CITY OF SANTA CRUZ City Hall 809 Center Street Santa Cruz, California 95060



WATER COMMISSION

Regular Meeting

February 1, 2021

7:00 P.M. GENERAL BUSINESS AND MATTERS OF PUBLIC INTEREST, COUNCIL CHAMBERS

<u>COVID-19 ANNOUNCEMENT</u>: This meeting will be held via teleconference <u>ONLY</u>.

In order to minimize exposure to COVID-19 and to comply with the social distancing suggestion, <u>the Council Chambers will not be open to the public</u>. The meeting may be viewed remotely, using the following sources:

City Website: https://ecm.cityofsantacruz.com/OnBaseAgendaOnline/Meetings/Search?dropid=4&mtids=124

Zoom Live: https://zoom.us/j/92633869666

Facebook Live: https://www.facebook.com/SantaCruzWaterDepartment/?epa=SEARCH_BOX

PUBLIC COMMENT:

If you wish to comment during on items 1-7 during the meeting, please see information below:

- Call any of the numbers below. If one number is busy, try the next one. Keep trying until connected.
 - +1 669 900 9128 +1 253 215 8782 +1 346 248 7799 +1 646 558 8656
 - +1 301 715 8592
 - +1 312 626 6799
- Enter the meeting ID number: 926 3386 9666
- When prompted for a Participant ID, press #.
- Press *9 on your phone to "raise your hand" when the Chair calls for public comment.
 - It will be your turn to speak when the Chair unmutes you. You will hear an announcement that you have been unmuted. The timer will then be set to three minutes.
 - $_{\odot}$ You may hang up once you have commented on your item of interest.
 - \circ If you wish to speak on another item, two things may occur:
 - 1) If the number of callers waiting exceeds capacity, you will be disconnected and you will need to call back closer to when the item you wish to comment on will be heard, or
 - 2) You will be placed back in the queue and you should press *9 to "raise your hand" when you wish to comment on a new item.

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<u>NOTE</u>: If you wish to view or listen to the meeting and don't wish to comment on an item, you can do so at any time via the Facebook link or over the phone via Zoom.

The City of Santa Cruz does not discriminate against persons with disabilities. Out of consideration for people with chemical sensitivities, please attend the meeting fragrance free. Upon request, the agenda can be provided in a format to accommodate special needs. Additionally, if you wish to attend this public meeting and will require assistance such as an interpreter for American Sign Language, Spanish, or other special equipment, please call Water Administration at 831-420-5200 at least five days in advance so that arrangements can be made. The Cal-Relay system number: 1-800-735-2922.

<u>APPEALS</u>: Any person who believes that a final action of this advisory body has been taken in error may appeal that decision to the City Council. Appeals must be in writing, setting forth the nature of the action and the basis upon which the action is considered to be in error, and addressed to the City Council in care of the <u>City Clerk</u>.

Other - Appeals must be received by the City Clerk within ten (10) calendar days following the date of the action from which such appeal is being taken. An appeal must be accompanied by a fifty dollar (\$50) filing fee.

Call to Order

Roll Call

Election of Officers

1. <u>Election of Water Commission Officers for 2021 (Pages 1.1 - 1.3)</u>

The Water Commission elects a Chair and Vice-Chair for 2021.

Statements of Disqualification - Section 607 of the City Charter states that ...All members present at any meeting must vote unless disqualified, in which case the disqualification shall be publicly declared and a record thereof made. The City of Santa Cruz has adopted a Conflict of Interest Code, and Section 8 of that Code states that no person shall make or participate in a governmental decision which he or she knows or has reason to know will have a reasonably foreseeable material financial effect distinguishable from its effect on the public generally.

Oral Communications

Announcements

Consent Agenda (Pages 2.1 - 3.5) Items on the consent agenda are considered to be routine in nature and will be acted upon in one motion. Specific items may be removed by members of the advisory body or public for separate consideration and discussion. Routine items that will be found on the consent agenda are City Council Items Affecting Water, Water Commission Minutes, Information Items, Documents for Future Meetings, and Items initiated by members for Future Agendas. If one of these categories is not listed on the Consent Agenda then those items are not available for action.

2. <u>City Council Actions Affecting the Water Department (Page 2.1)</u>

Accept the City Council actions affecting the Water Department.

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3. Water Commission Minutes from January 4, 2021 (Pages 3.1 - 3.5)

Approve the January 4, 2021 Water Commission Minutes.

Items Removed from the Consent Agenda

General Business (Pages 4.1 - 7.19) Any document related to an agenda item for the General Business of this meeting distributed to the Water Commission less than 72 hours before this meeting is available for inspection at the Water Administration Office, 212 Locust Street, Suite A, Santa Cruz, California. These documents will also be available for review at the Water Commission meeting with the display copy at the rear of the Council Chambers.

4. <u>Summer Water Supply Forecast - First Look (Page 4.1)</u>

Accept an informational presentation on the first look at the water supply situation for the 2021 peak demand season and provide feedback to staff.

5. <u>Preliminary Long-Term Water Demand Forecast Update (Pages 5.1 - 5.53)</u>

Accept a presentation on an updated preliminary long-term water demand forecast and provide feedback to staff.

6. <u>Presentation of 2021 Capital Investment Projects (CIP) (Pages 6.1 - 6.26)</u>

Accept a presentation and information on 2021 CIP projects.

7. <u>Recommendations from the Water Commission Ad Hoc Committee on Future</u> Revenue Requirements for Use in Developing Water Rates (Pages 7.1 - 7.19)

Accept a presentation summarizing the work of the Water Commission's Revenue Forecasting Ad Hoc Subcommittee and approve the Subcommittee's recommendation on the revenue requirements to be used in developing customer water rates for the July 1, 2023 to June 30, 2028 period.

Subcommittee/Advisory Body Oral Reports - No action shall be taken on this item.

- 8. <u>Santa Cruz Mid-County Groundwater Agency</u>
- 9. <u>Santa Margarita Groundwater Agency</u>

Director's Oral Report - No action shall be taken on this item.

Information Items

February 1, 2021 - WT Commission **Adjournment**



WATER COMMISSION INFORMATION REPORT

DATE: 1/27/2021

AGENDA OF:	February 1, 2021
TO:	Water Commission
FROM:	Rosemary Menard, Water Director
SUBJECT:	Election of Water Commission Officers for 2021

RECOMMENDATION: The Water Commission elects a Chair and Vice-chair for 2021.

BACKGROUND: Water Commission Bylaws, Article VI – Officers and Elections provided for review.

PROPOSED MOTION: Motion to elect a Chair and Vice-chair for 2021.

ATTACHMENTS: Water Commission Bylaws, Article VI - Officers and Elections.

ARTICLE VI – OFFICERS AND ELECTIONS

Section 1. Officers

Officers of the Advisory Body shall consist of a Chair and Vice Chair.

Section 2. Election of Officers

As soon as is practicable following the first day of February of every year, there shall be elected from among the membership of the Advisory Body a Chair and Vice Chair.

Section 3. Term of Office

The term of office for the Chair and Vice Chair is one calendar year. Officers may not serve in the same position for more than two consecutive years.

Section 4. Nominations

The Chair will open the floor to nominations. Any member may nominate a candidate from the membership for the position of Chair or Vice Chair; nominations need not be seconded.

A member may withdraw his/her name if placed in nomination, announcing that, if elected, s/he would not be able to serve; but s/he shall not withdraw in favor of another member.

Once the nominations are complete, the Chair will ask for a motion to close the nominations; a second of, and vote on, the motion is required.

The Chair then declares that it has been moved and seconded that the nominations be closed, and the members proceed to the election.

Section 5. Voting

Voting may be by voice vote or by roll call vote.

The candidate who receives a majority of the votes is then declared to be legally elected to fill the office of Chair, and will immediately chair the remainder of the meeting.

The same procedure is followed for the election of Vice Chair.

Section 6. Vacancy of an Officer

Should a vacancy occur, for any reason, in the office of Chair or Vice Chair prior to the next annual election, a special election shall be held to fill the vacant office from among the membership. That member shall serve until a new appointment has been made.

Section 7. Removal of Elected Officers

The Chair or Vice Chair may be removed by a majority vote of the full Advisory Body at a regularly scheduled meeting of the Advisory Body, when all appointed members are present, or at a special meeting convened for that purpose at which a quorum is present. Any officer removed ceases to hold the office once the vote has been tallied and announced. If the Chair is removed, the Vice Chair shall become the new Chair. An election for the Vice Chair shall then be agendized for the next meeting.

Section 8. Duties of the Chair

The Chair shall preside at all regular meetings and may call special meetings. The Chair shall decide upon all points of order and procedure during the meeting; his/her decision shall be final unless overruled by a vote of the Advisory Body, in compliance with Article IX, Section 2, "General Conduct of Meetings." The Chair may not make motions, but may second motions on the floor. The Chair acts as primary contact for staff and shall represent the Advisory Body before City Council whenever the Advisory Body or Council considers it necessary unless another member(s) is (are) appointed by the Advisory Body. The Chair and staff shall jointly set the meeting agenda.

Section 9. Duties of the Vice Chair

The Vice Chair shall assume all duties of the Chair in the absence or disability of the Chair.

Section 10. Duties of the Acting Chair

In case of absence of both the Chair and the Vice Chair from any meeting, an Acting Chair shall be elected from among the members present, to serve only during the absence of the Chair and Vice Chair.

ARTICLE VII – STAFF SUPPORT

Section 1. Staff

Staff support and assistance is provided, but advisory bodies do not have supervisory authority over City employees. While they may work closely with advisory bodies, staff members remain responsible to their immediate supervisors and ultimately to the City Manager and Council.

The Director of the Water Department shall designate appropriate staff to act as staff person(s) to assist and support the Advisory Body. Staff shall attend all regular and special Advisory Body meetings. Staff shall be responsible for coordination of such reports, studies, and recommendations as are necessary to assist the Advisory Body in the conduct of its business according to City Council policy and the Brown Act. Staff may enlist the assistance of other departments as required. Staff shall be responsible for all public notification regarding all regular and special Advisory Body meetings.

Staff shall record the minutes of the meetings in accordance with these bylaws. t Staff shall supervise volunteers and interns, shall work closely with the Chair between meetings, shall make recommendations, prepare reports and proposals to the Advisory Body, may represent the Advisory Body at other meetings, presentations, and other public functions as requested, and shall perform administrative tasks.

Staff shall be responsible for the maintenance of proper records and files pertaining to Advisory Body business. Staff shall receive and record all exhibits, petitions, documents, or other materials presented to the Advisory Body in support of, or in opposition to, any question before the Advisory Body. Staff shall sign all notices prepared in connection with Advisory Body business, shall attest to all records of actions, transmittals, and referrals as may be necessary or required by law, and shall be responsible for compliance with all Brown Act postings and noticing requirements.



WATER COMMISSION INFORMATION REPORT

DATE: 1/27/2021

AGENDA OF:	February 1, 2021
TO:	Water Commission
FROM:	Rosemary Menard, Water Director
SUBJECT:	City Council Actions Affecting the Water Department

RECOMMENDATION: That the Water Commission accept the City Council actions affecting the Water Department.

BACKGROUND/DISCUSSION:

January 12, 2021

No items to report.

January 26, 2021

Water Commission (One (1) Possible Reappointment or Appointment, and One (1) Appointment, both with Term Expirations of 1/1/25) (CC)

Motion carried to appoint one County elector and reappoint and/or appoint one City elector as Water Commissioners.

PROPOSED MOTION: Motion to accept the City Council actions affecting the Water Department.

ATTACHMENTS: None.



Water Commission 7:00 p.m. – January 4, 2021 Council Chambers/Zoom Teleconference 809 Center Street, Santa Cruz

Water Department

Summary of a Water Commission Meeting

Call to Order: 7:00 PM

Roll Call

Present:D. Engfer (Chair) (via Zoom), S. Ryan (Vice-Chair) (via Zoom), J. Mekis (via
Zoom), A. Páramo (via Zoom), D. Schwarm (via Zoom), W. Wadlow (via Zoom),
L. Wilshusen (via Zoom)

Absent: None

Staff:R. Menard, Water Director (via Zoom); D. Baum, Water Chief Financial Officer
(via Zoom); C. Coburn, Deputy Director/Operations Manager (via Zoom); N.
Christen, Water Conservation Representative (via Zoom); H. Luckenbach, Deputy
Director/Engineering Manager (via Zoom); B. Pink, Environmental Programs
Analyst II (via Zoom); K. Fitzgerald, Administrative Assistant III (via Zoom)

Others: One member of the public (via Zoom)

Presentation: Mayor Donna Meyers presented a proclamation to honor the public service of Commissioner Linda Wilshusen. Commissioners, Water Department staff, and a member of the public provided compliments to Commissioner Wilshusen for her work

Statements of Disqualification: None.

Oral Communications: One member of the public spoke.

Announcements: None.

Consent Agenda

- 1. City Council Items Affecting the Water Department
- 2. Water Commission Minutes From December 7, 2020
- 3. Water Commission Meeting Schedule for 2021

4. 2021 Water Commission Work Plan

5. Quarterly Update on the Water Supply Augmentation Strategy (WSAS)

Commissioners suggested that the Quarterly Update on the WSAS report be reorganized so that updates on newer items are placed toward the beginning of the report and more effectively integrated into the report so that information on these important initiatives is given more emphasis.

One public comment was received.

Commissioner Wilshusen moved the Consent Agenda. Commissioner Ryan seconded.

VOICE VOTE:MOTION CARRIEDAYES:AllNOES:NoneABSTAIN:None

Items Pulled from the Consent Agenda - None

General Business

6. <u>2019 AWWA Water Audit, Assessment of Distribution System Water Losses and the Status of Non-Revenue Water Management Planning</u>

Ms. Menard introduced Mr. Neal Christen for the presentation and discussion of the 2019 Water Audit, Assessment of Distribution System Water Losses and the Status of Non-Revenue Water Management Planning.

What is the correlation between pressure reductions and real losses?

• There is a direct correlation between pressure reduction and reduction of volume of background leakage that affects total leakage. Reducing the pressure would help to lower the annual volume of real losses but the infrastructure to achieve this is costly in that the dominant gravity zone within our system would need to be modified into multiple subzones that are managed through the use of valves, pressure reducing valves and advanced telemetry infrastructure.

Why has the rate of real losses remained steady even though investments have been made to lower water losses?

• One of the key variables that influence the rate of real losses is the rate of main replacements. Although the Department's water main replacement program has consistently delivered between 1 and 3 miles of distribution pipeline replacement a year, system aging and other pipeline conditions result in a relatively steady state of leakage. Since the volume of real loss is valued at the cost of production (\$500/MG), the significant cost of main replacement for the sole purpose of reducing real losses makes it cost prohibitive as a proactive measure. Our Non-Revenue Water program to date has been focused on refining the estimates of the constituent components of our annual volumes of real losses (background, unreported and reported) to better inform the selection of intervention strategies when determined necessary.

How is the representative sample of meters selected?

