WATER COMMISSION
INFORMATION REPORT

DATE: 06/30/2020

AGENDA OF: July 6, 2020

TO: Water Commission

FROM: Heidi Luckenbach, Deputy Director/Engineering Manager

SUBJECT: Water Supply Augmentation Strategy, Quarterly Work Plan Update

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RECOMMENDATION: Receive information regarding the status of the various components of the Water Supply Augmentation Strategy and provide feedback.

BACKGROUND and DISCUSSION: Following the completion of the Water Supply Advisory Committee (WSAC) process, the City Council accepted the Final Report on Agreements and Recommendations that included a detailed Implementation Plan and Adaptive Management Strategy. The WSAC work was adopted as part of the 2015 Urban Water Management Plan and is currently referred to as the Water Supply Augmentation Strategy (WSAS) that includes an Implementation Work Plan (Work Plan).

As per the Final Agreements and Recommendations of the Water Supply Advisory Committee (WSAC), the Water Commission shall receive quarterly updates on the status of the various elements of the recommended plan. This is the eighteenth quarterly update.

The content and format of this report will continue to be modified to provide a comprehensive overview of the progress, findings, obstacles, etc. of the various elements of work. Outstanding requests by the Commission include:

- Provide an update of the Phase 2 Recycled Water Study once alternatives have been selected. See below.
- Develop a spreadsheet that shows all the supply projects and portfolios of projects with all the metrics related to decision-making. This will begin with the work of Dr. Robert Raucher. See below.
- Provide an ongoing narrative and/or spreadsheet showing the nexus between water supply projects specifically spelled out in the WSAC report and other projects and studies being performed by the Water Department. Ongoing.

The Water Supply Augmentation Strategy (WSAS) consists of the following elements as defined by the WSAC:

- Element 0: Demand Management. Implementation of the Long Term Water Conservation Master Plan is foundational to the WSAS.

- Element 1: In Lieu. This alternative could include the sale of water to other agencies with or without the assumption of additional water back to the City during droughts.
- Element 2: Aquifer Storage and Recovery. Evaluations of both the Mid-County and Santa Margarita Groundwater Basins are being conducted.
- Element 3: Advanced Treated Recycled Water or Seawater Desalination.

Progress and status of the various WSAS-related work are described in detail below as well as that of other projects related to but not explicitly mentioned in the WSAS.

ELEMENT 0: DEMAND MANAGEMENT

Overview: Element 0 of the City's Water Supply Augmentation Strategy consists of ongoing demand management activities. The primary goal of this element is to generate an additional 200 to 250 million gallons per year in demand reduction by year 2035 from expanded water conservation.

Summary: Since the last quarterly report in March 2020, the Water Conservation section has been actively working on the following projects:

- Water Shortage Contingency Plan update
- Preparation of final water supply outlook
- Implementation of WaterSmart Software platform for all customers
- Working in cooperation with Customer Service on the meter replacement program

Staff also participated in a DWR workshop March 9 on the new requirement for suppliers to conduct an annual water supply and demand assessment (WSDA) pursuant to Senate Bill 606. Staff made a presentation for that workshop that summarizes our perspective and experience to inform the development of WSDA guidance.

Since April and the start of the Covid-19 shelter-in-place, several Conservation staff have been working in the field in cooperation with meter shop staff on the meter box field inventory project. This important fieldwork is being conducted in order to get a full picture of the condition of all meter boxes. The fieldwork consists of GPS locating, and photo and written documentation of the condition of each box. The goal is to have a full inventory of all meter boxes in the service area to facilitate meter replacement by having a better understanding of the location and condition of existing infrastructure.

The following is a summary of the status of selected measures in the Water Conservation plan:

No. 5 Home Water Use Reports. An independent evaluation of the effect of the first year of this program has been completed. Although the evaluation of the program saw no water savings as a direct result of the water reports overall, there was some evidence of savings within a customer group of high water users who signed up for the customer portal. Staff decided to continue a program with WaterSmart in order to provide a customer portal and water reports only to the highest users. Welcome letters were sent in late May and early June to all customers that did not participate in the WaterSmart program in 2019; all customers have now been invited in sign up for the portal. Water reports will be sent to a small group of approximately 2,000 of the highest-using single-family customers. In addition, hourly interval water use data from the Badger meter

system was integrated into WaterSmart so that it is visible in the WaterSmart portal. As customers' meters are replaced, their new data will appear in the portal. Thus far the WaterSmart program has received very positive feedback from customers.

No. 6 Water and Energy-Saving Assistance Program. This program offers free toilet replacement to qualifying low-income households, in conjunction with free weatherization and energy efficiency services funded by PG&E. This program has been successfully implemented in our service area. The shelter in place orders have temporarily halted fieldwork for several months but as of early June, the work has resumed. Staff is preparing a contract amendment to continue this program through the next fiscal year.

ELEMENT 1: WATER TRANSFERS AND/OR WATER EXCHANGES

Overview: This work is considering the feasibility of sending excess City surface water to neighboring agencies for the purpose of passively recharging the groundwater basin(s). In-Lieu is now described as follows.

- Water Transfers: Selling water to neighboring agencies for the purpose of augmenting their supplies and possibly (passively) recharging the groundwater basin.
- Water Exchanges: Negotiating an agreement whereby water provided to neighboring agencies would, by allowing the groundwater basins to recharge, provide additional groundwater back to the City during water supply shortages.

Summary: As previously mentioned, due to the lack of rainfall this past winter, water supply conditions and the water available from the north coast sources, Phase II of the water transfers had been put on hold and was formally ended on January 31, 2020. The total volume of water that had been transferred up until that date was 33.7 million gallons and was averaging roughly 0.6 million gallons per day.

