 250 parts per million (ppm). Hydrogen sulfide is not regulated by the EPA. A concentration high enough to be a drinking water health hazard also makes the water unpalatable. The odor of water with as little as 0.5 ppm of hydrogen sulfide concentration is detectable by most people. Concentrations less than 1 ppm give the water a "musty" or "swampy" odor. A 1-2 ppm hydrogen sulfide concentration gives water a "rotten egg" odor and makes the water very offensive.

- Crude oil has been encountered in the wells in East Harford basin which would preclude us from recommending their use as a drinking water source.

West Harford Canyon Wells

Avila Beach Resort currently utilizes Well 3, located in West Harford Canyon. This well was built and is used for golf course irrigation. A down-hole video survey was conducted in 2016 and SMMWC installed a meter on the well in July 2013. The water quality was sampled in July 2013. A constant discharge pumping test, along with water level and water quality monitoring, would need to be performed in order to determine the well's condition and to better estimate well yields. The depth of the sanitary seal does not meet well construction standards for a public water supply well. Without improvements or replacement, this well will not be suitable for use as a regular public water supply well. It has been accepted in the past by the State Health Department as a standby well, but this would need to be reviewed. Significant improvements to the existing infrastructure would be required to incorporate these wells into SMMWC's water system since they: 1) are not constructed to current public water supply well standards; 2) are not connected to SMMWC's distribution system; and 3) will likely require treatment to meet drinking water quality requirements.

Quantity

Well 3 in West Harford Canyon has been metered since 2013. Well 3 pumped at a maximum of 240 gpm which would equate to maximum of 387 AFY if it pumped at that rate continuously, however the maximum annual metered production of Well 3 in a year was approximately 80 AF. Based on information provided by the operator, this well can run dry seasonally and well production should be capped at 80AFY. We have used 80 AFY as the estimated production capability of that well. It is important to note that SMMWC does not have exclusive rights to the water in the West Harford groundwater basin. Water from West Harford has been historically used for golf course operations and could be used by others if development occurs upstream. Historic production is presented in Table 18.

Table 18. West Harford Canyon Historic Production

Water Source	Historic Production (AFY)	Basis
West Harford Canyon (Well 3)	13-80[1]	Metering of Pumping from 2013 to 2019

[1] Anecdotal operator information indicates that this well may have production limitations during drought and periods of higher pumping.

Quality

<u>West Harford Canyon Well 3</u>

- Water quality results from 2012 samples indicated a manganese and iron concentration above secondary drinking water MCLs.

Groundwater Cost of Treatment

The wells in East and West Harford Canyon will all require treatment to reduce the manganese and iron that is present in both basins to meet drinking water standards. Activated Carbon and/or Pyrolusite filters and chemical dosing will be required to treat all the wells if they are used for drinking water. Reverse osmosis (RO) may also be needed depending on the TDS levels in the wells and on the blending scenarios. A cooling tower would be required for the hot water Well 0H1, but both the location and anticipated water quality likely preclude it from being considered as a potential drinking water source.

As mentioned earlier in this report, petroleum was found in the Coffeeberry and East Harford wells. Due to the risks of removing petroleum to meet drinking water standards, these wells were not considered as a potential drinking water sources.

Water Treatment planning level costs estimates are shown in Table 19. These cost estimates were developed using the available data on water quality and production capacity. This analysis only includes costs associated with treatment, onsite piping and valves, instrumentation, well equipping and testing, a concrete pad for the treatment processes, and project soft costs. These cost estimates do not include costs related to water rights, land purchase, or additional pipelines to connect into the distribution system. Additional analysis beyond the scope of this effort would be required to analyze the blended water quality to determine where and how these sources should be introduced into the system. Since the wells have not been outfitted or operated for domestic use, there are likely unquantified costs associated with utilizing these sources that are beyond the scope of this report.

This cost estimate used the Association for the Advancement of Cost Estimating (AACE) International Cost Estimate Classification System to provide expected accuracy range for the cost estimate based on the level of project definition. The total costs and subsequently the $/AF range were determined based on a Class 5 estimate. A Class 5 estimate ranges between -20% to -50% on the low side, and +30% to +100% on the high side.