• The sample is randomly generated from the list of active small meters (5/8"-1.5") within the service area.

How will the meters that are replaced as part of the meter replacement program affect the quality of the water loss data?

• On a qualitative level, once new meters are in place, we expect to see higher resolution data that is more accurate with the new meters. These meters will still need to be physically tested on a regular basis to assure that the data that they are generating is accurate, as is the standard procedure for any metering system.

How does the score of 66 on data validity compare to other water agencies?

• The City's score is within the level 3 data validity range which is average in comparison to other California utilities. This audit requirement is relatively new to California utilities but we are moving in the right direction. The challenge moving forward will be improving the efficacy of our existing data collection methods, which will lead us to higher data validity scores.

What does "volume from own sources" mean?

• The Volume from Own Sources is the treated water from the Department's own sources that is supplied to distribution. The volume from own sources is our primary source of water production within our annual production profile. The most heavily weighted audit input is complicated by the fact that our San Lorenzo River and Newell Creek production meters measure volumes of raw water that enter the GHWTP contrary to measuring an effluent volume of treated water. Additionally, our production meters are aging and installed in sub-optimal configurations that can lead to diviation in meter accuracy.

Through our annual Non-Revenue Water program, much work has been completed to refine both our reported volumes of water production and estimates of production meter accuracy.

No public comments were received.

7. Final Draft, Water Shortage Contingency Plan

Ms. Menard introduced Mr. Ben Pink for the presentation and discussion on the Final Draft of the Water Shortage Contingency Plan (WSCP).

Commissioners emphasized the importance of staff continuing to develop methods and messages to effectively communicate water shortage information to the public.

Have usage patterns changed since the previous base year period as seen in Figure 3 on page 7.14 of the agenda packet?

• While generally the current usage pattern for the Single Family Residential Class shown in Figure 3 is similar to what the usage pattern for this same class of customer would have looked like for the 2002 – 2004 timeframe, the overall volume (millions of gallons per month) is lower now and the proportion of total water used for outdoor water use is significantly lower now as well.

Are there concerns regarding the amount of work that staff will have to perform when computing reduction amounts for individual business accounts as described in this WSCP?

• This will be a more labor-intensive process but our Customer Service and IT staff are having discussions on how to automate the development of individual business allocations. It does appear that such an approach is feasible.

Why are the Stage 5 restrictions for the industrial category more stringent than the business category?

• The industrial category does not necessarily have significant water uses for the "health and safety" priority, so that results in larger cuts for this class than for the business class in the later stages of the plan.

How is water used in the industrial classification the same as or different from water used in the business classification?

• Historically, the industrial water use classification has been used when water is a significant part of the industrial process. However, staff acknowledged that sometimes these classifications get applied and don't get reviewed very often to confirm that the classification is correct. Staff will further research this group of customers and reclassify them to the business claffication if appropriate.

How is the City's wastewater facility and the County of Santa Cruz Lode Street facility classified?

• The wastewater facility is classified as municipal and there is a dedicated irrigation meter at the Lode Street facility but no other water use, as the facility is basically a pump station rather than a water treatment facility. Also, as a point of clarification, the wastewater treatment plant produces a quantity of non-potable water from its treatment process and uses it for its various process water needs rather than using potable water.

Why do multi-finally residential accounts with a mixed use meter receive one CCF more than if the account has a dedicated irrigation meter?

• The presence of a separate irrigation meter on a multi-family residential property means that that irrigation meter will receive a water allocation under rationing that is separate from the allocation being provided for domestic use. Providing a bit more water per dwelling unit to a multi-family residential property without a separate irrigation meter allows that property to do at least some irrigation of its premises.

What are the impacts that the substantial curtailments in the WSCP of even indoor water use on effluent flow to the WWTP, and the resulting impacts on Pure Water Soquel (PWS) now and on any future City Advanced Treated Water solutions?

• In Phase 1 of the Recycled Water Feasibility Planning Study we used the 2015 dry weather flow from the Wastewater Treatment Facility (WWTF) of 6.1mgd to avoid stranded assets resulting from a project built around larger flows. We are giving PWS about ½ this amount. There is potential to expand the plant to treat the full amount of dry weather flows and to treat flows outside of the dry season if necessary. Staff is also working with Soquel to develop a priority of use should future flows decline below an amount that serves PWS and the City's planned uses.

No public comments were received.

Commissioner Ryan moved the staff recommendation that the Water Commission approve the Final Draft of the 2020 Update to the Water Shortage Contingency Plan to the City Council on

an interim basis until the Urban Water Management Plan is ready and acknowledging that there may be some minor copy edits. Commissioner Schwarm seconded.

VOICE VOTE:MOTION CARRIEDAYES:AllNOES:NoneABSTAIN:None

Subcommittee/Advisory Body Oral Reports

8. Santa Cruz Mid-County Groundwater Agency (MGA)

Ms. Menard reported that there has not been a meeting since November 19th, 2020 and that the next meeting will be held on March 18th. Commissioner Ryan reported that the MGA has decided to not submit a grant application for an implementation project for the basin.

9. Santa Margarita Groundwater Agency (SMGWA)

Commissioner Engfer reported that the SMGWA met on December 9th for a workshop hosted by Georgina King that focused on establishing a problem statement.

10. Ad Hoc Financial Planning Committee

Commissioner Páramo reported that the committee met with Water Department staff on December 15th and the group discussed refinements of spending scenarios that were reviewed in previous. These refinements included smoothing spending hikes in certain years and deferring certain projects. There will be a final meeting in mid-January and the findings will be presented to the Water Commission for adoption in February.

Director's Oral Report: Ms. Menard provided an update on the source water quality monitoring data that has been collected since the first November rain event in the aftermath of the CZU Lightning Complex fire. This information is now available on the City's website at: https://www.cityofsantacruz.com/government/city-departments/water/water-quality/czu-fire-water-quality

Adjournment Meeting adjourned at 10:05 PM.



WATER COMMISSION INFORMATION REPORT

DATE: 1/28/2021

AGENDA OF:	February 1, 2021
TO:	Water Commission
FROM:	Rosemary Menard, Water Director
SUBJECT:	2020 Peak Demand Season Water Supply Forecast – First Look

RECOMMENDATION: That the Water Commission accept an informational presentation on the first look at the water supply situation for the 2021 peak demand season and provide feedback to staff.

BACKGROUND: In early February each year, Water Department staff take a "first look" at how water supply for the coming peak demand season is shaping up and present that analysis to the Water Commission. The February "first look" is followed by a "final look" in April or occasionally May. The final assessment includes any recommendation to the Water Commission to act upon that provide input to the City Council on declaring a water shortage and establishing the degree of restrictions to be implemented during that year's demand season.

DISCUSSION: As of January 25, 2021, annual precipitation for both the City of Santa Cruz and its watersheds is far below average for this time of year. That said, as noted in the January 25, 2021 article provided at: <u>https://weatherwest.com/archives/8044</u>, it appears that circumstances related to local precipitation are about to change, and perhaps dramatically so.

In light of these circumstances, I directed Department staff to defer final preparation of the analytical work typically prepared for and presented to the Water Commission in early February until the last possible minute.

The presentation planned for the February 1, 2021 Water Commission meeting will be developed later this week and early next week and will be posted online ahead of the meeting and will provide the most up-to-date first look at our peak demand season supply situation.

FISCAL IMPACT: None.

PROPOSED MOTION: Motion to accept an informational presentation on the first look at the water supply situation for the 2021 peak demand season and provide feedback to staff.



WATER COMMISSION INFORMATION REPORT

DATE: 1/27/2021

AGENDA OF:	February 1, 2021
TO:	Water Commission
FROM:	Sarah Easley Perez, Principal Planner
SUBJECT:	Preliminary Long-Term Water Demand Forecast Update

RECOMMENDATION: That the Water Commission accept a presentation on an updated preliminary long-term water demand forecast and provide feedback to staff.

BACKGROUND: In 2014, the Water Department contracted with M.Cubed to prepare a water demand forecast for its water service area. The final product was an econometric analysis of water demand and a forecast of water demand for total system production through 2035. Such an approach allowed the forecast to reflect then current information on water usage and to account for the effects of water rates, conservation, and other factors expected to impact future water demand. To do this, the demand forecast incorporated empirical relationships based on historical data between water use and key variables such as season, weather, water rates, household income, employment, conservation, and drought restrictions.

Since its development, this work has been utilized to support various aspects of Water Department planning, including the work of the Water Supply Advisory Committee, the 2015 Urban Water Management Plan, 2017 Water Conservation Master Plan, as well as on-going operational modeling used for planning and design purposes.

In 2019 staff noted that water demand had not recovered from levels seen during the 2014-2015 water restrictions and asked M.Cubed to complete a comparative analysis of projected and actual demand.

The evaluation found that the changes to the rate structure and differences between the number of actual versus projected new water services related to development accounted for the majority of the divergence between projected and actual water demand. Based on this analysis, it was concluded that the original forecast model's underlying structure appeared to be sound, and the model was appropriate to continue to be used for Water Department demand forecasting.

DISCUSSION: To support ongoing Water Department planning, including development of the 2020 Urban Water Management Plan, M.Cubed has now completed a preliminary update to the

long-range water demand forecast based on best available current information and projecting demand through 2045. In 2020, total production was 2,446 MG. This is projected to increase to 2,720 MG by 2045.

In comparison to the previous projection, the updated projection for the year 2035 is 23 percent lower than in the forecast used in the 2015 Urban Water Management Plan: 2,647 MG versus 3,442 MG. The primary causes for the difference are:

- Significant increases in marginal water cost occurring between 2015 and 2020 and projected continuation of these increases from 2020 to 2031.
- Slower projected growth in service area population and occupied housing units.
- Slower projected growth in irrigation services.
- Lower projected UCSC build-out water demand.

A review of available information will be completed in spring 2021 to determine if the preliminary update to the demand forecast needs to be updated prior to finalization. Information that may be updated includes rate structure, conservation and demand management approach, and/or other updated information.

FISCAL IMPACT: None.

PROPOSED MOTION: Motion to accept a presentation on an updated preliminary long-term water demand forecast and provide feedback to staff.

ATTACHMENTS:

- 1. M.Cubed January 26, 2021 Technical Memorandum: Update of the City of Santa Cruz Long-Range Water Demand Forecast
- 2. Presentation City of Santa Cruz Draft Updated Long-Range Water Demand Forecast



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DRAFT Technical Memorandum

Date:	January 26, 2021
Prepared For:	Rosemary Menard (City of Santa Cruz Water Department)
Prepared By:	David Mitchell (M.Cubed)
Subject:	DRAFT Update of the City of Santa Cruz's Long-Range Water Demand Forecast

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Background

In 2014, the City of Santa Cruz Water Department (hereinafter Water Department) contracted with M.Cubed to prepare a water demand forecast for the Water Department's water service area in connection with other work being done for the Water Supply Advisory Committee. The final product was an econometric analysis of water demand and a forecast of water demand, broken down by customer class, and for total system production through 2035 (M.Cubed, 2015). This forecast was incorporated into the City of Santa Cruz's 2015 Urban Water Management Plan (UWMP). Maddaus Water Management updated the forecast in 2017 with new information on expected water savings from plumbing codes (Maddaus Water Management, 2017). Under normal weather and economic conditions, system water demand was forecast to range between 3.2 and 3.3 billion gallons per year over the 2035 planning horizon. This is the level of water demand the Water Department has been using in its operations modeling and water supply reliability studies.

In 2016, the Water Department completed a Long-Range Financial Plan and implemented several significant changes to its water rates and rate structure outlined in a Comprehensive Cost of Service Water Rate Study (Raftelis 2016). This study conservatively estimated that water sales would be at least 2.5 billion gallons per year.

Water use was rationed by the City of Santa Cruz in 2014 and 2015 due to severe drought conditions. In the years following the end of rationing, water sales have remained low, ranging between 2.3 and 2.4 billion gallons per years, somewhat below the level used in the cost of service study and significantly below the long-term projections.

In 2019, M.Cubed completed a comparative analysis of projected and actual water demand (M.Cubed 2019).¹ This study found that the divergence between predicted and actual water sales coincided with changes to the Water Department's water rate structure adopted in 2016. These changes resulted in marginal water cost increases greatly exceeding the rate increases assumed in the demand forecast. Most of the forecast error is explained by these increases. Differences between actual and projected water services also played a role. Together, these two factors explain 85% of the forecast error for 2018, with the increase in marginal water costs accounting for most of the difference. Weather was not found to be a significant explanatory factor, nor were differences in actual and projected water sales to large customers (UCSC and two golf courses).

Adjusting M.Cubed's original forecast for higher marginal water costs and lower service counts eliminated nearly all of the 2018 forecast error and actual water sales fell within the confidence bounds of the forecast. In light of this, it was concluded that the original forecast model's underlying structure appeared to be sound and it was decided that re-estimation of the weather normalization parameters and price and income demand elasticities developed in 2015 would not be necessary.

¹ This analysis is included with this memorandum as Attachment A.

In 2020, the Water Department contracted with M.Cubed to update the long-range water demand forecast. The scope of work for this update specifies completion of the following tasks:

- 1. Update service area population, land use, and housing projections consistent with local planning documents and AMBAG projections.
- 2. Using customer-level billing data, update the baseline estimates of average water use per service connection by customer class.
- 3. Apply adjustments to the baseline average use estimates to account for the effects of plumbing codes, conservation programs, and marginal water service costs on average water use over the course of the forecast.
- 4. Adjust the projections of future UCSC water demands to be consistent with the university's Long-Range Development Plan (University of California, Santa Cruz 2021).
- 5. Account for effects of the covid-19 pandemic on current and future water use.
- 6. Prepare a technical memorandum documenting the data and procedures used to update the demand forecast and provide side-by-side comparisons of the original and updated forecasts. Prepare an Excel workbook containing the datasets and calculations used to update the water demand forecast.

This Technical Memorandum constitutes the completion of the draft demand forecast. The draft forecast will be finalized in the spring and incorporated into the City of Santa Cruz's 2020 UWMP. The remainder of the memorandum is organized as follows. In the next section, the population, housing, and service growth projections are presented and compared to the 2015 forecast. Next, the baseline average water use estimates and adjustments are presented. The updated average use forecast is then compared to the 2015 forecast. Lastly, the housing and service growth forecasts are combined with the average use forecasts and the UCSC water use forecast to produce the water demand forecast, which is then compared to the 2015 forecast.

Population and Housing Projections

The projection of service area population and housing units is based on AMBAG's 2022 Regional Growth Forecast (hereinafter AMBAG 2022 RGF; AMBAG 2020). The following key assumptions and procedures are used to construct these projections:

- The population and housing unit projections for the Inside-City portion of the service area are taken directly from the AMBAG 2022 RGF. This includes population living within the City of Santa Cruz as well as population housed on the UCSC campus.
- The population and housing unit projections for the Outside-City portion of the service area are based on the AMBAG 2022 RGF projections for the City of Capitola and unincorporated portions of Santa Cruz County.