Next Steps: City and SqCWD staff have engaged in discussions regarding the potential extension of the current water transfer agreement that is to expire at the end of the year.

Contract Update(s)
Purchase Order Agreement with SqCWD for cost sharing of Water Quality Sampling and Development of Water Quality Results Technical Memorandum (TM).

- PO Opened: January 2017
- Project Partner(s): Soquel Creek Water District
- Engaged Stakeholders: None at this time.
- Original PO Amount: $60,000
- PO Change Order (Phase 2 WQ Monitoring): $45,000
- Amount Spent: $70,787
- Amount Remaining: $34,213

ELEMENT 2: AQUIFER STORAGE AND RECOVERY

Overview: Aquifer Storage and Recovery (ASR) is being evaluated as a form of actively recharging the groundwater basin(s). Work in this area includes the Mid-County Groundwater Basin (MCGB) and the Santa Margarita Groundwater Basin (SMGB).

Summary: The City contracted with Pueblo Water Resources (Pueblo) in 2016 for Phase I of the three-phase program to evaluate the feasibility (and potentially implement) of ASR as a water supply alternative. Phase I consists of higher-level feasibility work; i.e., site-specific injection capacity and geochemical analyses, groundwater modeling and development of a pilot test program. Phase II includes the pilot testing and Phase III is project implementation.

The groundwater modeling component of Phase I is ongoing and will continue through the completion of Phase II as part of the iterative process to ensuring project success. In the 2018 Summary of Initial Groundwater Modeling Results memo, Pueblo described initial modeling scenarios 1.0 – 9.0. Since that time, and based on model results, several additional scenario iterations (Scenarios 8.1 – 8.3) and new scenarios (Scenarios 10.0 – 11.3) have been performed in an effort to refine an implementable project. As can be seen in Attachment 1, Scenarios 1-9 are intended to cover the MCGB, SMGB, and a combined project. The exceptions are Scenarios 8.1, 8.2 and 8.3 that were intended to gain more information specific to the performance of the MCGB. Only scenarios using the MCGB groundwater model have been performed to date. Scenarios reflect different climate and water demands scenarios, and different ASR well configurations.

Below is additional information about the new suite of modeling scenarios.

<u>Scenarios 8.1 through 8.3</u>

- Rationale: To gain additional information on ASR performance in the MCGB using different combinations of wells along with combining SqCWD's Pure Water Soquel Program (PWS).
- Climate Period: GFDL2.1 A2 climate change scenario used during WSAC
- Water Demand: 3.2 billion gallons per year as developed during the WSAC timeframe
- Total ASR injection rates: 3.0 million gallons per day (mgd)
- Total ASR extraction rates: 3.0 or 4.1 mgd
- Wells: 6 to 7 simulated new ASR wells
- Findings:
    - Scenario 8.1 added PWS
    - Scenario 8.2 uses the 4 existing Beltz wells converted to ASR wells plus 3 new ASR wells
    - Scenario 8.3 combines Scenario 8.2 with PWS.
    - All 3 of these new scenarios were deemed technically infeasible due to excessive water levels at some of the simulated ASR wells.
    - Additional scenarios with smaller capacities were considered under this scenario group, but were not run due to the direction to look at different demand scenarios (2016-2018 demands), climate scenario (Catalog Climate) along with developing a City ASR project that focused on the Beltz area only.

Scenarios 10.0 through 10.2

- Rationale: To understand a project's feasibility under the Catalog Climate that was used in the basin's Groundwater Sustainability Plan (GSP).
- Climate Period: Catalog Climate future climate change scenario
- Water Demands: 2016 – 2018 demand projections of 2.6 BG
- Total ASR injection rates: varies
- Total ASR extraction rates: varies
- Wells: 4 existing Beltz Wells converted to ASR wells
- Findings
    - Scenario 10.0 had a total injection capacity of 1.5 mgd and extraction capacity of 2.5 mgd. This scenario was found to be infeasible due to excessive injection and extraction water levels at some of the simulated ASR wells; i.e., water levels in ASR wells rose above ground surface at times and also dropped below the top of the well screens.
    - Scenario 10.1 consisted of reduced injection/extraction capacities of 1.0/1.5 mgd, respectively, and was found to be feasible with acceptable injection and extraction water levels at all of the simulated ASR wells.
    - Scenario 10.2 consisted of Scenario 10.1 combined with PWS, and was also found to be technically feasible.

Scenarios 11.0 through 11.3

- Rationale: To develop a "Beltz Only" ASR project that focused on leveraging existing infrastructure by converting the existing Beltz wells to ASR wells and installing new ASR wells all within the City's service area.
- Climate Period: GFDL2.1 A2
- Water Demands: 2016 – 2018 demands projections of 2.6 BG
- Total ASR injection rates: 0 (for establishing the baseline), and 2mgd
- Total ASR extraction rates: 0 (for establishing the baseline), and 3mgd
- Wells: 4 existing Beltz wells converted to ASR wells plus 3 or 4 new ASR wells
- Findings:
    - Scenario 11.1 added 3 new ASR wells to the existing Beltz wells and was found to be infeasible due to excessive injection water levels at some of the simulated ASR wells.
    - Scenario 11.2 added a fourth new ASR well to existing Beltz wells to spread out the same injection capacity and was found to be feasible as injection and extraction water levels were acceptable.
    - Scenario 11.3 consisted of Scenario 11.2 combined with the PWS project and was found to be infeasible (as configured) due to injection well interference effects between the ASR and PWS wells and excessive injection water levels at some of the simulated ASR wells.

