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

Water Department

WATER COMMISSION

Regular Meeting

December 03, 2018

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

*Denotes written materials included in packet.

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.

APPEALS: 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 City Clerk.

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

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 - No action shall be taken on this item.

Commissioner Schiffrin Commemoration (Page 1)

Announcements - No action shall be taken on this item.

Consent Agenda (Pages 1.1-3.1) 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.

1. City Council Actions Affecting the Water Department (Page 1.1-1.2)

   Accept the City Council Actions Affecting the Water Department.

2. Water Commission Minutes from November 5, 2018 (Pages 2.1-2.7)

   Approve the November 5, 2018 Water Commission Minutes.

3. Water Commission Meeting Schedule for 2019 (Page 3.1)

   Approve the Water Commission meeting schedule for 2019.

Items Removed from the Consent Agenda

General Business (Pages 4.1-5.5) 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. WSAS Quarterly Work Plan Update (Pages 4.1-4.18)

   Receive information on the Quarterly WSAS Update and provide feedback to staff.

5. Workshop on Water Treatment – GHWTP Condition Assessment, Seismic Assessment, Treatment Process Evaluation, Requirements for Ongoing Operations with Existing Sources and Water Quality Characteristics, and with Additional Winter Water Sources and Water Quality Characteristics (Pages 5.1-5.5)

   Receive information on the Graham Hill Water Treatment Plant Master Plan and provide feedback to staff.

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

6. Santa Cruz Mid County Groundwater Agency

7. Santa Margarita Groundwater Agency

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

Information Items

Adjournment

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WHEREAS ANDY SCHIFFRIN HAS SERVED HIS COMMUNITY BY SERVING ON THE CITY OF SANTA CRUZ WATER COMMISSION FOR 25 YEARS; AND

WHEREAS ANDY SCHIFFRIN OFFERED HIS UNIQUE PERSPECTIVE GLEANED FROM HIS 40+ YEARS OF SERVICE IN LOCAL GOVERNMENT ON ALL MATTERS RELATED TO THE SANTA CRUZ WATER DEPARTMENT'S OPERATIONS, MANAGEMENT, PLANNING FOR MORE THAN TWO DECADES; AND

WHEREAS ANDY SCHIFFRIN SHEPHERDED THE WATER DEPARTMENT DURING A TIME OF WATER SHORTAGES, AND SIMULTANEOUS INCREASINGLY STRINGENT WATER QUALITY AND ENVIRONMENTAL REGULATIONS; AND

WHEREAS OVER THE LAST 25 YEARS, WATER COMMISSIONER ANDY SCHIFFRIN HAS PARTICIPATED IN DISCUSSIONS GUIDING A NUMBER OF IMPORTANT PLANNING EFFORTS RELATED TO WATER SUPPLY PLANNING INCLUDING:

- THE 1994 CITY OF SANTA CRUZ WATER SUPPLY ALTERNATIVE STUDY;
- THE 2000 CITY OF SANTA CRUZ ALTERNATIVE WATER SUPPLY STUDY;
- THE 2000 URBAN WATER MANAGEMENT PLAN AND SUBSEQUENT UPDATES IN 2005, 2010 AND 2015;
- THE 2002 EVALUATION OF REGIONAL WATER SUPPLY ALTERNATIVES;
- CREATION OF SCWD^2, A PARTNERSHIP BETWEEN THE CITY OF SANTA CRUZ AND SOQUEL CREEK WATER DISTRICT TO COLLABORATE ON THE DEVELOPMENT OF A LOCAL DESALINATION FACILITY TO CREATE A RELIABLE WATER SUPPLY FOR BOTH AGENCIES;
- THE 2009 WATER SHORTAGE CONTINGENCY PLAN;
- THE 2016 DIVISION OF DRINKING WATER SANITARY SURVEY; AND
- THE 2017 WATER CONSERVATION MASTER PLAN; AND

WHEREAS ANDY SCHIFFRIN CHAMPIONED UNDERSTANDABLE FINANCIAL INFORMATION AND ADVISED THE WATER DEPARTMENT ON THE DEVELOPMENT OF THE QUARTERLY FINANCIAL REPORT; AND

WHEREAS ANDY SCHIFFRIN HAS PARTICIPATED IN MULTIPLE PLANNING AND ANALYTICAL PROCESSES THAT RESULTED IN REVISED WATER RATES, SYSTEM DEVELOPMENT CHARGES OR FEES, ALL REQUIRING THE COMMISSION'S APPROVAL; AND

WHEREAS ANDY SCHIFFRIN HAS ATTENDED OVER 200 WATER COMMISSION MEETINGS, LISTENED TO APPROXIMATELY 400 STAFF PRESENTATIONS AND REVIEWED APPROXIMATELY 1,000 STAFF REPORTS, PROJECT REPORTS, DIAGRAMS AND DATA AS PART OF HIS 25 YEAR SERVICE ON THE WATER COMMISSION.

NOW, THEREFORE, I DAVID TERRAZAS, MAYOR OF THE CITY OF SANTA CRUZ, DO HEREBY PROCLAIM MONDAY, DECEMBER 3, 2018 AS "ANDY SCHIFFRIN APPRECIATION DAY" IN THE CITY OF SANTA CRUZ AND URGE ALL CITIZENS TO JOIN IN THE CELEBRATION OF HIM AND IN RECOGNITION OF HIS MANY YEARS OF VOLULANTARY SERVICE THAT, WHICH RECOGNITIONS HAS BEEN DETERMINED TO BE CATEGORICALLY EXEMPT FROM THE PROVISIONS OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

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WATER COMMISSION
INFORMATION REPORT

DATE: 11/28/2018

AGENDA OF: December 3, 2018

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: City Council Actions Affecting the Water Department

RECOMMENDATION: Accept the City Council actions affecting the Water Department.

BACKGROUND/DISCUSSION:

November 13, 2018

Resolution to Pledge Water Rates Revenues to Repay State Water Resources Control Board (SWRCB) Funding for Graham Hill Water Treatment Plant Concrete Tanks Project (WT)

Resolution No. NS-29,459 was **adopted** pledging water rate revenues to repay State Water Resources Control Board (SWRCB) funding for the Graham Hill Water Treatment Plant Concrete Tanks Project as required by the SWRCB to apply for funding and execute the agreement in a form approved by the City Attorney.

Resolution to Reimburse Capital Expenditures from Future State Water Resources Control Board Financing (WT)

Resolution No. NS-29,460 was **adopted** authorizing the Water Department to be reimbursed by State Water Resources Control Board (SWRCB) for costs related to the Newell Creek Dam Inlet-Outlet Pipeline Replacement Project. The reimbursement is contingent on SWRCB accepting the project loan application.

Award of Contract for Construction Management Services for Newell Creek Dam Inlet/Outlet Replacement Project (WT)

Motion **carried** authorizing the City Manager to execute an agreement in a form approved by the City Attorney with Mott MacDonald (San Ramon, CA) to provide construction management services for the Newell Creek Dam Inlet/Outlet Replacement Project.

Graham Hill Water Treatment Plant Concrete Tanks, Design and Construction Support Services with West Yost Associates – Contract Amendment No. 2 (WT)

Motion **carried** authorizing the City Manager to execute Contract Amendment No. 2 for the Graham Hill Water Treatment Plant Concrete Tanks, Design and Construction Support Services Project with West Yost Associates (WYA) in a form approved by the City Attorney.

Program Management Services with HDR Engineering – Contract Amendment 2018-3.2 (WT)

Motion **carried** authorizing the City Manager to execute Contract Amendment No. 2018-03.2 with HDR Engineering for Service Order No. 2 in the amount of $143,032 in a form to be approved by the City Attorney.

November 27, 2018

Coast Pump Station Pipeline Replacement Design and Construction Support Services – Contract Amendment No. 1 (WT)

Motion **carried** authorizing the City Manager to execute Contract Amendment No. 1 in the amount of $90,402 with Kleinfelder, Inc. in a form to be approved by the City Attorney.

Water Supply Augmentation Strategy Implementation; Prioritization of Recycled Water Alternatives above Seawater Desalination (WT)

Motion **carried** to support staff and Water Commission's recommendation to prioritize the further study of recycled water alternatives over seawater desalination, consistent with the implementation work plan recommended by the Water Supply Advisory Committee and approved by City Council; perform additional analysis on identified recycled water projects; and support the continued evaluation of improvements at the City's Wastewater Treatment Facility to a tertiary level of treatment that would be necessary for any beneficial use of recycled water.

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

ATTACHMENTS: None.