- Population and housing units in the City of Capitola that will be served by the Water Department are estimated as follows:
 - City of Capitola population and housing served by the Water Department in 2015 are taken from the City of Santa Cruz's 2015 Urban Water Management Plan (City of Santa Cruz 2016).
 - These are increased by the population and housing growth projected in the AMBAG 2022 RGF. Future growth in Capitola population and housing is expected to be driven primarily by the Capitola Mall Redevelopment, which would be served by the Water Department.²
- Population and housing units in unincorporated Santa Cruz County that will be served by the Water Department are estimated as follows:
 - Unincorporated county population and housing served by the Water Department in 2015 are taken from the City of Santa Cruz's 2015 Urban Water Management Plan (City of Santa Cruz 2016).
 - These are increased by the projected rates of growth of unincorporated county population and housing units in the AMBAG 2022 RGF.

It should be noted that the method used to project population and housing units for the Outside-City portion of the service area differs from how these estimates have been developed for previous forecasts. In previous forecasts, Outside-City population and housing units were based on an allocation of Traffic Analysis Zone (TAZ) population and housing units falling within the Outside-City service boundaries. However, the AMBAG 2022 RGF TAZ projections are not available yet and therefore an alternative approach was necessary.

Tables 1 and 2 summarize the population and housing unit projections based on the AMBAG 2022 RGF.

Tables 3 and 4 compare these projections to the 2015 UWMP projections. Note that the 2015 UWMP projections extend only to 2035. The updated service area population and occupied housing unit projections for 2035 are, respectively, 1.5% and 8.2% lower than the projections in the 2015 UWMP. The significantly lower occupied housing unit projection is due to (1) lower overall projected population, (2) higher average household size in the Outside-City portion of the service area, and (3) significantly more UCSC student body housed on campus than was assumed in the 2015 UWMP.

² Personal communication with Katie Herlihy, City of Capitola, January 13, 2021.

Table 1. Water Department Service Area Population Projection

Inside-City Service Area Population

	Population			
Year	Household	UCSC	Group Quarters	Total
2015	53,432	9,034	1,757	64,223
2020	53,299	9,750	1,375	64,424
2025	55,335	11,650	1,860	68,845
2030	56,552	13,750	1,916	72,218
2035	57,374	15,950	1,933	75,257
2040	58,192	18,650	1,986	78,828
2045	58,877	18,650	2,007	79,534

Outside-City Service Area Population

Year	Household	UCSC	Group Quarters	Total
2015	34,007	0	470	34,477
2020	33,657	0	467	34,124
2025	34,367	0	472	34,840
2030	34,783	0	477	35,259
2035	34,933	0	477	35,411
2040	35,038	0	478	35,515
2045	35,130	0	478	35,607

Total Service Area Population

	Population			
Year	Household	UCSC	Group Quarters	Total
2015	87,439	9,034	2,227	98,700
2020	86,956	9,750	1,842	98,548
2025	89,702	11,650	2,332	103,685
2030	91,335	13,750	2,393	107,477
2035	92,307	15,950	2,410	110,668
2040	93,230	18,650	2,464	114,343
2045	94,007	18,650	2,485	115,141

Table 2. Water Department Service Area Housing Unit Projection

Inside-City Service Area Housing Units

	Housing Units			
Year	Occupied	Vacant	Total	Avg PPH
2015	22,039	1,496	23,535	2.42
2020	22,608	1,346	23,954	2.36
2025	23,552	1,436	24,988	2.35
2030	24,084	1,494	25,578	2.35
2035	24,422	1,552	25,974	2.35
2040	24,706	1,589	26,295	2.36
2045	24,923	1,602	26,525	2.36

Outside-City Service Area Housing Units

	Housing Units			
Year	Occupied	Vacant	Total	Avg PPH
2015	13,136	1,560	14,696	2.59
2020	13,372	1,425	14,797	2.52
2025	13,688	1,630	15,318	2.51
2030	13,880	1,716	15,595	2.51
2035	13,946	1,774	15,720	2.50
2040	13,989	1,784	15,773	2.50
2045	14,027	1,774	15,801	2.50

Total Service Area Housing Units

	Housing Units			
Year	Occupied	Vacant	Total	Avg PPH
2015	35,175	3,056	38,231	2.49
2020	35,980	2,771	38,751	2.42
2025	37,240	3,066	40,306	2.41
2030	37,964	3,210	41,173	2.41
2035	38,368	3,326	41,694	2.41
2040	38,695	3,373	42,068	2.41
2045	38,950	3,376	42,326	2.41

PPH = Persons Per Household

Table 3. Water Department Service Area Population Projection Comparison

Year	Current	2015 UWMP	% Diff
2014/2015	64,223	63,789	0.7%
2020	64,424	66,860	-3.6%
2025	68,845	70,058	-1.7%
2030	72,218	73,375	-1.6%
2035	75,257	76,692	-1.9%
2040	78,828		
2045	79,534		

Inside-City Service Area Population

Outside-City Service Area Population

Year	Current	2015 UWMP	% Diff
2014/2015	34,477	31,462	9.6%
2020	34,124	32,543	4.9%
2025	34,840	33,562	3.8%
2030	35,259	34,614	1.9%
2035	35,411	35,698	-0.8%
2040	35,515		
2045	35,607		

Total Service Area Population

Year	Current	2015 UWMP	% Diff
2014/2015	98,700	95,251	3.6%
2020	98,548	99 <i>,</i> 403	-0.9%
2025	103,685	103,620	0.1%
2030	107,477	107,989	-0.5%
2035	110,668	112,390	-1.5%
2040	114,343		
2045	115,141		

Note: 2015 UWMP reported population in 2014 rather than 2015.

Table 4. Water Department Service Area Occupied Housing Unit Projection Comparison

Year	Current	2015 UWMP	% Diff
2014/2015	22,039	21,829	1.0%
2020	22,608	23,492	-3.8%
2025	23,552	24,177	-2.6%
2030	24,084	25,136	-4.2%
2035	24,422	25,925	-5.8%
2040	24,706		
2045	24,923		

Inside-City Occupied Housing Units

Outside-City Occupied Housing Units

Year	Current	2015 UWMP	% Diff
2014/2015	13,136	14,644	-10.3%
2020	13,372	14,832	-9.8%
2025	13,688	15,107	-9.4%
2030	13,880	15,540	-10.7%
2035	13,946	15,884	-12.2%
2040	13,989		
2045	14,027		

Total Service Area Occupied Housing Units

Year	Current	2015 UWMP	% Diff
2014/2015	35,175	36,473	-3.6%
2020	35,980	38,324	-6.1%
2025	37,240	39,284	-5.2%
2030	37,964	40,676	-6.7%
2035	38,368	41,809	-8.2%
2040	38 <i>,</i> 695		
2045	38,950		

Note: 2015 UWMP reported housing units in 2014 rather than 2015.

Non-Residential Services Projections

The projections of non-residential services are based on historical rates of service growth and projected increases in service area population and employment.

The following key assumptions are used to construct these projections:

- Business services are assumed to increase at the same rate as service area population (excluding UCSC population housed on campus).
- No growth is assumed for Municipal services. This assumption was also used in the 2015 UWMP.
- Irrigation services are assumed to increase at the average rate of increase for the previous 15 years.
- No growth is assumed for Industrial services. Historically, industrial service growth has been somewhat negative. The AMBAG 2022 RGF projects negligible growth in City of Santa Cruz manufacturing employment.
- No growth is assumed for Golf Course services. Water service to the Delaveaga golf course is assumed to continue unchanged. The Pasatiempo golf course shifted to treated wastewater from the City of Scotts Valley in 2017. The club signed a 30-year agreement with Scotts Valley allowing it to divert the Scott Valley's treated wastewater for irrigation of the golf course.³

Table 5 summarizes the non-residential service projections and compares them to the 2015 UWMP projections. Note that the 2015 UWMP did not include Industrial or Golf Course service projections. Only aggregate industrial water use was projected in the 2015 UWMP and the Golf Course projection was based on irrigated acreage. The current projection includes a forecast of both services and irrigated acreage for Golf Courses. Relative to the 2015 UWMP, the current projection assumes less irrigated acreage for Golf Courses. This is driven entirely by the Pasatiempo golf course's shift to using treated wastewater. This shift has proven to be faster and larger than projected in the 2015 UWMP.

The current projection assumes significantly fewer irrigation services than did the 2015 UWMP. The previous forecast was based on the historical relationship between the growth in the number of multifamily and business services and the number of irrigated services. This relationship began to break down during the drought and following the water rate increases. Consequently, by 2020 the previous forecast of irrigation services had diverged from actual services.

³ The club constructed a multi-million dollar tertiary treatment, storage, and irrigation system, which began operating in 2017, to utilize Scotts Valley's wastewater.

Current Proje	ction	2015	2020	2025	2030	2035	2040	2045
		Actual	Actual	Forecast	Forecast	Forecast	Forecast	Forecast
Service								
Units	Units							
BUS	Services	1,897	1,874	1,945	1,981	2,003	2,025	2,043
IND	Services	40	38	38	38	38	38	38
MUN	Services	217	219	219	219	219	219	219
IRR	Services	460	440	448	455	463	471	479
GOLF	Services	6	3	3	3	3	3	3
	Acres	146	93	93	93	93	93	93
2015 UWMP		2015	2020	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
Service								
Units	Units							
BUS	Services	1,897	1,948	1,971	2,008	2,055		
IND	Services	40	NA	NA	NA	NA		
MUN	Services	217	218	218	218	218		
IRR	Services	460	651	723	845	951		
GOLF	Services	6	NA	NA	NA	NA		
	Acres	146	119	109	99	99		
% Difference		2015	2020	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
Service								
Units	Units							
BUS	Services	0%	-4%	-1%	-1%	-3%		
IND	Services	0%	NA	NA	NA	NA		
MUN	Services	0%	0%	0%	0%	0%		
IRR	Services	0%	-32%	-38%	-46%	-51%		
GOLF	Services	0%	NA	NA	NA	NA		
	Acres	0%	-22%	-15%	-6%	-6%		

Table 5. Santa Cruz Water Department Non-Residential Services Projection

Average Water Use Per Service

The baseline average water use per service is based on observed 2017 to 2020 water use in each customer category. Baseline average use is adjusted over the forecast period for the effects of plumbing codes, conservation programs, and changes in marginal water service costs.

The following key assumptions are used to construct these projections:

- Baseline single- and multi-family average water use is based on 2020 water use per housing unit. Separate estimates are developed for the Inside-City and Outside-City service areas.
- Indoor residential water use is adjusted for plumbing code effects. A floor of 36 gallons per capita day (GPCD) is set. This is the average water use of highly efficient WaterSense retrofitted households, as measured by the 2016 Residential End Uses of Water Study (Water Research Foundation 2016).
- Outdoor residential water use is adjusted for increases in marginal water cost.
- Residential water savings from Water Department conservation programs are assumed to be subsumed within the marginal water cost adjustments.
- Baseline non-residential water use per service are based on the following:
 - Three-year 2017-19 average use per service is used to set the baseline use for Business services. Business water use in 2020 is significantly below average due to COVID-19 shelter-in-place orders. The forecast assumes that the effects on Business water use of the pandemic will be transitory.
 - Four-year 2017-2020 average use per service is used to set the baselines for Industrial, Municipal, Irrigation, and Golf Course services.
- Non-residential baseline water use per service, other than Industrial, is adjusted for plumbing codes and changes in marginal water costs.
- Plumbing code effects are derived from estimates prepared by M.Cubed for the California Department of Water Resources (M.Cubed 2016).
- Increases in marginal water costs between 2020 and 2031 are based on Water Department projections of water service costs and rates through 2031. After 2031, marginal water costs are assumed to keep pace with general price inflation.
- Price elasticities used to adjust average water use for increases in marginal water cost are taken from M.Cubed's 2015 demand study (M.Cubed 2015).
- Non-residential water savings from Water Department conservation programs are assumed to be subsumed within the marginal water cost adjustments.

Table 6 summarizes the average water use projections and compares them to the projections contained in the 2015 UWMP.

Current Projec	tion	2015	2020	2025	2030	2035	2040	2045
		Actual	Actual	Forecast	Forecast	Forecast	Forecast	Forecast
Avg Use	Units							
SFR	CCF/HH	59	67	66	66	66	66	66
MFR	CCF/HH	45	47	45	43	42	42	42
BUS	CCF/SVC	341	276	343	325	306	298	298
IND	CCF/SVC	1,435	1,362	1,302	1,302	1,302	1,302	1,302
MUN	CCF/SVC	214	404	329	312	289	284	284
IRR	CCF/SVC	133	233	229	203	169	164	164
GOLF	CCF/ACRE	795	558	627	580	515	503	503
2015 UWMP		2015	2020	2025	2030	2035	-	
2015 01010		Δctual	Forecast	Forecast	Forecast	Forecast	-	
		Actual	TOrcease	TOrcease	TUICEASE	TOrcease	-	
Avg Use	Units							
SFR	CCF/HH	59	86	83	80	77		
MFR	CCF/HH	45	56	52	50	49		
BUS	CCF/SVC	341	400	389	383	377		
IND	CCF/SVC	1,435	NA	NA	NA	NA		
MUN	CCF/SVC	214	294	290	283	277		
IRR	CCF/SVC	133	285	271	257	244		
GOLF	CCF/ACRE	795	671	641	606	593	-	
% Difference		2015	2020	2025	2030	2035	-	
		Actual	Forecast	Forecast	Forecast	Forecast	- -	
Ανσ Περ	Units							
	ССЕ/НН	∩%	-72%	<u>-</u> 20%	_12%	_15%		
MER	ссі / пп	0 % 0%	-25/0	-20%	-10/0	-1.5%		
RUS		0%	-17/0	-14/0	-14/0	-14/0		
		0% 0%	-21/0 VIV	۰۱۲۷ ۱۸	۸N دד-	۸IV ۱۳۷		
MUN	CCF/SVC	0% 0%	27%	12%	10%	1VA 1%		
IRR		0%	-18%	-16%	-21%	-7/0 -31%		
GOLE	CCE/SVC	0% 0%	-17%	-2%	-4%	-13%		
336		0/0	T1 /0	Z/0		T 7 /0		

Table 6. Santa Cruz Water Department Average Water Use Projections

UCSC Water Use

The UCSC water use projection is taken from the UCSC Draft 2021 Long Range Development Plan (LRDP). This forecast is 292 MG by 2040, the LRDP's assumed build-out year. UCSC water use in 2017-19 averaged 168 MG.

The LRDP notes that some of the projected increase in demand may be offset through conservation and use of local groundwater. However, it does not quantify this potential offset and therefore the updated demand projection assumes all of the increase would be supplied by the Water Department.

The projection of UCSC demand in the 2015 UWMP was based on the 2014 LRDP. That plan estimated build-out demand of 349 MG. Thus, UCSC has reduced its projected water demand at build-out by roughly 16%.