As mentioned above, groundwater modeling will continue through the completion of Phase II as part of an iterative process to ensure project success. To that end, future modeling iterations may involve re-running some scenarios with actual data obtained from the piloting of ASR at the City's Beltz wells. In addition, City staff and PWR have begun preliminary discussions about the benefits of installing a seawater intrusion barrier well along the coast. These discussions may lead to developing a new scenario that includes both a new seawater intrusion barrier well along

with potentially operating the existing Beltz wells differently and at higher extraction rates knowing that protective water levels for seawater intrusion will be met and maintained with the inclusion of the barrier well.

Since the conclusion of the fieldwork conducted under Phase II work at the Beltz 12 well site on July 31, 2019, staff from the City and Pueblo Water Resources evaluated the data collected and worked to generate a Technical Memorandum (TM) documenting results of the pilot. The final TM was prepared and submitted to the City by Pueblo Water Resources in June 2020. As documented in the Final TM, and as previously mentioned, the following recommendations are made:

- Beltz 12 should be converted to a permanent ASR facility.
- For planning purposes, a long-term operational ASR capacity of approximately 335 gpm injection and 455 gpm recovery pumping should be assumed for Beltz 12.
- Permanent ASR operations at the well should include ongoing monitoring for geochemical interactions during aquifer storage and ASR recovery, with particular focus on long-term water-quality interactions such as solubilization/leaching of metals and DBPs.

Following Council approval in December 2019, the Water Department entered into a professional services contract with Pueblo to perform an ASR pilot at Beltz 8 and to construct two monitoring wells under that contract. The two new monitoring wells were drilled at the Beltz 8 site and Pleasure Point between January and March 2020. Similar to the Beltz 12 ASR Pilot Test, the test program at Beltz 8 involves three repeated ASR cycles of operations and monitoring, each of larger volume and duration than the preceding cycle. To date, Pueblo has completed Cycles 1 and 2 of the Beltz 8 pilot test. Cycle 3 was scheduled to begin in May 2020 but was postponed until further data collection and evaluation could be completed. While the results from the monitoring data collected at Beltz 8 were within the range of historical values and below the maximum contaminant level (MCL), the Arsenic (As) concentrations measured at the monitoring wells during Cycle 2 was unexpectedly high. The table below shows Arsenic results obtained from Beltz 8 and the newly installed monitoring well (MW) prior to Cycle 1, through Cycles 1 and 2, and after the conclusion of Cycle 2.

As shown by the increasing values through the various stages of Cycle 2 recovery, the data from Beltz 8 could indicate that an adverse leaching or dissolution reaction may be occurring. Pueblo is continuing to monitor and collect samples from the wells to investigate the results. In addition, Pueblo is analyzing aquifer mineralogy and performing geochemical modeling to assess the situation and provide a recommendation for the Beltz 8 Pilot Test Program. Because the values seen from Cycles 1 and 2 of the pilot for Beltz 8 were below the MCL (10 ug/L), it is too early to determine if arsenic concentrations will be a fatal flaw for ASR moving forward at this well or if concentrations will "peak" at some point and drop off before they exceed the MCL. Results from the mineralogy analysis and geochemical modeling combined with results seen from Cycle 2 will ultimately inform the City's decision to proceed with Cycle 3 of the pilot along with moving forward with ASR at this well. These efforts are expected to be complete in August 2020.

Date/Time	Description	As (ug/L)	
		Beltz 8	MW
3/18/20 11:00	Pre-Injection	1.4	29
3/23/20 10:10	Cycle 1 Recovery (0%)	0.59	
3/23/20 14:00	Cycle 1 Recovery (25%)	1.1	
3/23/20 18:00	Cycle 1 Recovery (50%)	1.4	
3/23/20 22:00	Cycle 1 Recovery (75%)	1.6	
3/24/20 2:00	Cycle 1 Recovery (100%)	3.1	
3/24/20 6:00	Cycle 1 Recovery (125%)	3.8	
4/8/20 12:00	Cycle 2 Storage	0.41	
4/15/20 11:10	Cycle 2 Recovery (0%)	1.2	6.5
4/16/20 10:20	Cycle 2 Recovery (25%)	4.2	
4/17/20 10:30	Cycle 2 Recovery (50%)	5.5	
4/18/20 10:30	Cycle 2 Recovery (75%)	6.0	
4/19/20 10:30	Cycle 2 Recovery (100%)	5.8	
4/20/20 10:30	Cycle 2 Recovery (125%)	4.9	
4/21/20 10:30	Cycle 2 Recovery (150%)	4.5	7.4
4/29/20 11:20	Post-ASR Testing (interim)	3.5	6.5

Sustainable Groundwater Management Act
No major activities; update to be provided elsewhere in the agenda for this meeting.

Next Steps: Work over the next few months will include:

- Continue working with Pueblo on water quality data evaluation and geochemical modeling to fully assess water quality concerns associated with the preliminary arsenic results seen during Cycles 1 and 2 of the Beltz 8 pilot test.
- Obtain recommendation(s) from Pueblo for the continuation of the Beltz 8 Pilot Test Program.

- Continue working with Pueblo to determine the need for any future modeling scenarios using data obtained from piloting along with developing a scenario that involves the installation of a saltwater intrusion barrier well.
- Continue with discussions on climate change modeling efforts that are used in the HCP (Habitat Conservation Plan) process, ASR groundwater modeling and the work being done for both the Santa Cruz Mid-County Groundwater Agency and the Santa Margarita Groundwater Basin.