Water Department

Water Commission
7:00 p.m. – November 5, 2018
Council Chambers
809 Center Street, Santa Cruz

Summary of a Water Commission Meeting

Call to Order: 7:01 PM

Roll Call

Present: L. Wilshusen (Chair), D. Engfer (Vice-Chair), J. Mekis, A. Schiffrin, W. Wadlow

Absent: D. Baskin with notification, D. Schwarm with notification

Staff: R. Menard, Water Director; C. Coburn, Deputy Director/ Operations Manager; J. Becker, Finance Manager; H. Luckenbach, Deputy Director/Engineering Manager; K. Fitzgerald, Administrative Assistant III

Others: 7 members of the public.

Presentation: None.

Statement of Disqualification: None.

Oral Communications: Mr. Coburn gave an update on the status of the Rincon Fire that is burning near Highway 9 in the Santa Cruz Mountains and stated that the fire or activities related to its containment have not had any effects on the City water supply.

Announcements: Ms. Menard announced that Public Scoping Meetings on the draft Environmental Impact Report (EIR) of the Santa Cruz Water Rights Project will be held at the Harvey West Scouthouse on November 7th at 6:30 pm and at the Highlands Park House on November 8th at 6:30 pm.

Consent Agenda

1. City Council Items Affecting Water
2. Water Commission Minutes from October 1, 2018.
5. Informational Item Providing an Update on Planned In Lieu Water Transfer with Soquel Creek Water District
6. Updated Working Draft – Water Commission
7. Informational Items from the Public

Commissioners commented on the Updated Working Draft of the Water Commission Work Plan and requested the WSAS Decision Process item appearing in the Pending Item list for the March 2019 Water Commission meeting be added to the 2019 Draft Work Plan.

Commissioners commented that the September 2, 2019, Water Commission meeting will have to be rescheulded due to the Labor Day holiday.

Commissioner Schiffrin moved the Consent Agenda as amended. Commissioner Mekis seconded.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: Commissioner Wadlow abstained from Item 2 due to absence.

Items removed from the Consent Agenda

3. FY 2018 4th Quarter Financial Report

What proportion of the expenditures for the 2017 winter storms have been reimbursed through disaster public assistance agencies?

- To date, the Department was reimbursed approximately 86% of all related disaster expenditures from the Federal Emergency Management Agency (FEMA) and the California Office of Emergency Services (OES). This is testament to the hard work from our Distribution and Administration staff in meeting all the stringent documentation requirements from FEMA and OES given no prior training under a stressful situation.

- Secondly, the point was made that FEMA only reimburses public agencies for 75% of any disaster expenditures. The State shares the remainder of eligible disaster expenditures with the Department. The Department still needs to repair the damage to the Carbonera Tank Access Road and we expect 87.5% (FEMA 75%, OES 12.5%) of those future expenditures will be reimbursed through the FEMA Public Assistance Grant Program.

On page 3.5, is the budget balance for Water Treatment Upgrades for the planning phase only?

- Yes.

Commissioner Schiffrin moved the staff recommendation on Item 3. Commissioner Engfer seconded.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

4. Information Item Providing an Update on CEQA Processes for Various Water Department Projects including the Newell Creek Dam Inlet Outlet, the Graham Hill Water Treatment Plant Concrete Tanks Replacement, and the Water Rights Amendment Project.

What is the diameter of the 2000' of replacement pipeline for the Newell Creek Dam Inlet/Outlet Replacement Project referenced on page 4.1?

- A final determination on the diameter has not been reached at this time, but the current recommendation from the consultant is a 30" pipe. Staff hopes to gain more information when results of the modeling on the San Lorenzo River from Gary Fiske are available.

Why has the State questioned the Notice of Exemption (NOE) for the Graham Hill Water Treatment Plant Concrete Tanks Replacement?

- The State felt that an Initial Study, or a Negative Declaration or Mitigated Negative Declaration would provide more legal protections from possible challenges than an NOE. It should be noted that this issue was brought up by the State after they began reviewing the loan application for State Revolving Funding (SRF).

Commissioner Schiffrin moved the staff recommendation on Item 4. Commissioner Wadlow seconded.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

General Business

8. Update on Water Supply Augmentation Strategy Decision Process

Ms. Luckenbach introduced the discussion on the Water Supply Augmentation Strategy Decision Process. The discussion continued to cover the strategies staff is developing in order to implement the decision making process on projects for water supply augmentation.

Do alternatives exist under ASR and in lieu?
Table 1 of the packet on page 8.3 was intended really to highlight the alternatives related to Element 3 – recycled water and desalination. The alternatives for ASR and in lieu have not been defined as the modeling and pilot work is ongoing. But there will very likely be alternatives such as in lieu with Soquel Creek plus ASR in the Mid County Groundwater Basin. This table will continue to evolve as more information is known.

Commissioners commented that similar to what was done with the alternative numbering for the Recycled Water Study, staff should consider developing one unique identifier for each in lieu or ASR alternative to provide clarity when discussing in the future.

- On page 8.3 Item 3B - would accommodations of or collaboration with Soquel Creek Water District constrain City options at the WWTF? We are working carefully with the District to ensure that any expansion at the WWTF does not conflict with city operations or future opportunities the City may want to explore with regards to the use of recycled water.

Does a criterion that addresses “resilience” and “redundancy” exist?

- Yes, they have placed under “System Flexibility and Phasing Potential” in Table 2. This is intended to capture the ability to have a backup should a failure or break occur.

Should the ability or percentage of the ability to fill the demand gap be a criterion?

- Yes, this criterion already exists and is captured under the Economic Metric. Another related metric included in Table 2, referred to ACAYY, was developed by WSAC as a way to measure the cost-effectiveness of a project in relation to its ability to fill the demand gap.

Commissioners commented that projects, such as the water transfers with Soquel Creek Water District and ASR Phase II Testing, in Table 1 should be more clearly differentiated according to the status of each project.

Commissioners commented that items 4 and 5 under Recycled Water on Table 1 should be updated to show that they are still active because of the City's decision to recommend advanced treated recycled water over desalination.

Staff responded to Commissioners' comments and will add footnotes as necessary to the Table attachments as necessary.

Commissioners commented on the need to evaluate the criteria in Table on page 8.4 for any redundancy and adjust accordingly.

Commissioners suggested review of the WSAC metric of cost, the ACAYY (Annualized Cost per million gallons of Average Year Yield), and recommend an alternative cost comparison metric to the Commission for consideration if appropriate.

Staff responded that the metrics should not be removed at this time because of the varying complexity and layered costs of certain projects.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

Commissioner Schiffrin moved the staff recommendation on Item 8. Commissioner Engfer seconded.

No public comments were made.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

9. Review and Approval of City Council Staff Report Recommending the Prioritization of Recycled Water Alternatives above Seawater Desalination

Ms. Luckenbach introduced the discussion and review of the draft of the staff report that will be submitted to the City Council that recommends prioritizing Recycled Water Alternatives over Seawater Desalination.

Commissioners suggested that the recommendation on the draft staff report to City Council be altered to read "support the further study of improvements at the City's Wastewater Treatment Facility."

Commissioners suggested that the second paragraph of page 9.5 read "because the OPA now requires a subsurface intake" to clarify that it was not a requirement at the time when desalination was initially brought to the City Council.

Commissioners suggested including context in the background section of the draft staff report that states that the City Council accepted the WSAC report, thus directing staff to include the Urban Water Management Plan as an addition to Element 3.

Commissioners suggested that the staff report include that the staff recommendation is coming from the Water Commission and to also include the language "and potentially leading to significantly higher costs and uncertainty." at end of the last sentence on the first paragraph of page 9.5.

Have other City Commissions such as the Transportation and Public Works Commission or the Planning Commission been presented with this information?

- No.

Ann Hogan, City Wastewater System Manager from the Public Works Department commented on the status of the Title 22 Upgrade Project at the Wastewater Treatment Facility. Title 22 water is tertiary treated wastewater that can be used for a variety of non-potable uses. Ms. Hogan reported that a business case study will be conducted to help determine if the upgrades are worthwhile and feasible and, based on potential beneficiaries of the shift to tertiary treatment, how any costs should be allocated. She also noted that Public Works has a very positive outlook on a partnership between the Public Works and Water Departments.

Ms. Menard commented that any upgrades to the Wastewater Treatment Facility would not require further expansion of the existing plant layout into Neary Lagoon.

Is the Santa Cruz Public Works Department Title 22 Upgrade Project listed on page 9.4 the same project that Ms. Hogan was referencing?

- Yes.

What is the difference between Title 22 and Tertiary treatment upgrades to the Waste Water Treatment Plant?

- Tertiary treatment upgrades are a part of the Title 22 Upgrade project.

Commissioner Schiffrin moved to support the staff recommendation on item 9 with Commissioners suggestions to the draft staff report to City Council. Commissioner Mekis seconded.

Commissioner Wilshusen proposed an amendment to Commissioner Schiffrin's suggested wording on the draft staff recommendation to say: "support continued evaluation of

improvements at the City's Wastewater Treatment Facility."