Table 19. Planning Level Estimated Groundwater Treatment Costs

Basin & Wells	Assumed Treatment[1]	O&M	Total Capital	Annualized Capital[7]	Potential Production[5]	$/AF
Avila Valley Sub-basin	Nano Filtration or Reverse Osmosis	$36,360	$1,326,000	$85,419	322[8]	$298 - $510
Well 01H[3]	Not recommended					
Coffeeberry & East Harford[6]	Not recommended					
West Harford Well 3 Replacement	Pyrolusite Filter & Reverse Osmosis	$21,400	$1,697,779	$110,443	80[4]	$794 - $3,177

[1] Treatment costs do not include redundancy of equipment.
[2] Based on WSC's 2021 Groundwater Treatment Analysis at a 215gpm flow rate.
[3] The location, temperature, and quality of this well will likely make it unusable for domestic water purposes so it was not included in the cost estimates.
[4] Estimate from historic metered production.
[5] The production assumes a Reverse Osmosis recovery of 80%.
[6] Not recommended due to crude oil in wells.
[7] Annualized costs were calculated using a repayment term of 30 years with an interest rate of 5%.
[8] Per 2021 Groundwater Treatment Analysis

Reverse Osmosis might not be needed if the groundwater can be blended with SWP or another source of water to reduce the TDS. If SWP water was not available, then the additional cost of treating for TDS would be required for at least a portion of the water in the Avila Sub-basin. There are also other treatment options such as nanofiltration that could potentially be used to reduce the TDS levels from the Avila Sub-basin wells. Continued blending with State Water would help to reduce the cost/AF for the additional groundwater supply.

7 Conclusions

As discussed in Section 4, SMMWC has experienced demands ranging between 149 AFY and 222 AFY from 2005 to 2021. Based on the analysis in this memo, WSC estimates that future demands could range between 202 AFY and 279 AFY at buildout. WSC estimates that SMMWC will need to plan for 241 AFY of demands on its system under normal operating conditions. These demands should be reviewed periodically as new data is collected to assure that SMMWC has adequate water supplies to reliably meet these demands.

Figure 12 shows the historical production and the projected supply and buildout demands with improvements to SMMWC's groundwater portfolio by adding a well in West Harford Canyon. State Water is conservatively shown using a 37% delivery which was the average allocation during the 2012-2016 drought years.