Contract Update(s):

Consultant: Pueblo Water Resources (Pueblo) – Phase I

- Contract Signed: February 2016
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz, Scotts Valley Water District, San Lorenzo Valley Water District
- Original Contract Amount: $446,370
- Contract Amendment No. 1: $377,615
- Contract Amendment No. 2: $35,000
- Amount Spent: $725,324
- Amount Remaining: $123,661
- Status: On schedule for work in MCGB and delayed approximately 18 months for work in the SMGB.

Consultant: Pueblo Water Resources (Pueblo) – ASR Phase II – Beltz 12 ASR Pilot Test

- Contract Signed: October 2018
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz
- Original Contract Amount: $458,085
- Amount Spent: $429,491
- Amount Remaining: $28,594
- Status: On Schedule.

Consultant: Pueblo Water Resources (Pueblo) – ASR Phase II – Beltz 8 ASR Pilot Test

- Contract Signed: January 2020
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz
- Original Contract Amount: $1,051,945
- Contract Amendment No. 1 (Increase in monitoring well depth): $47,172
- Amount Spent: $876,861
- Amount Remaining: $222,256
- Status: Delayed – Duration unknown at this time.

ELEMENT 3: ADVANCED TREATED RECYCLED WATER AND DESALINATION

Overview: Advanced Treated Recycled Water and Desalination were included within the same Element with the intention that, following feasibility-level work, just one would proceed for further evaluation and preliminary design.

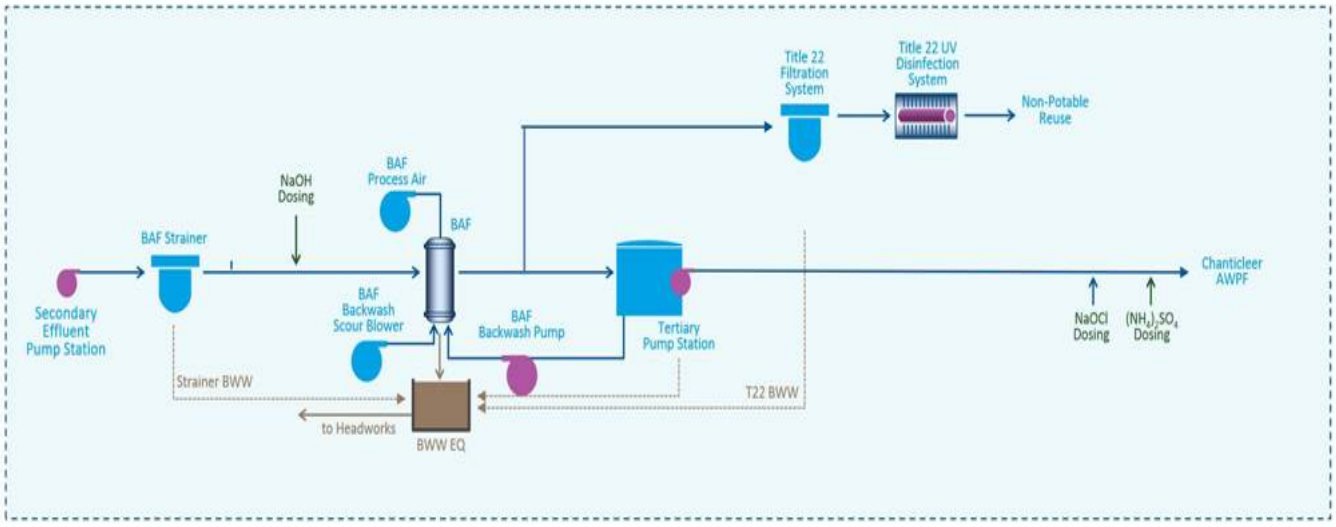
Summary: Kennedy Jenks was hired in 2016 for Phase 1 of a study that evaluated beneficial uses of treated wastewater as both a water supply as well as other options such as irrigation that may or may not result in supply augmentation. Phase 1 was a fairly broad study that developed supply augmentation alternatives to sufficient levels of detail to be able to compare and contrast with the desalination alternative. In November 2018, City Council took action to prioritize recycled water over desalination.

Phase 2 is building on the work developed in Phase 1 by adding a higher level of detail to those alternatives showing potential for augmenting water supply. Work began on Phase 2 following the Council approval in December 2019. In May 2020, City Council approved Contract Amendment Number 1 that, as described in more detail in last quarter's report, incorporates the work of Drs. Robert Raucher and Casey Brown. Phase 2 will incorporate the current status of projects by both Scotts Valley Water District and Soquel Creek Water District.

At this time the study is focused on non-potable reuse for irrigation and indirect-potable reuse for groundwater injection. A notable difference between Phase 1 and Phase 2 is the ongoing work by Soquel Creek Water District on their Pure Water Soquel (PWS) Program.

The PWS Program includes a bifurcated treatment system with tertiary pretreatment occurring at the City's Wastewater Treatment Facility (WWTF) and advanced purification occurring at their Chanticleer site. During Phase 1 of the recycled water study, an assumption was made that the tertiary pretreatment occurring at the WWTF would produce up to 1,800 acre-feet per year (afy) of Title 22-quality water, permittable through the state as disinfected for purposes such as outdoor irrigation and as high-quality source water to the PWS advanced purification system. Due to source water quality issues related to the secondary-treated wastewater from the WWTF, specifically nitrite, ammonia and TOC, the PWS treatment facility at the WWTF will produce Title 22, disinfected tertiary recycled water for 300 afy for City uses and 1,500 afy of tertiary treated, non-disinfected recycled water that will be treated further at the Chanticleer to purified standards for the PWS Program with microfiltration, reverse osmosis, UV light and advanced oxidation. The tertiary pretreatment for the 300 afy stream and the 1,500 afy will be different.