No public comments were made.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

Subcommittee/Advisory Body Oral Reports

10. Santa Cruz Mid-County Groundwater Agency

- Ms. Menard reported that the October meeting of the Mid County Ground Water Agency occurred two weeks prior and consisted of modeling results of in lieu and ASR similar to those presented by Robert Marks at the October Water Commission meeting, and focused on seawater intrusion and maintaining protective groundwater elevations. The Mid County Groundwater Agency Board will meet next Wednesday, November 15th to discuss issues related to projects and management actions that may be included in the Groundwater Sustainability Plan. No GSP Advisory Committee meeting held in November and this group will meet for the last time this calendar year on Wednesday, December 12th.

Will grant funding opportunities be available to the City if Proposition 3 passes?

- It is possible with such a large statewide water bond that there are bound to be grant opportunities available to the City for a variety of projects.

11. Santa Margarita Groundwater Agency

- Commissioner Engfer reported that the SMGA has had two meetings since the last report in August and that it is still in the beginning phases of organization. The election results of the Scotts Valley Water District board and San Lorenzo Water District board could possibly bring significant changes to the constituency of the SMGA.

Ms. Menard commented that the facilitator working with the SMGA has recommended a significant investment in community education and that outreach events for land and water use connectivity, water budgets, stream flows, and groundwater issues are being planned for half day sessions tentatively scheduled for January 12th, February 9th and March 9th, 2019.

Does the recent decision linking public trust doctrine on the interaction between groundwater and surface water flows going to affect the Santa Margarita basin?

- The interaction of groundwater and surface water it is likely one of the key issues in the Santa Margarita basin so it is possible that the public trust doctrine will play some role in the future of this basin. More information on this court decision can be found at:

  https://www.omm.com/resources/alerts-and-publications/alerts/ca-court-of-appeal-affirms-application-of-public-trust-doctrine-groundwater-pumping/

One member of the public commented.

Director's Oral Report: Ms. Menard reported that the Union Locust building remodel is continuing as scheduled.

Adjournment Meeting adjourned at 8:17PM.

Respectfully submitted,

Katy Fitzgerald
Staff

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WATER COMMISSION
INFORMATION REPORT

DATE: 11/28/2018

AGENDA OF: 12/3/2018

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: Water Commission Meeting Schedule for 2019

RECOMMENDATION: Approve the Water Commission meeting schedule for 2019.

BACKGROUND/DISCUSSION: All meetings are scheduled for the Santa Cruz City Council Chambers unless otherwise noted.

January 2019
(01-07-19)

February 2019
(02-04-19)

March 2019
(03-04-19)

April 2019
(04-01-19)

May 2019
(05-06-19)

June 2019
(06-03-19)

July 2019
(07-01-19) *(Likely to be cancelled)*

August 2019
(08-05-19)

September 2019
(09-02-19) *Labor Day (Will be rescheduled)*

October 2019
(10-07-19)

November 2019
(11-04-19)

December 2019
(12-02-19)

FISCAL IMPACT: None

PROPOSED MOTION: Motion to approve the Water Commission meeting schedule for 2019.

ATTACHMENTS: None.

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WATER COMMISSION
INFORMATION REPORT

DATE: 11/28/2018

AGENDA OF December 3, 2018

TO: Water Commission

FROM: Heidi Luckenbach, Deputy Director/Engineering Manager

SUBJECT: Water Supply Augmentation Strategy, Quarterly Work Plan Update

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

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

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

The content and format of this report have been modified based on feedback from the Water Commission. Commissioner comments that are reflected herein or are a work in progress include:

- Organize by "Element" as defined by the WSAC. Reflected herein.
- Develop a spreadsheet that shows all the supply projects and portfolios of projects with all the metrics. Included as Attachment 1.
- Include an update on Santa Cruz Water Rights. Reflected herein.
- Develop a narrative and/or spreadsheet that shows the nexus between water supply projects specifically spelled out in the WSAC report and other projects and studies being performed by the Water Department. Work in progress.
- For context, include an update on work being performed under the Sustainable Groundwater Management Act. Work in progress.

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

- Element 0: Demand Management. Implementation of the Long Term Water Conservation Master Plan is foundational to the WSAS.
- Element 1: In Lieu. This alternative could include the sale of water to other agencies with or without the assumption of additional water back to the City during droughts.
- Element 2: Aquifer Storage and Recovery. Evaluations of both the Mid-County and Santa Margarita Groundwater Basins are being conducted.
- Element 3: Advanced Treated Recycled Water or Seawater Desalination

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

DISCUSSION:

ELEMENT 0: DEMAND MANAGEMENT

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

Summary: The following is a summary of the status of the selected measures in the water conservation plan.

No. 2 Advanced Metering Infrastructure (AMI). Work on AMI is currently proceeding on two tracks: 1) a business case study, and 2) an irrigation meter pilot project. It is a joint effort between Customer Service, Meter Shop, Administration, Engineering, and Water Conservation.

- AMI Business Case Study

The AMI Business Case Evaluation (BCE) is moving forward successfully. Task 3 of the BCE is the business case model evaluation itself. Staff has reviewed the preliminary model results and has reviewed & commented on the Task 3 technical memorandum. Staff is awaiting the draft of the final BCE report, which will incorporate all the comments on the first three tech memos and provide the final model results and analysis. The draft BCE report is expected to be delivered on December 10th. The results of the BCE will be presented to the Water Commission in early 2019.

- AMI Irrigation Meter Pilot Project

The AMI Irrigation Meter Pilot Project with Badger meter is also moving forward successfully. The pilot evaluation period is over and the analysis and reporting are nearly complete. Staff has reviewed preliminary data results from the customer survey and will soon be reviewing the results of the water savings analysis. It is anticipated that the draft final report from this project will be received approximately December 15th. The results of the Irrigation Meter Pilot Project will be presented to the Water Commission in early 2019 as well.

No. 3 Large-Landscape Budget Based Water Rates. Staff is working with the meter shop to put all dedicated irrigation accounts with water budgets in a single billing cycle. This refinement is being made so that all meters are read at the same time at the end of the month and to better align the water budget to the month in which consumption occurs.

No. 4 General Public Information. Staff has produced a much-needed update to a general purpose brochure summarizing water conservation services, regulations and incentives. The brochure is currently in production.

No. 5 Home Water Use Report. The Home Water Use Report program with WaterSmart Software is proceeding successfully. The software has been loaded with the city data and an ongoing weekly data feed has been established and is functioning well. Data for a total of 10,237 customers have been loaded into the software platform; 5,497 are the treatment group which will be receiving the home water reports and 4,740 are the control group. Staff is now able to view all the data in the software utility portal and is testing and evaluating the data and the software features. There is a wealth of different analytics and reports, many of them look promising to provide valuable information. The current schedule is for testing to continue through the month of December and January. It is anticipated that the first customer welcome letters will be sent in February 2019 with the first water reports to be sent in March or April.

No 25 Expand Large Landscape Survey/Water Budget Program. This program has undergone a second phase of expansion in 2018. A total of 146 smaller dedicated irrigation accounts that had been mapped the previous year to determine the landscape water budget were added to the 230 sites already enrolled in the program, adding a total of about 20 more acres of irrigated area under management. While these sites were too small to justify sending a monthly landscape water use report, the water budget analytics were visible to staff for tracking purposes. In addition, the landscape water budget program has made hourly consumption data available on its platform to all customers with AMI endpoints. Staff received the 2017 annual report from Waterfluence in November, which is included as Attachment 1.

No. 28 Residential Rain Barrels. This popular seasonal program is active again. Customers purchase up to three rain barrels at a reduced rate online. The first of three distribution events of the seasons is scheduled for January 12, 2019.

Water Conservation Office staff participated in 2 different training opportunities in October and November. One was to become qualified as a rater for the Monterey Bay Friendly Landscape recognition program. The other was a Water Use Efficiency Practitioner, Grade 2 course sponsored by AWWA.

In addition to the foregoing, the Water Conservation Office suspended Stage 1 water restrictions at the end of October and continues to administer several ongoing programs, which include

- No. 1 System Water Loss Reduction
- No. 7 Single family Residential Surveys
- No. 8 Plumbing Fixture Giveaways
- No. 9 Residential High Efficiency Toilet Rebates
- No. 10 High Efficiency Clothes Washer Rebates
- No. 13 Toilet Retrofit at Time of Sale
- No. 22 Water Efficient Landscape Regulations for New Development
- No. 23 Single Family Residential Turf Removal
- No. 24 Multifamily Residential Turf Removal
- No. 31 Single and Multifamily Residential Dishwasher Rebates

Finally, the California Department of Water Resources invited the City Water Department this fall to participate in a pilot landscape area measurement project with 16 to 20 other agencies

across California. It's all part of a process to set water use efficiency targets for urban water suppliers based in part on irrigable landscape area that was enacted into law earlier this year.