Coastal Irrigation, Miscellaneous Use, and System Water Losses

The Water Department currently provides untreated water to coastal agricultural irrigators on the western side of its service area. Water use by coastal irrigators has been in steady decline. It annually averaged 33 MG between 2006 and 2010, 25 MG between 2011 and 2015, and 12 MG between 2016 and 2020. An annual demand of 12 MG is assumed for purposes of the long-range forecast.

Miscellaneous water uses and system water losses are assumed to comprise 7.5% of total production (excluding coastal irrigation). This is the same assumption that was used in the 2015 UWMP forecast.

COVID-19 Impacts on Business and Residential Water Use

Residential water use is slightly up and business water use is significantly down in 2020. The change in business water use is almost certainly a consequence of the shelter-in-place and business restrictions put in place in response to the COVID-19 pandemic. Changes in business water use associated with the pandemic response have been observed in other parts of California as well (Pacific Institute 2020). Because 2020 Business water use is significantly below use in 2017-19, it has been excluded from the calculation of baseline water use for the long-range forecast.

Pandemic-related changes in residential water use on the order of 3-5 GPCD in other parts of California have been measured (California Department of Water Resources, forthcoming). Observed increases in Santa Cruz residential water use between 2017-19 and 2020 have been on the order of 2 GPCD. Some of this increase can be attributed to weather differences. Because 2020 Residential water use is not significantly different from residential use in 2017-19, it has not been excluded from the calculation of baseline water use for the long-range forecast.

Projected Water Sales and Production

Projected water sales and total production are summarized in Table 7. Projected water sales are equal to the product of projected service units and average water use per service unit. Projected production is equal to projected water sales plus miscellaneous and coastal irrigation water uses and distribution system water losses. In 2020, total production was 2,446 MG. This is projected to increase to 2,720 MG by 2045.

The updated projection for 2035 is 23 percent lower than the 2015 UWMP forecast – 2,647 MG versus 3,442 MG. The primary causes for the difference are:

- Significant increases in marginal water cost occurring between 2015 and 2020 and the projected continuation of these increases from 2020 to 2031.
- Slower projected growth in service area population and occupied housing units.
- Slower projected growth in irrigation services.
- Lower projected UCSC build-out water demand.

YEAR		2015	2020	2025	2030	2035	2040	2045
				Forecas	Forecas	Forecas	Forecas	Forecas
		Actual	Actual	t	t	t	t	t
Service								
Units	Units							
	Household	40.000	40.440	40.040	40.000	40 544	10 6 4 4	40 777
SFR	S	19,029	19,119	19,249	19,380	19,511	19,644	19,///
	Household	10 140	10.001	17.001	10 504	10.057	10.052	10 172
	S	10,140	10,801	1,991	10,584	18,857	19,052	19,173
BUS	Services	1,897	1,874	1,945	1,981	2,003	2,025	2,043
	Services	40	38	38	38	38	38	38
MUN	Services	217	219	219	219	219	219	219
IKK	Services	460	440	448	455	463	4/1	479
GOLF	Services	6	3	3	3	3	3	3
UC	Services	11	11	11	11	11	11	11
Avg Use	Units							
SFR	CCF/HH	59	67	66	66	66	66	66
MFR	CCF/HH	45	47	45	43	42	42	42
BUS	CCF/SVC	341	276	343	325	306	298	298
IND	CCF/SVC	1,435	1,362	1,302	1,302	1,302	1,302	1,302
MUN	CCF/SVC	214	404	329	312	289	284	284
IRR	CCF/SVC	133	233	229	203	169	164	164
GOLF	CCF/SVC	19,339	17,309	19,441	17,988	15,964	15,608	15,608
UC	CCF/SVC	19,477	13,369	18,899	24,429	29,959	35,489	35,489
Sales	Units							
SFR	MG	835	952	954	952	958	966	974
MFR	MG	538	588	601	600	596	601	606
BUS	MG	484	388	499	481	458	452	456
IND	MG	43	39	37	37	37	37	37
MUN	MG	35	66	54	51	47	47	47
IRR	MG	46	77	77	69	59	58	59
GOLF	MG	87	39	44	40	36	35	35
UC	MG	160	110	156	201	247	292	292
Total	MG	2,228	2,257	2,421	2,433	2,437	2,487	2,505
MISC/LOSS	MG	181	183	196	197	198	202	203
Coastal Irr.	MG	34	6	12	12	12	12	12
Productio								
n	MG	2,442	2,446	2,630	2,642	2,647	2,701	2,720
Rounded	MG	2,400	2,400	2,600	2,600	2,600	2,700	2,700

Table 7. Santa Cruz Water Department Sales and Production Projection

DRAFT Update of the City of Santa Cruz's Long-Range Water Demand Forecast

2015 UWMP Productio					
n	MG	3,385	3,350	3,389	3,442
Rounded	MG	3,400	3,400	3,400	3,400

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Attachment A - Comparative Analysis of Projected and Actual Water Demand in 2018



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- DATE: February 22, 2019
- TO: Toby Goddard
 - City of Santa Cruz Water Department
- FR: David Mitchell
- RE: Comparative Analysis of Projected and Actual Water Demand in 2018

Introduction and Summary of Findings

In 2014, the Water Department contracted with M.Cubed to prepare a water demand forecast for the City's water service area in connection with the work being done for the Water Supply Advisory Committee. The final product was an econometric analysis of water demand and a forecast of water demand, broken down by customer class, and for total system production through 2035 (M.Cubed, August 2015). Two near-term sales forecasts spanning 2014-2020 were also prepared for the Water Department, one by M.Cubed and the other by Raftelis Financial Consultants.⁴ M.Cubed summarized and compared the two near-term forecasts in a memorandum to the Water Department dated August 12, 2015 (Attachment 1). The two near-term forecasts are compared to actual sales in Figure 1.⁵ Both forecasts assumed a period of sales rebuilding (or rebound) following the lifting of drought water use restrictions. The M.Cubed forecast predicted quicker rebound than the Raftelis forecast. So far the Raftelis forecast has performed well with a mean absolute forecast error of less than 5% between 2015 and 2018. The M.Cubed forecast has not performed as well. While it closely tracked actual sales in 2014 and 2015, it began to diverge from actual sales in 2016. After normalizing for weather, the M.Cubed forecast is approximately 19% greater than actual sales in 2018 (see Table 2).

The divergence of the M.Cubed forecast from actual sales coincided with changes to the City's water rate structure adopted in 2016 that resulted in significant increases in the marginal cost of water service.⁶ As demonstrated later, most of the forecast error is explained by the increase in the marginal cost of water service. Differences between actual and projected service units also played a role. Together, these two factors explain roughly 85% of the 2018 forecast error, with the increase in the marginal cost of water service accounting for most of the explanation. Weather was not found to be a

⁴ The M.Cubed forecast spanned 2014-2020 while the Raftelis forecast spanned 2015-2020.

⁵ The forecasts did not include sales to Coast Irrigation or Miscellaneous/Other. System losses also were not included as part of the forecast.

⁶ These changes are described in the Water Department's Comprehensive Cost of Service Water Rate Study (2016).

significant explanatory factor, nor were differences in actual and projected sales to large customers (UCSC and the two golf courses).

Recalibrating the M.Cubed forecast to actual service units and marginal water service cost eliminates most of the forecast error. Calibrating the forecast to actual service units reduces the forecast error from 19% to 14% (see Tables 2 and 4). Adjusting the forecast for the increase in the marginal cost of water service further reduces the forecast error from 14% to 3% (see Tables 4 and 7). After making these adjustments, actual sales in 2018 are bracketed by the lower- and upper-bounds of the recalibrated forecast (see Table 7).

The analysis suggests that the increase in the marginal cost of water service was the primary cause for the divergence between actual and forecast sales in 2018. This has implications for the long-term forecast as well, assuming the higher marginal costs will carry forward into the future. If this is the case, then the long-range forecast should be adjusted to reflect the effect of these higher marginal costs on the future demand for water.



Figure 1. Forecast and Actual Sales, FY 2015-2020

Forecast and Actual 2018 Sales

Table 1 shows the original M.Cubed forecast compared to actual 2018 sales. The largest relative forecast errors are associated with industrial (44%) and irrigation (49%) water uses. The smallest relative forecast errors are associated with business (9%) and municipal (3%) water uses. Most of the

absolute error, however, is associated with single-family and multiple residential water use. Note that the comparison between actual and forecast sales in Table 1 has not been normalized for weather.

	Actual	Forecast	Diff	% Diff
Single Family Residential	925	1,124	199	21%
Multiple Residential	564	652	88	16%
Business	501	546	45	9%
Industrial	39	56	17	44%
Municipal	45	46	1	3%
Irrigation	76	113	37	49%
Golf Course Irrigation	57	66	9	15%
UCSC	174	192	18	10%
Total	2,381	2,796	415	17%
Lower-Bound Forecast		2,656	275	12%
Upper-Bound Forecast		2,936	554	23%

Table 8. Actual and Forecast Water Sales in CY2018 in Million Gallons, Not Normalized for Weather

Weather Normalization

Normalizing for actual weather conditions in 2018 results in the forecast shown in Table 2. Weather normalization causes predicted sales to increase by approximately 1% which in turn increases the forecast error by approximately 2%, from 17% to 19%.

Projected Versus Actual Service Units

The sales forecast depends on projections of service units. Actual and projected service units for 2018 are shown in Table 3.⁷ The difference between projected and actual service units is less than 5% except in the case of irrigation, where the difference is nearly 40%. Between 1999 and 2013 there was a strong positive correlation between the total number of multi-family and business accounts and the number of irrigation accounts. This relationship provided the basis for the forecast of irrigation services. However, the relationship appears to have broken down more recently and the number of irrigation accounts has actually declined slightly since 2013. This may partly be a consequence of drought water use restrictions and higher marginal water cost.

⁷ Actual service units for multi-family residential are calculated by multiplying the number of multi-family accounts by 6.38, the average number of multi-family dwelling units per account. This is the same dwelling unit factor used in the original forecast.
		Weather- Adjusted		
	Actual	Forecast	Diff	% Diff
Single Family Residential	925	1,125	200	22%
Multiple Residential	564	652	88	16%
Business	501	553	52	10%
Industrial	39	56	17	44%
Municipal	45	49	5	10%
Irrigation	76	117	41	53%
Golf Course Irrigation	57	79	21	37%
UCSC	174	192	18	10%
Total	2,381	2,823	442	19%
Lower-Bound Forecast		2,682	301	13%
Upper-Bound Forecast		2,965	583	24%

Table 9. Actual and Weather-Normalized Forecast Water Sales in CY2018 in Million Gallons

Table 10. Actual and Projected Service Units

	Service Units	Actual	Projected	Diff	% Diff
Single Family Residential	Housing Units	19,074	19,312	238	1%
Multiple Residential	Housing Units	17,673	18,450	778	4%
Business	Accounts	1,879	1,931	52	3%
Municipal	Accounts	219	218	-1	0%
Irrigation	Accounts	435	594	159	37%
Golf Course Irrigation	Acres	Unknown	127		

The 2018 sales forecast calibrated to the actual number of service units is shown in Table 4. The forecast error drops from 19% to 14%. Thus, errors in the projected number of service units explain a bit more than one-fourth of the forecast error.

Table 11. Actual and Service	Unit Calibrated Forecast Water S	Sales in CY2018 in Million Gallons
------------------------------	----------------------------------	------------------------------------

	Actual	Service Unit Calibrated Forecast	Diff	% Diff
Single Family Residential	925	1,111	186	20%
Multiple Residential	564	623	60	11%

Comparative Analysis of Projected and Actual Water Demand in 2018

Business	501	538	37	7%
Industrial	39	56	17	44%
Municipal	45	49	5	11%
Irrigation	76	74	-2	-3%
Golf Course Irrigation	57	79	21	37%
UCSC	174	192	18	10%
Total	2,381	2,723	341	14%
Lower-Bound Forecast		2,587	205	9%
Upper-Bound Forecast		2,859	478	20%

Water Rates

Table 5 summarizes the differences between actual and forecast marginal cost of water service. The calculation of these percentages is provided in Attachment 2. By 2018 actual marginal cost was between 55% and 79% greater than forecast marginal cost.

Year	Inside City	Outside City	UCSC
2014	0%	0%	0%
2015	1%	1%	1%
2016	18%	13%	18%
2017	73%	55%	76%
2018	74%	55%	79%

Table 12. Exceedence of Actual to Forecast Marginal Cost of Water Service

The parameters in Table 6 were used to adjust the sales forecast for the higher marginal cost of water service. For example, the single-family residential sales adjustment factor in Table 6 is calculated as:

SFR Adjustment Factor = 1 + -.114*[.74*.623+.55*.377] = 0.924

This is the weighted-average price adjustment for inside- and outside-city single-family residential customers. Thus, on average, the higher marginal cost of water service would be expected to reduce single-family water sales by 7.6%, given the sales shares and elasticity estimates in Table 6.

Because price elasticities were not estimated for UCSC and industrial customers in the original econometric analysis, the elasticity for inside-city business customers is used as a proxy for these two classes.

	Margii	nal Water					Sales
	Cost %	Increase	Sale	s Share	Price I	Elasticity	Adjustment
	Inside	Outside	Inside	Outside	Inside	Outside	Factor 1/
Single Family Residential 2/	74%	55%	0.623	0.377	-0.114	-0.114	0.924
Multiple Residential	74%	55%	0.560	0.440	-0.124	-0.124	0.919
Business	74%	55%	0.630	0.370	-0.099	-0.262	0.901
Industrial 3/	74%	55%	1.000	0.000	-0.099		0.927
Municipal	74%	NA	1.000	0.000	-0.237		0.825
Irrigation	74%	55%	0.644	0.356	-0.545	-0.545	0.634
Golf Course Irrigation	74%	55%	0.446	0.554	-0.358	-0.358	0.773
UCSC 3/	79%	NA	1.000	0.000	-0.099		0.922
Mataa	•	•	•	•	•	•	•

Table 13.	Parameters Used	to Re-Calibrate Sales	Forecast to Actual	2018 Marginal Cos	t of Water
Service					

Notes:

1/ Sales Adjustment Factor is equal to one plus the sales weighted average adjustment for inside and outside city customers.

2/ The single family residential elasticity is the sales weighted average of the peak and off-peak elasticities estimated with the econometric model.

3/ Inside-city business price elasticity used as proxy for industrial and UCSC price response.

Table 7 shows the adjusted sales forecast, calibrated to actual marginal water service cost. Recalibrating the forecast to actual marginal cost reduces the forecast error from 14% to 3%. There are still significant class-level errors following recalibration, but these mostly cancel out. Note that predicted UCSC and golf course sales are now close to their actuals, indicating that their forecast errors in previous tables are largely resolved by the marginal cost adjustment.

Re-calibrating the sales forecast to the actual service units and marginal water service cost eliminates approximately 85% of the 2018 forecast error. Actual sales now fall between the lower- and upper-bounds of the forecast.