Nitrite, ammonia and TOC will impact the downstream advanced purification processes. To address these water quality issues, the PWS Program is pursuing nitrifying Biological Aerated Filter (nBAF) to reduce nitrite, ammonia and TOC, meet regulated target discharge levels and eliminate the need for a costly Ozone system. The nBAF would be located at the Santa Cruz WWTF (see schematic below) and would receive secondary effluent as the source water supply. A chlorine residual will be maintained after the nBAF to help mitigate biological growth in the PWS pipeline.



The implications for Santa Cruz's use of recycled water include the following:

- **Recycled Water Direct from Santa Cruz WWTF:** The PWS is planning to construct a separate 300afy tertiary treatment and disinfection system (e.g. granular media filter and ultraviolet (UV) light) at the Santa Cruz WWTF to serve recycled water to La Barranca Park, a truck fill station and for in-plant uses. The Recycled Water Feasibility Study (RWFS) will evaluate the cost-effectiveness of increasing the capacity of this system to serve other non-potable customers directly from the Santa Cruz WWTF.
- **Tertiary Water from the PWS Pipeline:** The tertiary water in the PWS pipeline would not meet Title 22 disinfected requirements for non-potable reuse because nBAF is not an approved Title 22 tertiary treatment process and the chlorine residual would not meet Title 22 disinfection requirements. The RWFS will evaluate the cost-effectiveness of a turnout along the PWS pipeline to send tertiary water to Pasatiempo, where their existing satellite treatment facilities could be used to produce recycled water for golf course irrigation. No other users are identified along the PWS pipeline because of the need for costly satellite treatment systems, and Pasatiempo currently receives source water from the City of Scotts Valley. This alternative would be practical only with regional partnerships in North Santa Cruz County.
- **Recycled Water Direct from Chanticleer Site:** The microfiltration system at the PWS's advanced water treatment plant at the Chanticleer site could be expanded to produce tertiary Title 22 disinfected water for non-potable reuse or purified water for indirect potable reuse. The RWFS is evaluating options to serve nearby customers or recharge the groundwater basin in the Beltz Wellfield.

The District and their consultant team are working to complete a 30% design of treatment facilities by mid-July and a 100% draft Title 22 Engineering Report by August that defines treatment facilities to meet regulatory requirements for non-potable reuse in Santa Cruz and indirect potable reuse in the Mid-County Groundwater Basin. The City and District continue to work closely on all aspects of the PWS project to increase future opportunities for interested parties.

Figure 1 of Attachment 2, includes an updated market assessment of potential irrigation sites, with modified infrastructure to reflect the need to achieve additional pretreatment at the

Chanticleer site to meet Title 22 requirements for irrigation. As described above, Phase 1A projects would build on the small Title 22 disinfected system at the WWTF; Phase 1B projects would require a satellite treatment system to meet Title 22 requirements and therefore are only including Pasatiempo and Scotts Valley. Phase 3 would require expansion of the microfiltration system at the Chanticleer site to meet Title 22 disinfected requirements and could then be used for irrigation at DeLaveaga Golf Course, etc.

Based on preliminary estimates, the current cost of potable water for Pasatiempo Golf Course and DeLaveaga Golf Course is greater than the estimated life cycle unit cost for recycled water. Serving recycled water to these golf courses would offset approximately 335 afy of potable water with a local, drought-resistant supply. Depending on the future rates for recycled water, these customers may realize cost savings over time if connected to recycled water. Pasatiempo could utilize its existing satellite facility to store and treat tertiary water from the PWS pipeline. DeLaveaga could be served by a new pipeline from the Chanticleer site, assuming expansion of the PWS MF system with the addition of disinfection (e.g. UV).

In addition to using recycled water for irrigation, the project team is currently evaluating three alternatives that would build on the PWS Program by constructing additional groundwater injection wells with, or without, an ASR project. See Figure 2 in Attachment 2. There may be efficiencies in this type of partnering and, as will be informed by the work of Drs. Raucher and Brown, there may be a point in time when recycled water is more abundant and reliable than surface water. Below are the details of the three alternatives being considered in the MCGB.

Indirect-potable Alternatives/Groundwater Injection MCGB (Attachment 2 Figure 2)

- 2.A: Injection at well sites SC2, SC4, and/or HB5 and extraction at Beltz Wells #8, 9, 10 and 12 (No ASR and injection limited by expansion capacity at Chanticleer)
- 2.B: Injection at well sites J, D, F, B and extraction at Beltz Wells #8, 9, 10 and (No ASR; limited by expansion capacity at Chanticleer)
- 2.C: Injection at well sites SC2, SC4, and/or HB5 and extraction at Beltz Wellfield ASR extraction wells (with ASR and injection limited by basin capacity and ASR operations)

Similarly, Figure 3 of Attachment 2 shows preliminary concepts for indirect potable alternatives/groundwater injection in the SMGB.

Next Steps: 1) The Kennedy Jenks team is working with the ASR team to develop a series of groundwater modeling scenarios that will further the understanding of using injection wells for recycled water as opposed to surface water. 2) The Commission had requested staff to present work to the Water Commission following Task 3.1 Develop and Evaluate Phase 2 Alternative. Due to some scheduling issues with the Commission and consultants, this is being deferred until a future meeting, (likely August or October). See below for work on the Water Supply Augmentation Implementation Plan.