ELEMENT 1: WATER TRANSFERS AND/OR WATER EXCHANGES

Overview: This work is considering the feasibility of sending excess City surface water to neighboring agencies for the purpose of passively recharging the groundwater basin(s). For clarity, the phrase "in lieu" is being dropped in formal communications and being replaced by the two basic concepts the term "in lieu" intended to capture.

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

Summary: Staff from the City and Soquel Creek Water District (SqCWD) have been working together to begin the water transfer pilot study. The start date was initially established for November 26 but delayed a week to avoid startup following a long holiday weekend. The three outstanding items reported at the last quarterly report have been complete: the District finalized a distribution system monitoring plan and the State Division of Drinking Water (DDW) amended the District's drinking water permit; the City and District have finalized the intertie operations plan; and, the District has notified customers of the pending change in source water.

Next Steps: Begin Water Transfers pilot by implementing intertie operations plan and activating interconnection between the City and SqCWD potentially starting the week of December 3rd. During the water transfer period, the City and SqCWD will conduct sampling protocols that are compliant with state regulations and the distribution system monitoring plan approved by DDW. In addition to obtaining water quality information during this water transfer period, City and SqCWD staff will also evaluate if there is any recovery in groundwater basin water levels in response to wells being turned off.

Contract Update(s)

Consultant: Black & Veatch, (Bench Scale Corrosion Testing)

- Contract Signed: August 2017
- Project Partners: Soquel Creek Water District
- Engaged Stakeholders: None at this time.
- Original Contract Amount: $668,000 (While Council approved the entire contract scope and budget, a purchase order was opened in the amount to cover Phase 1 only, $180,220.)
- Contract Amendment No. 1: $7,500, 10/2/2017 for additional water testing.
- Amount Spent: $187,720
- Amount Remaining: $0 This Purchase Order has been closed.
- Status: Complete.

ELEMENT 2: AQUIFER STORAGE AND RECOVERY

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

Summary: Evaluation of this element is divided in to three phases of work: feasibility, pilot, and implementation. These phases will overlap with one another, particularly the feasibility and piloting phases, and the work is iterative in nature. While a large portion of the Phase I work is complete, the groundwater modeling is ongoing and will continue through completion of Phase II.

Phase II work has begun in the MCGB at Beltz 12 with the expectation that active piloting will begin as early as December pending permit approval from the Central Coast Regional Water Quality Control Board. Other regulatory work completed ahead of the active piloting work included the filing of a Notice of Exemption with both the County and the State's Office of Planning and Research, along with working with the State's Division of Drinking Water on the final ASR Pilot Test Work Plan for Beltz 12. Two tables are included below, excerpted from the ASR Pilot Test Work Plan for Beltz 12. The test program will be completed in three different testing cycles; Table 1 includes the details about each cycle. Table 7 includes the current schedule.

Table 1. Summary of ASR Cycles

ASR Cycle No.	Injection					Storage	Recovery				
	Period (days)	Rate (gpm)	Total Volume (mg)	Total Volume (af)	Radius (ft)	Period (days)	Period (days)	Rate (gpm)	Volume (mg)	Volume (af)	Discharge Location
1	1	400	0.58	1.77	18	2	1	700	1.01	3.09	Storm Drain
2	7	400	4.03	12.4	46	14	6	700	6.05	18.6	Storm Drain
3	30	400	17.3	53.0	96	60	30	400	17.3	53.0	Distribution

Total Duration (days):	151
Total Injection Volume (mg):	21.9
Total Recovery Volume (mg):	24.3

Table 7. Preliminary Project Schedule

Task / Activity	Time Period	Duration (months)
CEQA and Permitting	Sep 2018 - Nov 2018	3
Site Preparation	Nov 2018	1
ASR Cycles	Dec 2018 - May 2019	6
Data Analysis and Reporting	Jun 2019 - Jul 2019	2
	Total:	**12**

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

- Finalizing the Summary of Initial Groundwater Modeling Results.
- Implementing the ASR Pilot Test Work Plan for Beltz 12 including
    - removal of existing pump assembly and installation of higher capacity temporary pump and injection drop tubes;
    - connection of temporary injection supply pipeline between the City's distribution system and the well head;
    - setup of backflush water and recovered test water pipelines;
    - setup of temporary tanks and connections to the existing reclaim tanks for backflush water solids settling and dechlorinating prior to discharge to storm drain;
    - starting the ASR cycles, where a cycle consists of injecting potable drinking water into the aquifer; storage of the injected water in the aquifer; and, recovery of the stored water; and,
    - implementing the sampling and analysis portion of the work plan to obtain a variety of water-level and water-quality data.
- Continue discussion with Land Trust of Santa Cruz County about potentially installing a test well and monitoring wells on property they own within the Santa Margarita Groundwater Basin.
    - Discussion will continue after getting environmental input on Sandhill Ecosystems and the potential environmental considerations associated with drilling a test well and monitoring wells on parcels designated as Sandhill habitat.
- Continue discussion to reconcile or synchronize climate change modeling efforts that are used in the HCP process, ASR groundwater modeling and the work being done for the Santa Cruz Mid-County Groundwater Agency for compliance with the Sustainable Groundwater Management Act.
- At a future meeting staff will summarize and provide to the Commission a list of groundwater scenarios being evaluated.
- At a future meeting staff will summarize and provide to the Commission assumptions that are used in the groundwater model.

Contract Update(s):

Consultant: Pueblo Water Resources (PWR) – Phase I

- Contract Signed: February 2016
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz, Scotts Valley Water District, San Lorenzo Valley Water District
- Original Contract Amount: $446,370
- Contract Amendment No. 1: $377,615
- Contract Amendment No. 2: $35,000 (note: this amount has not yet been added to the purchase order)
- Amount Spent: $607,643
- Amount Remaining: $216,341 (note: plus the $35,000 that has not yet been added to the purchase order)
- Status: On schedule for work in MCGB and delayed approximately 12 months for work in the SMGB.

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

- Contract Signed: October 2018
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz
- Original Contract Amount: $458,085
- Amount Spent: $0
- Amount Remaining: $458,085
- Status: On Schedule.

ELEMENT 3: ADVANCED TREATED RECYCLED WATER OR DESALINATION

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

Summary: At their October 1 and November 5 meetings, the Water Commission heard updates from staff on the findings of the recycled water and desalination studies, as well as staff's recommendation to prioritize recycled water over desalination. With concurrence from the Water Commission, staff took an item to the City Council on November 27, 2018, recommending a motion to support staff's and Water Commission's recommendation to prioritize the further evaluation of recycled water at this time, pending outcomes of work on the other supply alternatives. City Council supported this recommendation.

Next Steps: Council's action also authorized staff to work with the City's Public Works Department to evaluate the implementation of tertiary-level of treatment at the City's Wastewater Treatment Facility, and evaluate further opportunities for advanced treated recycled water for potential water supply. Staff is developing a work plan for both of these efforts.

Contract Update(s):

Consultant: Kennedy/Jenks Consultants, Regional Recycled Water Facilities Planning Study (RWFPS)

- Contract Signed: February 2016
- Project Partners: Water and Public Works Departments, State Water Resources Control Board (SWRCB)
- Engaged Stakeholders: City Parks and Recreation Department, County of Santa Cruz – Water Resources Division, Santa Cruz County Sanitation District, Scotts Valley Water District, Soquel Creek Water District, University of California Santa Cruz
- Original Contract Amount: $486,000
- Contract Amendment No. 1: $26,357
- Contract Amendment No. 2: $74,951
- Funding: State of California $75,000
- Amount Spent: $556,641

- Amount Remaining: $30,667
- Schedule: Complete.

Consultant: DUDEK, Desalination Feasibility Update Study
- Contract Signed: May 2017
- Project Partners: NA
- Engaged Stakeholders: None at this time.
- Original Contract Amount: $139,669
- Amount Spent: $135,880
- Amount Remaining: $3,789
- Schedule: Complete.

OTHER

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

Source Water Monitoring

Through the Source Water Monitoring project, the City strives to learn more about water quality in the San Lorenzo River, especially during high-flow, winter months. This understanding could facilitate the treatment of more water during the winter, increasing the feasibility of an in-lieu water transfer project. The second year of this project is coming to a close. Monitoring for this second year is complete and the consultant, Trussell Technologies, has submitted a draft report. Similar to 2017, a final version that incorporates staff's comments is anticipated in January 2019. As mentioned previously, staff will continue with this program for future water years with less reliance on Trussell Technologies to manage and analyze the data.

Santa Cruz Water Rights Project

This project involves the modification of existing City water rights to increase the flexibility of the water system by improving the City's ability to utilize surface water within existing allocations. In addition to improved flexibility, the success of this project will facilitate future regional water supply projects. The City issued the Initial Study and Notice of Preparation on October 15, 2018. Scoping meetings were held on November 7 and 8, one in the San Lorenzo Valley and one in the City of Santa Cruz. Roughly 15 comments were received by the requested due date of November 14, 2018.