Table 14. Actual	and Marginal Water	Cost Calibrated Forecas	st Water Sales in	CY2018 in Million
Gallons				

		Marginal		
		Water Cost		
		Calibrated		
	Actual	Forecast	Diff	% Diff
Single Family Residential	925	1,026	101	11%
Multiple Residential	564	572	9	2%
Business	501	484	-17	-3%
Industrial	39	52	13	33%
Municipal	45	41	-4	-9%

Comparative Analysis of Projected and Actual Water Demand in 2018

Irrigation	76	47	-29	-38%
Golf Course Irrigation	57	61	4	6%
UCSC	174	177	3	2%
Total	2,381	2,461	79	3%
Lower-Bound Forecast		2,338	-44	-2%
Upper-Bound Forecast		2,584	202	9%

Drought Recovery

Santa Cruz's drought recovery has lagged the average rate of recovery for all water suppliers in the Bay Area and Central Coast hydrologic regions. Figure 2 shows actual and trend monthly GPCD relative 2013. Starting in 2017, Santa Cruz's recovery began to lag the regional trend. This is also illustrated in Table 8, which compares Santa Cruz's year-over-year percentage change in GPCD to the mean and median rates for Bay Area and Central Coast water suppliers.

The divergence in drought recovery rate coincides with Santa Cruz's increase in the marginal cost of water service. Of course there may be other causes of the divergence and Santa Cruz's recovery has been faster than many other suppliers (see Figure 2), but the escalation in the marginal cost of water service is at the very least consistent with a slower rate of drought recovery.

Table 15.	Year-Over-Year	Change in	GPCD
-----------	----------------	-----------	-------------

		Bay Area and Central Coast Water Suppli			
Year	Santa Cruz	Mean	Median		
2017	3.3%	8.7%	6.3%		
2018	-1.0%	3.0%	0.3%		
Source: State Water Resource Control Board					



Figure 2. Monthly GPCD Relative to 2013 Monthly GPCD

Summary of Findings

To summarize the results of this analysis:

- The Raftelis near-term forecast has performed well with a mean absolute forecast error of less than 5% between 2015 and 2018. The M.Cubed forecast has not performed as well. While it closely tracked actual sales in 2014 and 2015, it began to diverge from actual sales in 2016. After normalizing for weather, the M.Cubed forecast was approximately 19% greater than actual sales in 2018 (see Table 2).
- Recalibrating the M.Cubed forecast to actual service units and marginal water service cost eliminates most of the forecast error. Calibrating the forecast to actual service units reduces the forecast error from 19% to 14% (see Tables 2 and 4). Adjusting the forecast for the increase in the marginal cost of water service further reduces the forecast error from 14% to 3% (see Tables 4 and 7). After making these adjustments, actual sales in 2018 are bracketed by the lower- and upper-bounds of the forecast (see Table 7).

- Santa Cruz's drought recovery has lagged the average rate of recovery for the Bay Area and Central Coast hydrologic regions. The divergence in drought recovery rate coincides with Santa Cruz's increase in the marginal cost of water service. Of course there may be other causes of the divergence and Santa Cruz's recovery has been faster than many other suppliers (see Figure 2), but the escalation in the marginal cost of water service is at the very least consistent with a slower rate of drought recovery.
- The analysis suggests that the increase in the marginal cost of water service was the primary
 cause for the divergence between actual and forecast sales in 2018. This has implications for
 the long-term forecast as well, assuming the higher marginal costs will carry forward into the
 future. If this is the case, then the long-range forecast should be adjusted to reflect the effect of
 these higher marginal costs on the future demand for water.

References

City of Santa Cruz Water Department (2016), Long Range Financial Plan, June 2016.

City of Santa Cruz Water Department (2016), Water Department Prop. 218 Notice Proposed Rates, July 2016.

M.Cubed (2015), FY2015-2020 Water Sales Forecast, Memorandum from David Mitchell to Toby Goddard, dated August 12, 2015.

M.Cubed (2015), City of Santa Cruz Water Demand Forecast, Report prepared for the City of Santa Cruz Water Department, October 2015.

State Water Resources Control Board, Water Supplier Monthly Production Reports, downloaded from https://data.ca.gov/dataset/drinking-water-public-water-system-operations-monthly-water-production-and-conservation on February 19, 2019.

Attachment 1:

M.Cubed August 12, 2015 Memorandum to Toby Goddard, Santa Cruz Water Department



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A comparison of the Raftelis and M.Cubed water sales forecasts for FY2015-2020 is provided in the following figure. The data used to generate the figure are provided at the end of this memo.



The following is noted:

- The Raftelis forecast is about eight percent less, on average, than the M.Cubed primary forecast; and about three and a half percent less, on average, than the M.Cubed lower-bound forecast.
- The main difference is in the middle period of the forecast. The two forecasts are almost the same at the beginning and end of the forecast period, but they diverge in the middle. The Raftelis forecast assumes a slower rate of sales recovery from the drought than the M.Cubed forecast.

- The Raftelis forecast, though more conservative, is not at odds with the M.Cubed forecast. Both indicate a period of sales rebuilding between FY2016 and FY2019, and then a leveling off of sales in the range of 2,700 to 2,900 million gallons.
- The rate of drought recovery is a big uncertainty, so the two forecasts together may provide a useful range for revenue analysis and fiscal planning.

We made the following assumptions to generate the M.Cubed sales forecast for FY2015-2020:

- Weather variables in the model were set to their long-term normal values.
- Drought stage restrictions were used as a proxy in the model for a gradual rebound in sales even if the drought were to end this year. Stage 3 drought restrictions were assumed to stay in place for the remainder of 2015. Stage 2 drought restrictions were assumed to be in effect in 2016 and 2017. Stage 1 drought restrictions were assumed to be in effect in 2018. No restrictions were assumed in effect in 2019 and 2020. The rate of this rebound, of course, is highly uncertain. For example, if we had used a linear extrapolation from 2015 (Stage 3) to 2020 (no restriction), the sales forecast would show a more gradual rise and lay somewhat closer to the Raftelis forecast. Our approach assumes that golf, irrigation, and municipal demands will snap back more quickly once the stage 3 restrictions are lifted.
- Housing vacancy and unemployment rates were projected along a linear trend from their current levels to their long-term normal levels by 2020.
- Household income and water rates were projected along a linear trend from their current levels to their 2020 forecasted levels.

A backcast of 2014 total production was made with the model. The model predicted total (calendar year) 2014 production of 2,612 million gallons, essentially the same as actual production of just about 2,600 million gallons. For (calendar year) 2015, the model predicts sales of 2,126 million gallons and total production of 2,298 million gallons, which is right in line with current Water Department expectations.

Primary Forecast									TOTAL	MISC/	TOTAL	Raftelis	%
Fiscal Year	SFR	MFR	BUS	IND	MUN	IRR	GOLF	UC	SALES	LOSS	PROD	Sales	Difference
2015	757	535	468	56	27	50	55	186	2,135	173	2,308	2,108	-1.3%
2016	921	588	506	56	34	70	58	188	2,421	196	2,618	2,114	-12.7%
2017	1,121	648	547	56	44	104	69	190	2,780	225	3,005	2,476	-10.9%
2018	1,124	652	546	56	46	113	66	192	2,796	227	3,023	2,484	-11.2%
2019	1,160	660	546	56	49	132	63	194	2,861	232	3,093	2,694	-5.9%
2020	1,188	661	545	57	48	141	60	196	2,898	235	3,132	2,702	-6.7%
Lower Bound Fore	ecast								TOTAL	MISC/	TOTAL	Raftelis	%
Fiscal Year	SFR	MFR	BUS	IND	MUN	IRR	GOLF	UC	SALES	LOSS	PROD	Sales	Difference
2015	714	517	448	56	24	44	44	183	2,031	165	2,196	2,108	3.8%
2016	869	569	489	56	30	61	48	184	2,306	187	2,493	2,114	-8.3%
2017	1,058	625	533	56	39	90	58	184	2,643	214	2,858	2,476	-6.3%
2018	1,067	629	531	56	41	101	55	185	2,666	216	2,882	2,484	-6.8%
2019	1,113	637	530	56	45	120	53	185	2,739	222	2,962	2,694	-1.7%
2020	1,140	635	529	56	44	129	50	186	2,769	225	2,994	2,702	-2.4%
Upper Bound For	ecast								TOTAL	MISC/	TOTAL	Raftelis	%
Fiscal Year	SFR	MFR	BUS	IND	MUN	IRR	GOLF	UC	SALES	LOSS	PROD	Sales	Difference
2015	803	553	489	56	30	58	68	189	2,246	182	2,428	2,108	-6.1%
2016	975	609	523	56	38	80	71	193	2,545	206	2,751	2,114	-16.9%
2017	1,188	671	562	56	50	119	82	196	2,925	237	3,162	2,476	-15.4%
2018	1,183	676	562	57	51	128	79	200	2,935	238	3,173	2,484	-15.4%
2019	1,209	685	562	57	53	145	76	203	2,990	242	3,233	2,694	-9.9%
2020	1,238	688	562	57	53	155	72	207	3,033	246	3,279	2,702	-10.9%

Santa Cruz Water Department Water Sales Forecast: FY2015-2020, Million Gallons

Attachment 2: Marginal Cost Indices Used in Original and Recalibrated M.Cubed Forecasts

The marginal cost index used in the original M.Cubed forecast is provided in the following table, which is from Attachment 7 of M.Cubed 2015 Sales Forecast Report. The original forecast assumed a 32.1% increase in the marginal cost of water from 2014 to 2018.

		%			
	Caltrans	Change	%	Real	%
	Inflation	in	Change	Water	Change
	Rate	Water	Net of	Rate	from
Year	Forecast	Rate	Inflation	Index	2014
2014	2.8%			100.0	
2015	3.3%	10.0%	6.7%	106.7	6.7%
2016	3.2%	10.0%	6.8%	114.0	14.0%
2017	2.4%	10.0%	7.6%	122.6	22.6%
2018	2.3%	10.0%	7.7%	132.1	32.1%
2019	2.4%	10.0%	7.6%	142.1	42.1%
2020	2.3%	4.4%	2.1%	145.1	45.1%

The average annual commodity charges based on actual rates and charges are provided in the next table. The actual increase in the marginal cost of water between 2014 and 2018 ranged from 104% to 137%.

	Average Com	modity Charge (\$/CCF, 2013 \$)	Real Water Rate Index			
Year	Inside City	Outside City	UCSC	Inside City	Outside City	UCSC	
2014	\$4.03	\$5.13	\$4.03	100.0	100.0	100.0	
2015	\$4.32	\$5.51	\$4.32	107.3	107.4	107.3	
2016	\$5.39	\$6.62	\$5.39	134.0	129.1	134.0	
2017	\$8.56	\$9.74	\$8.68	212.5	189.7	215.7	
2018	\$9.27	\$10.50	\$9.52	230.2	204.5	236.5	
2019	\$9.56	\$10.84	\$9.83	237.6	211.1	244.1	
2020	\$9.92	\$11.24	\$10.20	246.4	219.0	253.2	

Actual marginal costs are 55% to 79% larger in 2018 than assumed in the original M.Cubed forecast, as shown in the next table.

	Real Water Rat			
Rate Category	Original Forecast	Actual Rates	% Difference	
Inside City	132.1	230.2	74.3%	

DRAFT Comparative Analysis of Projected and Actual Water Demand in 2018

Outside City	132.1	204.5	55.8%
UCSC	132.1	236.5	79.0%

City of Santa Cruz Draft Updated Long-Range Water Demand Forecast

DAVID MITCHELL M.CUBED FEBRUARY 2021

What I'll Cover

- Draft Long-Range Demand Forecast
- Key Assumptions and Data
- Comparison to 2015 UWMP
- Q & A

See our Technical Memo for additional detail

POLICY ANALYSIS FOR THE PUBLIC AND PRIVATE SECTORS

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DRAFT Technical Memorandum

Date: Prepared For: Prepared By:	January 24, 2021 Rosemary Menard (City of Santa Cruz Water Department) David Mitchell (M.Cubed)						
Subject:	DRAFT Update of the City of Santa Cruz's Long-Range Water Demand Forecast						
Contents Background							
Population and	Housing Projections						
Non-Residentia	I Services Projections						
Average Water	Use Per Service						
UCSC Water Us	e						
Coastal Irrigatio	n, Miscellaneous Use, and System Water Losses						
COVID-19 Impa	COVID-19 Impacts on Business and Residential Water Use						
Projected Water Sales and Production							
References	References						
Attachment A - Comparative Analysis of Projected and Actual Water Demand in 2018							

Updated Long-Range Demand Forecast

YEAR		2015	2020	2025	2030	2035	2040	2045
		Actual	Actual	Forecast	Forecast	Forecast	Forecast	Forecas
Annual Demand	Units							
SFR	MG	835	952	954	952	958	966	974
MFR	MG	538	588	601	600	596	601	606
BUS	MG	484	388	499	481	458	452	456
IND	MG	43	39	37	37	37	37	37
MUN	MG	35	66	54	51	47	47	47
IRR	MG	46	77	77	69	59	58	59
GOLF	MG	87	39	44	40	36	35	35
UC	MG	160	110	156	201	247	292	292
Total Demand	MG	2,228	2,257	2,421	2,433	2,437	2,487	2,505
MISC/LOSS	MG	181	183	196	197	198	202	203
Coastal Irrigation	MG	34	6	12	12	12	12	12
Total Production	MG	2,442	2,446	2,630	2,642	2,647	2,701	2,720
Rounded	MG	2,400	2,400	2,600	2,600	2,600	2,700	2,700
2015 UWMP		2015	2020	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
Total Production	MG	2,442	3,385	3,350	3,389	3,442		
Rounded	MG	2,400	3,400	3,400	3,400	3,400		
% Difference from L	JWMP	0%	-28%	-22%	-22%	-23%		

Key Assumptions for Residential

- Population and housing units based on AMBAG 2022 Regional Growth Forecast
- Baseline use/service based on 2020 demand
- Baseline adjusted for:
 - Plumbing/efficiency codes
 - Rates/conservation
- Indoor use >= 36 GPCD

Key Assumptions for Non-Residential

- Service Growth
 - Business: same as service area population (excluding UCSC)
 - Municipal: none, same assumption used in 2015 UWMP
 - Industrial: none, AMBAG RGF shows minimal change in manufacturing employment
 - Irrigation: based on historical rate of service growth
 - Golf courses: none
- Baseline use/service
 - Business: 2017-19 average use/service
 - Other non-residential: 2017-2020 average use/service
- Baseline adjusted for:
 - Plumbing/efficiency codes
 - Rates/conservation

UCSC Demand

- From 2021 Draft Long-Range Development Plan (LRDP)
 - 292 MG by 2040
- Down 16% from 2014 LRDP
 - 349 MG
- UCSC 2017-19 demand
 - 168 MG

Coastal Irrigation Demand

- 12 MG: average for 2016-2020
- Irrigation demand has been decreasing:
 - 2006-2010 average: 33 MG
 - 2011-2015 average: 25 MG
 - 2016-2020 average: 12 MG

COVID-19

- Significant impact on 2020 business water use
 - 2020 has been excluded from the business baseline
- Likely increase in 2020 residential water use, but not large. 2020 average use is 2 GPCD > 2017-19 average use
 - 2020 has not been excluded from the residential baseline