Contract Update(s):

Consultant: Kennedy Jenks, Recycled Water Feasibility Study – Phase 2

- Contract Signed: December 20, 2019
- Project Partners: City Public Works

- Engaged Stakeholders: Scotts Valley Water District, Soquel Creek Water District, County of Santa Cruz
- Original Contract Amount: $260,000
- Contract Amendment No. 1: $496,205
- Amount Spent: $50,198
- Amount Remaining: $706,205
- Schedule: RWFS December 2020; Water Supply Augmentation Implementation Plan August 2021

OTHER

The projects and programs reported below were not specifically identified in the WSAC work plan but are related in various ways. Staff is in the process of organizing this quarterly report in a manner that clearly describes the relationship, or nexus, between these items with those above. This is a work in progress and the format of this quarterly report will continue to evolve.

Development of Water Supply Augmentation Implementation Plan
When last reported, this work was planned to be performed under a contract with Corona Environmental Consulting team. Dr. Raucher has since left this firm and the contract is now structured as two sub-consultant contracts, one with Raucher, LLC and the other with Hydrosystems Group at the University of Massachusetts.

City Council approved this contract amendment in May 2020. Staff is currently working with Drs. Raucher and Brown to kick off the climate change work. Their start date was delayed by approximately two months to accommodate the submission of a grant application with the US Bureau of Reclamation through the WaterSMART Drought Response Program.

Source Water Monitoring
No new update.

Santa Cruz Water Rights Project
This project involves the modification of existing City water rights to increase the flexibility of the water system by improving the City's ability to utilize surface water within existing allocations. In addition to improved flexibility, the success of this project is necessary to facilitate future water supply projects.

Work is continuing on the development of the Draft Environmental Impact Report (EIR), with current work still focusing on refining the scope and extent of the project and associated impact modeling. An update presentation to the Water Commission is planned for October 2020.

Revised change petitions reflecting the updated project description and other requested information are expected to be completed and submitted to State Water Resources Control Board in July. The Draft EIR is expected to be circulated for public review in fall 2020, and the Final EIR is expected to be completed in spring 2021.

Outreach and Communication
Outreach during this quarter has included the following:

- Monthly email newsletters to WSAC email list.
- Water Supply Advisory Committee Recommendations Annual Report, year 4

FISCAL IMPACT: None.

PROPOSED MOTION: Receive information on the Water Supply Augmentation Strategy, Quarterly Work Plan Update.

ATTACHMENT(S):
1. ASR Groundwater Model Scenario Summary
2. Preliminary Concepts for Non-Potable and Indirect Potable Reuse Projects

Groundwater Modeling Scenario Summary

Scenario No.	Assumed City Demands	Climatic Period	Project Type	GW Basin	Infrastructural Capacity (mgd)		Number of Wells		Project Description / Comments
					Inj	Ext	Inj	Ext	
1.0	WSAC Developed	1985 - 2015 (historical)	In-Lieu Only	SMGB	NA	2.0	NA	2	Recharge flows maximized for ea basin based on the In-Lieu demands of each District (i.e., essentially simulates ea basin being utilized in isolation, not conjunctively).
				MCGB	NA	2.0	NA	2	
				Combined	NA	4.0	NA	4	
2.0			ASR Only	SMGB	2.75	2.0	9	9	Recharge and recovery flows split 50/50 between basins.
				MCGB	2.75	2.0	6	6	
				Combined	5.5	4.0	15	15	
3.0			In-Lieu plus ASR	SMGB	1.0	2.0	3	3	Recharge and recovery flows split 50/50 between basins.
				MCGB	0.5	2.0	2	2	
				Combined	1.5	4.0	5	5	
4.0		1973 - 1984 (historical)	In-Lieu Only	SMGB	NA	1.9	NA	2	Recharge and recovery flows apportioned to ea basin proportionally based on relative District demands.
				MCGB	NA	2.1	NA	2	
				Combined	NA	4.0	NA	4	
5.0			ASR Only	SMGB	2.75	2.0	9	9	Recharge and recovery flows split 50/50 between basins.
				MCGB	2.75	2.0	6	6	
				Combined	5.5	4.0	15	15	
6.0			In-Lieu plus ASR	SMGB	0.75	1.89	3	3	In-Lieu recharge and recovery flows apportioned to ea basin proportionally based on relative District demands. ASR flows split 50/50
				MCGB	0.75	2.11	2	2	
				Combined	1.5	4.0	5	5	
7.0		2020 - 2070 (GFDL2.1 A2 Climate Change scenario)	In-Lieu Only	SMGB	NA	1.9	NA	2	Recharge and recovery flows apportioned to ea basin proportionally based on relative District demands.
				MCGB	NA	2.1	NA	2	
				Combined	NA	4.0	NA	4	
8.0			ASR Only	SMGB	3.0	3.0	9	9	Recharge and recovery flows split 50/50 between basins.
				MCGB	3.0	3.0	6	6	
				Combined	6.0	6.0	15	15	
8.1				*MCGB*	*3.0*	*3.0*	*6*	*6*	*Combo run of Scenario 8.0 w/PWS*
8.2					*3.0*	*4.1*	*7*	*7*	*Beltz wellfield only. Combination of converted existing 4 wells and 3 new wells.*
8.3					*3.0*	*4.1*	*7*	*7*	*Combo run of Scenario 8.2 w/PWS*
9.0			In-Lieu plus ASR	SMGB	1.0	3.1	3	3	In-Lieu recharge and recovery flows apportioned to ea basin proportionally based on relative District demands. ASR flows split 50/50.
				MCGB	1.0	3.4	3	3	
				Combined	2.0	6.5	6	6	
10.0	'16 - '18 Demands Projection	2020 - 2070 (Catalog Climate Change scenario)	ASR Only	MCGB	1.5	2.5	4	4	Existing Beltz wells only, converted to ASR.
10.1					1.0	1.5	4	4	*Reduced per-well injection/extraction capacities based on results of Scenario 10.0.*
10.2					1.0	1.5	4	4	*Combo run of Scenario 10.1 w/PWS*
11.0		2020 - 2070 (GFDL2.1 A2 Climate Change scenario)			0.0	0.0	0	0	Revised Baseline No-Project scenario (updated Beltz pumping)
11.1					2.0	3.0	7	7	Existing Beltz wells converted to ASR + 3 new ASR wells
11.2					2.0	3.0	8	8	Existing Beltz wells converted to ASR + 4 new ASR wells
11.3					2.0	3.0	8	8	ASR Scenario 11.2 combo with PWS