Analytical Environmental Services (AES) had been under contract to prepare the environmental documentation and related materials to complete the California Environmental Quality Act (CEQA) compliance process. However, the working relationship with AES presented challenges that proved to be irresoluble. Staff decided to terminate the contract with AES in early November and is in the process of initiating an agreement with the firm who followed AES by a close margin in the original solicitation. As a result of this switch, the schedule to issue the draft Environmental Impact Report by summer 2019 will be extended by 3-6 months. However, staff is confident this was the appropriate move to make.

Outreach and Communication
Our Water, Our Future progress reports were distributed by email following Water Commission meetings. A meeting with the Sentinel resulted in a front-page article on progress made on the WSAC recommendations as they relate to the larger CIP program of work. And, a media event is planned for the startup of the water transfers.

FISCAL IMPACT: None.

ATTACHMENT(S):
Attachment 1: Summary of Quantitative Results
Attachment 2: 2017 Waterfluence Annual Report

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Table 3:
Summary of Quantitative Results

Quantiative Data (To be populated)

			Treatment Levels and Flows			Water Delivered						Estimated Costs					Energy / GHG		
Alternative	Ref. No.	Description	Treatment Level	ADDITIONAL Treatment Capacity City Facilities (mgd)	Treatment Capacity Non-City Facilities (mgd)	Ave Annual (AFY)	Average Annual (MGD)	Use in Santa Cruz (AFY)	Use in Santa Cruz (MGD)	Peak Season Deliveries (AF in Summer)		Estimated Construction Cost ($mil)	Annual O&M Cost ($mil/yr)	ACAYY or Other	Total Annual Cost ($/mil)	Total Annual Cost ($/AF)	Unit Energy of Delivered (KWH/AF)	Est O&M GHG Emissions (MTCO2/yr)	Social Cost of Carbon ($)
Element 1 Water Transfers and/or In Lieu Water Exchanges		Near Term with SqCWD	WTP																
		Longer Term with SqCWD, CWD, SVWD and/or SLVWD	WTP																
Element 2 ASR		Purisima	WTP																
		Santa Margarita	WTP																
		Purisima and Santa Margarita	WTP																
Element 3 ATRW or Desalination		Santa Cruz PWD Title 22 Upgrade Project for NPR use in and around the SC WWTF	Teriary																
		Maximize tertiary treatment and reuse for identified City NPR uses.	Teriary																
		UCSC satellite treatment and reuse on campus	Teriary																
		City sends secondary water to SqCWD for their use only	Secondary																
		City sends tertiary water to SqCWD for combined use	Tertiary																
		City sends additional secondary effluent (or tertiary RW) from SC WWTF to SqCWD AWTF and conveys advanced treated water back to the City for use	AWT																
		City sends advanced treated water from an AWTF at/near the SC WWTF to SqCWD for combined use	AWT																
		City sends advanced treated RW from an AWTF at/near the SC WWTF to SqCWD for combined use	AWT																
		City led GRRP from an AWTF at/near the SC WWT for local groundwater replenishment in the City's service area.	AWT																
		City led GRRP with a decentralized AWTF at the DA Porath Pump Station for local groundwater replenishment in the City's service area.	AWT																
		Surface Water Augmentation (SWA) via an AWTF with blending in Loch Lomond Reservoir	AWT																
		Stream Flow Augmentation via AWTF with discharge to San Lorenzo River downstream of Tait Street Wells	AWT																
		Direct Potable Reuse (DPR) via AWTF with raw water blending prior to treatment at GHWTP	AWT																
		4-way Regional GRRP (City, SVWD, SLVWD and SqCWD)	AWT																
		SWRO Facility similar to scwd2 project. With or without partnerships	SWRO																

City of Santa Cruz
Large Landscape Program
2017 Annual Report

November 4, 2018

Waterfluence LLC
PO Box 561 Menlo Park CA 94026
www.waterfluence.com
(800) 800-9519

Summary

The City of Santa Cruz (City) in California contracts with Waterfluence to provide program services for improving irrigation efficiency at large commercial and public landscape sites. The City's partnership with Waterfluence began in 2010 and has expanded regarding the number of sites covered. This report summarizes the program features, characteristics of participating sites, and customer engagement for 2017. It also identifies ways to focus and improve the program going forward.

- **Site Characteristics**. In 2017, the City had 230 sites irrigating 423 acres of landscape in the program. The average depth of water applied over all landscape area was 1.5 feet totaling 637 acre feet.
- **Customer Engagement**. In 2017, 92% of sites actively viewed information online via the Waterfluence website.
- **Landscape Field Surveys**. In 2017, Waterfluence conducted 7 landscape field surveys at targeted sites agreeing to have our irrigation expert gather in-depth diagnostics and provide recommendations to improve irrigation efficiency. Over the last seven years we conducted 47 field surveys.
- **Irrigation Efficiency Opportunities.** Significant reductions in overwatering can still be made with commercial sites, sites with less than 1 acre of landscaping, and sites planted predominately with shrubs. Overwatering by more than 2 feet occurred at 8% of sites in 2017. Eliminating 2017 overwatering over all sites would save 61 acre feet.
- **Irrigation Efficiency Trends**. Overwatering dropped significantly after 2013, by over 50% during the 2015 and 2016 drought years. Overwatering rebounded upward in 2017 but is still 48% below 2013 levels.

Program Description

Waterfluence partners with urban water agencies to improve irrigation efficiency at large commercial and public landscape sites using an online platform. The platform currently covers about 10% of California's population and helps:

- **Monitor.** For each site, we chart how actual water use compares to a budget benchmark based on site-specific characteristics and real-time weather. Regular updates help people track progress and receive feedback on their actions. Calculations can be difficult for customers and landscape managers to make, and so we assist. Our metrics are irrigation-focused and interactive.
- **Recommend.** Beyond identifying potential irrigation problems, we use our irrigation expertise to recommend solutions. Our internal algorithms continually analyze water use at each site to identify leaks, seasonal misapplications, and poor sprinkler performance. For targeted sites accepting additional help, our irrigation experts conduct on-site landscape field surveys to

generate detailed diagnostics. When relevant, we encourage tapping water agency financial rebates to offset improvement costs.

- **Connect.** Stakeholders at commercial and public irrigation sites - water bill customers, property managers, HOA board members, maintenance staff, and landscape contractors - often oversee multiple sites in multiple communities. Our platform provides a centralized place to help stakeholders better understand, prioritize, communicate, and act on solutions toward the non-controversial goal of improving irrigation efficiency across all their sites.

Site Characteristics

In 2017 the City had 230 sites irrigating 423 acres of landscape in the program. Sites have progressively entered the program since the program start in 2010. Although the average depth of water applied over all irrigated landscape in 2017 was 1.51 feet, application rates varied widely with site type and size, among other factors. We segment sites into commercial and public categories because of fundamental differences in how irrigation is managed. Commercial sites, such as HOAs and offices, account for 78% of sites and 32% of water use and are often managed by landscape contractors. Public customers include parks, schools and golf courses and are managed by in-house staff. Across all sites, 75% of irrigated area is planted in turf grass and the remainder is in shrubs, trees, groundcovers, and pools/fountains. Public sites have 89% of their irrigated area in turf.

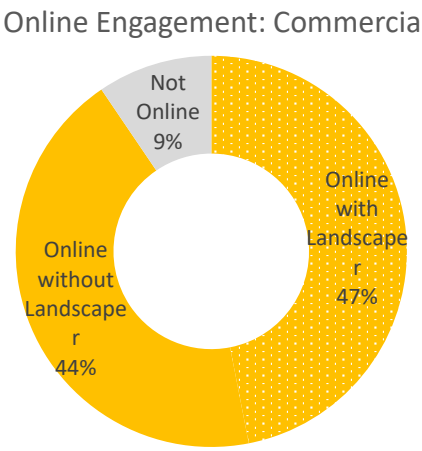
Description	Commercial	Public	Total
Number of Sites	179	51	230
< 1 Acre	60%	7%	67%
1-3 Acres	14%	8%	22%
>3 Acres	3%	7%	11%
Irrigated Acres	143	280	423
Average Acres per Site	0.8	5.5	1.8
Turf %	47%	89%	75%
Shrub %	53%	11%	25%
2017 Water Use CCF	87,573	190,028	277,601
2017 Water Use Acre Feet	201	436	637
2017 Water Use %	32%	68%	100%
2017 Depth Applied FT	1.40	1.56	1.51