Reasons demand forecast has been revised down

- 2035 forecast is 23% lower than 2015 UWMP projection
- Primary Reasons:
 - Water Rates: change in design and increase in level (2016-2031) (see TM Attachment A)
 - Slower projected growth in population & housing (differences in 2014 and 2022 AMBAG RGF)
 - Lower projected UCSC water demand (difference in 2014 and 2021 LRDP)
 - Slower growth in irrigation services and water use (related to first two reasons)

Updated Long-Range Demand Forecast

YEAR		2015	2020	2025	2030	2035	2040	2045
		Actual	Actual	Forecast	Forecast	Forecast	Forecast	Forecas
Annual Demand	Units							
SFR	MG	835	952	954	952	958	966	974
MFR	MG	538	588	601	600	596	601	606
BUS	MG	484	388	499	481	458	452	456
IND	MG	43	39	37	37	37	37	37
MUN	MG	35	66	54	51	47	47	47
IRR	MG	46	77	77	69	59	58	59
GOLF	MG	87	39	44	40	36	35	35
UC	MG	160	110	156	201	247	292	292
Total Demand	MG	2,228	2,257	2,421	2,433	2,437	2,487	2,505
MISC/LOSS	MG	181	183	196	197	198	202	203
Coastal Irrigation	MG	34	6	12	12	12	12	12
Total Production	MG	2,442	2,446	2,630	2,642	2,647	2,701	2,720
Rounded	MG	2,400	2,400	2,600	2,600	2,600	2,700	2,700
2015 UWMP		2015	2020	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
Total Production	MG	2,442	3,385	3,350	3,389	3,442		
Rounded	MG	2,400	3,400	3,400	3,400	3,400		
% Difference from U	JWMP	0%	-28%	-22%	-22%	-23%		

Some Issues to Consider:

- Outside-City Population & Housing Forecast
 - Replace with TAZ-based projection if TAZ data become available
- Demand Hardening
 - Using demand elasticities from 2015 demand study: ok for residential and business, may be high for municipal and irrigation accounts
- UCSC Demand
 - LRDP says some future demand may be offset by additional conservation and local groundwater



Backup Slides

Inside-City Serv	vice Area Popula	tion	
Year	Current	2015 UWMP	% Diff
rear	Garrent	2010 0 0 0	/* Biii
2014/2015	64,223	63,789	0.7%
2020	64,424	66,860	-3.6%
2025	68,845	70,058	-1.7%
2030	72,218	73,375	-1.6%
2035	75,257	76,692	-1.9%
2040	78,828		
2045	79,534		

Updated Population Forecast

Outside-City Service Area Population

Year	Current	2015 UWMP	% Diff
2014/2015	34,477	31,462	9.6%
2020	34,124	32,543	4.9%
2025	34,840	33,562	3.8%
2030	35,259	34,614	1.9%
2035	35,411	35,698	-0.8%
2040	35,515		
2045	35,607		

Total Service Area Population

	Year	Current	2015 UWMP	% Diff
	2014/2015	98,700	95,251	3.6%
	2020	98,548	99,403	-0.9%
	2025	103,685	103,620	0.1%
	2030	107,477	107,989	-0.5%
	2035	110,668	112,390	-1.5%
-	2040	114,343		
5	.50 2045	115,141		

Inside-City Occ	upied Housing U	nits	
Year	Current	2015 UWMP	% Diff
2014/2015	22,039	21,829	1.0%
2020	22,608	23,492	-3.8%
2025	23,552	24,177	-2.6%
2030	24,084	25,136	-4.2%
2035	24,422	25,925	-5.8%
2040	24,706		
2045	24,923		

Outside-City Occupied Housing Units

2015 UWMP Year Current % Diff 2014/2015 13,136 14,644 -10.3% 13,372 -9.8% 2020 14,832 13,688 -9.4% 2025 15,107 2030 13,880 15,540 -10.7% 2035 13,946 -12.2% 15,884 2040 13,989 2045 14,027

Total Service Area Occupied Housing Units

Year	Current	2015 UWMP	% Diff
2014/2015	35,175	36,473	-3.6%
2020	35,980	38,324	-6.1%
2025	37,240	39,284	-5.2%
2030	37,964	40,676	-6.7%
2035	38,368	41,809	-8.2%
_ <u>20</u> 40	38,695		
^{3.} 2045	38,950		

Updated Housing Forecast

Updated Non-Residential Service Forecast

Current Proje	ction	2015	2020	2025	2030	2035	2040	2045
		Actual	Actual	Forecast	Forecast	Forecast	Forecast	Forecast
Service								
Units	Units							
BUS	Services	1,897	1,874	1,945	1,981	2,003	2,025	2,043
IND	Services	40	38	38	38	38	38	38
MUN	Services	217	219	219	219	219	219	219
IRR	Services	460	440	448	455	463	471	479
GOLF	Services	6	3	3	3	3	3	3
	Acres	146	93	93	93	93	93	93
2015 UWMP		2015	2020	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
Service								
Units	Units							
BUS	Services	1,897	1,948	1,971	2,008	2,055		
IND	Services	40	NA	NA	NA	NA		
MUN	Services	217	218	218	218	218		
IRR	Services	460	651	723	845	951		
GOLF	Services	6	NA	NA	NA	NA		
	Acres	146	119	109	99	99		
% Difference		2015	2020	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
6								
Service	l locito							
Units	Units	00/	40/	10/	10/	20/		
BO2	Services	0%	-4%	-1%	-1%	-3%		
IND	Services	0%	NA	NA	NA	NA		
MUN	Services	0%	0%	0%	0%	0%		
IRR	Services	0%	-32%	-38%	-46%	-51%		
GOLF	Services	0%	NA	NA	NA	NA		
	<u>5.52</u>	0%	-22%	-15%	-6%	-6%		

Updated Avg Use/Service Forecast

Current Proje	ction	2015	2020	2025	2030	2035	2040	2045
		Actual	Actual	Forecast	Forecast	Forecast	Forecast	Forecast
Avg Use	Units							
SFR	CCF/HH	59	67	66	66	66	66	66
MFR	CCF/HH	45	47	45	43	42	42	42
BUS	CCF/SVC	341	276	343	325	306	298	298
IND	CCF/SVC	1,435	1,362	1,302	1,302	1,302	1,302	1,302
MUN	CCF/SVC	214	404	329	312	289	284	284
IRR	CCF/SVC	133	233	229	203	169	164	164
GOLF	CCF/ACRE	795	558	627	580	515	503	503
2015 UWMP		2015	2020	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
Avg Use	Units							
SFR	CCF/HH	59	86	83	80	77		
MFR	CCF/HH	45	56	52	50	49		
BUS	CCF/SVC	341	400	389	383	377		
IND	CCF/SVC	1,435	NA	NA	NA	NA		
MUN	CCF/SVC	214	294	290	283	277		
IRR	CCF/SVC	133	285	271	257	244		
GOLF	CCF/ACRE	795	671	641	606	593		
		2045	2020	2025	2020	2025		
% Difference		2015	ZUZU	2025	2030	2035		
		Actual	Forecast	Forecast	Forecast	Forecast		
ΔνσΠερ	Units							
SER		0%	-73%	-20%	_18%	_15%		
MER	ССЕ/НН	0%	-23/0	-2070	-1/10/	-1.10/		
RUS		0%	-17/0	-17%	-14/0 -150/	-14%		
		0%	-31/0	-1270 NIA	-1370 NIA	-1370 NIA		
MUN		0%	1NA 270/	120/	100/	INA 10/		
		0%	.100/	15%	. 210/	470		
		0%	170/	-1070 /01-	-ZI%	120/		
GOLF	5 53	U%	-1/%	-270	-4%	-13%		



WATER COMMISSION INFORMATION REPORT

01/26/2021

AGENDA OF:	February 1, 2021
TO:	Water Commission
FROM:	Heidi Luckenbach, Deputy Director/Engineering Manager
SUBJECT:	Presentation of 2021 Capital Investment Projects

RECOMMENDATION: Accept the information and presentation of 2021 capital investment projects.

BACKGROUND/DISCUSSION: A tradition of the Water Department is to kick-off the budget season with a view of some of the Department's projects that were completed in the current fiscal year or have made significant and noteworthy progress in design or construction. Unlike previous years, however, and because of the large number of items requiring the Commission's attention and input, this year's presentation will be abbreviated and focus on just five projects delivered by four staff from the Water Department's Engineering and Customer Service Sections. Below is a brief introduction to each project with some added context and highlights.

Laguna Diversion Retrofit Project Jessica Martinez-McKinney, Associate Planner II

In addition to a project update, staff is asking the Commission to review the project in a more detailed fashion, refer to Attachment 1. For this project staff is employing the agreed-upon process that results in the Water Commission supporting staff's recommendation to, in this case, approve a project and certify a final environmental impact report.

<u>Newell Creek Dam Inlet/Outlet Replacement Project</u> Isidro Rivera, Associate Professional Engineer

The project is currently under construction and the presentation will focus on providing an update on construction activities, discuss accomplishments to date and upcoming milestones. Attachment 2 is provided for additional photo-documentation of construction activities from the start of construction.

This project has implemented two processes new to the Department: Construction Partnering, and the use of a Dispute Resolution Board. Construction Partnering is focused on establishing

and maintaining alignment across all disciplines of the project team. With a focus on establishing common goals, objectives and communication, the activities involved in Partnering have been shown to establish a collaborative team, improve efficiencies, work through disagreements and avoid disputes. A Dispute Resolution Board is a board of impartial professionals formed at the beginning of a project to follow construction progress, encourage dispute avoidance, and assist in the resolution of any disputes for the duration of the project. The three-member board has been established and met once with the project team thus far. Active engagement of both groups throughout the project has been proven in the industry to meet and exceed overall project objectives.

Newell Creek Pipeline Replacement Project Lewis Kay, Associate Professional Engineer

The Newell Creek Pipeline extends approximately 10 miles between Newell Creek Dam and the Graham Hill Water Treatment Plant (GHWTP). The project has been split into three segments to facilitate design and construction: Newell Creek Dam to Felton (northern segment), Felton to GHWTP (southern segment), and the Brackney segment (part of the northern segment but extracted due to FEMA funding opportunity). The Water Department has initiated a program-level Environmental Impact Report of the entire project to comply with CEQA with project-level analyses required on a segment by segment basis. The Department has also contracted with two separate design firms for the southern and Brackney segments. Timing of project implementation can be seen in Attachment 3. The presentation will focus on the Brackney segment.

Coast Pump Station Pipeline Replacement Project Lewis Kay, Associate Professional Engineer

This project is being constructed with industry-standard techniques of open-cut trenching for the mainline pipe installation and micro-tunneling below the San Lorenzo River. The project team consists of staff from the Department (Construction Manager), HDR, Inc. (Project Manager and Environmental Lead), Kleinfelder (Design Engineer), on-site resource specialists (biologist, archeological, and tribal monitors) observing the day to day activities to ensure compliance with permit requirements, and regulators, particularly staff from CA Department of Fish & Wildlife.

The site is very space constrained on both sides of the river, nestled into an otherwise quiet neighborhood on the east side of the river and the River Street corridor on the west which is a busy business/commercial corridor and main traffic corridor to Route 9. The space constraints meant the Contractor had to be strategic about sequencing work on either side of the river with large equipment and onsite working space. Additionally, a portion of each site has riparian corridors within them which required environmental permits with certain restrictions that needed to be closely followed which affected some construction means & methods, scheduling and monitoring needs.

Due to the number of current and future projects taking place along the east side of the river, the Department formed a community engagement team that meets each week to cross-reference project activities and provide weekly notification to the neighbors. This has helped greatly for this project to keep the directly adjacent neighbors on both sides of the river informed about upcoming construction activities and provide early notification about noisy work which was

primarily related to the driving in and removal of the sheet piles required to construct the very deep micro-tunnel pits. This project has experienced several obstacles from construction to community impacts, but the strong team has successfully worked through each issue thoroughly and diligently as it arose and continues to do so as the project heads towards its final phases of completion.

<u>Meter Replacement Project</u> Kyle Petersen, Customer Service Manager

As can be seen in the chart below, the Department meter population is reaching (blue bars) or has exceeded (red bars) their functional useful life. An aging meter typically under-registers use or stops registering altogether.



Meters – Aging Population

There are several impacts to a failing meter stock.

- 1. As can be seen in the chart below, moving to a highly volumetric rate structure has significant financial implications when a meter under-registers.
- 2. There is an equity question in that some customers with properly functioning meters are paying for all of their use while others are not. This also gives customers a false sense of how they are doing as water-efficient users.

This project will replace the entire distribution system meter stock.



Lost Volumetric Sales

Attachment 3 is the schedule for the majority of the projects in the Department's 10-year Capital Investment Program (CIP), showing the various activities through FY2030. (Note that there is a very small subset of capital projects that do not appear on this schedule, such as routine main replacement projects, and the timing of the projects will be shifted following approval of the financial plan.) More information about these projects can be made available and will be the subject of future meetings.

ATTACHMENTS:

- 1. Information Report, Laguna Creek Diversion Retrofit Project, Approval Process and Water Commission Consideration
- 2. Newell Creek Dam Inlet Outlet Project, Construction Progress
- 3. Capital Investment Program Single Line Schedule



WATER COMMISSION INFORMATION REPORT

DATE: 01/27/21

AGENDA OF:	February 1, 2021
TO:	Water Commission
FROM:	Jessica Martinez-McKinney, Associate Planner II
SUBJECT:	Laguna Creek Diversion Retrofit Project, Approval Process and Water Commission Consideration

RECOMMENDATION: Receive information on Laguna Creek Diversion Retrofit Project in advance of project approval processes scheduled for the March 1st Water Commission Meeting and the March 9th City Council Meeting.

BACKGROUND: In 2019, with Water Commission input and support, staff began implementing an approach to facilitate the Commission's review of certain projects so that the Commission would be in a position to provide, as appropriate, recommendations to City Council prior to subsequent action by City Council. As Commissioners may recall, because Commission members have a broad set of complementary skills and experience that will support a comprehensive review of projects, this level of engagement and support of staff's recommendation by the Commission will likely be viewed favorably during subsequent Council deliberations.

To make the best use of Commission time, use of this approach is limited to projects of a certain dollar value, complexity, stakeholder interest, or needing atypical council action(s) such as a significant unavoidable impact. Three project milestones have been identified to bring projects to the Commission: once at project concept ($\sim 10\%$) when the environmental and finance plans are developed, and two consecutive times prior to council action. As expressed in previous staff reports, certain atypical or more complex projects, such as the Santa Cruz Water Rights Project and the Newell Creek Pipeline Improvement Project, may require additional updates to the Commission at interim milestone points.