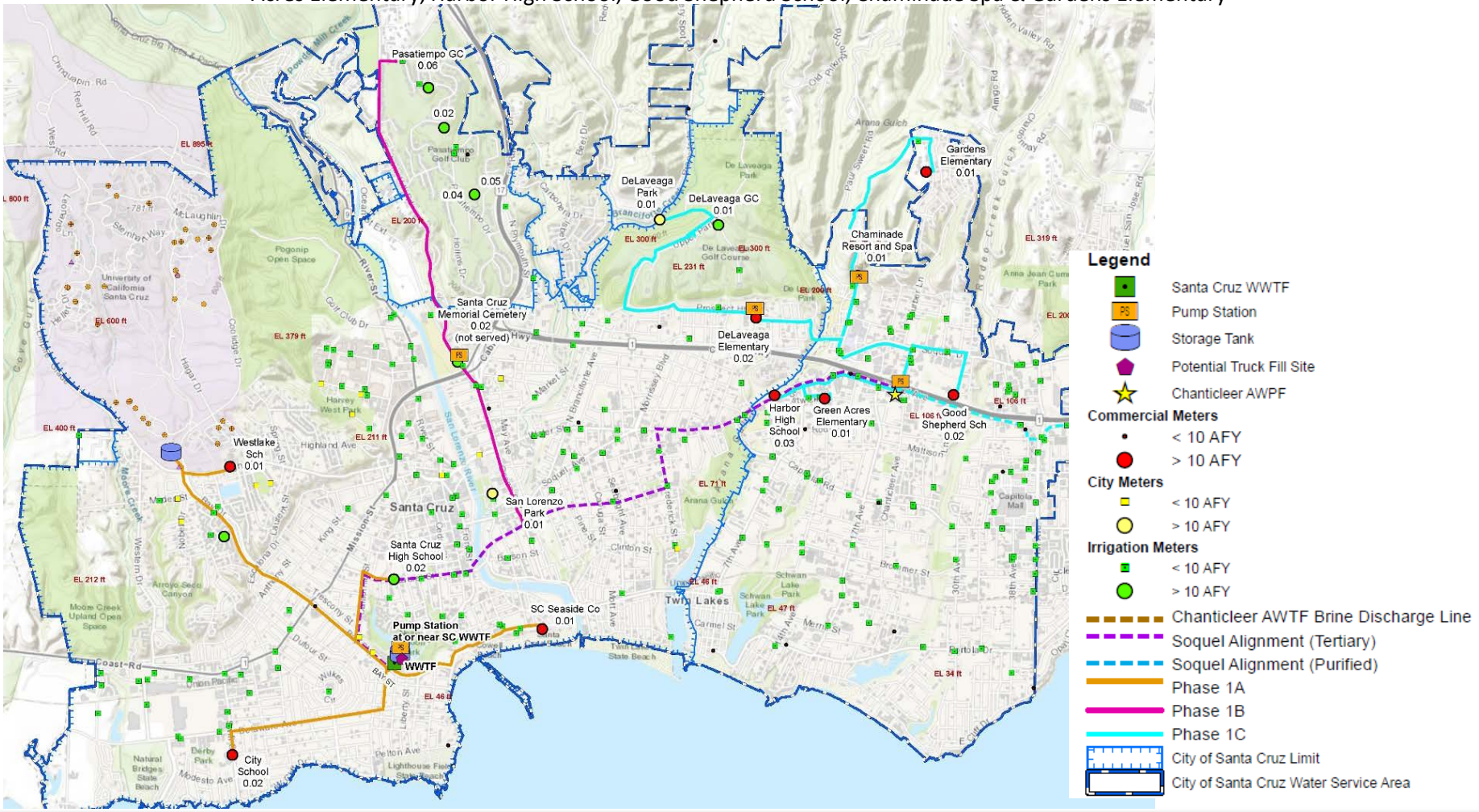
Notes:

1 - Cummulative Losses at end of scenario

Attachment 2, Figure 1: Preliminary Concept | Non-Potable Reuse/Irrigation

Potential Non Potable Reuse Customers (0.74 MGD ave annual demand)

Baseline (0.13 MGD)	Title 22 RW from SC WWTF to serve in Plant uses, La Barranca Park, Neary Park and Filling Station
Alt 1A (0.21 MGD)	Title 22 RW from SC WWTF to SC Seaside, City School, Sta Cruz High School & UCSC
Alt 1B (0.17 MGD)	Tertiary (non-Title 22) water from turnout from Pure Water Soquel Pipeline to Pasatiempo GC (satellite treatment)
Alt 1C (0.23 MGD)	Title 22 RW from Chanticleer Site to DeLaveaga GC, DeLaveaga Park and DeLaveaga Elementary, Green Acres Elementary, Harbor High School, Good Shepherd School, Chaminade Spa & Gardens Elementary



Attachment 2,

Figure 2: Preliminary Concept | Indirect Potable Reuse/IPR Mid-County Groundwater Basin

Indirect Potable Reuse (IPR) – City Led Groundwater Replenishment in Mid-County GW Basin