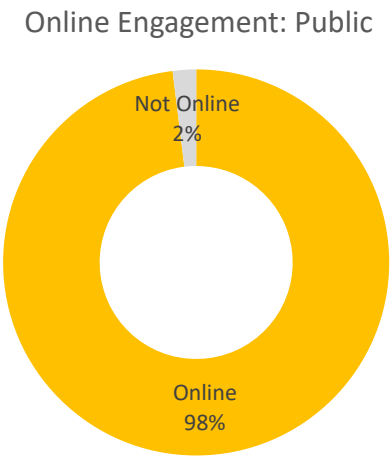
Customer Engagement

Waterfluence distributes monthly landscape reports to customers by mail or by online access. The online content has more depth and allows multiple stakeholders, such as HOA board members, park

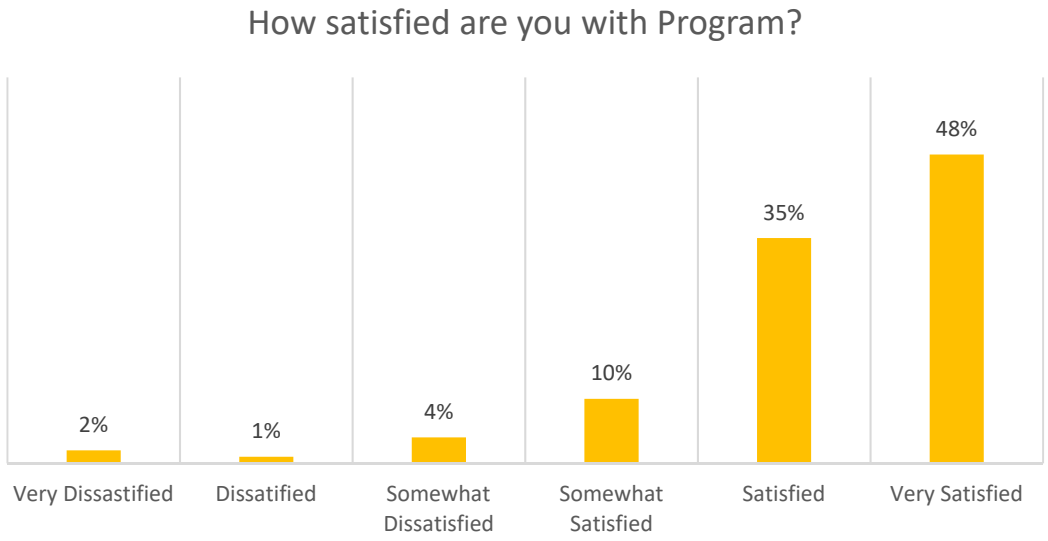
staff, and landscape contractors, to view site information. In 2017, 92% of sites were viewed online by at least one contact.

Commercial and public sites were both highly engaged with 91 and 98% of their sites being viewed online respectively. An important distinction with commercial sites is that their irrigation is frequently managed by independent landscape contractors. We find our program works best when landscapers are connected to the platform. In 2017, 47% of commercial sites were actively being viewed by a landscaper online. To improve engagement, Waterfluence is looking into ways to more effectively meet needs of landscape contractors by including hourly water use and upgrading site mapping capabilities.





In December 2016, we surveyed all of our online viewers and 83% reported to be satisfied or very satisfied with the program. Satisfied contacts typically described the reports as an easy tool for tracking water use and potential problems. Dissatisfied contacts usually desired more timely reporting, clarification of report information, or adjustments to their water budgets. The next customer satisfaction survey is scheduled for December 2018.



Landscape Field Surveys

The City targets on-site landscape field surveys to sites in most need of additional help based on low performance metrics and high savings potential. For sites pre-approved by the City, the main contact at each site must accept the survey online. The survey is free to customers and consists of an irrigation expert visiting the site to gather in-depth diagnostics and provide recommendations to improve efficiency. Field surveys compliment water use monitoring by troubleshooting complicated irrigation issues and improving the accuracy of water budget parameters with "boots-on-the-ground" observations. Between 2010 and 2017, 47 sites in the program (20%) accepted and received field surveys.

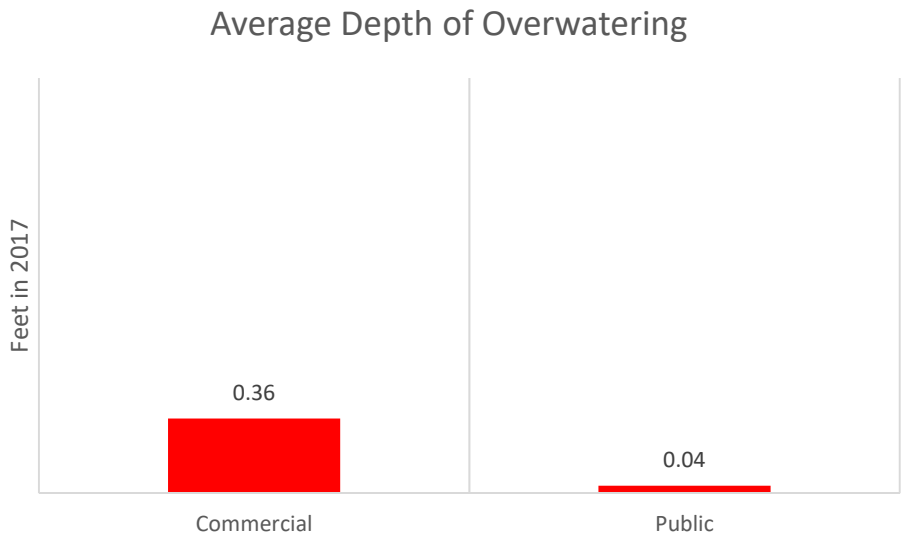
Year	Sites	Acres
2010	1	3.2
2011	3	4.6
2012	7	8.9
2013	11	16.0
2014	10	14.4
2015	8	8.9
2017	7	27.0
Total	47	83.1

Irrigation Efficiency Opportunities

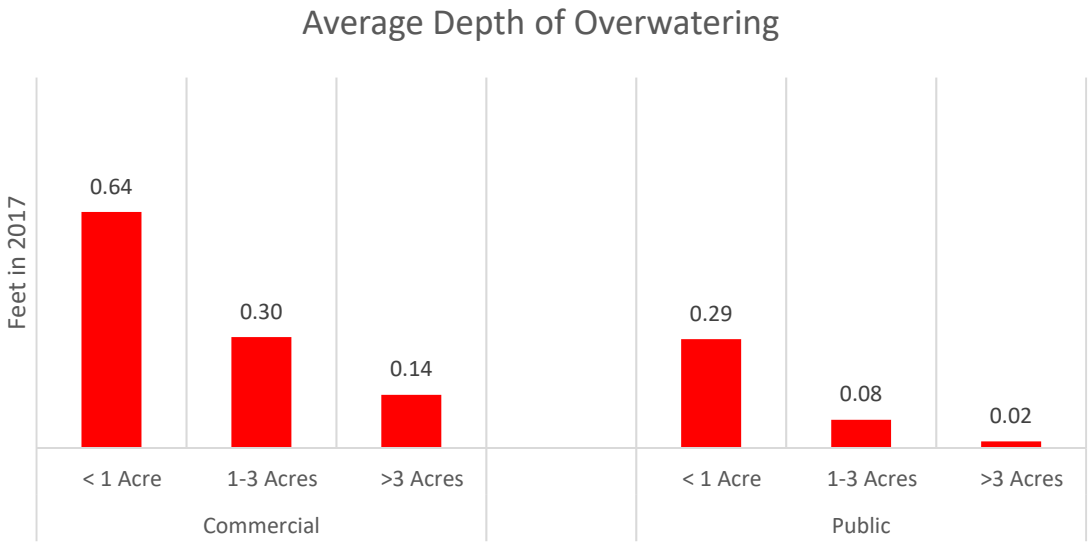
The program's key performance metric is minimizing the depth of overwatering—defined as the volume of water used above our calculated water budget divided by irrigated area. This metric is weather-normalized enabling year-to-year comparisons.

To guide future efforts to improve the program, we analyzed 2017 overwatering with respect to four elements: customer type, site size, plant type, and frequency of site overwatering.