The Laguna Creek Diversion Retrofit Project (proposed project) is an example of a CIP project that is reaching the stage where formal approvals will be required in the coming months so that construction can proceed summer 2021. This proposed project has an uncommon scope, regulatory drivers, and complexity in permitting and environmental compliance. The Project will have an Environmental Impact Report (EIR) that will need to be certified by City Council prior to approval and implementation of the project.
The timing of more significant project consideration and approvals is shown below.

- March 2, 2020: Water Commission receives project information with the Update on Major Projects Presentation, also known as the "Parade of Projects".
- February 1, 2021: Water Commission receives an FYI on the project (this item) for review and consideration.
- March 1, 2021: Water Commission receives a similar item on General Business for discussion. Staff's recommendation will be along the lines of "the Water Commission understands the project's purpose and need, financing capability, and environmental review and supports staff's recommendations to City Council."
- March 9, 2021: City Council received an item to certify the Final Environmental Impact Report for the Project and approve the Project, Plans, and Specifications for bidding.

DISCUSSION: Consistent with previous CIP projects implementing this approach, the remainder of this staff report will address the following four components as it relates to the Laguna Creek Diversion Retrofit Project:

- 1. Proposed Project Summary
- 2. Technical
- 3. Environmental
- 4. Financial

PROPOSED PROJECT SUMMARY

The City's Laguna Creek Diversion Facility (Facility) serves as an important source of raw water to the North Coast System, which provides a combined 15 to 35 percent of the City's overall water supply and enhances system-wide operational flexibility due its favorable water quality and year-round reliability. The Laguna Creek watershed is characterized by an impressive terrestrial and aquatic biodiversity. In particular, federally endangered Coho salmon have in recent years been found to be reproducing successfully in Laguna Creek, which is at the extreme southern limit of the range.

The Facility was constructed in 1890 and originally included a dam and diversion flume constructed from native stone and a pipeline constructed of cast iron. Within a few years of construction the issue of sedimentation became apparent and in 1897 the original eight-inch pipe installed through the dam, to clean sand, sediment, and debris, was found to be ineffective and replaced by a larger 24-inch operable iron sluice gate. The gate could be raised and lowered to allow accumulations to flow freely through the dam.

Today the dam continues to impound sediment and debris due to intermittently clogged sediment control bypass valves, and the streambed has aggraded to the crest of the dam. In 2007, the City began implementing routine excavation of sediment, however, this sediment management strategy is labor-intensive and removes needed spawning gravels for anadromous salmonids from the downstream reaches of Laguna Creek and changes the timing of the sediment transport reducing habitat complexity. In addition, the existing intake screen panels are aged and were installed prior to current regulatory requirements for screening of nonanadromous fish species; and the screen openings are too large to eliminate the potential for entrainment of juvenile fish and other aquatic organisms. Other Facility constraints include the lack of permanent fallprotection infrastructure for use by staff during dam maintenance. Finally, the City's Draft Anadromous Salmonid Habitat Conservation Plan (HCP) includes improvements at the Facility as a biological objective and requires implementation within 10 years of the signed Incidental Take Permit. The proposed project is intended to address the operational and safety constraints at the site as well as the biological objective in the draft HCP.

Staff began working with Black and Veatch in 2018 to assess the overall condition of the dam and to conduct an alternative analysis and business case evaluation of projects to implement. The condition assessment found no signs of major deterioration or structural defects, and that the dam has adequate strength and stability for continued service. The alternatives analysis and business case evaluation considered social, environmental, and operational factors and weighed these factors against cost. In 2019, Coanda screen technology was selected as the best alternative to advance for detailed design.

The project team includes:

- 1. City staff, providing overall project management, contract management, and design review;
- 2. HDR, supporting city staff;
- 3. Black and Veatch, performing the design of the infrastructure;
- 4. Dudek, the environmental and permitting consultant;
- 5. Resource agencies, permitting the project elements.

TECHNICAL

The proposed project would consist of retrofitting the existing Laguna Creek Diversion intake, replacement of the sediment bypass system, and construction of other associated improvements. The Coanda screen technology is an efficient way of screening fine materials from diverted water with minimal clogging and maintenance. The design and orientation of the screen would allow the City to divert water independent of conditions behind the dam. The new system would be designed to allow for the movement of sediment past the dam in sync with the hydrology of the creek by using the creek energy present during high streamflows, resulting in gravel deposits downstream to benefit downstream fisheries and aquatic habitats. The Coanda screen would provide appropriate fish screening per current regulatory requirements and the new diversion infrastructure would allow for finer control of diversion rates enhancing the City's ability to meet beneficial in-stream flow releases and provision of ramping flows (controlled changes in downstream water levels so that fish do not become stranded).

The project is comprised of the following primary components (see figure 3-1 below, excerpted from the Environmental Impact Report):

- Abandonment of the existing intake structure, installation of bypass piping to the existing flume, and filling the existing intake structure with concrete;
- Construction of a new intake structure at the downstream face of the dam (the existing dam will stay largely intact);
- Installation of a Coanda Screen at the new intake structure;
- Construction of a new valve vault;

- Installation of new 18-inch diversion piping and connection of the diversion pipeline to the existing pipeline;
- Installation of new blowoff piping and a control valve;
- Installation of streambank protection; and
- Installation of new concrete stairs, access hatches, site lighting, and safety provisions such as handrails and fall arrest features.

Construction activities would generally include the following phases: improvement of access roads, site preparation, and mobilization; installation of the cofferdam and temporary creek bypass system; construction of the Coanda screen intake structure, including dam preparation, foundation work, and concrete formwork, and installation of the intake screen, piping, and valves; modification of the existing intake and sediment-control valves; installation of the valve vault; installation of electrical; installation of the access stairs and riprap bank stabilization; and startup and testing, site restoration, and construction closeout. No blasting or pile-driving is required for construction.

The proposed project would require the use of heavy equipment such as excavators, drill rigs, forklifts, graders, tractors, loaders, backhoes, dumpers, and generators. Haul trucks would be used to transport materials to the site and to transport spoils off-site to a permanent disposal location. Water trucks would also be used at the site.

Construction would occur in 2021 upon completion of the environmental review process, approval of the Proposed Project by the City Council, and acquisition of the necessary permits. The duration of construction would occur over approximately 3 months. Construction work would be performed from 7:00 a.m. to 5:00 p.m. on weekdays. If it is required, work outside of these hours would require approval from the Water Director.

The 100% set of plans and specifications are due in February of 2021 and bidding of the project would occur immediately after City Council approval.

ENVIRONMENTAL

The proposed project site contains Laguna Creek – a perennial, cold-water stream – surrounded by undeveloped redwood forest land and contains special status species including the federally endangered California Red-Legged Frog. These resources and the project are regulated by the United States Army Corps of Engineers, United States Fish and Wildlife Service, California Department of Fish and Wildlife (CDFW), Central Coast Regional Water Quality Control Board, California Department of Fire and Forestry, and County of Santa Cruz. In addition, the dam was found to be a physical example of pioneering water management infrastructure in California and is considered a historic resource for the purposes of the California Environmental Quality Act and regulated by the State Historic Preservation Office. Given the historic status of the dam and the sensitive environmental resources at the project site an Environmental Impact Report (EIR) was identified as the most appropriate level of environmental review. Despite the factors, no significant unavoidable impacts were identified in the Draft EIR. Additionally, the project will benefit from a streamlined permit for the California Red-Legged Frog given the project's minimal impacts. Finally, early and often regulator engagement facilitated project acceptance by CDFW. Dudek was hired in 2019 for environmental review and permitting of the project. An EIR was identified as the most appropriate level of environmental review. To elicit comments on the scope and content of the EIR Notice of Preparation (NOP) for the EIR was circulated from March 16, 2020 to April 15, 2020. The NOP was circulated to the State Clearinghouse, to local, regional, and federal agencies, to organizations and interested citizens that have requested notification for City projects, and the Water Commissioner. Additionally, the NOP was circulated to owners of properties contiguous with the project site. A notice about the availability of the NOP was published in the Sentinel on March 15, 2020. The NOP was also made available at the Water Department Engineering Counter, and online. A public scoping meeting was held on March 31, 2020. Comments were received from CAL FIRE, the Native American Heritage Commission and several individuals.

The Draft EIR was published and circulated for review and comment by the public and other interested parties, agencies, and organizations for a 45-day public review period from September 18, 2020 through November 2, 2020. The Draft EIR was filed at the State Clearinghouse and a Notice of Availability for the Draft EIR was sent to the entities listed above. A notice about the availability of the Draft EIR was published in the Sentinel on September 20, 2020. The Draft EIR was also made available at the same locations listed above under Scoping. Two public meetings in the format of online webinars were held on Wednesday, October 14, 2020 at 2:00 p.m. and 6:30 p.m. to provide information on the Proposed Project and to take public written comments on the Draft EIR. Comments were received from the California Department of Fish and Wildlife, County of Santa Cruz, and one individual. The Final EIR includes all comment letters received on the Draft EIR and provides responses to individual comments that were submitted. It also summarizes sections of the EIR document that were revised to provide corrected or clarified text or in response to the public comments. Certification of the Final EIR will be presented to the City Council on March 9, 2021 for consideration.

The EIR includes an analysis of the following environmental issue areas:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources and Tribal Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Utilities and Service Systems
- Wildfire

• CEQA-Required Sections: Significant Unavoidable Impacts, Significant Irreversible Changes, Growth Inducement, Cumulative Impacts, and Alternatives

No significant unavoidable impacts were identified in the Draft EIR, and mitigations were proposed for all potentially significant impacts to reduce those impacts to a level of less than significant.

Four applications for permits have been submitted to agencies including: the US Army Corp of Engineers, the Regional Water Quality Control Board, the California Department of Fish and Wildlife, and County of Santa Cruz. An additional permit application for tree removal will be submitted to CAL FIRE once a contract is in place with the prime contractor.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (Corps) exercises regulatory jurisdiction over certain activities within waters of the United States. The Corps receives its statutory authority from Section 404 of the Clean Water Act, which regulates the placement of dredged or fill material in jurisdictional waters of the United States, and Section 10 of the Rivers and Harbors Act of 1899, which regulates the construction of any structure in or over any navigable water of the United States or any work affecting the course, location, condition, or capacity of such waters. The Project would involve the placement of fill materials in the reservoir, filling of the seepage channel, and any temporary fills associated with construction. The project would therefore be subject to Corps regulatory authority under Section 404 of the Clean Water Act.

Regional Water Quality Control Board

The California State Water Resources Control Board (SWRCB) oversees the policy objectives of the nine Regional Water Quality Control Boards (RWQCBs). The RWQCBs exercise jurisdiction over water quality in waters of the United States within their respective regions and administer Section 401 Water Quality Certification and Section 402 National Pollutant Discharge Elimination System (NPDES) permits pursuant to the Clean Water Act to ensure projects meet state water quality standards to regulate point source discharges of pollutants to waters of the United States. The RWQCBs also regulate impacts to waters of the state, including point-source and diffused-source discharges to land and groundwater, under California's Porter-Cologne Water Quality Control Act.

A Section 401 Water Quality Certification from the Central Coast RWQCB, Region 3 is necessary for the project. Section 401 of the Clean Water Act requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards.

California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) regulates impacts to rivers, streams, and lakes in California. Fish and Game Code Section 1602 requires notification to CDFW prior to commencing any activity that may: substantially divert or obstruct the natural flow of any river, stream or lake; substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or deposit debris, waste or other materials that could pass into any

river, stream, or lake. The waters included in the definition of a river, stream or lake include those that are episodic as well as those that are perennial. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow.

A Section 1602 Lake or Streambed Alteration Agreement (LSA Agreement) is required for the project due to work within Laguna Creek, which could substantially adversely affect an existing fish or wildlife resource. CDFW will include measures in the LSA Agreement to protect fish and wildlife resources including administrative measures, avoidance and minimization measures, and reporting measures.

County of Santa Cruz

In 1976, the California State Legislature enacted the California Coastal Act to provide long-term protection of the state's coastline for the benefit of current and future generations. The California Coastal Act provides for the management of lands within California's coastal zone boundary. The boundary of the coastal zone varies across the state and varies from a couple of hundred feet to 5 miles inland of the shore. The California Coastal Act requires that individual jurisdictions adopt a LCP to implement the California Coastal Act at the local level. After the CCC certifies an LCP, the local government becomes the coastal development permit (CDP) permitting authority. The County of Santa Cruz (County) has a CCC-certified LCP.

As the proposed project occurs within the Coastal Zone and is not exempt from the LCP, it would require compliance with the LCP, including LCP policies and the standards contained in the LCP implementing ordinances. While some of these ordinances require separate approvals or permits (e.g., Riparian Exception, Significant Tree Permit), such approvals are not required for the Proposed Project, as it falls under California Government Code Section 53091 (d) and (e) and is legally exempt from County building and zoning ordinances. The relevant LCP policies and ordinances are addressed through the CDP findings made by the. The LCP implementing ordinances in the County Code Chapter 13.03 include the following sections that are relevant to the Proposed Project:

- Zoning Regulations (Chapter 13.10)
- Coastal Zone Regulations (Chapter 13.20)
- Geologic Hazards (Chapter 16.10)
- Grading Regulations (Chapter 16.20)
- Erosion Control (Chapter 16.22)
- Riparian Corridor and Wetlands Protection (Chapter 16.30)
- Sensitive Habitat Protection (Chapter 16.32)
- Significant Trees Protection (Chapter 16.34)
- Native American Cultural Sites (Chapter 16.40)
- Paleontological Resource Protection (Chapter 16.44)
- Timber Harvesting Regulations (Chapter 16.52)
- Permit and Approval Procedures (Chapter 18.10)

Department of Forestry and Fire Protection (CAL FIRE)

Commercial harvesting of timber on non-federal lands in California, whether or not the property is under timberland contract, is regulated under the state's Z'berg-Nejedly Forest Practice Act (PRC Section 4511 et seq.) and the related Forest Practice Rules (14 CCR Chapters 4, 4.5, and 10). Through this legislation, the state has established a comprehensive and specialized program

for reviewing and regulating the harvesting of timber. Harvest is strictly regulated through the review and approval of plans (e.g., Timber Harvesting Plan) by CAL FIRE. Minor conversions are conversions of 3 acres or less and, under the authority granted in the California Code of Regulations Section 1104(a)(4), do not require a timber harvesting plan. Timber operations conducted under an exemption are exempt from conversion permit and timber harvesting plan requirements of the California Forest Practice Rules, although they are still required to comply with all other applicable provisions of the Z'berg-Nejedly Forest Practice Act and regulations of the Board of Forestry.

The proposed project will apply for a minor conversion permit exemption from CAL FIRE for the removal of trees and replacement with developed uses.

Compensatory Mitigation for Permanent Impacts

The Department has developed one mitigation project to meet the mitigation requirements of the EIR and the following permits:

- Clean Water Act Section 404 Nationwide Permit from the Army Corp of Engineers,
- Clean Water Act 401 Water Quality Certification from the California Central Coast Regional Water Quality Control Board, and
- California Fish and Game Code Section 1602 Lake and Streambed Alteration Permit from the California Department of Fish and Wildlife.