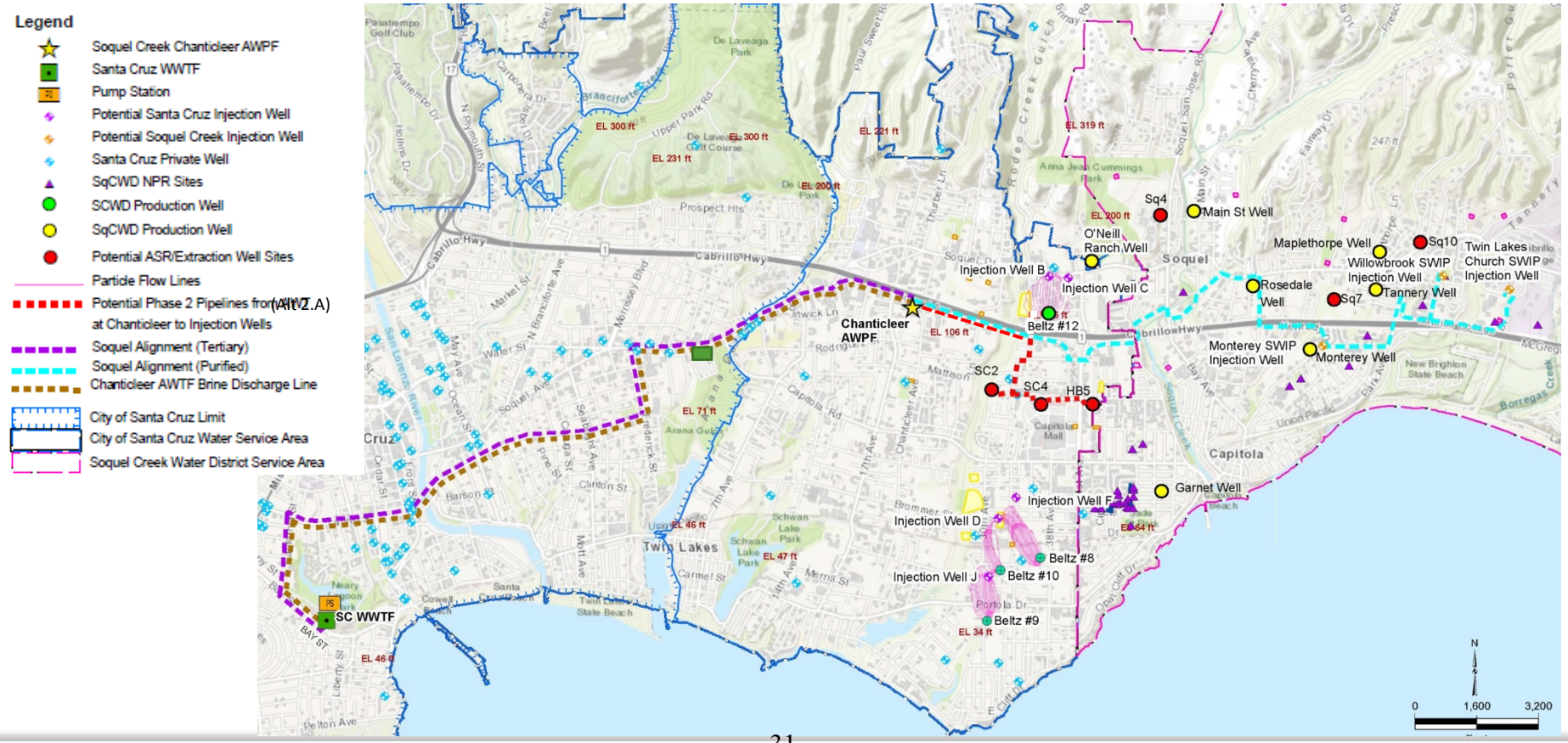
Expanded Purified Treatment at Chanticleer AWTF for injection at Beltz Wellfield. RWFPS Phase 1 estimated recharge potential in Beltz Wellfield to be 2.0 mgd. Average annual recharge to be updated based on PWS project, groundwater modeling and Aquifer Storage and Recovery (ASR) project findings.

Alternatives:

Alt 2.A IPR Injection at well sites SC2, SC4, and/or HB5 and extraction at Beltz Wells #8, 9, 10 and 12 (No ASR; limited by expansion capacity at Chanticleer)

Alt 2.B IPR Injection at well sites J, D, F, B and extraction at Beltz Wells #8, 9, 10 and (No ASR; limited by expansion capacity at Chanticleer)

Alt 2.C IPR Injection at well sites SC2, SC4, and/or HB5 and extraction at Beltz Wellfield ASR extraction wells (with ASR; limited by basin capacity and ASR operations)



Attachment 2,
Figure 3: Preliminary Concept | Indirect Potable Reuse/IPR Santa Margarita Groundwater Basin

Indirect Potable Reuse (IPR) – Regional Groundwater Replenishment Project in San Margarita GW Basin

Expanded Tertiary Treatment at Santa Cruz WWTF or Chanticleer AWTF for injection at El Pueblo Site and/or Hansen Quarry. RWFPS Phase 1 estimated recharge potential to be up to 3.2 mgd for SCWD and 0.5 mgd for SVWD. Average annual recharge to be updated based on PWS project, groundwater modeling and ASR project findings.

Alternatives:

Alt 3.A Tertiary water from Santa Cruz WWTF conveyed to new AWTP at El Pueblo with recharge nearby

Alt 3.B Purified water from AWTP Chanticleer Site conveyed to Scotts Valley (limited to 1,500 AFY)

Alt 3.C Tertiary water from Santa Cruz WWTF conveyed to new AWTP with recharge at Hansen Quarry