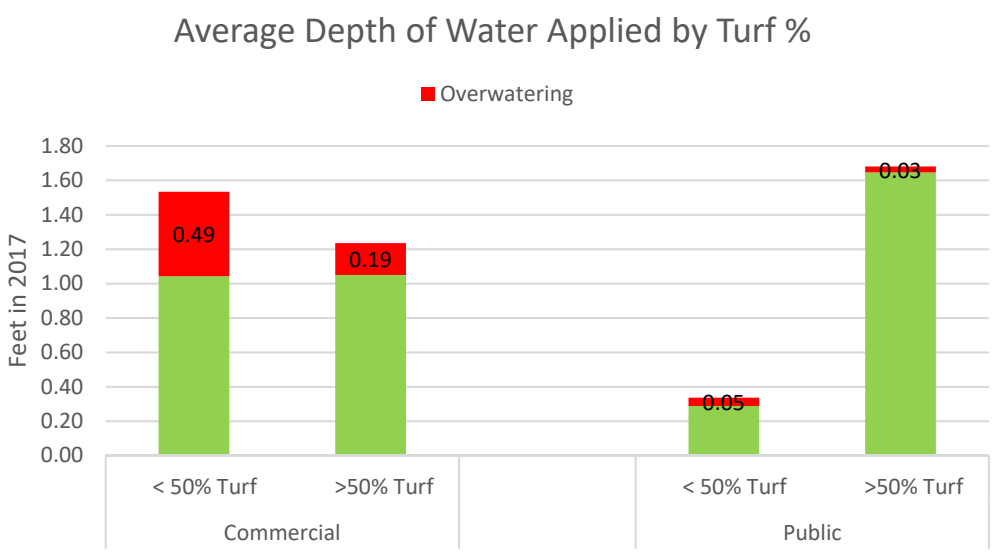
Customer Type. Commercial sites have made great progress but still have potential for improvement. Public sites are closer to optimal levels. Additional engagement efforts targeted toward commercial site managers can help close this gap.



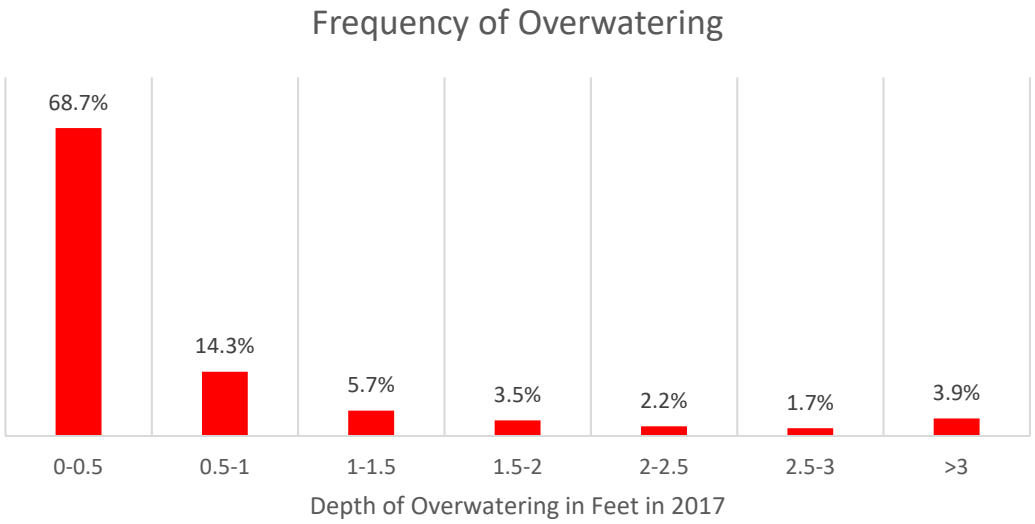
Site Size. Larger landscapes tend to be more efficiently irrigated. Although smaller sites use less water by volume, their potential to reduce overwatering on a percentage basis is greater. Small sites with less than one acre of landscape also make up two-thirds of total sites in the program.



Plant Type. With commercial sites we find the depth of water applied is higher with sites predominantly planted with shrubs, trees and groundcovers compared to sites predominantly planted with turf grass. Theoretically turf's water requirements are significantly higher. Shrubs have different irrigation system and scheduling considerations, and our data suggest they have more potential for efficiency improvements. Public sites have minimal overwatering irrespective of plant type.



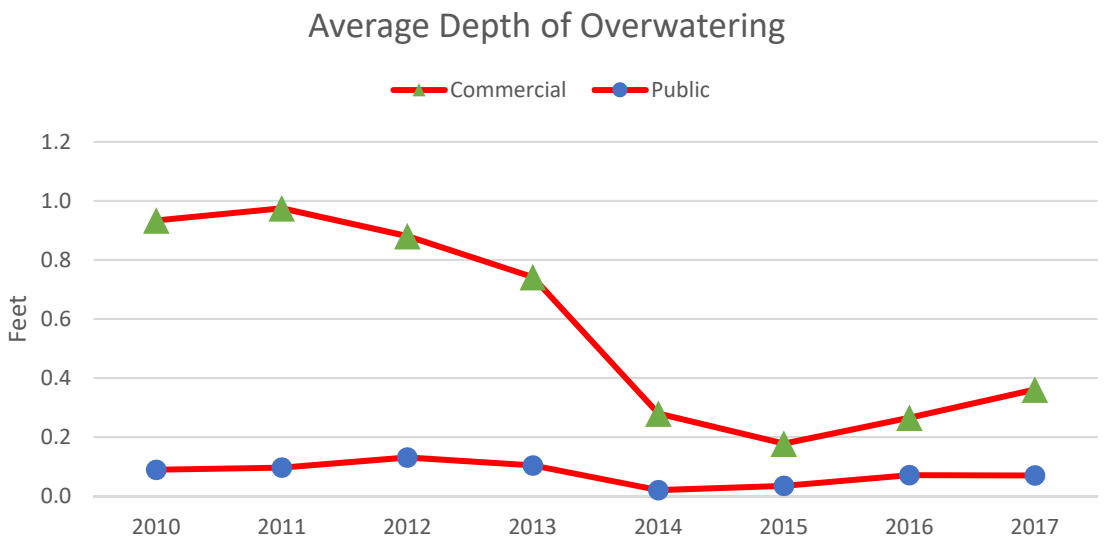
Frequency of Site Overwatering. A benefit of this program is that problem sites can be readily identified with respect to irrigation efficiency. Overwatering by more than 2 feet in 2017 occurred at 8% of sites, predominately small and commercial. These sites could be targeted for verification of water budget assumptions, landscape field surveys, program engagement, and financial incentives, among other tactics to improve performance.



Irrigation Efficiency Trends

For program sites, overwatering dropped significantly after 2013. Although commercial sites overwater more than public sites, both site types have made improvements. Overwatering was lowest during 2015 and 2016, years of heightened awareness because of statewide drought and local efforts to curtail water

use. Overwatering increased in 2017 after drought related efforts ended, but is still 48% below 2013 levels. The rebound in overwatering undoubtedly would be higher if not for the continued awareness and investments by the City to improve irrigation efficiency.



The findings of 2017 support continued focus to reduce overwatering by targeting commercial properties, smaller landscapes, and shrub-dominated landscapes. And while many sites are doing an excellent job irrigating to plant needs, we find 8% of sites are overwatering by more than 2 feet per year requiring more attention.

WATER COMMISSION
INFORMATION REPORT

DATE: 11/28/2018

AGENDA OF: December 3, 2018

TO: Water Commission

FROM: Kevin Crossley, Senior Engineer

SUBJECT: Workshop on Water Treatment – GHWTP Condition Assessment, Seismic Assessment, Treatment Process Evaluation, Requirements for Ongoing Operations with Existing Sources and Water Quality Characteristics, and with Additional Winter Water Sources and Water Quality Characteristics.

RECOMMENDATION: Receive information on the Graham Hill Water Treatment Plant Master Plan and provide feedback to staff.

BACKGROUND: The City of Santa Cruz Water Department is poised to make major capital reinvestments in its surface water treatment plant: Graham Hill Water Treatment Plant (GHWTP). The major drivers for these investments are aging plant infrastructure, changing characteristics of source water, the ongoing evolution of water quality regulations, and the central role the plant will play in some potential future water supply augmentation strategies.

Aging Infrastructure:

The GHWTP was constructed in 1959. The most recent major capital investments were made over 30 years ago in the mid-1980s. Since that time only the electrical system and filters have seen major upgrades, while the remainder of the plant has remained largely unchanged and is showing its age. For example, a condition assessment in 2015 found that three of the four concrete tanks at the plant had a remaining useful life of 5 years or less, were seismically deficient and should be replaced. In addition to the tanks, other components are at or past their service life and will require major maintenance or replacement over the next decade to retain current treatment capacity and performance.

Changing Characteristics of Source Water:

As has been noted in many discussions over the last several years, one implication of making an ongoing commitment to bypass flows to support the recovery of threatened steelhead trout and endangered Coho salmon is that there will be a shift in the characteristics of the source waters available to the City. Allocation of resources from North Coast Streams to meet fish flow needs

reduces the availability of this "best quality raw water" for use in the water system. Additional water from the San Lorenzo River and Loch Lomond Reservoir sources will play a larger role in the future of our local water supply, as these sources are more challenging to treat due to higher levels of total organic carbon in these supplies and intermittent high turbidity levels in the San Lorenzo River.

Ongoing Evolution of Water Quality Regulations:

The Water Department is required to treat for, monitor and report on a significant range of potential contaminants.[1] As shown in Attachment 1, the vast majority of the current drinking water regulations, including the Surface Water Treatment Rules which, along with the Disinfectant and Disinfection Byproducts Rules, were not yet promulgated when the last major investments were made in the GHWTP.