The mitigation focuses on enhancing onsite riparian and redwood habitat through invasive species removal. Acceptance of the proposed mitigation project by regulators is still in process.

FINANCIAL

The current total project cost estimate, from planning through construction and mitigation, is \$3.6 million. Major cost elements include:

- Construction: \$1.9 million.
- Design: \$360,000
- Environmental: \$645,000
- Construction services: \$600,000 (includes construction management, environmental monitoring, environmental mitigation)

Several grants were evaluated for this project, one through the Wildlife Conservation Board and the other the Coastal Conservancy. Neither was pursued due to lack of alignment with the targeted objectives of the grantor.

These project costs are included in Department's financial plan and pro-forma; projects without external funding (e.g., SRF, WIFIA, grants) will be paid through pay/go or bond financing.

FISCAL IMPACT: There is no fiscal impact associated with this item and the requested action. The cost of the project is being incorporated into the Department's financial planning efforts.

PROPOSED MOTION: None.

ATTACHMENT(S):

- 1. Draft Environmental Impact Report (available online at: <u>http://www.cityofsantacruz.com/government/city-departments/water/online-reports/environmental-documents</u>);
- 2. Final Environmental Impact Report (To be posted online and shared electronically to Commissioners early February: <u>http://www.cityofsantacruz.com/government/city-departments/water/online-reports/environmental-documents</u>)



May 2020 - NTP: May 04, 2020



Installation of Exclusion Fencing

Delivery of Contractor Jobsite Trailers

June 2020



30" PVC Pipe Delivery

July 2020



Staging – 30" NCP

Installation – 30" NCP

August 2020 – Wild Fire Evacuation from August 19, 2020 to September 1, 2020



Installation – 30" NCP



Installation – 30" NCP



Wildfire Evacuation



Mobilization of Barges

September 2020



Installation of Concrete Encased 30" NCP



Connection of 30" to Existing



Installation of Temporary 16" Bypass



Installation of Silt Curtain

September 2020 (continued)



Exposed Abandoned 22" NCP

Concrete Backfill for Precast Culvert

October 2020



Excavation for Concrete Apron

Installation of Concrete Apron

October 2020 (continued)





Mobilizing Crane to Barge



Beginning of Dredging

Completion RW #1 in Riparian Zone Beneficial Flow released in plunge pool Re-established Exclusion Fence

November 2020 – Achieved Milestone 1 (November 10, 2020)

Re-established access road

6.23



December 2020 – Recent Activities



Install Shotcrete at Portal

Install Shotcrete at Portal

December 2020 – Recent Activities (continued)



Continued Dredging



Current Condition of Plunge Pool



Temporary Paving over 30" NCP



Concrete Barrier Wall

FSS

CITY of SANTA CRUZ WATER PROGRAM

Capital Improvement Projects

Level 1 - Single Line Schedule

Activity ID	Activity Name	Start	Finish			2023 202 0 0 0 0 0	
City of SC	WP - CURRENT	19-Feb-18 A	11-Feb-31				
1.1 - Lagu	ina Creek Diversion Retrofit Project	30-Jun-18 A	04-Jan-23				
1.2 - North	n Coast System Major Diversion Rehab	30-Jun-18 A	11-Feb-31		 		
1.3.1 - Tai	t Diversion Rehab/Replacement Project	30-Jun-18 A	13-Dec-29		 		
1.3.2 - Co	ast Pump Station Rehab/Replacement	16-Aug-18 A	02-Jul-30		 		I
1.4 - Felto	on Diversion and Pump Station Assessment	30-Jun-18 A	02-Apr-29				
1.5 - New	ell Creek Dam Inlet/Outlet Replacement Project	21-May-18 A	28-Sep-23				
2.1 - North	n Coast System Repair and Replacement Project	02-Oct-18 A	20-Aug-21				
2.1.1 - No	rth Coast Repair Phase 4	01-Feb-24	03-Aug-27		 		
2.1.2 - No	rth Coast Repair Phase 5	01-Jul-24	12-Dec-28		 		
2.2 New	ell Creek Pipeline Rehab / Replacement	01-Apr-18 A	20-Jul-22	0			
2.2.1 - Nev	well Creek Pipeline Felton/Graham Hill	01-Sep-19A	05-Nov-24				
2.2.2 - Nev	well Creek Pipeline Felton/Loch Lomond	03-Jan-23	13-Sep-28		 		
2.2.3 - Bra	ackney Landslide Area Pipeline Risk Reduction	02-Mar-20 A	25-Oct-24				
2.3 Coast	Pump Station 20" RWP Replacement	02-Jul-18 A	10-Feb-22				
3.1 - Wate	r Supply Augmentation	30-Jun-18 A	15-Dec-21]		
3.2 - Recy	cled Water Feasibility Study	30-Jun-18 A	19-Jan-22				
3.3 - ASR	Planning (Existing Contracts FY20-FY21)	01-Dec-19A	04-Oct-22	[
3.3.1 - AS	R Mid County Existing Infrastructure	30-Jun-20 A	02-Jul-24				
3.3.2 - AS	R Mid County New Wells	16-Feb-21	29-Mar-27				
3.3.3 - AS	R Santa Margarita Groundwater	01-Jan-21	28-Sep-27				
3.3.4 - AS	R Pipeline New	01-Sep-22	30-Sep-27				
4.1 - Grah	am Hill WTP Tube Settlers Replacement	19-Feb-18 A	24-Mar-23		 		
4.2 - Grah	am Hill WTP Flocculator Rehab / Replacement	01-Nov-18 A	24-Mar-23				
4.3 - Grah	am Hill WTP Concrete Tanks Project	30-Jun-18 A	26-Jun-25	-			
4.3.1 - Gra	aham Hill WTP Entrance Improvements	01-Jan-21	18-Jun-24				
4.4 - Grah	am Hill WTP Facilities Improvements Project	01-May-18 A	30-Jan-29				
4.5 - Rive	r Bank Filtration Study	09-May-18 A	10-Nov-27		 		
6.1 - Univ	ersity Tank No.4 Rehab / Replacement	16-Aug-18 A	20-May-25				
6.2 - Univ	ersity Tank No.5 Replacement	30-Jun-18 A	01-Jul-21				

Planning Design

Construction

Post Construction **Program Administration and Construction Services not Shown** Environmental

Page 1 of 1





WATER COMMISSION INFORMATION REPORT

DATE: 1/28/2021

AGENDA OF:	February 1, 2021
TO:	Water Commission
FROM:	Nicole Dennis, Principal Management Analyst
SUBJECT:	Report of the Water Commission's Ad Hoc Subcommittee on Revenue Forecasting and Financial Scenario Planning Outcomes

RECOMMENDATION: That the Water Commission accept the recommendation of the Ad Hoc Subcommittee of Financial Planning Scenario 4 as the revenue requirements for further water rate development.

BACKGROUND: At the Water Commission's July 7, 2020 meeting, an Ad Hoc Subcommittee was formed to forecast revenues and develop various financial scenarios to establish revenue requirements to inform the water rate making process. Three members of the Water Commission, Doug Engfer (Chair), Walt Wadlow and Alejandro Páramo, were selected to work closely with Water Department staff on this assignment.

The Ad Hoc Committee met with staff on five different occasions to:

- Gain an understanding of the current financial model, including inputs and outputs, used by the Department;
- Review four scenarios with four different Capital Investment Plan (CIP) expenditure plans including a low (\$189 million), medium (\$377 million) and high (\$610 million) level of capital investment as well as a no CIP (\$0) scenario; and
- The Ad Hoc Committee directed staff to prepare a fifth scenario that smoothed the \$610 million CIP over 15 years to equalize the collective impacts on water rates.

DISCUSSION: The five meetings held with the Ad Hoc Subcommittee were highly interactive. Subcommittee members asked insightful questions, requested additional analyses, adjusted inputs, and had detailed conversations with staff to understand the impacts of the various scenarios.

The associated presentation will convey the detailed information of scenarios reviewed by the Ad Hoc Committee. Data reviewed included: CIP project priorities, projects included in each of the scenarios, a side-by-side comparison of all the scenarios, and the aggregate impact on future water rates.

The final financial scenario approved by the Water Commission will establish revenue requirements and inform the water rate making process. This information will be provided to the Water Department's rate consultant, Raftelis, to use, ultimately, in the development of rates by customer class. The next step in the water rates process will be rate design which is scheduled for the March 1, 2021 Water Commission meeting.

FISCAL IMPACT: Adoption of Financial Planning Scenario 4 will fully funds the current CIP over the next water rate period of July 1, 2022 through June 30, 2027 and smooth water rate cumulative increases through FY 2037. While preliminary calculation of the rate impacts of Financial Planning Scenario 4 are known in the aggregate, the impact to individual customer classes are unknown at this time. Additional rate design and analysis will need to be completed over the next six to nine months to determine actual rate increases by customer class.

PROPOSED MOTION: Motion to accept the recommendation of the Ad Hoc Subcommittee of Financial Planning Scenario 4 as the revenues requirements for the water rate development.

ATTACHMENTS: 1. Slide 14 Graphic– SCWP Priority Ranking Chart Attachment 1. Slide 14 Graphic-SCWP Projects Priority Ranking



Revenue Forecasting & Financial Scenario Planning

Water Commission Ad Hoc Subcommittee Results and Recommendation

Our Water, Our Future



Ad Hoc Committee Work: What's the Plan for What is Needed for the CIP?

Financial Planning Conceptual Model



Ad Hoc Committee Process

Meeting 1: Gained understanding of current financial model inputs/outputs

Meetings 2 & 3: Evaluated 3 initial CIP spending scenarios and the impact to rates

• Recommended a 4th scenario for consideration

Meetings 4 & 5: Evaluated results of 4th scenario and compared all scenarios to develop recommendation

 \bullet A 5th analysis was run with no CIP to assess impacts of projected increases in O&M

Financial Model Overview

- Supports the Long Term Financial Plan by modeling:
 - Financial targets for 180 days cash, reserve balances, and 1.5x
 Debt Service Coverage

Model Inputs

- Revenue projections
- O&M budget
- CIP budget
- Debt service payments



Model Outputs

- Financial targets
- Debt requirements
- Fund balances
- Annual % increased to water rate revenues
- Current inputs include the postponed 7/1/2020 6% rate increase to 7/1/2021 and updated projections for revenues, O&M and CIP expenses, loan and bond proceeds, staff furloughs, and lower debt interest rates

Scenario Development – CIP Priority Tool

78



- Used multiple criteria to establish relative priority of projects
- Assisted decision making on which projects received priority for funding

Scenario Development – Common elements in scenarios

- All values are presented in escalated dollars
- All scenarios include:
 - Active (in construction) CIP projects
 - Department-led main replacements
 - Minor maintenance projects (Facility and Infrastructure Improvements)
- Annual % increased to water rate revenues are shown for the FY2023-2027 timeframe

Initial Scenarios Considered

Scenario 1	Scenario 2	Scenario 3
Low	Medium	High
Commitments to active projects-only	Funds active projects, treatment, and some water supply projects	Current CIP-Baseline Budget and Schedule

Initial Scenarios Considered – Scenario 1 Overview

- Only funds projects that are under construction, or will be in the next 3 months
- Funds several planning studies
- No investment in water supply or treatment, or pipelines

Requires 7% per year over year rate increases

Spending tapers by FY25

10-yr cost is **\$189M**

Initial Scenarios Considered – Scenario 2 Overview

Adds:

- Mid-County Water Supply projects only
- Water Treatment
 Improvements
- A single grant funded transmission main project
 (Brackney Risk Reduction)
- No investment in most of Newell Creek Pipeline,
 Santa Margarita ASR, and Diversions

Requires 10% per year over year rate increases

Spending tapers by FY28

712

10-yr cost is \$377M

Initial Scenarios Considered – Scenario 3 Overview

- Funds:
 - All Water Supply projects
 - Water Treatment Improvements
 - Replacement of raw water transmission mains (Newell Creek and North Coast) systems
 - Rehab or replacement of raw water diversions

Requires 14% per year over year rate increases

Spending continues through FY2030

713

10-yr cost is **\$610M**

Issues discussed in considering scenarios

- System reliability/degradation
- Continued vulnerability to drought
- Emergency repairs of pipeline failures and other infrastructure
- Scenario 3 contains "second peak" in spending in FY2026-FY2027
- Recommended modelling of a 4th scenario to extend schedule from 10-years to 15-years to "smooth" year over year rate increases

Scenario 4 Overview

 Accomplishes Scenario 3 projects by delaying projects to smooth revenue requirements over a 15-year period Requires 10% per year over year rate increases

Project Name	Delay (years)
ASR-Mid County-new wells	2
ASR- Santa Margarita , Wells/Pipelines	2/5
Newell Ck Pipeline-Felton to Loch Lomond	5
North Coast System Pipelines	5
Coast Pump Station Rehab	3

15-yr cost is \$658M
Putting it all together – the data

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
	Low	Medium	High	"Smooth"
Brief Description	Commits to active projects only	Funds active projects, treatment, and some water supply projects	Current CIP- Baseline Budget and Schedule	Refined version of Scenario 3 – Delays 6 projects
Cost	\$189M over 10-years	\$377M over 10-years	\$610M over 10-years	\$658M over 15-years
Bulk of work completed by	FY2025	FY2028	FY2030	FY2033
Impact to rates (FY2023- FY2027)	7% annual increase	10% annual increase	14% annual increase	10% annual increase

Putting it all together – the schedule



Estimated Impacts on Rates

Estimated the impact on single-family residential (SFR) for 4 ccf and 6 ccf customers:

<u>SFR with 5/8 meter @ 4 ccf</u>					<u>SFR with 5/8 meter @ 6 ccf</u>								
	Sc	enario 1	So	cenario 2 & 4	Sc	enario 3		Sc	enario 1	Sc	enario 2 & 4	Sc	enario 3
Proposed % increase		7%		10%		14%	Proposed % increase		7%		10%		14%
Current	\$	50.83	\$	50.83	\$	50.83	Current	\$	72.72	\$	72.72	\$	72.72
FY 2022	\$	53.66	\$	53.66	\$	53.66	FY 2022	\$	76.84	\$	76.84	\$	76.84
FY 2023	\$	56.90	\$	58.59	\$	60.48	FY 2023	\$	81.46	\$	83.87	\$	86.57
FY 2024	\$	60.35	\$	64.01	\$	68.24	FY 2024	\$	86.38	\$	91.61	\$	97.64
FY 2025	\$	64.02	\$	69.97	\$	77.07	FY 2025	\$	91.62	\$1	.00.11	\$ 1	10.24
FY 2026	\$	67.93	\$	76.52	\$	87.11	FY 2026	\$	97.20	\$ 1	.09.45	\$ 1	24.56
FY 2027	\$	72.10	\$	83.72	\$	98.53	FY 2027	\$ 1	03.15	\$ 1	19.73	\$ 1	40.85

Note: The adopted 6% rate increase is assumed for FY 2022; the proposed rates are applied to FY 2023-2027 using current rate structure.

7.18

Discussion

Our Water, Our Future

7.19