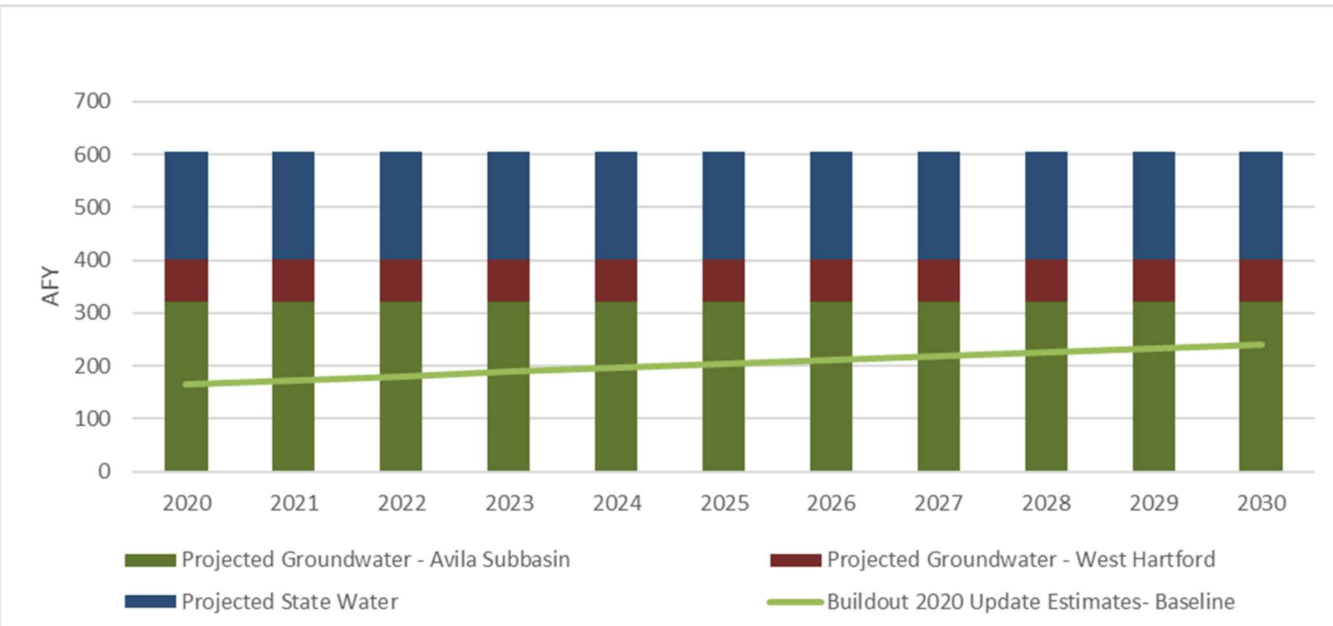

Figure 12. Projected Water Supply and Demand

California Department of Public Health (CDPH) Waterworks standards require that community water systems using only groundwater shall have a minimum of two (2) approved sources and shall be capable of meeting Maximum Day Demand (MDD) with the highest-capacity source offline. Because the SWP is shut down for annual maintenance and more importantly could be permanently disrupted during a catastrophic event, the reliable production capacity during average hydrologic conditions is estimated with the highest-capacity groundwater source, well 6A, offline. The estimated reliable production capacity from all of SMMWC's existing sources during average hydrologic conditions is shown in Table 20. Even with well 6A offline and a 37% State Water delivery, SMMWC will be able to meet its planned future demand of 241 AFY.

Table 20. Reliable Production Capacity

	Production Capacity (AFY)
SWP	**204**[1]
Well 4A	**145**[2]
Well 5A	**177**[2]
Well 6A	**Offline**
Combined Capacity of Wells 4A, 5A, and 6A	**484**[2]
Total Capacity	**526**[3]
[1] Includes Table A and drought buffer at a 37% allocation.	
[2] Based on pump tests conducted by CHG **(3)**; the combined rate of having Wells 4A, 5A, and 6A pumping simultaneously is 300 gpm with all three online.	
[3] Total capacity is the summation of SWP production capacity and the combined capacity of Wells 4A and5A, (322 afy) while assuming Well 6A is offline.	

In order to improve water quality through blending lower quality groundwater with higher quality State Water, SMMWC has relied heavily on State Water since becoming a State Water Subcontractor. The wells in the Avila Valley Sub-basin have been used when State Water is offline and as a secondary source due to the lower quality of water produced by the wells. The wells in both East and West Harford Canyon basins have not been used for domestic production. Additional analysis is recommended to identify the location, condition, and water quality of the wells in West Harford Canyon if SMMWC wants to better define the feasibility of bringing a well from this area online.

WSC concludes the following:

- Provided there is sufficient flow in San Luis Creek to recharge at the pumped rate, the wells in the Avila Valley Subbasin could be pumped for extended periods of time and at higher than historical rates.
- The blending of low TDS State Water with local ground water supplies helps SMMWC produce an acceptable quality of water for its customers.
- Water Treatment of local groundwater supplies may be considered in the future for improved water availability, quality, and as a safeguard against potential sea level rise and water quality degradation.
- Recycled water may be explored as a supplemental water supply.

8 References

1. **Department of Water Resources.** Contract between the State of California Deparment of Water Resources and San Luis Obispo County Flood Control and Water Conservation District for a Water Supply. 2003.

2. ***Master Water Treatment Agreement Between the Central Coast Water Authority and the San Luis Obispo County Flood Control and Water Conservation District.*** **1992.**

3. ***The State Water Project Final Delivery Reliability Report 2011.*** **State of California Natural Resources Agency Department of Water Resources. June 2012.**

4. Cleath-Harris Geologist. ***Pumping Testing Wells 4A, 5A, 6A Technical Memorandum.*** **January 2022.**