Drinking water regulations are not static; they continually evolve. A treatment plant is a complex and expensive facility and is typically not readily adaptable to changing conditions over time. The opportunity to look forward and assess likely future treatment requirements is during the planning phase of major treatment plant investments. For Santa Cruz, future treatment issues could involve addressing Constituents of Emerging Concern that have been found intermittently and at very low levels in our San Lorenzo River source.

Water Supply Augmentation:

Water supply augmentation is another major driver for reinvestments and upgrades to the Water Treatment Plant. The City's Water Supply Advisory Committee (WSAC) recommended several strategies in their Final Agreements and Recommendations of the Water Supply Advisory Committee for how best to address an agreed-upon water supply gap of 1.2 billion gallons during times of extended drought. Strategy 1 - Development of Groundwater Storage consists of two Elements:

- Element No. 1: In-Lieu, passive recharge
- Element No. 2: Aquifer Storage and Recovery

Conceptually, surplus surface water available in the winter months would be treated to drinking water standards and then stored passively or actively in local aquifers for later recovery. Adequate surface water treatment capacity is a central component of Strategy 1, and while the GHWTP meets the City's current capacity needs and all current water quality regulations, it does so with a very small margin for error. Expecting the current plant to perform at an even higher level in the future for future water supply projects is unrealistic. Key operational constraints and limitations with the 1950's treatment technology mean the GHWTP is incapable of producing either the quantity or the quality of water required for the full scale implementation and operation of the WSAC Strategy 1-Groundwater Storage Program.

[1] See comprehensive list of Drinking Water Regulations at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

DISCUSSION: In December 2017, HDR was contracted to prepare a Facility Master Plan (Facility Plan) for the GHWTP. When finished in March 2019, the Facility Plan will present a long range comprehensive vision for upgrading the GHWTP and identify the most cost-effective improvements that meet the revised water treatment objectives and improve the overall reliability and resiliency of the plant. The Facility Plan will complete a comprehensive condition assessment of the treatment plant, evaluate alternatives for upgrading the plant, develop a plan for non-treatment problems like parking, a lack of storage and deficient office space, and prepare a 10% design and cost estimate.

The Water Commission will receive information about the planned treatment plant improvements through a December and Spring 2019 workshops. In general, the first workshop will focus on the current condition and performance of the GHWTP, limitations and operational challenges, and a primer on regulations and water treatment. The second workshop, tentatively scheduled for April 2019, will delve into the development of the facility plan, which itself involved several side studies, alternatives analyses, and conclude with a presentation of the preliminary design. The final draft of the facility plan will be transmitted to the Water Commission prior to the second workshop.

FISCAL IMPACT: None

PROPOSED MOTION: Motion to accept the information.

ATTACHMENTS:
Attachment 1: EPA Drinking Water Regulation Timeline

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Regulation Timeline: Contaminants Regulated Under the Safe Drinking Water Act

Federal Register Publication Month/Year	Final Regulation	Number of Contaminants (Cumulative)	Action	Contaminants Regulated	
12/75; 7/76	NPDWRs	22 (22)	New regs	2,4-D 2,4,5-TP (Silvex) arsenic barium cadmium chromium coliform bacteria endrin fluoride gross alpha gross beta lead	lindane mercury methoxychlor nitrate radium-226[1] radium-228[1] selenium silver toxaphene turbidity[8]
11/79	Total Trihalomethanes Rule	1 (23)	New reg	total trihalomethanes (TTHMs[2])	
4/86	Fluoride Rule	1 (23)	*Revision*	*fluoride**	
7/87	Phase I (Volatile Organic Compounds)	8 (31)	New regs	benzene carbon tetrachloride 1,2-dichloroethane p-dichlorobenzene 1,1-dichloroethylene	1,1,1-trichloroethane trichloroethylene vinyl chloride[3]
6/89	Total Coliform Rule	1 (31)	*Revision*	*total coliforms*[2]	
6/89	Surface Water Treatment Rule	5 (35)	1 *Revision* 4 New regs	Giardia[4] *turbidity*[8] HPC bacteria[4]	Legionella[4] viruses[4]
1/91; 7/91	Phase II	38 and 1 deletion (61)	11 *Revisions* 27 New regs ~~1 Deletion~~	*2,4-D* *2,4,5-TP* acrylamide[4] alachlor aldicarb[5] aldicarb sulfone[5] aldicarb sulfoxide[5] asbestos atrazine *barium* *cadmium* carbofuran chlordane (mono) chlorobenzene *chromium* dibromochloropropane o-dichlorobenzene cis-1,2-dichloroethylene trans-1,2-dichloroethylene 1,2-dichloropropane epichlorohydrin[4]	ethylbenzene ethylene dibromide heptachlor heptachlor epoxide *lindane* *mercury (inorganic)* *methoxychlor* *nitrate* nitrite total nitrate/nitrite PCBs pentachlorophenol *selenium* ~~silver~~[9] styrene tetrachloroethylene toluene *toxaphene* xylenes
6/91	Lead and Copper	2 (62)	1 *Revision* 1 New reg	copper[4]	*lead*[4]
7/92	Phase V	23 (84)	1 *Revision* 22 New regs	adipate, di(2-ethylhexyl) antimony beryllium cyanide dalapon dichloromethane[6] dinoseb dioxin (2,3,7,8-TCDD) diquat endothall *endrin* glyphosate	hexachlorobenzene hexachlorocyclopentadiene nickel oxamyl (vydate) PAHs (benzo(a) pyrene) phthalate, di(2-ethylhexyl) picloram simazine thallium 1,2,4-trichlorobenzene 1,1,2-trichloroethane
n/a/95	N/A	1 (83)	*Remand*	*nickel*	

Federal Register Publication Month/Year	Final Regulation	Number of Contaminants (Cumulative)	Action	Contaminants Regulated	
12/98	Stage I Disinfectant and Disinfection Byproduct Rule	7 (89)	1 *Revision* 6 New regs	bromate chloramine chlorine chlorine dioxide	chlorite haloacetic acids (HAA5)[2] *TTHMs*[2]
12/98	Interim Enhanced Surface Water Treatment Rule	3 (90)	2 *Revisions* 1 New reg	Cryptosporidium[4] *Giardia*[4]	*turbidity*[8]
12/00	Radionuclides	5 (91)	4 *Revisions* 1 New reg	*gross alpha* *gross beta* *radium-226*[1]	*radium-228*[1] uranium
01/00	Revision to the Lead and Copper Rule	2 (91)	2 *Revisions*	*lead*[4]	*copper*[4]
1/01	Arsenic	1 (91)	*Revision*	*arsenic*	
6/01	Filter Backwash Recycling Rule	1 (91)	*Revision*	*Cryptosporidium*[4]	
1/02	Long Term 1 Enhanced Surface Water Treatment Rule	2 (91)	*Revision*	*Cryptosporidium*[4]	*turbidity*[4,8]
1/06	Long Term 2 Enhanced Surface Water Treatment Rule	1 (91)	*Revision*	*Cryptosporidium*[4]	
1/06	Stage 2 Disinfectant and Disinfection Byproduct Rule	2 (91)	2 *Revisions*	*HAA5*[2]	*TTHMs*[2]
11/06	Ground Water Rule	3 (94)	3 New regs	E. coli[7] Enterococci[7]	coliphage[7]
10/07	Lead and Copper Rule	2 (94)	2 *Revisions*	*lead*[4]	*copper*[4]
10/09	Airline Drinking Water Rule	1 (94)[10]	New	*total coliforms*[2]	
2/13	Revised Total Coliform Rule	1 (94)	2 *Revisions*	*total coliforms*[2]	*E. coli*[7]

*Italics in the Contaminants Regulated column indicates a rule that was revised.

Notes:

1. Radium-226 and radium-228 are counted as two contaminants although their standard is combined.
2. Total THMs, haloacetic acids, and total coliforms are counted as a single contaminant in the above table. However, each of these represent a group standard. The group standards consist of: TTHMs (chloroform, bromodichloromethane, dibromochloromethane, bromoform); TC (total coliform bacteria including fecal coliforms and *E. coli*); HAA5 (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid, and dibromoacetic acid).
3. Vinyl chloride is also known as chloroethylene & monochloroethylene.
4. These nine contaminants have a treatment technique instead of a MCL.
5. Aldicarb, aldicarb sulfone, and aldicarb sulfoxide are considered regulated contaminants although their MCLs are stayed.
6. Dichloromethane is also known as methylene chloride.
7. *E. coli*, *Enterococci*, and coliphage are indicators of microbial contamination.
8. Turbidity is a measure of cloudiness in water that indicates the presence of disease-causing microbes. Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria.
9. Silver was deleted during the Phase II regulatory action.
10. A new rule was developed applying specifically to airlines, but doesn't change the total count of contaminants regulated since total coliforms were already regulated by another rule for non-airline drinking water systems.

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